

# APPLICATION FOR LAND USE CHANGE ACCORDING TO THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (ACT 16 OF 2013)



## SUBDIVISION AND REZONING: FORMALISATION OF GAMAKOR COMMUNITY

### INVOLVED PROPERTIES:

REMAINDER OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI  
!GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE;

PORTION 95 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI  
!GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE;

PORTION 128 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI  
!GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE.



**SUBMISSION DATE:  
AUGUST 2020**



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**SUBDIVISION  
AND REZONING**

**FORMALISATION OF  
GAMAKOR COMMUNITY**

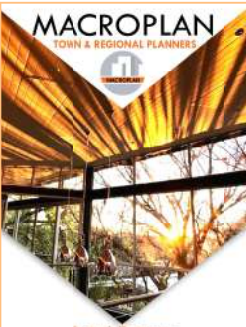

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!GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE.**

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## Table of Contents

<b>SECTION A:</b>	<b>COMPREHENSIVE APPLICATION FORM</b>	<b>1</b>
<b>SECTION B:</b>	<b>MOTIVATIONAL REPORT</b>	<b>14</b>
<b>1. INTRODUCTION</b>		<b>14</b>
1.1. BACKGROUND		14
1.2. CURRENT REALITY		15
1.3. ASSIGNMENT		16
1.4. OBJECTIVE		16
1.5. JURISDICTION		19
1.6. COMPLIANCE WITH PRINCIPLES		30
<b>2. PLANNING CONSIDERATIONS</b>		<b>34</b>
2.1. LOCATION OF STUDY AREA		34
2.2. PHYSIOGRAPHY		35
2.2.1. TOPOGRAPHY		35
2.2.2. SOIL/GEOLOGICAL CONDITIONS		35
2.2.3. FAUNA AND FLORA		35
2.3. INTEGRATED PLANNING		35
2.4. CHARACTER OF THE AREA		37
2.5. INFRASTRUCTURE		37
2.5.1. WATER		37
2.5.2. SEWERAGE		38
2.5.3. ELECTRICITY		38
2.5.4. STORM WATER		39
2.5.5. ROAD NETWORK		39
2.6. SIZE, ZONINGS AND REGULATIONS		39
2.7. SUMMARY		41
2.8. LAYOUT PRINCIPLES		41
<b>3. PROPOSED LAND USE CHANGE</b>		<b>42</b>
3.1. PLANNING APPROACH		42
3.2. PUBLIC PARTICIPATION		43
3.3. PROPOSED LAND USES		43
<b>4. RECOMMENDATION</b>		<b>46</b>
4.1. APPROVAL OF THE APPLICATION		46

## LIST OF FIGURES

FIGURE 1: LOCALITY MAP OF THE REGION	17
FIGURE 2: LOCALITY MAP WITH AERIAL PHOTOGRAPH	18
FIGURE 3: EXTRACT OF LAND USE AND ZONINGS	20
FIGURE 4: GENERAL LAND USE MAP	21
FIGURE 5: PROPOSED SUBDIVISION	47
FIGURE 6: PROPOSED CONSOLIDATION	48
FIGURE 7: PROPOSED LAYOUT	49

## LIST OF PHOTOS

PHOTO 1: VISUAL PRESENTATION OF HOUSING TYPES .....	22
PHOTO 2: EXISTING INTERNAL ROAD NETWORK .....	22
PHOTO 3: STUDY AREA IN RELATION TO RAILWAY LINE .....	23
PHOTO 4: STORM WATER FURROWS .....	23
PHOTO 5: PROPOSED ROAD NETWORK .....	24
PHOTO 6: ASSOCIATED LAND USES.....	24
PHOTO 7: LONGSTANDING NORTHERN OCCUPATION .....	25
PHOTO 8: INFORMAL HOUSES – NORTHERN SECTION .....	25
PHOTO 9: STREET NETWORK – NORTHERN SECTION .....	26
PHOTO 10: LOCAL RESIDENT WITH HIS PROPERTY .....	26
PHOTO 11: HOUSES IN CENTRAL-EASTERN SECTION.....	27
PHOTO 12: INFORMAL HOUSES IN CENTRAL AREAS.....	27
PHOTO 13: INFORMAL HOUSES IN THE CENTRAL TO SOUTHERN SECTIONS .....	28
PHOTO 14: NEATNESS OF SOME OF THE PROPERTIES .....	28
PHOTO 15: INFORMAL HOUSES TO THE SOUTH OF GAMAKOR.....	29
PHOTO 16: INFORMAL HOUSE IN CENTRAL SECTION OF GAMAKOR .....	29

## LIST OF TABLES

TABLE 1: BREAKDOWN OF PROPERTY INFORMATION.	15
TABLE 2: BREAKDOWN OF PROPERTY INFORMATION.	40
TABLE 3: BREAKDOWN OF REQUESTED ZONING/ LAND USES	40

## LIST OF ANNEXURES

ANNEXURE A: COPY OF TITLE DEEDS	
ANNEXURE B: AUTHORISING DOCUMENTATION	
ANNEXURE C: SG DIAGRAMS	
ANNEXURE D: SERVICES REPORT	
ANNEXURE E: DETIAL LAYOUT	
ANNEXURE F: BOTANICAL ASSESSMENT	
ANNEXURE G: GEOTECHNICAL REPORT	
ANNEXURE H: FRESHWATER REPORT	
ANNEXURE I: FINAL SCOPING REPORT	
ANNEXURE J: SANRAL NOTIFICATION LETTER	
ANNEXURE K: TRANSNET NOTIFICATION LETTER	
ANNEXURE L: BREAKDOWN OF HOUSES	
ANNEXURE M: SDF	
ANNEXURE N: SACPLAN REGISTRATION CERTIFICATES	



**SECTION A: COMPREHENSIVE APPLICATION FORM**

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E-Mail: admin@kaigarib.co.za

Private Bag X6  
Kakamas  
8870

Application for Land Use amendment in terms of Spatial Planning and Land Use Management Act 16 of 2013.

Application for land use amendments

(give full details in the attached motivation report, if space provided is not enough)

**SECTION 1**

**Details of Applicant** (See Planning Profession Act, Act 36 of 2002)

<b>Name:</b>	Macroplan	<b>Contact person:</b>	Len Fourie JP Theron
<b>Postal address:</b>	P.O. Box 987 Upington	<b>Physical address:</b>	4A Murray Avenue Upington
<b>Code:</b>	8800		8801
<b>Tel no:</b>	054 332 3642	<b>Cell no:</b>	082 821 1025 082 821 1024
<b>Fax no:</b>	054 332 4283		
<b>SACPLAN</b>	Len J. Fourie: Pr.Pl.n. A/1322/2006	<b>E-mail address:</b>	<a href="mailto:macroplan@mweb.co.za">macroplan@mweb.co.za</a>
<b>Reg No:</b>	J.P. Theron: Pr. Pl.n. A/2394/2016 (Annexure N)		<a href="mailto:jptheron@mweb.co.za">jptheron@mweb.co.za</a>

Macroplan Town and Regional Planners, has been appointed by Barzani Development on behalf of the Department of Cooperative Governance, Human Settlements and Traditional Affairs (COGHSTA).

**SECTION 2**

**Details of Land Owner** (If different from Applicant)

<b>Name:</b>	The involved properties, the Remainder of the Farm Kousas, No. 459, Portion 95 of the Farm Kousas, No. 459 & Portion 128 of the Farm Kousas, No. 459, are all held under the ownership of the Kai !Garib Local Municipality.	<b>Contact person:</b>	Dr. Johnny Mackay
<b>Postal address:</b>	Private Bag X6 Kakamas 8870	<b>Physical address:</b>	11 <sup>th</sup> Avenue Kakamas 8870

Tel no: (054) 431 6300

Cell no: 078 802 8938

Fax no: (054) 431 6301

E-mail address: [mackayj@kaigarib.gov.za](mailto:mackayj@kaigarib.gov.za)

If the applicant is not the registered owner(s), attach a power of attorney from the registered owner(s) to the application. This also applies if the person applying is still busy obtaining the land unit and if the land unit is owned by a company or more than one person.

**SECTION 3****Details of Property (In accordance with Title deed)**

<b>Erf / Farm No and portion description:</b>	<p>As per attached Title deeds (Annexure A):</p> <ul style="list-style-type: none"> <li>CERTAIN Remaining Extent of the Redeemed Quitrent Farm "KOUSAS", Situated within the Division of GORDONIA (hence referred to as the Remainder of the Farm Kousas, No. 459);</li> <li>Portion 95 of the Farm Kousas Number 459, Situated in the Kai !Garib Municipality, Division Gordonia, Province Northern Cape (hence referred to as Portion 95 of the Farm Kousas, No. 459);</li> <li>Portion 128 of the Farm Kousas Number 459, Situated in the Kai !Garib Municipality, Division Gordonia, Province Northern Cape (hence referred to as Portion 128 of the Farm Kousas, No. 459).</li> </ul>	<b>Area (m<sup>2</sup> or ha):</b>	<ul style="list-style-type: none"> <li>Remainder of the Farm Kousas, No. 459 – 940.374ha;</li> <li>Portion 95 of the Farm Kousas, No. 459 – 15.2302ha;</li> <li>Portion 128 of the Farm Kousas, No. 459 – 36.25ha</li> </ul>
<b>Physical address of erf/farm:</b>	<p>N/A</p>	<b>Existing Zoning:</b>	<p>According to the newly adopted Kai !Garib LUMS:</p> <ul style="list-style-type: none"> <li>Remainder of the Farm Kousas, No. 459 – Agricultural Zone I;</li> <li>Portion 95 of the Farm Kousas, No. 459 – Open Space Zone I &amp; Open Space Zone II;</li> <li>Portion 128 of the Farm Kousas, No. 459 – Residential Zone I</li> </ul>
<b>Location from nearest town:</b>	<p>The involved properties can be found to the west of Keimoes and stretches from the railway line to the northern alignment of Keimoes' residential</p>	<b>Existing land use:</b>	<p>The majority of land that comprise the study area for this submission has been subject to informal township establishment.</p>



<b>Town/ suburb:</b>	area.	<b>Area applicable to application:</b>	
	Situated within the delineated urban edge of Keimoes.		Approximately 97ha
<b>Registration Division:</b>	Gordonia RD	<b>Title deed no:</b>	<ul style="list-style-type: none"> <li>Remainder of the Farm Kousas, No. 459 – T889/2014;</li> <li>Portion 95 of the Farm Kousas, No. 459 – G40/1970;</li> <li>Portion 128 of the Farm Kousas, No. 459 – T889/2014.</li> </ul>

**SECTION 4****Type of Application being Submitted** (Mark with an X and give detail)

Application for:

(Please mark applicable block with a cross)

<b>Rezoning from one zone to another:</b>	<b>X</b>
<b>Consolidation of land:</b>	<b>X</b>
<b>Subdivision of land:</b>	<b>X</b>
Township establishment (Human settlement planning and design)	
Removal, suspension or amendment of Title Deed Restrictions:	
Permanent departure from any stipulations as determined in these regulations, including relaxing of Development Control stipulations:	
Temporary departure to allow the use of a building or land for a period of at most five years, for a purpose for which no specific zone has been provided for in these regulations:	
Secondary use as determined in these regulations:	
Consent use as determined in these regulations:	
The annulment, suspension or amendment of the original approval conditions as provided by the Responsible Authority:	
General Plan Cancellation:	
Closure of Park or Public Road:	
The extension of the approval period:	
Any other application in terms of provincial legislation or municipal by-law:	
<b>Please give a short description of the scope of the project:</b>	

Our office, Macroplan Town and Regional Planners, has been appointed (See Annexure B) by Barzani Development on behalf of the Department of Cooperative Governance, Human Settlements and Traditional Affairs (hence referred to as COGHSTA), to facilitate the needed town planning procedures involved with the formalisation of the Gamakor Community, which is situated to the west of Keimoes, Kai !Garib Local Municipality, ZF Mgcawu District Municipality.

The Gamakor informal community has been occupying portions of the above mentioned farm properties for several years and already formed part of the area for future expansion during the compilation of the Kai !Garib Spatial Development Framework in 2012. COGHSTA is currently in the process of addressing the housing backlog in the Northern Cape Province, with numerous township establishment projects already identified of which the formalisation of the Gamakor Community in Keimoes is one.

As previously mentioned, it is the goal of this application to formalise an informal settlement, locally known as Gamakor. This community is situated on portions of three land units and the following land use changes are needed for the formalisation process:

**1. SUBDIVISION (See Figure 5):**

- 1.1. Subdivision of a 60ha portion of the Remainder of the Farm Kousas, No. 459, Gordonia RD;
- 1.2. Subdivision of a 0.56ha portion of Portion 95 of the Farm Kousas, No. 459, Gordonia RD.

**2. CONSOLIDATION (See Figure 6):**

- 2.1. Consolidation of the subdivided 60ha portion of the Remainder of the Farm Kousas, No. 459, Gordonia RD & 0.56ha portion of Portion 95 of the Farm Kousas, No. 459, Gordonia RD, with Portion 128 of the Farm Kousas, No. 459, Gordonia RD, in order to create the formalisation area for the Gamakor Community;

**3. SUBDIVISION & REZONING (See Figure 7 & Annexure E):**

- 3.1. Subdivision of the newly consolidated land unit into 1575 individual land units.
- 3.2. Rezoning of the newly created properties, thereby allocating appropriate land use rights to each of the newly created individual erven suitable to their future purpose within the Gamakor community. The proposed zonings, in terms of the Kai !Garib Land Use Management Scheme, are as follow and should be read together with the final layout plan attached as Annexure E to this submission:

Zoning	Primary Use/s	Erven Amount
Residential Zone I	Dwelling House / Residential House	1500
Business Zone I	Business Building/ Premises	31
Institutional Zone I	Place of Instruction / Educational building	2
Institutional Zone II	Place of Worship	7
Open Space Zone II	Public Open Spaces	32
Open Space Zone III	Private Open Spaces	1
Authority Zone I	Municipal Use	1
Transport Zone I	Public Street	1
Total		1575

Please refer to Figures 5, 6 & 7, Annexure E and §3.3 of this report for more information in this regard.



**SECTION 5****Detail of application** (Mark with an X and give detail where applicable)

Is the land unit currently developed (buildings etc.)?	YES		If answered YES, what is the nature & condition of the developments / improvements?	The Gamakor informal community, which comprise of different land uses, can be located on the study area. This application seeks to formalise these uses.
Is the current zoning of the land utilised?		NO	If answered NO, what is the application / use of the land?	The land use rights presently allocated to the involved portions of land do not support the current land uses that are associated with the informal community of Gamakor. This application is lodged to acquire the suitable land use rights for the formalisation of Gamakor.
Is the property burdened by a bond?		NO	If answered YES, attach the bondholder's consent to the application:	Not applicable
Has an application for subdivision/ rezoning/ consent use/ departure on the property previously been considered?		NO	If answered YES, when and provide particulars, including all authority reference numbers and decisions:	To the knowledge of this office no formal land use changes have been undertaken on the involved portions of land in the past.
Does the proposal apply to the entire land unit?		NO	If answered NO, indicate the size of the portion of the land unit concerned, as well as what it will be used for and the same for the remaining extent:	This application for land use change pertains to a 60ha portion of the Remainder of the Farm Kousas, No. 459 and a 0.56ha portion of Portion 95 of the Farm Kousas, No. 459, but does apply to the entire extent of Portion 128 of the Farm Kousas, No. 459.
Are there any restrictions, such as servitudes, rights, bonds, etc. with regard to the land unit in terms of the deed of transfer that should be lifted, as it might have an influence on this application?		NO	If answered YES, please provide detail description:	Portion 95 of the Farm Kousas, No. 459 is the only property that contained restrictive conditions in its property deed that might have impeded on the formalisation process, however, these restrictive title deed conditions have since been removed, with proof thereof imprinted on pages 6 – 9 of the property deed (Annexure A).
Are there any physical	YES		If answered YES, name full particulars	A myriad of specialist studies have

restrictions (e.g. steep inclines, unstable land formations, marshes, etc.) that might influence the intended development?			and state how the problem will be solved and submit detail layout plan:	<p>been conducted on account of the formalisation of the informal community of Gamakor. For the most part the physiography of the study area is ideal for township establishment, however, the following should be noted:</p> <ol style="list-style-type: none"> <li>1. The Botanical Assessment (See Annexure F) identified three Vachellia erioloba trees within the study area which have been adequately accommodated within the final layout (See land units 1557 &amp; 1574 on Annexure E);</li> <li>2. The Geological Report (See Annexure G) identified patches of land that fall under Geological Zone VI &amp; VII, which can accommodate structures that have been designed by professional engineers. The areas that fall under Geological Zone VI have already been occupied by informal structures, however, the area that falls under Geological Zone VII has been incorporated within the layout as a public open space with no housing permitted thereon;</li> <li>3. The Fresh Water Report (Annexure H) captured three storm water furrows that have been adequately incorporated by means of buffers and the internal road network of Gamakor.</li> </ol>
Is any portion of the land unit in a flood plain of a river beneath the 1:50 annual flood-line, or subject to any flooding?		NO	If answered YES, please provide detail description:	Not Applicable
Is any other approval that falls outside of this Act, necessary for the implementing of the intended development?	YES		If answered YES, please provide detail description:	Various approvals/ no objections/ authorisations have to be obtained in relation to the proposed formalisation, which include

Environmental Authorisation, no-objection from Sanral and no-objection from Transnet Ltd.. This application is however compiled and submitted without the mentioned no-objections/ approvals, with the sole purpose of commencing with the public participation process. At the time of writing the progress regarding the feedback from the interested and affected parties are as follow:

- Environmental Authorisation: The final scoping report (Annexure I) has been submitted to DENC. The processing of the application has been limited, due to the Covid-19 protocols that have been enforced by the Department of Environment and Nature Conservation;
- Sanral: Sanral has been furnished with a formal notification letter (Annexure J) for review on the 7th of July 2020. Sanral has acknowledged receipt of the notification letter and an official from their office has been assigned thereto;
- Transnet Ltd.: Transnet Ltd. has been furnished with a formal notification letter (Annexure K) for review on the 7th of July 2020. Despite numerous follow-up e-mail no acknowledgement from Transnet Ltd. has been received.

It should be noted that this application will not proceed beyond the public participation process until

			the aforementioned approvals/ no objections/ authorisations have been obtained or if the departments fails to provide comments within the period provided in the Kai !Garib LUMS. Kindly note that the involved properties are registered in the ownership of the Kai !Garib Municipality and therefore the input from the Department of Agriculture is not required.
What arrangements will be made regarding the following services for the development? (Full Engineering Reports must be supplied, where applicable). If services will be provided by the Municipality, proof of input from departments must be included as Annexure to the application.	Water supply:	<p>BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the provision of water are as follow:</p> <p><b>Bulk Water Infrastructure – The current capacity of the bulk water infrastructure is not enough to accommodate the proposed Gamakor development as is.</b> It is proposed that the infrastructure should be upgraded, not only to provide adequate capacity for the Gamakor development, but also for future water demand increases. The following upgrades are proposed:</p> <ul style="list-style-type: none"> <li>• Repairs at the Water Treatment Works for mechanical and electrical components and the control system;</li> <li>• Replace one of the supply pumps at the Water Treatment works with a larger pump (sized for 91 l/s and 45m head);</li> <li>• Install a new 4.2km 450mm Ø uPVC supply line to the storage reservoir from the waste water treatment works;</li> <li>• A new storage reservoir will be required to meet the recommended 48-hour storage requirement. The construction of a new 3ML reservoir is proposed to the north of the development.</li> <li>• Install a new 1km 450mm Ø uPVC distribution line from the storage reservoir to the Gamakor area.</li> </ul> <p>Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for. BVI also approached the Department of Water and Sanitation (DWS) for funding, with DWS confirming the possibility of using WSIG to fund bulk water and waste water infrastructure over a period of two</p>	

		years.
	<b>Electricity supply:</b>	<p>BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the provision of electricity are as follow:</p> <p><b>The existing bulk services infrastructure of Keimoes is not sufficient to accommodate the additional demand the proposed 1500 residential properties and associated land uses will require.</b></p> <ul style="list-style-type: none"> <li>• Electricity Supply – Formal bulk upgrade process to be finalised between Eskom and Kai !Garib Municipality.</li> <li>• Electrical Load Centre – The existing Load Centre “Keimoes Nommer 2” can accommodate the future additional load, with only minor modifications to be done in the Load Centre and as agreed with the Municipality’s Electrical Department.</li> </ul> <p>Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for.</p>
	<b>Sewerage and waste-water:</b>	<p>BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the handling of sewerage and waste-water are as follow:</p> <p><b>Bulk Sewage Infrastructure - The current capacity of the sewer water infrastructure is not enough to accommodate the proposed Gamakor development, nor is it adequate for the current loading.</b> It is proposed that the infrastructure should be upgraded as soon as possible:</p> <ul style="list-style-type: none"> <li>• Waste Water Treatment Works: Construction of a new 2.5 ML Waste Water Treatment Works. The proposed position of the WWTW is to the south-west of the Gamakor development.</li> <li>• Gamakor West pump station and rising main: The western portion of the Gamakor will be able to drain to the south-western corner. It is proposed to construct a pump station with a 1km 250mm diameter rising main to</li> </ul>



		<p>the proposed WWTW;</p> <ul style="list-style-type: none"> <li>Gamakor East pump station and rising main: The south-eastern portion of the Gamakor drains to the south-eastern corner. It is proposed to construct a pump station with a 2km 250mm diameter rising main to the proposed WWTW. This pump and rising main should be sized to accommodate a large portion of the Keimoes area in order to migrate the sewer flows to the new WWTW in the future in phases.</li> <li>In order to migrate future flows from the current pumping system to the new WWTW, a new pump line will also need to be constructed between the Extension 6 Pump Station and the Gamakor East Pump Station. However, this is not necessary for the Gamakor development and has been omitted from the costing summary.</li> </ul> <p>Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for. BVI also approached the Department of Water and Sanitation (DWS) for funding, with DWS confirming the possibility of using WSIG to fund bulk water and waste water infrastructure over a period of two years.</p>
	<b>Storm-Water:</b>	<p>BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report storm-water management are as follow:</p> <ul style="list-style-type: none"> <li>Storm Water Management: No bulk infrastructure upgrading required on the storm water.</li> </ul> <p>It should furthermore be noted that the final layout plan (Annexure F) for the Gamakor community has been designed with the contouring of the landscape, as well as the major storm water furrows in mind.</p>
	<b>Road Network:</b>	<p>The proposed development entails an extended internal road network to functionally link with Keimoes` existing road infrastructure. The formalisation of existing residential blocks &amp; erven, as well as the presence of permanent structures, have resulted in staggered intersections within the existing road network of Keimoes. The layout for Gamakor provides a coherent internal road network with a hierarchy of road classes. J.C. Hollenbach Street has been extended into the Gamakor Community thereby creating an arterial road for easy access throughout the layout. Collector roads at key intersections with the existing road network of Keimoes have also been incorporated to further</p>

promote accessibility right through the layout. Lastly, the road network has been designed to allow for future township expansion to the north and west, as well as make provision for a future linkage to the N14 national road. Kindly note that the linkage to the N14 will take place in the future and is not a priority at this stage. SANRAL has been informed of the planned formalisation process and the possible direct linkage to the N14 national road. The notification letter to SANRAL can be seen as Annexure J.

### SECTION 6

List of Attachments and supporting information required / submitted with checklist for Municipal use (Mark with an X / number annexure)

Checklist (for the completion by the Applicant only)				Checklist (for the use of Responsible Authority only)		
YES	NO	ANNEXURE	DOCUMENT ATTACHED	YES	NO	N/A
x		Section A	Completed Comprehensive Application form			
x		Section B	Complete Motivation Report			
x		§2.3	Alignment to the Provincial, District and Municipal SDFs			
	x		Public participation report (minutes of meetings, copies of advertisement, etc.)			
x		Annexure B	Power of Attorney (Board of Directors' / Trustees' resolution / consent)			
x		Annexure A	Copy of Title Deed(s)			
	x		Mortgage holder's consent			
x		Annexure A	Cadastral information – diagram/General Plan including servitudes, lease areas, etc.			
	x		Status report from Surveyor General – street closure or state owned land			
x		Figure 4	Topographic map/ aerial map			
x		Figure 1 & 2	Locality Map			
x		Annexure E	Site Plan			
x		Figure 3	Zoning Map			
	x		Zoning Certificate			
x		Figure 4	Land Use Map			
	x		Conveyancer's certificate			
	x		Special endorsement/proxy			
	x		Home Owners' Association consent			
x		Annexure E	Proposed design/layout plan			
x		Figure 5 & 7	Proposed subdivision plan			
x		Figure 6	Proposed consolidation plan			
	x		Proposed development plan			
	x		Mineral rights certificate (together with mineral holder's consent) and/or prospecting contract			
	x		Mineral impact assessment (MIA)			
x		Annexure I (Final	Environmental Impact Assessment (EIA – EA) including Heritage Impact			

		Scoping Report)	Assessment (approval from Dept Sport, Arts and Culture) and Archaeological Impact Assessment (AIA) (approval from relevant Department - SAHRA)			
	x		Detail Engineering Services report (Bulk and internal)			
x		Annexure J	Traffic impact study (SANRAL notification letter)			
x		Annexure G	Geo-technical report (including geology) report (NHRB Standards)			
	x		Social impact assessment			
	x		Flood line assessment (1:50 and 1:100 years)			
	x		Coastal setback report (consent from Dept of Environmental Affairs)			
	x		Subdivision of agricultural land (consent of the Dept of Agriculture)			
	x		List of sections in Title Deed conditions to be removed /amended			
x		Annexure N	Adherence to planning legislation including the Planning Profession Act 36 of 2002			
x			At least three (3) sets of full colour documentation copies			

**SECTION 7****Declaration**

**Note:** If application is made by a person other than the owner, a Power of Attorney is compulsory. If the property is owned by more than one person, the signature of each owner is compulsory. Where the property is owned by a company, trust, or other juristic person, a certified copy of the Board of Directors/Trustees' resolution is compulsory.

I hereby certify the information supplied in this application form to be complete and correct and that I am properly authorised to make this application.

Applicant's / Owner's Signature:



Date:

2 0 2 0 0 8 2 5

Full name (print):

Justus Petrus Theron

Professional capacity:

Professional Town and Regional Planner

Applicant's ref:

Pr. Pln. A/2394/2016

Applicant's / Owner's Signature:



Date:

2 0 2 0 0 8 2 5

Full name (print):

Len Jacobus Fourie

Professional capacity:

Professional Town and Regional Planner – Senior Town Planner

Applicant's ref:

Pr.Pln. A/1322/2006

**SECTION 8****Prescribed Notice and advertisement procedures****(for the completion and use of Responsible Authority only)**

Checklist for required advertisement procedure			Checklist for required proof of advertisement		
YES	NO	DOCUMENTATION AND STEPS TO BE TAKEN	YES	NO	DOCUMENTATION TO BE PROVIDED AS PROOF
		Notice to be placed in the Local Newspaper			Proof of Notice in Local Newspaper Note: The original newspaper advertisement or full

					colour copy, indicating page number and date.
		<b>Notice to be placed in the Provincial Gazette (for 2 consecutive weeks)</b>			<b>Proof of Notice in the Provincial Gazette</b> Note: The original newspaper advertisement or full colour copy, indicating page number and date.
		<b>Notices to neighbours</b> Note: The map indicating the neighbouring erven and list of neighbours will be provided. If the applicant chooses to deliver the notices per hand (Option 1), two copies of the notice must be provided on or before the date of the notice to each neighbour. One copy of the notice must be signed by the respective party (neighbour) to be handed back to the Responsible Authority. Alternatively (Option 2), the notices can be sent via registered post.			<b>Proof of Notice to neighbours</b> Note: Option 1: The signed notices of all surrounding neighbours, as identified by the Responsible Authority, must be provided. Note: Option 2: The proof of the registered mail must be provided to the Responsible Authority
		<b>Notice to be placed on the site</b> Note: The notice provided must be placed on the site in a laminated A3 format (two language formats separate on A3) on or before the date of the notice.			<b>Proof of Notice in site</b> Two colour photos of the notice on site must be provided of which one is close up and the other one is taken from a distance in order to see the placing on the site itself.
		<b>Public Meeting</b> Note: The holding of a public meeting in order to inform the general public of the application.			<b>Proof of Public Meeting</b> The applicant must provide proof of the agenda, the attendance register and minutes of the meeting to the Responsible Authority.
		<b>Any Additional components:</b>			<b>Proof of additional components:</b>

## SECTION B: MOTIVATIONAL REPORT

### 1. INTRODUCTION

#### 1.1. BACKGROUND

##### GENERAL BACKGROUND

Economic development in the Northern Cape has seen a steady increase over the past decade with a 2.1% growth figure and contributing 2.0% to the growth of South Africa's GDP (StatsSA). The Kai !Garib Municipality is situated at the very heart of the province, stretched across the banks of the Orange River. This locale allows the municipality to enjoy a strong agricultural economy that thrives of the exportation of summer fruit, production of wine and the expansive availability of game and stock farming. Besides the presence of these economic drivers, the municipality has also seen an increased interest in the development of renewable energy facilities, brought about by the unique climatic factors that the region has to offer. Economic growth in the municipality is furthermore stimulated by major roads (N14, R27 and R359) that allows linkage to larger economic hubs in the Northern Cape and the rest of the country.

The intensive nature of the farming practices on the banks of the Orange River has led to the establishment of various notable urban centres along its banks, with Keimoes and Kakamas being the economic powerhouses of the Kai !Garib Municipality. These 2 urban centres, notwithstanding the status of Kenhardt as node of importance as well, have continued to show economic growth potential and investment possibility. Populations are increasing and with the growing economic opportunity of the towns, housing opportunity has become a development factor of critical importance. In addition to the agricultural sector of the Kai !Garib Municipality, smaller, less significant economic sectors also play an important role within the municipal area and contribute to the economy's well-being of the !Kai !Garib Municipality.

These mentioned aspects did not only have an economic impact, but also contributed to population increases within the municipality, be it from immigration or natural growth. This escalation in the population has led to a growing need for housing provision within the municipality.

##### FOCUS OF THIS APPLICATION:

The Gamakor informal community has been occupying portions of the above-mentioned farm properties for several years and already formed part of the area for future expansion during the compilation of the Kai !Garib Spatial Development Framework in 2012. COGHSTA is currently in the process of addressing the housing backlog within the Northern Cape Province, with numerous township establishment projects already identified of which the formalisation of the Gamakor Community in Keimoes is one.

It is important that all developments must align with the provisions of the Spatial Development Framework (SDF) of the local or district municipality, as well as the applicable scheme regulations of a municipality. In cases where a development proposal does not align with the provision of the SDF, site specific motivations need to be provided as to allow the Joint Municipal Planning Tribunal to make informed decisions.



## 1.2. CURRENT REALITY

The undertaking of the formalisation of the Gamakor Community by Macroplan derives from an indirect appointment by COGHSTA and is therefore a project of national and provincial importance. The Gamakor Informal community can be found to the west of Keimoes and stretches from the railway line to the northern alignment of the Keimoes residential area. The formalisation process pertains to portions of three registered farm portions, namely the Remainder, Portion 95 & Portion 128 of the Farm Kousas, No. 459, Gordonia RD, all held under the ownership of the Kai !Garib Local Municipality. The proposed formalisation will primarily provide sub-economic housing with the end goal of securing ownership of land for the current residents. A small fraction of the development scope will cater to middle-income housing, which will provide much needed income tax to the local municipality. The Gamakor informal community currently houses an estimated 850 to 900 informal stands, of which almost 140 stands accommodate permanent structures.

The objectives of this application, which is handled in the terms of the provisions of the Spatial Planning and Land Use Management Act (Act 16 of 2013), Kai !Garib SPLUMA By-laws & the Kai !Garib Scheme Regulations are as follow:

1. Formalise the existing informal stands currently established on the study area;
2. Provide ±600 additional erven (55 erven for middle-income housing) for future population increases;
3. Incorporate land uses normally associated with large residential neighbourhoods, such as institutional, recreational and business uses;
4. Create a coherent internal road network that adequately links to the existing road network of Keimoes and promotes easy and accessible movement throughout.

The following table provides a breakdown of the involved land portions, in terms of size, land use and zoning:

Property Description	Property Size	Land Use	Zoning Status Quo
Remainder of the Farm Kousas, No. 459, Gordonia RD	940.374ha	Mostly vacant, except for ±35ha which forms part of the Gamakor informal community.	Agricultural Zone I
Portion 95 of the Farm Kousas, No. 459, Gordonia RD	15.2302ha	Mostly vacant, except for ±0.56ha which forms part of the Gamakor informal community.	Open Space Zone I & Open Space Zone II
Portion 128 of the Farm Kousas, No. 459, Gordonia RD	36.25ha	The entire extent of this property forms part of the Gamakor informal community.	Residential Zone I

*Table 1: Breakdown of property information.*

The title deeds of the involved properties have been scrutinised to determine if there are any restrictive conditions that needs to be removed in order for the land use change process to take place. Portion 95 of the Farm Kousas, No. 459 is the only property that contained restrictive conditions in its property deed that might have impeded on the formalisation process, however, these restrictive title deed conditions have since been removed, with proof thereof imprinted on pages 6 – 9 of the property deed (Annexure A).

In order to achieve the objective of formalising the informal community of Gamakor, this formal land use change application, pertaining to subdivision, consolidation & rezoning, is submitted to the Kai !Garib Local Municipality as municipality of first instance. This application for land use change (subdivision, consolidation and rezoning) is therefore submitted to the Kai !Garib Municipality in order to ensure legal compliance with the clear context of the Spatial Planning and Land use Management Act (Act 16 of 2013).

### 1.3. ASSIGNMENT

Our office, Macroplan Town and Regional Planners, has been appointed by Barzani Development on behalf of COGHSTA, to facilitate the needed town planning procedures involved with the formalisation of the Gamakor Community. The appointment letter from Barzani Development, as well as the preceding appointment letter from the Kai !Garib Municipality, serve as the power of attorney for this application for land use change. Please refer to Annexure B of this submission for the said authorising documentation.

### 1.4. OBJECTIVE

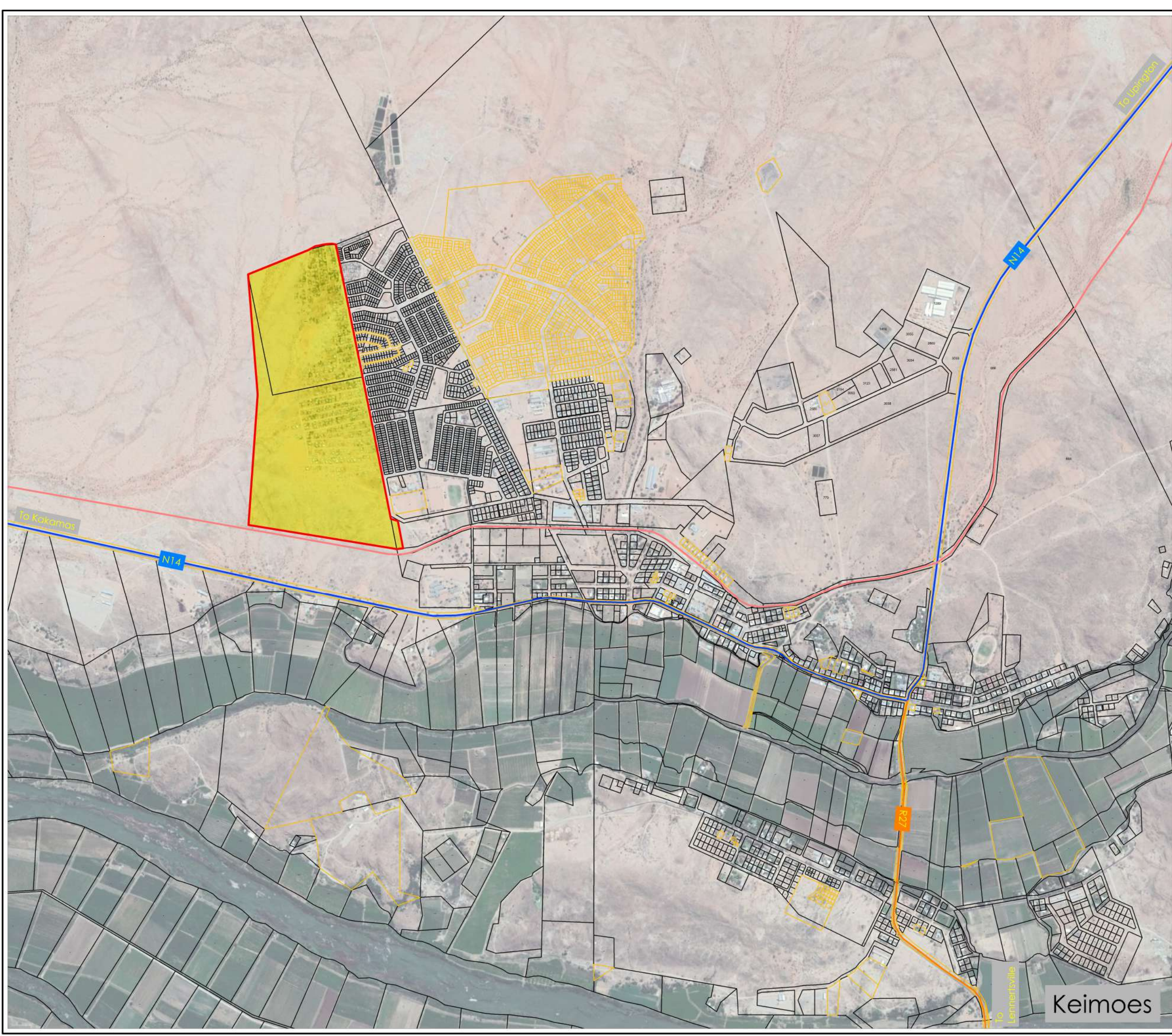
The objectives of this report are as follow:

1. **SUBDIVISION (See Figure 5):**
  - 1.1. Subdivision of a 60ha portion of the Remainder of the Farm Kousas, No. 459, Gordonia RD;
  - 1.2. Subdivision of a 0.56ha portion of Portion 95 of the Farm Kousas, No. 459, Gordonia RD.
2. **CONSOLIDATION (See Figure 6):**
  - 2.1. Consolidation of the subdivided 60ha portion of the Remainder of the Farm Kousas, No. 459, Gordonia RD & 0.56ha portion of Portion 95 of the Farm Kousas, No. 459, Gordonia RD, with Portion 128 of the Farm Kousas, No. 459, Gordonia RD, in order to create the formalisation area for the Gamakor Community;
3. **SUBDIVISION & REZONING (See Figure 7 & Annexure E):**
  - 3.1. Subdivision of the newly consolidated land unit into 1575 individual land units.
  - 3.2. Rezoning of the newly created properties, thereby allocating appropriate land use rights to each of the newly created individual erven suitable to their future purpose within the Gamakor community. The proposed zonings, in terms of the Kai !Garib Land Use Management Scheme, are as follow and should be read together with the final layout plan attached as Annexure E to this submission:

Zoning	Primary Use/s	Erven Amount
Residential Zone I	Dwelling House / Residential House	1500
Business Zone I	Business Building/ Premises	31
Institutional Zone I	Place of Instruction / Educational building	2
Institutional Zone II	Place of Worship	7
Open Space Zone II	Public Open Spaces	32
Open Space Zone III	Private Open Spaces	1
Authority Zone I	Municipal Use	1
Transport Zone I	Public Street	1
Total:		1575


To serve as a support system for the Kai !Garib Local Municipality, in order for all the formalities to be handled correc





**Legend**


- Study Area
- National Road
- Provincial Road
- Railway Line
- Registered Cadastral Land Units
- Surveyed Cadastral Land Units



**KAI !GARIB**  
MUNICIPALITEIT-MUNICIPALITY

Postal Address:  
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8870

Tel No: 054 461 6700  
Fax No: 054 461 6401



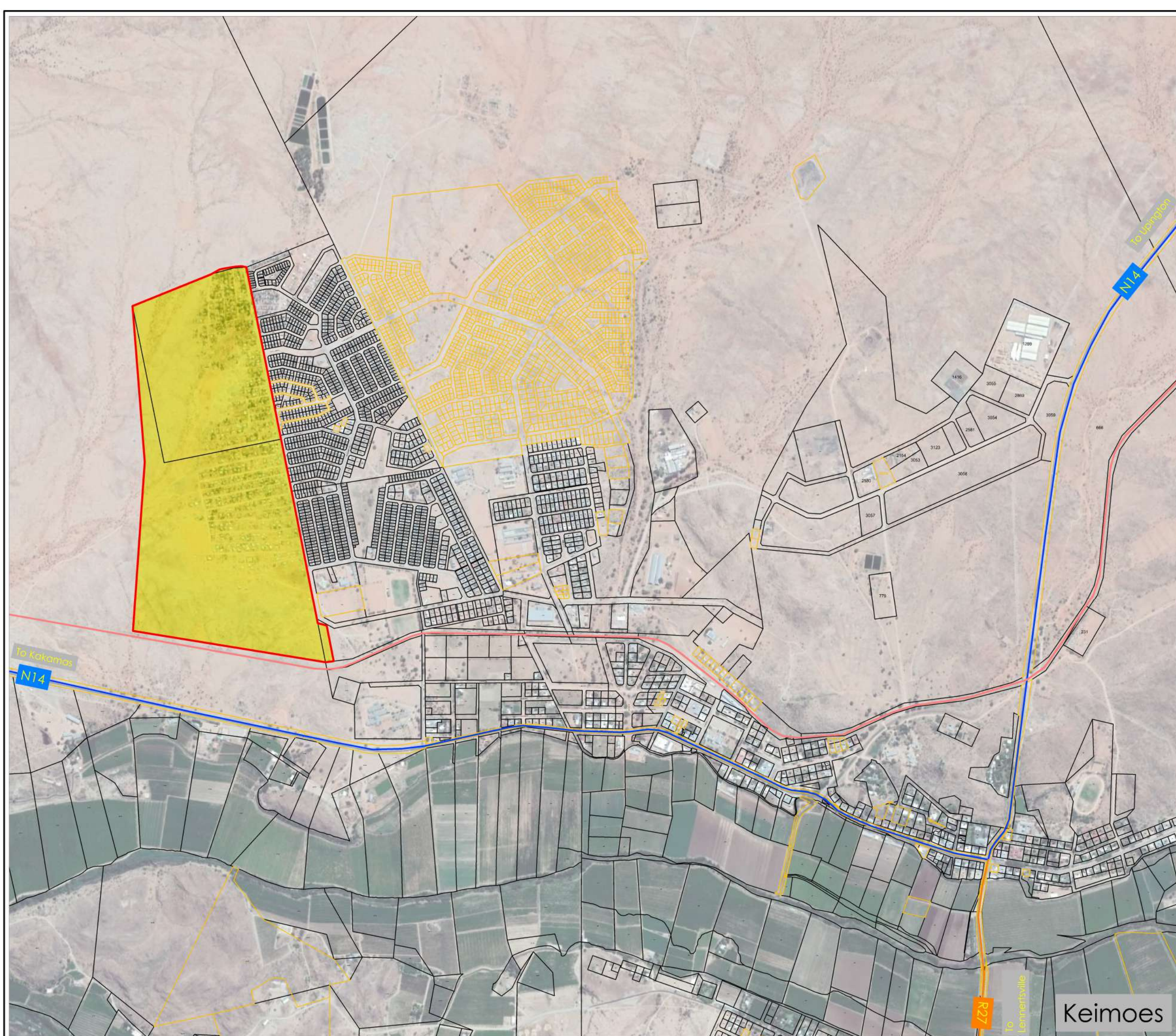
**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference:  
(FIG1.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed JP Theron	Date August 2020
Drawn JP Theron	Scale 1: 20 000





Page: 18

Title: Figure 2  
Locality Map: Local

Description: REMAINDER OF THE FARM KOUSAS, NO. 459, PORTION 95 OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

Legend

Study Area

National Road

Provincial Road

Railway Line

Registered Cadastral Land Units

Surveyed Cadastral Land Units

KAI !GARIB

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Reference  
(FIG1.SUB.REZ) 200721 Re. Ptn 95 & Ptn 128 of the Farm Kousas, No. 459

Designed  
JP Theron

Date  
August 2020

Drawn  
JP Theron

Scale  
1: 15 000



## 1.5. JURISDICTION

According to §26 of the Spatial Planning Land Use Management Act (Act 16 of 2013), the MEC delegated the powers to approve the land use change application, to the JMPT. This application will be evaluated in terms of the Kai !Garib Scheme Regulations of 2007.

**§26 of SPLUMA, which states the following:**

- (2) Land may be used for the purposes permitted –
  - (a) By a land use scheme;
  - (b) By a town planning scheme, until such scheme is replaced by a land use scheme;

With the enactment of SPLUMA, the delegations of jurisdictions in terms of the decision making on land use change matters are, however, interpreted as follow:

§26 (4)

A permitted land use may, despite any other law to the contrary, be changed with the approval of a Municipal Planning Tribunal in terms of this Act.

§33 (1)

...all land development applications must be submitted to a municipality as the authority of first instance.

§34 (2)

A district municipality may, with the agreement of the local municipalities within the area of such district municipality, establish a Municipal Planning Tribunal to receive and dispose of land development applications and land use applications within the district area.

§35 (1)

A municipality must, in order to determine land use and land development applications within its municipal area, establish a Municipal Planning Tribunal.

**In light of the above, this land use application is submitted to the Kai !Garib Municipality as the authority of first instance, for processing, administration and for the subsequent referral to the Joint Municipal Planning Tribunal, overseen by the ZF Mgcawu District Municipality.**

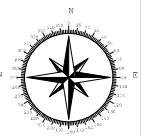
Title: **Figure 3**  
**Zoning Extract**


Description: REMAINDER OF THE FARM KOUSAS, NO. 459, PORTION 95 OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

**Legend**

	Agricultural Zone I		Institutional Zone II
	Agricultural Zone II		Institutional Zone III
	Residential Zone I		Resort Zone I
	Residential Zone II		Open Space Zone I
	Residential Zone III		Open Space Zone II
	Residential Zone IV		Open Space Zone III
	Business Zone I		Transport Zone I
	Business Zone II		Transport Zone II
	Business Zone III		Transport Zone III
	Business Zone IV		Transport Zone IV
	Business Zone V		Authority Zone I
	Industrial Zone I		Authority Zone II
	Industrial Zone II		Special Zone
	Industrial Zone III		Undetermined Zone
	Institutional Zone I		

 Study Area





KAI !GARIB  
KUNENBURG!TET!MUNICIPALITY

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



Reference (FIG3.SUB.REZ) 200721 Re, Ptn 95 & Ptn 128 of the Farm Kousas, No. 459	
Designed JP Theron	Date August 2020
Drawn JP Theron	Scale 1: 7000



Title: **Figure 4**  
**General Land Uses**

Description:  
REMAINDER OF THE FARM KOUSAS, NO. 459, PORTION 95 OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

**Legend**

-  Study Area
-  Institutional (Schools)
-  Residential Use
-  Vacant Land
-  Public Road
-  Business Uses
-  Agricultural
-  Institutional (Medical)
-  Institutional Uses (Churches)
-  Municipal Uses



Municipality:



Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401

Consultant:



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4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference:

(FIG4.SUB.REZ) 200721 Re. Ptn 95 & Ptn 128 of the Farm Kousas, No. 459

Designed:

JP Theron

Date:

August 2020

Drawn:

JP Theron

Scale:

1: 7000



Photo 1: Visual presentation of housing types



The photo above was taken from within the community of Gamakor and shows the typical housing structures that can be found within the said community.

Photo 2: Existing internal road network



The community of Gamakor is characterised by narrow gravel roads that form the internal road network of the involved community. The majority of the existing roads have been maintained by the proposed layout for the community of Gamakor.



Photo 3: Study Area in relation to railway line



Permanent housing structures, as visible in the image above, can also be found throughout the Gamakor Community. These structures had to be incorporated into the final layout since these structures cannot be relocated.

Photo 4: Storm Water Furrows



As part of the Fresh Water Report three storm water furrows were identified, with one of them visible in the image above. The storm water furrow in the image above has been kept open, however, numerous informal structures are situated within the storm water furrow that traverse through a large section of the community. Unfortunately, the informal houses situated within the storm water furrows will have to be relocated, in order to comply with the findings of the specialist studies. Attached as Annexure L is a map that indicates all the houses that need to be moved and or relocated.



Photo 5: Proposed Road Network



One of the main objectives of the final layout is to provide a settlement configuration that makes provision for a coherent internal road network that adequately connects to the existing formal road network of Keimoes. The final layout has been designed to incorporate the different road hierarchies throughout, with a major arterial road and collector roads included for easy access.

Photo 6: Associated Land Uses



Land uses normally associated with residential areas can be found within the Gamakor informal community. This application for land use change will seek to formalise all land uses currently situated in the community, as well as make provision for additional uses, such as business nodes, recreational areas, & a proposed school.



Photo 7: Longstanding northern occupation



The northern sections of the Gamakor community has been occupying the property for more than 15 years. It is clear from the height of the trees in Photo 7 that the informal houses already erected, have all been located on the property for a long time. Photo taken in the northern sections of the study area from a northerly direction.

Photo 8: Informal Houses – Northern Section



The informal houses in Gamakor as found in the northern sections of the study area, as seen from a southerly direction.



Photo 9: Street Network – Northern Section



A typical street as found in the northern sections of the study area, as seen from the east.

Photo 10: Local Resident with his property



A local resident from Gamakor in the central sections of the study area as seen from a north-easterly direction. Some of the existing stone structures found on the property can also be seen in the background of the photo.



Photo 11: Houses in central-eastern section



The houses found in the central-eastern sections of Gamakor bordering directly on an area already formalised (see road on the left-hand side of the photo). The photo was taken from a north-easterly direction.

Photo 12: Informal Houses in central areas



Informal houses as found in the central areas of the study area, as seen from a south-westerly perspective.



Photo 13: Informal Houses in the central to southern sections



The informal houses and roads already provided in the central to southern sections of the study area, as seen from the east.

Photo 14: Neatness of some of the properties



A photo taken of some of the informal houses in the central sections of Gamakor, as seen from the south. The neatness of some of the houses is something very special and the house in Photo 14 is an excellent example of what we found in the study area.



Photo 15: Informal Houses to the South of Gamakor



This photo was taken in the southern sections of the study area and indicates some of the informal houses found in these areas, as seen from the west.

Photo 16: Informal House in central section of Gamakor



A close-up of one of the informal houses as found in the central sections of Gamakor, as seen from the north-east. It is clear that most residents have been residing in their properties for a very long time.

## 1.6. COMPLIANCE WITH PRINCIPLES

SPLUMA sets out certain development principles (§7) to guide the development of land in the republic and any land use application should be considered with due cognisance of these principles. These principles may be briefly listed as follows:

1. THE PRINCIPLE OF SPATIAL JUSTICE;
2. SPATIAL SUSTAINABILITY;
3. EFFICIENCY;
4. SPATIAL RESILIENCE; AND
5. GOOD ADMINISTRATION.

The following sub-paragraphs may be highlighted in terms of this application, along with an explanation of their relevance:

**(a) The principle of spatial justice, whereby –**

- (i) Past spatial and other development imbalances must be redressed through improved access to and use of land;

*Relevance: This application for formalisation of an existing informal community will address past spatial and other development imbalance, since integration will be achieved and the use of land will be improved.*

- (ii) Spatial development frameworks and policies at all spheres of government must address the inclusion of persons and areas that were previously excluded, with an emphasis on informal settlements, former homeland areas and areas characterised by widespread poverty and deprivation;

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

- (iii) Spatial planning mechanisms, including land use schemes, must incorporate provisions that enable redress in access to land by disadvantaged communities and persons;

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

- (iv) Land use management systems must include all areas of a municipality and specifically include provisions that are flexible and appropriate for the management of disadvantaged areas, informal settlements and former homeland areas.

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

- (v) Land development procedures must include provisions that accommodate access to secure tenure and the incremental upgrading of informal areas; and

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

- (vi) A Municipal Planning Tribunal considering an application before it, may not be impeded or restricted in the exercise of its discretion solely on the ground that the value of land or property is affected by the outcome of the application.

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

**(b) The principle of spatial sustainability, whereby spatial planning and land use management systems must –**

- (i) Promote land development that is within the fiscal, institutional and administrative means of the Republic;

*Relevance: It is the opinion of this office that the proposed development will not place an unreasonable amount of stress on the fiscal, institutional and administrative capabilities of the area in which it is situated.*

- (ii) Ensure that special consideration is given to the protection of prime and unique agricultural land;

*Relevance: The Kai !Garib Municipality is the registered landowner of the three land units involved in this submission for land use change, as such the involved properties are exempted from the provision of the Act 70 of 1970 as clearly described in the definition of agricultural land which reads as follow:*

**"Agricultural land"** means any land, except-

*(a) land situated in the area of jurisdiction of a municipal council, city council, town council, village council, village management board, village management council, local board, health board or health committee, and land forming part of, in the province of the Cape of Good Hope, a local area established under section 6(1)(i) of the Divisional Councils Ordinance, 1952 (Ordinance 15 of 1952 of that province), and, in the province of Natal, a public health area as defined in section I of the Local Health Commission (Public Health Areas Control) Ordinance, 1941 (Ordinance 20 of 1941 of the last-mentioned province), and in the province of the Transvaal, an area in respect of which a local area committee has been established under section 21(1) of the Transvaal Board for the Development of Peri-Urban Areas Ordinance, 1943 (Ordinance 20 of 1943 of the Transvaal), and, in South-West Africa, a peri-urban area established under section 9 of the Peri-Urban Development Board Ordinance, 1970 (Ordinance 19 of 1970 of South-West Africa), but excluding any such land declared by the Minister after consultation with the executive committee concerned and by notice in the Gazette to be agricultural land for the purposes of this Act;*

*(c) land of which the State or the administration of the territory of South-West Africa is the owner or which is held in trust by the State or a Minister or the Administrator of the said territory for any person;*

*For further clarity, this office consulted with the appointed land surveyor and confirmation was received that no formal feedback from the Dept. of Agriculture will be required during the registration of the general plan at the office of the Chief Surveyor General.*



- (iii) Uphold consistency of land use measures in accordance with environmental management instruments;

*Relevance: The magnitude of the proposed formalisation process necessitates the undertaking of an Environmental Impact Assessment (EIA), under the guidance of the National Environmental Management Act (107 of 1998). At present the EIA is still in process, due to the constraints brought forth by the Covid-19 pandemic. The latest progress on the EIA is that the final scoping report (Annexure I) has been compiled and submitted at the Department of Environment and Nature Conservation for consideration. The Environmental Authorisation will be provided to the Kai !Garib Municipality and the ZF Mgcawu District Municipal Planning Tribunal upon receipt thereof.*

- (iv) Promote and stimulate the effective and equitable functioning of land markets;

*Relevance: It is the opinion of this office that the proposed development will contribute to the value of land in the area surrounding thereto, but that it will not necessarily unfairly increase the cost thereof.*

- (v) Consider all current and future costs to all parties for the provision of infrastructure and social services in land developments;

*Relevance: This application for the formalisation of the informal community of Gamakor falls under the jurisdiction of the Kai !Garib Municipality, as such the provision of this services will be the responsibility of the Kai !Garib Municipality. A services report was compiled on the basis of the proposed formalisation of Gamakor, with the general findings being that the existing bulk service infrastructure is not sufficient to accommodate the additional erven that will comprise the formalised community of Gamakor. The Kai !Garib Local Municipality will be responsible for procuring funding from the various bulk services infrastructure grants.*

- (vi) Promote land development in locations that are sustainable and limit urban sprawl; and

*Relevance: The area that comprise the community of Gamakor is confined by the urban edge of Keimoes, as such this application does not contribute to urban sprawl.*

- (vii) Result in communities that are viable.

*Relevance: The proposed formalisation will result in a viable community, since this application will bring about the creation of land units for individual land ownership, thereby creating land units that can be transferred from municipal to individual ownership. The formalised layout will facilitate the installation of bulk municipal service infrastructure which is of utmost importance in ensuring community viability. The need for housing and formalisation of informal settlements have been identified as projects of importance by COGHSTA that needs to be addressed.*

**(c) The principle of spatial efficiency, whereby –**

- (i) Land development optimises the use of existing resources and infrastructure;

*Relevance: Please refer to §2.5 of this submission for details regarding the rendering of services;*

- (ii) Decision-making procedures are designed to minimise negative financial, social, economic or environmental impacts; and

*Relevance: The SPLUMA By-laws of the Kai !Garib Local Municipality indicates the specific procedures that are to be followed with a land use change application such as this. This will ensure that both the Municipality, the relevant community and our client will be guarded against negative social, economic and environmental impacts.*

- (iii) Development application procedures are efficient and streamlined and timeframes are adhered to by all parties.

*Relevance: As the applicant in this instance, our office will do our very best to adhere to the timelines set by the local municipality. If this is not possible we will, if need be, endeavour to consult the municipality in these matters and find a solution thereto.*

- (d) The principle of spatial resilience, whereby flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impacts of economic and environmental shocks.

*Relevance: This component is applicable to public entities such as municipalities and government departments, it is therefore not the responsibility of an applicant to adhere thereto.*

- (e) The principle of good administration, whereby –

- (i) All spheres of government ensure an integrated approach to land use and land development that is guided by the spatial planning and land use management systems as embodied in this Act;

*Relevance: This component is applicable to public entities such as municipalities and government departments, it is therefore not the responsibility of an applicant to adhere thereto.*

- (ii) All government departments must provide their sector inputs and comply with any other prescribed requirements during the preparation or amendment of spatial development frameworks;

*Relevance: This component is applicable to public entities such as municipalities and government departments, it is therefore not the responsibility of an applicant to adhere thereto.*

- (iii) The requirements of any law relating to land development and land use are met timeously;

*Relevance: Various approvals/ no objections/ authorisations (not covered by EIA) have to be obtained in relation to the proposed formalisation, which include Environmental Authorisation, no-objection from Sanral and no-objection from Transnet Ltd.. This application is however compiled and submitted without the mentioned no-objections/ approvals, with the sole purpose of commencing with the public participation process. At the time of writing the progress regarding the feedback from the interested and affected parties are as follow:*

- *Environmental Authorisation: The final scoping report (Annexure I) has been submitted to DENC. The processing of the application has been limited, due to the Covid-19 protocols that have been enforced by the Department of Environment and Nature Conservation;*



- *Sanral: Sanral has been furnished with a formal notification letter (Annexure J) for review on the 7<sup>th</sup> of July 2020. Sanral has acknowledged receipt of the notification letter and an official from their office has been assigned thereto;*
- *Transnet Ltd.: Transnet Ltd. has been furnished with a formal notification letter (Annexure K) for review on the 7<sup>th</sup> of July 2020. Despite numerous follow-up e-mail no acknowledgement from Transnet Ltd. has been received.*

*It should be noted that this application will not proceed beyond the public participation process until the aforementioned approvals/ no objections/ authorisations have been obtained or if the departments fails to provide comments within the period provided in the Kai !Garib LUMS. Kindly note that the involved properties are registered in the ownership of the Kai !Garib Municipality and therefore the input from the Department of Agriculture is not required.*

- (iv) The preparation and amendment of spatial plans, policies, land use schemes as well as procedures for development applications, include transparent processes of public participation that afford all parties the opportunity to provide inputs on matters affecting them; and

*Relevance: The By-laws of the Kai !Garib Local Municipality stipulates that the applicant (in this case our office) will be responsible for the application procedures that is to follow the submission of an application. Our office takes public participation very seriously and will follow all the by-law stipulations very closely to ensure full compliance, which will result in a completely transparent process.*

- (v) Policies, legislation and procedures must be clearly set in order to inform and empower members of the public.

*Relevance: This component is applicable to public entities such as municipalities and government departments; it is therefore not the responsibility of an applicant to adhere thereto.*

## 2. PLANNING CONSIDERATIONS

### 2.1. LOCATION OF STUDY AREA

The study area is situated in Keimoes, which forms an important economic urban node in Kai !Garib. Situated on the intersect of the N14 and the R27, the town is well connected with national markets via road infrastructure and rail infrastructure, albeit the latter has seen a significant decline in national usage. Developed on an agricultural economy which thrives on viti- & viniculture, the town has become an attractive place of residence and economic opportunity.

On a site-specific level, the Gamakor Informal community can be found to the west of Keimoes and stretches from the railway line to the northern alignment of the Keimoes residential area. The following coordinate point for the centre of Gamakor may be helpful for the purpose of locating the study area:

Central point of involved property:

28°41'44.22"S

20°56'55.06"E

Please refer to the figures attached to this submission for a visual interpretation regarding the locality of the study area.

## **2.2. PHYSIOGRAPHY**

The physiography of the area within which the study area is located is discussed briefly.

### **2.2.1. TOPOGRAPHY**

The proposed formalisation of Gamakor necessitated the completion of numerous specialist studies that inform the Environmental Impact Assessment. The assessment has scrutinised the area earmarked for formalisation and further development, thereby addressing the physiography in more detail. The final scoping report, as well as other specialist studies, are attached as Annexures to this submission. No problems are anticipated in this regard.

### **2.2.2. SOIL/GEOLOGICAL CONDITIONS**

The undertaking of a geotechnical investigation was required for the formalisation of the Gamakor Community. The Geological Report (Annexure G) for the most part indicated that the study area is suitable for normal township expansion, however patches of land have been identified that fall under Geological Zone VI & VII, which can only accommodate structures that have been designed by professional engineers. The areas that fall under Geological Zone VI have already been occupied by informal structures, however, the area that falls under Geological Zone VII has been incorporated within the layout as a public open space with no development permitted thereon.

### **2.2.3. FAUNA AND FLORA**

The proposed formalisation of Gamakor necessitated the completion of numerous specialist studies that inform the Environmental Impact Assessment. It is worth mentioning that the Botanical Assessment (See Annexure F) identified three *Vachellia erioloba* trees within the study area which have been adequately accommodated within the final layout (See land units 1557 & 1574 on Annexure E);

The final scoping report, as well as other specialist studies, are attached as Annexures to this submission. No problems are anticipated in this regard.

## **2.3. INTEGRATED PLANNING**

The Spatial Planning and Land Use Development Act (Act 16 of 2013) stipulates that each Municipality must prepare a spatial development framework (SDF) that interpret and represent the spatial development vision of the competent Authority. All proposed developments, specifically pertaining to land use change applications within a municipality, must be measured

against an approved Spatial Development Framework (SDF) of such a municipality, which may be seen as the spatial translation of the Integrated Development Plan (IDP). The planning legislation states that no land development decision can be made if the proposed development is inconsistent with the municipal spatial development framework. However, the Joint Municipal Planning Tribunal may depart from the provisions of the SDF only if site-specific circumstances justify a departure from the provisions of such SDF, as envisaged in §22 (2).

#### **KAI !GARIB SPATIAL DEVELOPMENT FRAMEWORK:**

The Kai !Garib SDF was approved and adopted in 2012 and as such is a valid and weight bearing document. The SDF of the Kai !Garib Municipality adheres to the requirements as stipulated in the Spatial Planning and Land Use Management Act (Act 16 of 2013), therefore providing potential investors with adequate information to plan a development in accordance with the spatial vision of the municipality, as to allow the Joint Municipal Planning Tribunal to make an informed decision regarding this application for land use change.

The Kai !Garib Municipal SDF is well-equipped, in terms of spatial planning categories, spatial planning objectives and restructuring elements. The informal community of Gamakor was captured (See Annexure M) during the compilation of the Kai !Garib SDF of 2012 and the Spatial Planning Category of D.h Residential Areas were assigned thereto. The Spatial Planning Category of D.h Residential Areas make provision for numerous housing types that include low-cost housing, a housing category of which this application is primarily applying for. The large scope of the Gamakor community necessitates the inclusion of land uses that are normally associated with residential areas, since these uses contribute to a sustainable neighbourhood and increase the livelihood of its residents. The proposed layout for the formalisation of Gamakor includes the following supportive land uses: Institutional uses (churches and school), business nodes, recreational uses (sport ground) and municipal uses (community hall or similar uses).

#### **INTEGRATED DEVELOPMENT PLAN 2020/2021:**

In terms of Key Performance Areas, the Gamakor community has been listed as one of the projects under priority 2: Lack of Housing/ Existing informal settlements/ Lack of Land Ownership in the Kai !Garib Integrated Development Plan 2020/2021. The project breakdown is as follows:

Nr	Project Name	Location	Target Dates	Possible Funders	Status Quo	EIA
pd/h/017	Develop 1500 Erven	Gamakor - Keimoes	2019/20	COGHSTA	Planning	In process

In light of the above mentioned, the proposed formalisation of Gamakor is in-line with the provisions of the Kai !Garib Spatial Development Framework and has been prioritised as a key project within the IDP and can therefore be seriously considered for approval by the Joint Municipal Planning Tribunal. It should furthermore be noted that this application derives from an indirect appointment of COGHSTA and is therefore a project of provincial and national importance.

## 2.4. CHARACTER OF THE AREA

The community involved in this submission can be found on the western outskirts of Keimoes and has been occupying portions of the involved properties for several years. The character of the area is residential in nature with low cost housing being the predominant land use therein. Other less significant land uses, which are normally associated with residential areas, can also be found throughout the community and include business premises, churches and recreational areas. Storm water furrows and gravel roads furthermore contribute to the informal feeling experienced when visiting the area.

The informal settlement of Gamakor currently functions in a harmonious manner with the surrounding neighbourhood of Keimoes without any problems being encountered, it is therefore the opinion of this office that this application should be considered for approval by the JMPT.

## 2.5. INFRASTRUCTURE

### 2.5.1. WATER

BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the provision of water are as follow:

**Bulk Water Infrastructure – The current capacity of the bulk water infrastructure is not enough to accommodate the proposed Gamakor development as is.** It is proposed that the infrastructure should be upgraded, not only to provide adequate capacity for the Gamakor development, but also for future water demand increases. The following upgrades are proposed:

- Repairs at the Water Treatment Works for mechanical and electrical components and the control system;
- Replace one of the supply pumps at the Water Treatment works with a larger pump (sized for 91 l/s and 45m head);
- Install a new 4.2km 450mm Ø uPVC supply line to the storage reservoir from the waste water treatment works;
- A new storage reservoir will be required to meet the recommended 48-hour storage requirement. The construction of a new 3ML reservoir is proposed to the north of the development.
- Install a new 1km 450mm Ø uPVC distribution line from the storage reservoir to the Gamakor area.

Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for. BVI also approached the Department of Water and Sanitation (DWS) for funding, with DWS confirming the possibility of using WSIG to fund bulk water and waste water infrastructure over a period of two years.

### 2.5.2. SEWERAGE

BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the handling of sewerage and waste-water are as follow:

**Bulk Sewage Infrastructure - The current capacity of the sewer water infrastructure is not enough to accommodate the proposed Gamakor development, nor is it adequate for the current loading.** It is proposed that the infrastructure should be upgraded as soon as possible:

- Waste Water Treatment Works: Construction of a new 2.5 ML Waste Water Treatment Works. The proposed position of the WWTW is to the south-west of the Gamakor development.
- Gamakor West pump station and rising main: The western portion of the Gamakor will be able to drain to the south-western corner. It is proposed to construct a pump station with a 1km 250mm diameter rising main to the proposed WWTW;
- Gamakor East pump station and rising main: The south-eastern portion of the Gamakor drains to the south-eastern corner. It is proposed to construct a pump station with a 2km 250mm diameter rising main to the proposed WWTW. This pump and rising main should be sized to accommodate a large portion of the Keimoes area in order to migrate the sewer flows to the new WWTW in the future in phases.
- In order to migrate future flows from the current pumping system to the new WWTW, a new pump line will also need to be constructed between the Extension 6 Pump Station and the Gamakor East Pump Station. However, this is not necessary for the Gamakor development and has been omitted from the costing summary.

Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for. BVI also approached the Department of Water and Sanitation (DWS) for funding, with DWS confirming the possibility of using WSIG to fund bulk water and waste water infrastructure over a period of two years.

### 2.5.3. ELECTRICITY

BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report for the provision of electricity are as follow:

**The existing bulk services infrastructure of Keimoes is not sufficient to accommodate the additional demand the proposed 1500 residential properties and associated land uses will require.**

- Electricity Supply – Formal bulk upgrade process to be finalised between Eskom and Kai !Garib Municipality.
- Electrical Load Centre – The existing Load Centre “Keimoes Nommer 2” can accommodate the future additional load, with only minor modifications to be done in the Load Centre and as agreed with the Municipality’s Electrical Department.

Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for.

#### **2.5.4. STORM WATER**

BVI Consulting Engineering has been appointed to conduct a detailed services report (Annexure D) for the formalisation of Gamakor. The services report investigated the current bulk services capacity, determined the needed upgrades to accommodate the Gamakor community, and sought solutions to obtain the required funding to implement the necessary upgrades to the bulk services infrastructure. The findings of the services report storm-water management are as follow:

- Roads and Access: No bulk infrastructure upgrading required on the roads.

It should furthermore be noted that the final layout plan (Annexure F) for the Gamakor community has been designed with the contouring of the landscape, as well as the major storm water furrows in mind.

#### **2.5.5. ROAD NETWORK**

The proposed development entails an extended internal road network to functionally link with Keimoes’ existing road infrastructure. The formalisation of existing residential blocks & erven, as well as the presence of permanent structures, have resulted in staggered intersections within the existing road network of Keimoes. The layout for Gamakor provides a coherent internal road network with a hierarchy of road classes. J.C. Hollenbach Street has been extended into the Gamakor Community thereby creating an arterial road for easy access throughout the layout. Collector roads at key intersections with the existing road network of Keimoes have also been incorporated to further promote accessibility right through the layout. Lastly, the road network has been designed to allow for future township expansion to the north and west, as well as make provision for a future linkage to the N14 national road. Kindly note that the linkage to the N14 will take place in the future and is not a priority at this stage. SANRAL has been informed of the planned formalisation process and the possible direct linkage to the N14 national road. The notification letter to SANRAL can be seen as Annexure J.

### **2.6. SIZE, ZONINGS AND REGULATIONS**

The formalisation process pertains to portions of three registered farm portions, namely the Remainder, Portion 95 & Portion 128 of the Farm Kousas, No. 459, Gordonia RD, all held under the ownership of the Kai !Garib Local Municipality. The proposed formalisation will provide sub economic & middle income housing with the end goal of securing ownership of land for current and residents. The Gamakor community currently houses an estimate of between 850 to 900 informal stands, of which almost 140 stands accommodate permanent structures.

The following table provides a breakdown of the involved land portions, in terms of size, land use and zoning:

Property Description	Property Size	Land Use	Zoning (Kai !Garib Land Use Management Scheme)
Remainder of the Farm Kousas, No. 459, Gordonia RD	940.374ha	Mostly vacant, except for ±35ha which forms part of the Gamakor informal community.	Agricultural Zone I
Portion 95 of the Farm Kousas, No. 459, Gordonia RD	15.2302ha	Mostly vacant, except for ±0.56ha which forms part of the Gamakor informal community.	Open Space Zone I & Open Space Zone II
Portion 128 of the Farm Kousas, No. 459, Gordonia RD	36.25ha	The entire extent of this property forms part the Gamakor informal community.	Residential Zone I

Table 2: Breakdown of property information.

In order to achieve the objective of formalising the informal community of Gamakor, this formal land use change application, pertaining to subdivision, consolidation & rezoning, is submitted to the Kai !Garib Local Municipality as municipality of first instance.

The proposed zonings and land uses, in terms of the Kai !Garib Land Use Management Scheme, that are proposed by this application are as follow:

Zoning	Primary Use/s	Erven Amount
Residential Zone I	Dwelling House / Residential House	1500
Business Zone I	Business Building/ Premises	31
Institutional Zone I	Place of Instruction / Educational building	2
Institutional Zone II	Place of Worship	7
Open Space Zone II	Public Open Spaces	32
Open Space Zone III	Private Open Spaces	1
Authority Zone I	Municipal Use	1
Transport Zone I	Public Street	1
Total:		1575

Table 3: Breakdown of requested zoning/ land uses

Please refer to the Detail Layout (Annexure E) for further detail in this regard.



## 2.7. SUMMARY

During the consideration of the approval of this application, it is necessary to keep the following in mind:

- a) *This application is in line with the principles set out in Chapter 2, §7 of the Spatial Planning and Land Use Management Act, Act 16 of 2013;*
- b) *This application complies with the provisions of the Kai !Garib Land Use Management Scheme;*
- c) *Addressing the backlog of housing as encountered within numerous settlements in the Northern Cape Province;*
- d) *This application complies with the general principles as prescribed in Chapter 1 of the Spatial Planning Land Use Management Act (Act 16 of 2013);*
- e) *The proposed formalisation of the Gamakor informal community aligns with the provisions of the Kai !Garib SDF;*
- f) *The proposed formalisation of the Gamakor informal community has been captured as a priority project within the Kai !Garib Integrated Development Plan of 2020/2021.*

## 2.8. LAYOUT PRINCIPLES

### LOW-COST HOUSING

The formalisation of Gamakor consists of sub economic housing, ranging between 300m<sup>2</sup> to 350m<sup>2</sup> for the most part. These are, however, instances where properties exceed the mentioned size range, due to the long-standing occupation of land portions. This proposed layout seeks to accommodate the bulk of existing temporary and permanent houses at their currently location.

### MIDDLE INCOME HOUSING

The formalisation of Gamakor makes provision for a total of 55 middle income residential properties. These properties will be subject to property taxation and will therefore provide much needed final backing to the Kai !Garib Municipality.

### MOVING/ RELOCATION OF HOUSES

A detail survey of the study area has been undertaken by the appointed land surveyors and this survey included the identification of all temporary and permanent structures. It should be mentioned that Macroplan conducted a site visit a few months after the detail survey upon which additional permanent structures were identified. Kindly refer to Annexure L for a map indicating the structures that were identified during the detail survey, as well as the additional permanent structures that Macroplan picked up. One of the main objectives during the design of the Gamakor community was to accommodate as much of the existing structures, without moving or relocating them, as best possible. Numerous factors had to be kept in mind during the preparation of the final layout, such as the street fronting of the existing houses, permanent structures, storm water furrows and creating of a coherent internal road network. The impact (See Annexure L) of the final layout on the existing structures has been divided into two distinctive actions, namely the moving of structures and the relocation of structures. The moving of structures requires the shifting of temporary structures a few meters to the nearest proposed erf, these include structures that are situated within the proposed road network or encroach over a communal property boundary. The relocation of temporary structures means to relocate a temporary structure to a proposed erf that is not

situated in close proximity to these structures. These are temporary structures that are situated within the storm water furrows or two houses that are developed on a single property.

### STORM WATER FURROWS

The Fresh Water Report (Annexure H) captured three storm water furrows that needed to be suitably accommodated within the final layout. Open spaces and the internal road network have been used to accommodate the storm water furrows. A 32m buffer from the centre of the main storm water furrow has been maintained to canal any storm water, whilst a 10m buffer from the centre of the lower order storm water furrows have been maintained due to their lower impact.

### ROAD NETWORK

The proposed development entails an extended internal road network to functionally link with Keimoes' existing road infrastructure. The formalisation of existing residential blocks & erven, as well as the presence of permanent structures, have resulted in staggered intersections with the existing road network of Keimoes. The layout for Gamakor provides a coherent internal road network with a hierarchy of road classes. J.C. Hollenbach Street has been extended into the Gamakor Community thereby creating an arterial road for easy access throughout the layout. Collector roads at key intersections with the existing road network of Keimoes have also been incorporated to further promote accessibility right through the layout. Lastly, the road network has been designed to allow for future township expansion to the north and west, as well as to make provision for a future linkage to the N14 national road. Kindly note that the linkage to the N14 will take place in the future and is not a priority at this stage.

## 3. PROPOSED LAND USE CHANGE

### 3.1. PLANNING APPROACH

During the motivation of the project, the following objectives were kept in mind:

- ❖ *The proposed formalisation is not expected to negatively influence the character of the surrounding residential neighbourhood.*
- ❖ *The physiography, as evident by findings of geotechnical report, of the area is capable to accommodate the planned formalisation.*
- ❖ *A detail services report was conducted on account of the formalisation of the Gamakor community which will inform the procurement of funding going forward.*
- ❖ *The proposed formalisation will facilitate individual transfers of land ownership.*
- ❖ *Complying with any provisions that the Municipality may be enforce on the application.*
- ❖ *The proposed layout complies with the findings and recommendations of the specialist studies.*



### 3.2. PUBLIC PARTICIPATION

As contemplated in SPLUMA and the Kai !Garib Municipal By-laws, a land use change implies an amendment to the Scheme and where an amendment to a scheme is to be considered, according to §28(2), a public participation process must be undertaken to ensure that all affected parties have the opportunity to make representations on, object to and appeal the decision. For the purpose of land use applications in the Kai !Garib Municipality at this stage, we will be guided by the requirements of the Municipality and we anticipate these to include:

1. Notice placed in local print media, which will be followed by a limited 30 day period within which any member of the public may provide inputs and/or objections with regard to the proposed development at the local municipality. No late inputs will be considered relevant with the cut-off date being clearly indicated in the public notice.
2. The same notice published in the local print media will be placed at the entrance to the involved property, at the same time as publication, allowing an expanded audience to be reached by the notice.
3. The said notice will be forwarded to the surrounding land owners via registered mail or hand delivery, further expanding the audience for inputs.
4. The formalisation of Gamakor will also include an transparent community engagement process, that will be done with the assistance of the Kai !Garib Housing Department and the Ward Councillors.

Should any inputs be received by the office of the Kai !Garib Municipality, it would be the responsibility of the receiving official to place the date stamp of the Municipality on the received input, proving that it was acquired within the limited timeframe. Upon the closure of the 30 day public participation period, any inputs received must be forwarded to the applicant whereupon the applicant will have a maximum of 30 days to provide a written response to these inputs. The application will then be forwarded to the decision-making body for consideration.

### 3.3. PROPOSED LAND USES

After approval, the following land uses will be established on the study area in terms of the Kai !Garib Scheme Regulations – Please refer to Annexure E for the Detail Layout:

Residential Zone I	Indication on map: colour	Yellow	
	Primary use/s	Dwelling House / Residential House	Means a building containing only one residential unit – a self-contained interlinking group of rooms for the accommodation and housing of a single family, or a maximum of four persons who do not satisfy the definition of a “family”, together with such outbuildings as are ordinarily used therewith.

*1500 land units created will be given this zoning with the objective of formalising the existing residential houses development on*

the study area, as well as make provision for future residents. This land use covers 56% of the total Gamakor Formalisation area.

Business Zone I	Indication on map: colour	Red	
	Primary use/s	Business Building / Premises	Means a site and/or building or part thereof used or intended to be used as shops and/or offices and it includes hotels, restaurants, dry-cleaners, financial institutions, professional offices, places of assembly, doctors consulting rooms, stock or product exchanges, put-put course, flats above ground floor and buildings for similar uses, but it excludes bottle stores, taverns, places of entertainment, a casino, adult entertainment, institutional buildings, funeral parlours, public garages, service stations, repairing or related replacing functions, industrial buildings, offensive industries, heavy vehicle overnight facilities or any wholesale business.

31 land units created will be given this zoning within the layout, providing economic prosperity to the residents of Gamakor. This land use covers 9% of the total Gamakor Formalisation area.

Institutional Zone I	Indication on map: colour	Light Blue	
	Primary use/s	Place of Instruction / Educational building	Means a school (both primary, secondary, special and private schools), college, technical institute, academy, university, lecture hall or other centre of instruction, and includes a hostel appertaining thereto, and a convent, dormitory, public library, art gallery, museum, gymnasium, training centre and creche, but does not include a building used or intended to be used wholly or primarily as a certified reformatory or industrial school or as a school for the mentally handicapped;

2 land units created will be given this zoning within the layout, providing educational opportunities for the residents of Gamakor. This land use covers 4.7% of the total Gamakor Formalisation area.

Institutional Zone II	Indication on map: colour	Light Blue	
	Primary use/s	Place of Worship	Means a church, synagogue, mosque, temple, chapel or other place for practising religion. This includes any building in connection therewith, for instance a hall, Sunday school classes or parsonage, but does not include funeral parlours (Office & Facility), including chapels forming part of such funeral parlours;

7 land units created will be given this zoning within the layout, providing religious properties for the residents of Gamakor. This



land use covers 1% of the total Gamakor Formalisation area.

Open Space Zone II	Indication on map: colour	Green	
	Primary use/s	Public open space	Means any land which falls under, or is intended to come under the ownership of the local authority, which is not leased or intended to be leased on a long-term basis, and which is utilised by the public as an open space, park, garden, picnic site, square, playground or recreational site, whether it appears on an approved general plan or not.

32 land units created will be given this zoning within the layout, accommodating storm-water furrows & protective vegetation. This land use covers 9% of the total Gamakor Formalisation area.

Open Space Zone III	Indication on map: colour	Light Green	
	Primary use/s	Private open space	Means any land which has been set aside in this scheme for use as a private site for sport, playing, rest and recreation facilities or as an ornamental garden or pleasure-garden, provided that the land is under the long-term management of a private person or authority, and also a cemetery or show grounds, whether public or private.

1 land unit created will be given this zoning within the layout, providing recreational activities for the residents of Gamakor. This land use covers 1% of the total Gamakor Formalisation area.

Transport Zone I	Indication on map: colour	Light Grey	
	Primary use/s	Public Street	Means any land indicated on a plan or diagram or is specified within this zoning scheme, reserved for street purposes and where the ownership as such vests in a competent authority and includes facilities for public transport.

1 land unit created will be given this zoning within the layout, accommodating the internal road network. This land use covers 26.1% of the total Gamakor Formalisation area.

Authority Zone I	Indication on map: colour	Light Red	
			Means land/erven and buildings utilised by Local and District Municipality to carry out its mandatory functions, of which the extent thereof is of such nature that is cannot be classified or defined under any other usage in these regulations and include uses such as

	Primary use/s	<b>Municipal Use</b>	stores, warehouses, cemeteries, commonage, nursery, waste disposal site and water purification works, etc. The land/erven zoned for this purpose must be registered in the name of the Municipality.
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*1 land unit created will be given this zoning within the layout, providing community related uses. This land use covers 0.2% of the total Gamakor Formalisation area.*

## 4. RECOMMENDATION

It is thus evident from the previous discussions that this application for the formalisation of the Gamakor Settlement on the involved properties, is desirable for development in the Kai !Garib Municipality and should be positively considered for approval by the JMPT.

### 4.1. APPROVAL OF THE APPLICATION

The Kai !Garib Municipality is therefore requested to:

1. Give the go-ahead for advertising the application according to and in terms of the procedures adopted by themselves as part of their commitment to the provisions of the Spatial Planning and Land Use Management Act, Act 16 of 2013. The public participation process will be handled by this office and proof thereof will be sent to the Municipality.
2. Communicate the relevant Administrative fee to this office after accepting the application and stipulating its requirements.
3. Recommend the approval of this land use application to the JMPT after the closure of the public participation process.

The JMPT is therefore requested to:







1. Favourably consider this application for subdivision, consolidation and rezoning by means of approving it in terms of the recommendation from the office of the Kai !Garib Municipality.

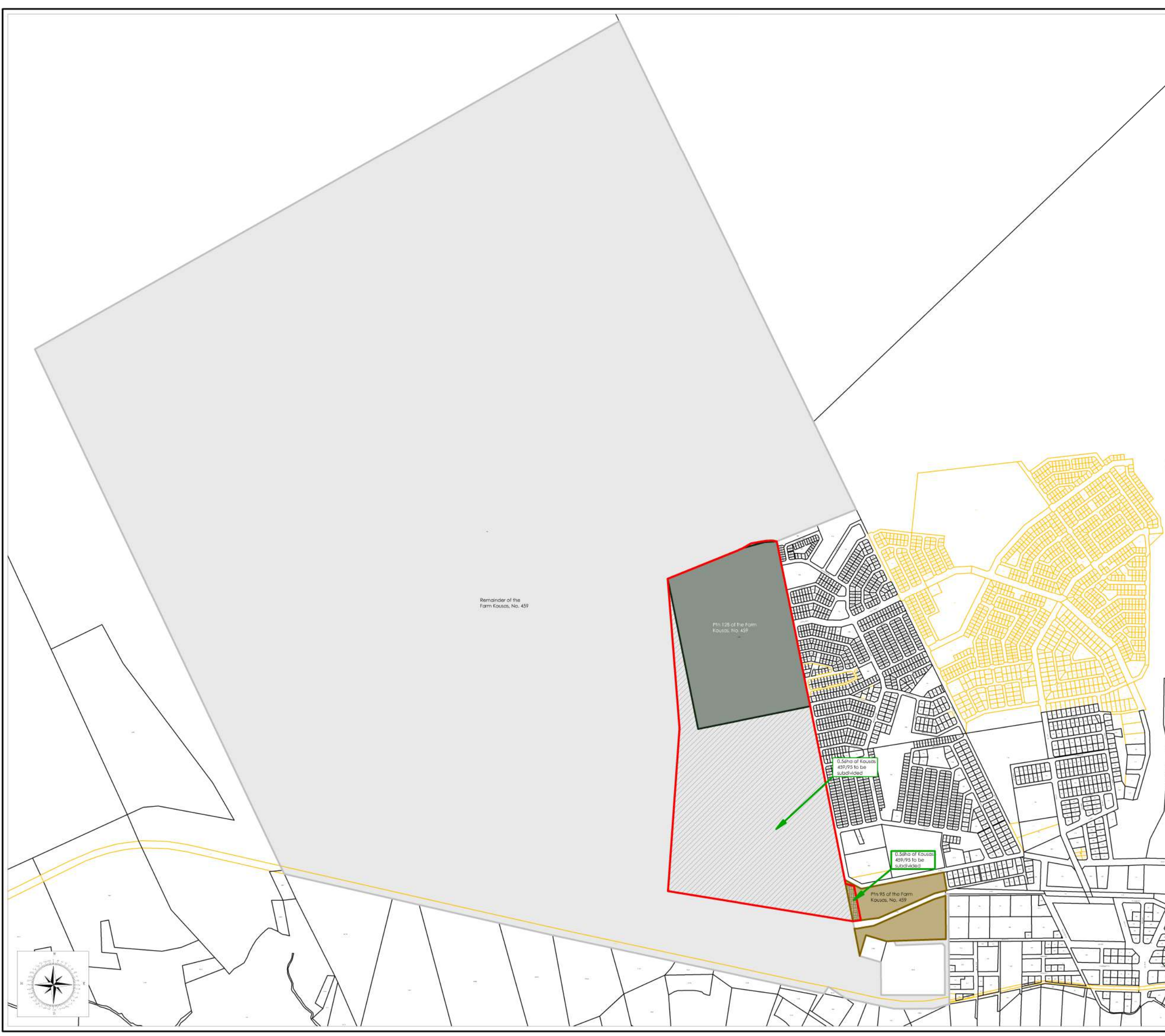


Title: **Figure 5**  
**Proposed Subdivision**

Description:  
REMAINDER OF THE FARM KOUSAS, NO. 459, PORTION 95 OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

**Legend**

- Involved Properties
-  Kousas 459/RE
  -  Kousas 459/128
  -  Kousas 459/95
- Proposed Subdivision Areas
-  60ha portion of Kousas 459/Re
  -  0.56ha portion of Kousas 459/95
  -  Study Area



Municipality:



Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401

Consultant:



**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference: (FIG5.SUB.REZ) 200721 Re, Ptn 95 & Ptn 128 of the Farm Kousas, No. 459		
Designed	JP Theron	Date August 2020
Drawn	JP Theron	Scale 1: 17500



Title: **Figure 6**  
**Proposed Consolidation**


Description:  
REMAINDER OF THE FARM KOUSAS, NO. 459, PORTION 95 OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI IGARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

**Legend**

 Newly Consolidated Land Unit

New created land unit in extent of approximately 97 ha.

This land unit forms the study area to the formalisation of Gamakor and will subsequently be subdivided into numerous land units to cater to the different land uses of the Gamakor community.



KAI !GARIB  
MUNICIPALITY

Postal Address:  
Private Bag X6  
Kakamas  
8870

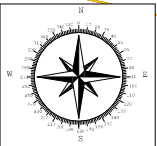
Tel No: 054 461 6700  
Fax No: 054 461 6401



MACROPLAN  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

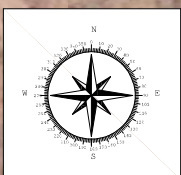
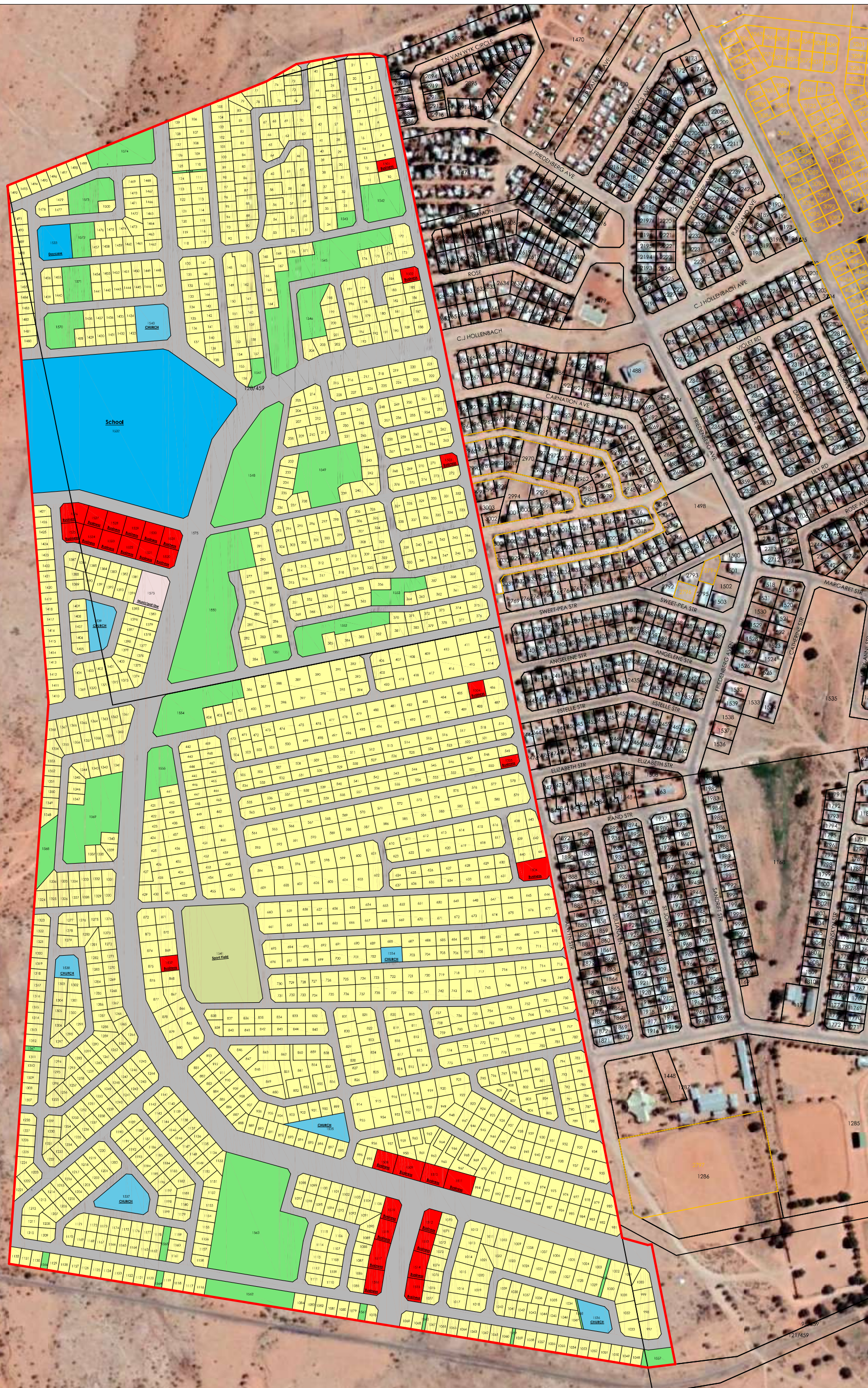
054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference (FIG6.SUB.REZ) 200721 Re, Ptn 95 & Ptn 128 of the Farm Kousas, No. 459	
Designed JP Theron	Date August 2020
Drawn JP Theron	Scale 1: 7500





**FIGURE 7 - PROPOSED FORMALISATION LAYOUT OF GAMAKOR INFORMAL COMMUNITY - PG. 49**



# KAI !GARIB MUNICIPALITY GAMAKOR TOWNSHIP FORMALISATION

Design: JP Theron (A/2394/2016)

Drawn: JP Theron (A/2394/2016)

Date: August 2020

Scale: 1:5000

Plan nr: \_\_\_\_\_

**Detail Layout Plans**










Detail Layout Plan  
CL/DRW/KAI2020/GAM/FIN

### Proposed Land Uses In terms of Kal !Garlb Land Use Management Scheme

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes		
			total area per use	average size	percentage covered by use
	Open Space Zone I				
	Open Space Zone II	32	8.4ha	2625m²	9%
	Open Space Zone III	1	1ha		1%
	Agricultural Zone I				
	Agricultural Zone II				
	Recreation Zone I				
	Residential Zone I	1500	54ha	360m²	56%
	Residential Zone II				
	Residential Zone III				
	Residential Zone IV				
	Residential Zone V				
	Residential Zone VI				
	Institutional Zone I	2	4.5ha	2.23ha	4.7%
	Institutional Zone II	7	1ha	1429m²	1%
	Institutional Zone III				
	Authority Zone I	1	0.1ha	1652m²	0.2%
	Authority Zone II				
	Special Zone				

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes		
			total area per use	average size	percentage covered by use
	Undetermined Zone				
	Business Zone I	31	2ha	645m <sup>2</sup>	2%
	Business Zone II				
	Business Zone III				
	Business Zone IV				
	Business Zone V				
	Business Zone VI				
	Industrial Zone I				
	Industrial Zone II				
	Industrial Zone IV				
	Industrial Zone IV				
	Utility Zone I				
	Utility Zone II				
	Utility Zone III				
	Transport Zone I	I	25ha	25ha	26.1%
	Transport Zone II				
	Transport Zone III				
Total		1575	96ha	N/A	100%

### Topographical Information

Detail Description	Symbol
Protected Trees	
Contours	
Fences	
Water furrows	
Existing Houses	
Permanent Houses	
New Permanent Houses since project inception	
Rock Outcrops	
Storm-water Furrow	

**Project Descriptions:**

**Formalisation of Gamakor Informal Communities**



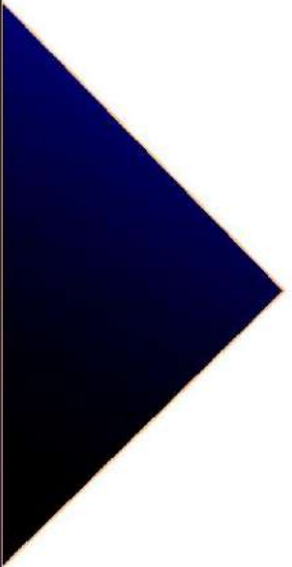
Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401





## ANNEXURE A: COPY OF TITLE DEEDS





2

L13588/cc

SEELREG  
STAMP DUTY R.....  
FOOI  
FEES R... *Ex PCS*

Prepared by me:

CONVEYANCER  
VENTER PHILIPPUS

GESERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie 66, Act 47/37  
terms of Regulation No.....

AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRATEUR VAN AMES  
REGISTRAR OF DEEDS

Date/Datum: 2020-03-04

DEED OF TRANSFER.

T 889 2014

(By virtue of a Power of Attorney)

BE IT HEREBY MADE KNOWN

**PHILIPPUS VENTER**

That ~~ANDRIES PETRUS GERBRAND VENTER~~  
appeared before me, Registrar of Deeds, VRYBURG he being duly authorised  
thereto by a Power of Attorney, dated 27 JANUARY 2014, executed at  
Kimberley and granted to him by the

FOR INFORMATION ONLY

NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA

AND the Appearer declared that on 19 August 2010 his Principal as aforesaid donated the following property to the undermentioned Transferee for the use of low cost housing free of charge

NOW THEREFORE the said Appearer in his capacity, as aforesaid, did, by these presents, cede and transfer, to and on behalf of

**KAIL GARIB MUNICIPALITY**

Its successors in title or assigns in full and free property

1. Portion 128 of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 36,0025 (Thirty Six Comma Zero Zero Two Five)  
Hectares

As will appear from Diagram SG Number 741/2009 and held by  
Deed of Transfer Number T88/1931

FOR INFORMATION ONLY

**SUBJECT TO:**

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESKOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.

2. Remaining extent of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 940,0374 (Nine Four Zero Comma Zero Three Seven  
Four) Hectares

Firstly transferred by Deed of Grant Number 955/1894 with diagram  
relating thereto and held by Deed of Transfer Number T88/1931

**SUBJECT TO:**

FOR INFORMATION ONLY

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.



- 4 -

**WHEREFORE** the Appearer in his said Capacity, renouncing all the right and title, the said

**NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA**

heretofore had to the premises, did, in consequence also acknowledged the said transferor to be entirely dispossessed of, and disentitled to the same; and that by virtue of these presents, the said

**KAI GARIB MUNICIPALITY**

Its successors in title or assigns now is and henceforth shall be entitled thereto conformably to local custom; The State, however, reserving its rights,

**IN WITNESS** whereof I, the said Registrar, together with the Appearer, q.q, have subscribed to the presents and have caused the seal of Office to be affixed thereto.

**THUS DONE and EXECUTED** at the Office of the **REGISTRAR OF DEEDS**, in **VRYBURG** on 2014-05-09

q.q.

In my presence

  
REGISTRAR OF DEEDS

FOR INFORMATION ONLY

2556336  
22. 6. 70  
14. 8. 70  
Datum

GUSERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie  
terms of Regulation No. 66, Act 47/37

AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRAR VAN AKTES  
REGISTRAR OF DEEDS

Date/Datum: 2020-07-16

FOR INFORMATION ONLY

POH PUNTEN ENDOUSEMENTS SET  
VIR VERDERE ENDOUSEMENTS BIEH

B15

AFSKRIF UITGEREIK—DATUM  
COPY ISSUED—DATE 1997-03-12

AANSOEK NR  
APPLICATION No. VA 17/1997

GD. 55-132-00858

Wet op die Beskikking oor  
Staatsgrond, 1961.

(Verkoop). 40  
1970

REPUBLIEK VAN SUID-AFRIKA.  
GRONDBRIEF NO.

NADEMAAL kragtens Goedkeuring gedateer 16  
Februarie 1968 magtiging verleen is vir die uitreiking van  
'n grondbrief aan die

MUNISIPALITEIT KEIMOES

ten opsigte van Perseel 45 van die plaas KOUSAS, geleë ge-

2 / ....

8

19

deeltelik in die Munisipaliteit Keimoes, Administratiewe distrik Gordonia die eiendom van die Republiek van Suid-Afrika kragtens Akte van Transport No. 88/1931 gedateer 28 Maart 1931, watter eiendom verkoop is aan die genoemde

MUNISIPALITEIT KEIMOES

vir die bedrag van vierhonderd en drie rand nege sent (R403.09).

SO GETUIG hierdie Akte dat behoudens die bepalings van die Wet op die Beskikking oor Staatsgrond 1961, en behoudens die regte van die Staat, die Republiek van Suid-Afrika hierby aan die genoemde

MUNISIPALITEIT KEIMOES

die se opvolgers in titel of regverkrygendes, toeken, afstaan en transporteer :-

Perseel 45 van die plaas KOUSAS, geleë gedeeltelik in die Munisipaliteit Keimoes, administratiewe distrik Gordonia, getransporteer aan KLAAS BOK kragtens Grondbrief No. 955 gedateer 24 April 1894, en aan die Republiek van Suid-Afrika kragtens Akte van Transport No. 88/1931 gedateer 28 Maart 1931;

Groot sewe en vyftig desimaal vyf vier twee agt (57.5428) hektaar, soos voorgestel en omskryf op die hieraangehegte L.G. No. 3010/67.

A. ONDERWORPE aan die voorwaardes en met die regte waarna verwys word in Akte van Transport No. 88/1931 gedateer 28 Maart 1931;

B. VERDER ONDERWORPE aan die volgende voorwaarde :-

3 / ....

98

98



specially subject to certain grazing rights in favour of the owners of the Lots shown on General Plan No. K. 60, except Lot marked School Site, in so far as these rights do not lapse by merger by reason of this Transfer, and which rights are more fully set out in certain Conditions of Sale marked "A" attached to the Deeds of Transfer Nos. 6640, 6641 and 7924, registered in favour of WILLIAM STERN on the 4th June, 1913 and 25th May, 1916, respectively.

C.  
te :-

EN VERDER ONDERWORPE aan die volgende reg-

- (a) By Deed of Grant No. 6/1939 dated 18th February, 1939 registered 7th March, 1939 the owner of Lot 22A thereby conveyed is entitled to the benefit of certain grazing rights on the remainder of the farm Kousas held under Deed of Transfer No. 88/1931 dated 28th March, 1931, as will more fully appear on reference to the conditions contained in the said Deed of Grant No. 6/1939.
- (b) Die eiendom gehou onder Akte van Transport No. 88/1931 gedateer 28 Maart 1931, is onderworpe aan 'n reg. van vrye weiding ten gunste van die eienaar van Perseel No. 19 van die plaas KOUSAS, afdeling Gordonia, toegeken aan JACOBUS NICOLAAS MOOLMAN kragtens Grondbrief 75/1957 op 6 Augustus 1957 uitgereik en op 13 September 1957 geregistreer.
- (c) Die eiendom gehou onder Akte van Transport No. 88/1931 gedateer 28 Maart 1931, is onderworpe aan 'n reg. van vrye weiding ten gunste van die eienaar van persele nos. 6 en 7 van die plaas Kousas, afdeling Gordonia, toegeken aan JOHANNES JAKOBUS SNYDERS (gebore 29 Maart 1896) kragtens Grondbrief No. 75/1958 op 19 September 1958 uitgereik, op 30 September 1958 geregistreer.

FOR INFORMATION ONLY

D. EN VERDER ONDERWORPE aan die voorbehoud van alle regte op edelgesteentes, onsele minerale en aardolie soos in die mineraalwette omskryf, vir die Staat.

E. EN VERDER BEHOUDENS die volgende voorwaardes :

- (a) Die grond mag alleenlik vir die doeleindes van 'n subekonomiese behuisingskema vir Kleurlinge gebruik word of vir sodanige ander doeleindes as wat die Minister van Landboukrediet en Grondbesit mag goedkeur;
- (b) Die grond of enige gedeelte daarvan mag nie sonder die voorafgekreë skriftelike goedkeuring van die Minister van Landboukrediet en Grondbesit deur die munisipaliteit vervreem word nie.

ALDUS GEDOEN en ONDERTEKEN deur die Administratiewe Beheerbeampte, Departement van Landboukrediet en Grondbesit, Pretoria, op hierdie .....dag van .....Augustus..... 1970 behoorlik daartoe gemagtig ingevolge die Wet op die Beskikking oor Staatsgrond, 1961.

.....  
ADMINISTRATIEWE BEHEERBEAMPTIE.  
DEPARTEMENT VAN LANDBOUKREDIET  
EN GRONDBESIT.

Volmag No. GPA.24/69  
Item 15(a)(ii).

GEREGISTREER in die Register van .....  
plase gehou te VRYBURG.

BOEK .....1..... FOLIO .....45.....  
op die .....27e..... dag van .....Augustus..... een-  
duisend nege honderd en sewentig (1970).

.....  
REGISTRATEUR VAN AKTES.

B I S .

End. op G 40/70

Kousas 459/95

FOR INFORMATION ONLY

Certificate of Registered Title No. T 142/74 Issued in terms of	
Sertifikaat van Geregtigde Titel No. 142/74 uitgevaardigd krachtens	
Sect. 143	Act No. 47/1937 In respect of the
Art. 1288	Wet No. 47/1937 ten opzichte van
E 1288 Keimoes groot =	
42 326 Hektar.	
Remainder	19 2302 ha
Restant	
DEEDS OFFICE AKTESKANTOOR	T. H. BRINCKER REGISTRAR REGISTRATEUR
- 8 - 2 - 1974	

Die binnegemeelde plaas is nou tot  
The within-mentioned farm is now No. Ged. 95 van die  
Registrasie-Afdeling  
Registration Division  
Distrik  
District

Aktekantoor,  
Deeds Office,  
Vryburg.

- 8 - 2 - 1974

T. H. BRINCKER  
Registateur van Aktes/Registrar of Deeds.



B16.

End. op G. 40/70.

Ged. 95 Plaas. Kousas. N<sup>o</sup> 459.

FOR INFORMATION ONLY

MISC. 13/1974

Kragtens Artikel. 2(a) van die Wet  
op die beskikking van Staatsgrond.  
N<sup>o</sup> 48/1961. word voorinvoordes E(a) en  
(b) op bladsy 4 hiervan gekanselleer.

- 8 - 2 - 1974

Aktekantoor,  
Vryburg

T. H. BRINCKER

Registrateur van Aktes.

Bladsy 7

ENDOSSEMENT OP GRONDBRIEF 40/1970  
DIE PLAAS KOUSAS 459/95

FOR INFORMATION ONLY

Kragtens Administrateurs Proklamasie Nr 315/1973  
gedateer 29 Augustus 1973 in Offisiële Koerant  
Nr. 374 geateer 7 September 1953, is die grense  
van die Munisipaliteit van Keimoes verander  
met ingang van 1 Januarie 1974 deur die geheel  
van die binne gemelde eiendom (Uitgesluit die  
figure X,Y,F,G,H,J op die kaart Nr. 3010/67  
hieraan geheg) daarby in te lyf. Sien ook  
endossement op Kroongrondbrief Nr. 16/1942  
gedateer 16/9/42.  
Vide Misc. 22/1975

28-2-1975  
Aktekantoor,  
VRYBURG.

T. H. BRINCKER  
REGISTRATEUR VAN AKTES.

FOR INFORMATION ONLY  
B-8

8.  
BLADSY/PAGE.....  
ENDOSSEMENT OP  
ENDORSEMENT ON..... T 40/70  
SIENDOM/PROPERTY  
Plaas [Kassa] 499/95

FOR INFORMATION ONLY

ENDOSSEMENT:

Kragtens Notariële Akte van Kansellasië van Weidingsregte  
nr K 60/1975 S gedateer 25-6-1975 en hede geregistreer word  
die reg van vrye weiding (voorwaarde C (a) (b) en (c) op  
bladsy 3) gekanselleer soos meer volledig sal blyk uit  
bogemelde Notariële Akte.

15 -7- 1975  
AKTEKANTOOR VRYBURG

T. H. BRINCKER  
REGISTRATEUR VAN AKTES

9.  
FOR FURTHER ENDORSEMENTS SEE  
VIR VERDERE ENDOSSEMENTE SIEN.....



FOR INFORMATION ONLY

SCHRIJFSTAAT VAN GEREESTREKTE TITEL UITGEVERIK  
CERTIFICATE OF REGISTERED TITLE ISSUED

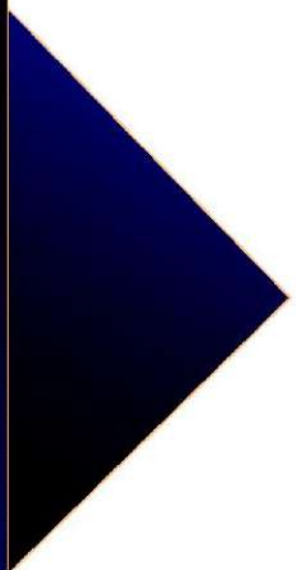
OPGEGEVEN VAN BRP 2152 KEEMOES  
Bij CF ..... PESTUIT 97-72-100  
GROOF 124325 D. JANDER .....

148/97

C. DAVERA  
REGISTRATEUR/REGISTRAR

1997-05-06

## ANNEXURE B: AUTHORISING DOCUMENTATION







Company Registration: 2009/001909/07 VAT Number: 4470254741

Barzani Development	Barzani Project Management
Barzani Holdings	Barzani Construction Supplies
Barzani Infra	Barzani Logistics & Plant
Barzani Properties	Barzani Mining
Barzani Aviation	Barzani Finance
Barzani Technologies	Barzani Security
Barzani Town Planning	Barzani Legal
Barzani IT Solutions	Barzani Materials

✉ info@barzanigroup.co.za

🌐 www.barzanigroup.co.za

#### Gauteng (Head Office)

Tel: +27 12 881 0210  
Fax: +27 86 476 7573

Building 9 Cambridge Office Park  
5 Bauhinia Street, Highveld  
Techno Park, Centurion, 0169

#### North West

Tel: +27 18 468 4876  
Fax: +27 86 476 7573

52 Ian Street, Wilkopies  
Klerksdorp, 2571  
(PO Box 6468 Flamwood, 2572)

#### Northern Cape

Tel: +27 53 831 3249  
Fax: +27 86 476 7573

Sub Office: Agri Office Park  
Building 2, Unit 1  
South Kimberly, 8301

#### Eastern Cape

Tel: +27 43 050 0828  
Fax: +27 86 476 7573

Leadwood House, Cedar Square  
Bonza Bay Road  
Beacon Bay, 5241

#### Kwazulu-Natal

Tel: +27 31 944 1635  
Fax: +27 86 476 7573

Office 15, Ground Floor A Block  
BCX Durban 1, 1 Frosterley Crescent  
La Lucia Ridge, Umhlanga, 4091

#### Mpumalanga

Tel: +27 13 590 0952  
Fax: +27 86 476 7573

2nd Floor, North Tower Suites 202, 1  
Aqua Street, Riverside 1226

## Amendment 2 to Appointment

Date : 28 May 2020

To : **Macroplan (Pty) Ltd (Consultant)**  
Represented by : *Len Fourie*

From : **Barzani Holdings (Pty) Ltd (Employer)**  
Represented by : *Roelof Van Den Berg & Ian Van Der Westhuizen*

Reference: NC/21/2018/PP (Gamakor 1500)

**WHEREAS** the Employer appointed the Consultant for Township Establishment for the Gamakor project.

**AND WHEREAS** the parties are desirous to change the Employer's name from Barzani Holdings (Pty) Ltd to Barzani Development (Pty) Ltd.

The Parties agree that the provisions of the Appointment will be amended as follows:

### 1. Amendment

The Parties agree that the Employer be changed to Barzani Development (Pty) Ltd with registration number 2019/001909/07. The signatories for the amended Employer remain the same and the Employer accordingly agrees



✉ info@barzanigroup.co.za

🌐 www.barzanigroup.co.za

## Gauteng (Head Office)

Tel: +27 12 881 0210  
Fax: +27 86 476 7573

Building 9 Cambridge Office Park  
5 Bauhinia Street, Highveld  
Techno Park, Centurion, 0169

## North West

Tel: +27 18 468 4876  
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(PO Box 6468 Flamwood, 2572)

## Northern Cape

Tel: +27 53 831 3249  
Fax: +27 86 476 7573

Sub Office: Agri Office Park  
Building 2, Unit 1  
South Kimberly, 8301

## Eastern Cape

Tel: +27 43 050 0828  
Fax: +27 86 476 7573

Leadwood House, Cedar Square  
Bonza Bay Road  
Beacon Bay, 5241

## Kwazulu-Natal

Tel: +27 31 944 1635  
Fax: +27 86 476 7573

Office 15, Ground Floor A Block  
BCX Durban 1, 1 Frosterley Crescent  
La Lucia Ridge, Umhlanga, 4091

## Mpumalanga

Tel: +27 13 590 0952  
Fax: +27 86 476 7573

2nd Floor, North Tower Suites 202, 1  
Aqua Street, Riverside 1226

that the Consultant will by no means be prejudiced by the amendment in any possible way. The signatories waive all rights that Barzani Holdings (Pty) Ltd enjoyed with the original Appointment Letter.

## 2. General

Save for the amendments and additional provisions stipulated under this amendment, the balance of the provisions and interpretations of the Appointment Letter and all relevant contracts remain to be in full force and effect.

Roelof van den Berg:  
Director

Date: 27/05/2020

Ian van der Westhuizen:  
Director

Date: 28/05/2020

Herewith do we accept this appointment letter, together with all the terms and conditions

Date:

01-06-2020

Service Provider Representative:

Len J Fourie

Signature:





# Munisipaliteit Kai !Garib Municipality

Munisipale Gebou

11<sup>de</sup> Laan

Tel 054 461 6700

Faks 054 461 6401

E-Pos: [admin@kaigarib.gov.za](mailto:admin@kaigarib.gov.za)

Privaatsak X 6

KAKAMAS

8870

BTW Reg Nr. 4170193371



Mnr. WD Swart  
Handel met hierdie saak

Municipal Building

11<sup>th</sup> Avenue

Tel 054 461 6700

Fax 054 461 6401

E-Mail: [admin@kaigarib.gov.za](mailto:admin@kaigarib.gov.za)

Private Bag X 6

KAKAMAS

8870

VAT Reg No. 4170193371

---

26 September 2017

Verw. No. 14.5.1.14

**Mnr. Len Fourie**

**Macroplan Stad- en Streeksbeplanners**

**Posbus 987**

**KEIMOE**

**8800**

## FORMALISERING VAN GAMMAKOR INFORMELE GEBIED, KEIMOE

U word verwys na die vergadering 'n tyd gelede te Keimoes waartydens die formalisering van die informele gebied, Gammakor, Keimoes ook bespreek was.

Hiermee word u aanstelling bevestig om voort te gaan met die verskillende prosesse ter formalisering van die informele gebied, Gammakor.

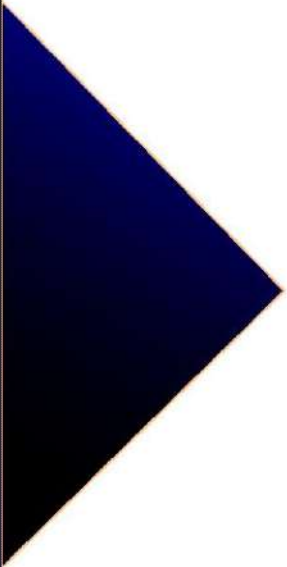
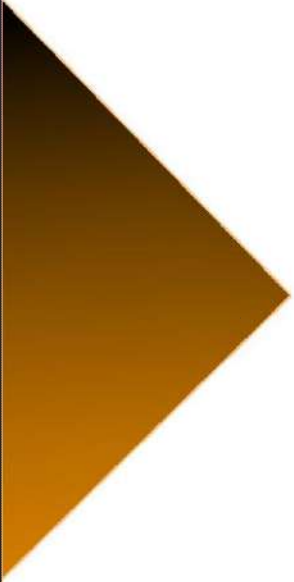
By voorbaat dank.

Die uwe

**JG LATEGAN**

**WND. MUNISIPALE BESTUURDER**

## ANNEXURE C: SG DIAGRAMS





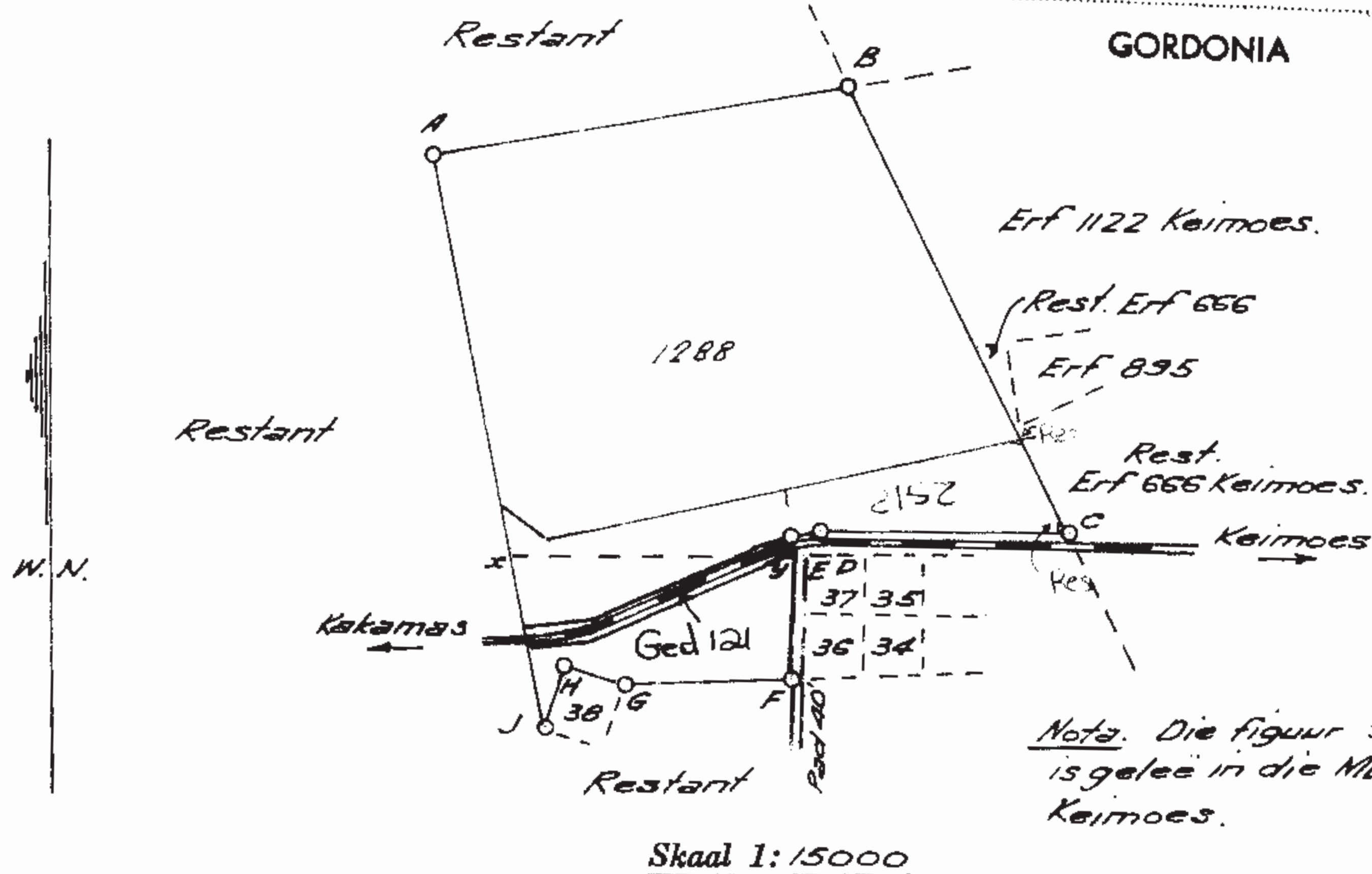
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FG	825.2	87.45.20	F	+ 13281.2 + 88035.9	
GH	299.8	106.37.40	G	+ 14105.8 + 88068.2	
HJ	300.1	16.35.40	H	+ 14393.1 + 87982.4	
JA	2825.1	168.49.00	J	+ 14478.8 + 88270.0	
		Keimoes Sta.	D	+ 8444.5 + 88184.7	
		Keimoes Wes	D	+ 11503.4 + 93663.2	

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Beskrywing van Bakens.

- A.C.D.E.F. Ysterpaal in beton.  
B. Ysterpaal wat 6" uitsteek.  
G. 1/2" ronde ysterpen.  
H.J. 1/2" ronde ysterpen in beton.

Gedeelte 95 (.....)  
gedeelte van Gedeelte..... van die plaas  
Kousas Nr. 459



Nota. Die figuur x.y.F.G.H.J. is geleë in die Munisipaliteit Keimoes.

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stel voor 671812 morg grond, synde

Perseel 45

van die plaas Kousas

geleë in gedeeltelik in die Munisipaliteit Keimoes.

Administratiewe Distrik Gordonia

Provinsie Kaap die Goeie Hoop

Opgemeet in Nov.-Des. 1966

deur my

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Landmeter.

Hierdie kaart is gehêg aan  
Grondbrief No. 40/70  
gedateer  
t.g.v.  
Registrateur van Aktes.

Die oorspronklike kaart is  
No. 1238/1894  
Transport/Grondbrief  
No. Gar. O. 2.59

Lêer No. S/3063.  
M.S. No. E.761/67  
Komp. GJ. 6DD/W4844(3047)  
Aftrek  
Alg. Plan K. 60 (2948)

FOR ENDORSEMENTS  
SEE BACK OF DGM.

S.P.C.T.-C7108

C

459/95





Gedeelte 128 van die Plaas Kousas No 459  
geleë in die Munisipaliteit Kai !Garib  
Administratiewe Distrik Gordonia  
Provinsie Noord-Kaap

Opgemeet in November 1983 tot Februarie 1984 en  
April 2006 deur ons

PLS0679 J D van Zyl

Professionele Landmeters

PLS0680 J L N van Zyl

L.G. No.  
741/2006

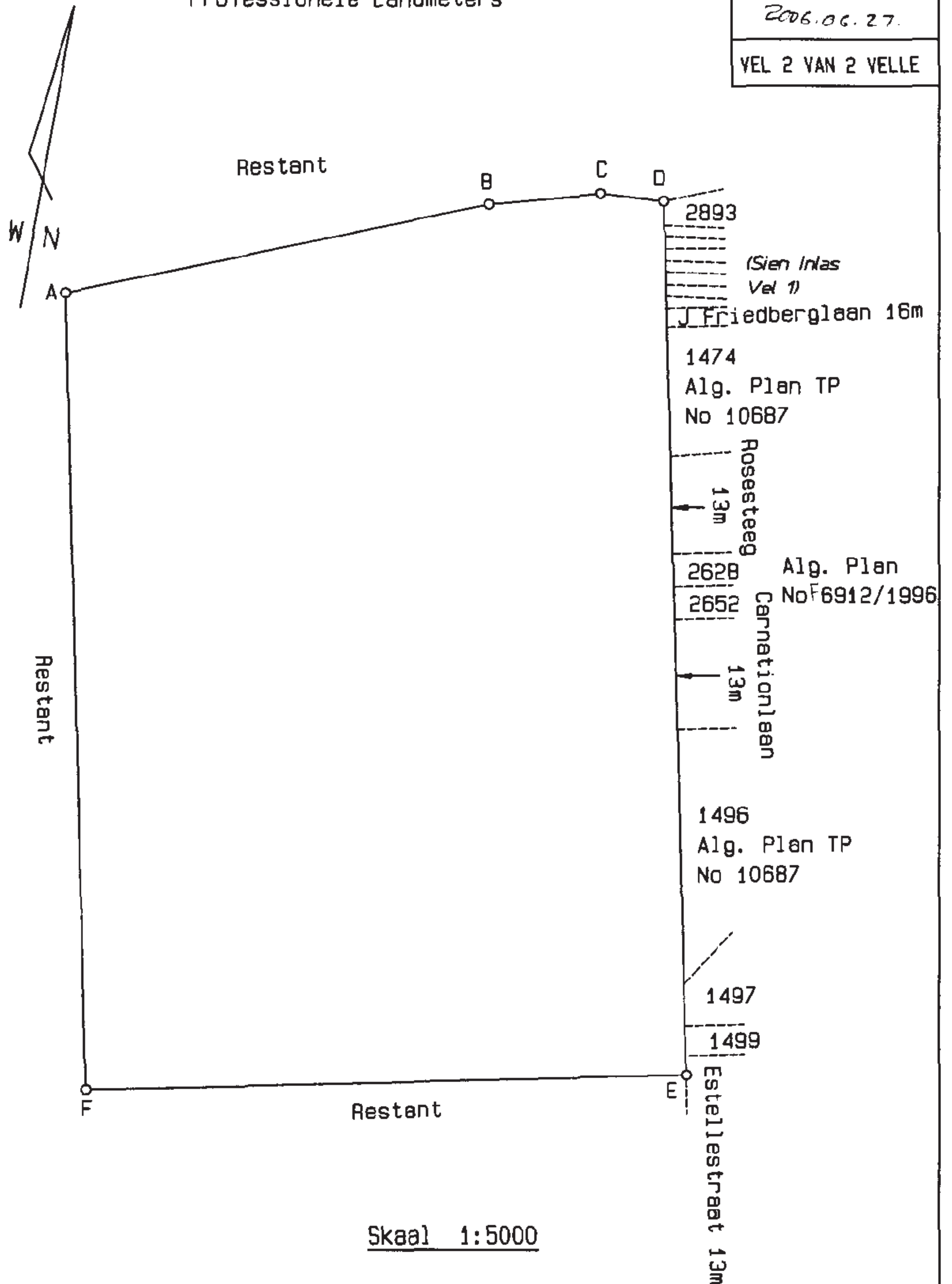
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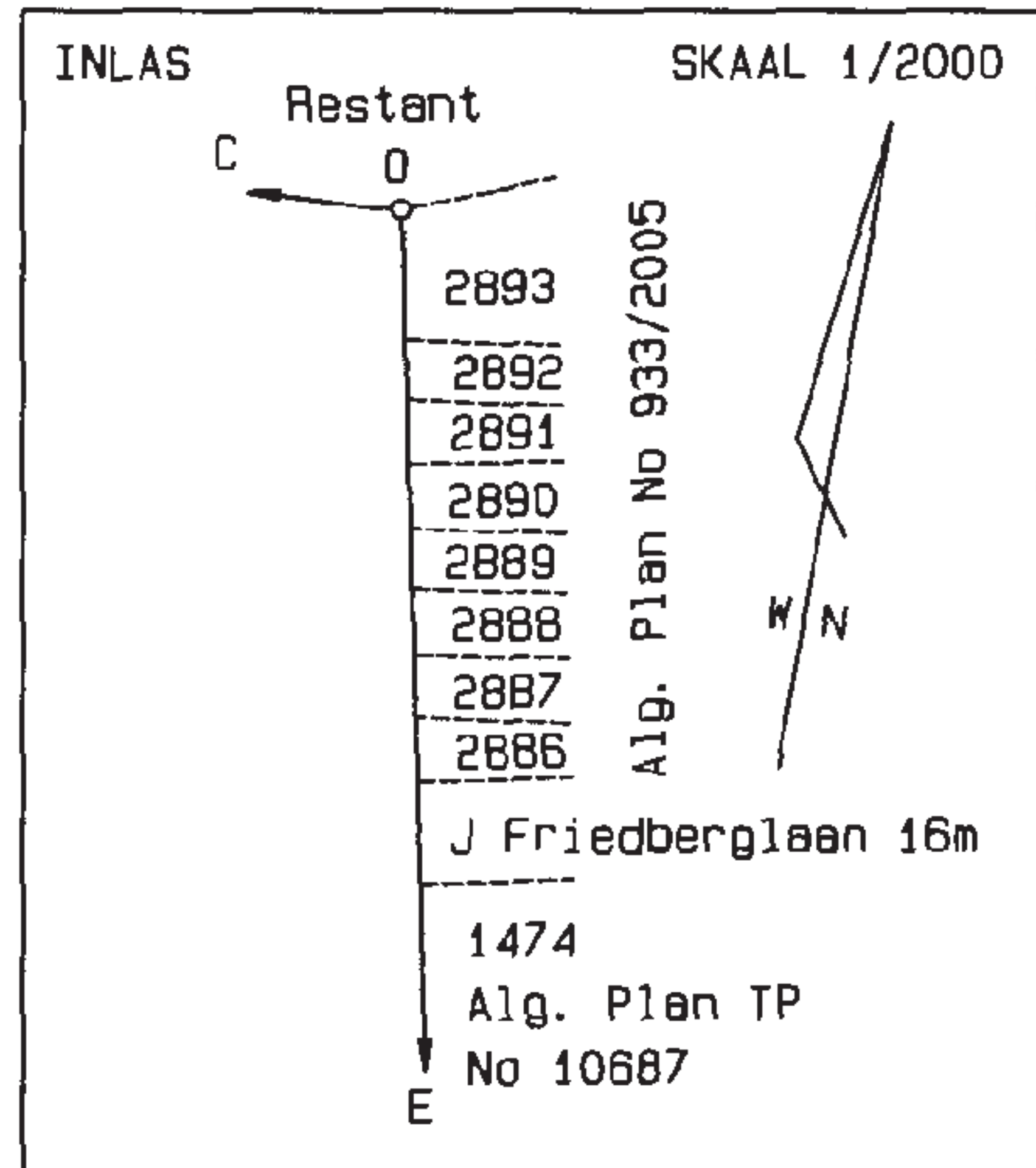


ONDERVERDELINGSDIAGRAM

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DE	738,10	348 34 01	D	+ 4 989,51	
EF	502,41	78 34 01	E	+ 4 843,20	
FA	673,14	168 34 04	F	+ 5 335,64	
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T'Kabies		(38)	Δ	+ 8 789,18	
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Beskrywing van bakens

A, B, C, D, E : Ysterpaal  
F : 20mm Ysterpen



Die figuur

A B C D E F

stel voor 36,0025 hektaar grond, synde

Gedeelte 128 van die Plaas Kousas No 459  
geleë in die Munisipaliteit Kai !Garib  
Administratiewe Distrik Gordonia  
Provinsie Noord-Kaap

Opgemeet in November 1983 tot Februarie 1984 en April 2006 deur ons

PLS0679 J D van Zyl

PLS0680 J L N van Zyl

Professionele Landmeters

Goedgekeur kragtens Artikel 49  
van Wet 7 van 1998. (Noord-Kaap  
Beplanning- en Ontwikkelingswet)

Verwysing: 14.5.1.2

Datum : 02/05/2006

Hierdie kaart is  
geheg aan  
No.

ged.  
t.g.v.

Registrateur van Aktes

Die oorspronklike kaart  
is  
L.G. No. F1238/1894

Grondbrief Gor.G.2-59

Lêer No. GORD 459

M.S. 362/2006

A.P.

Komp. GJ-600/V3 ( )

GJ-600B (5572)

GJ-600/V4 (3046)

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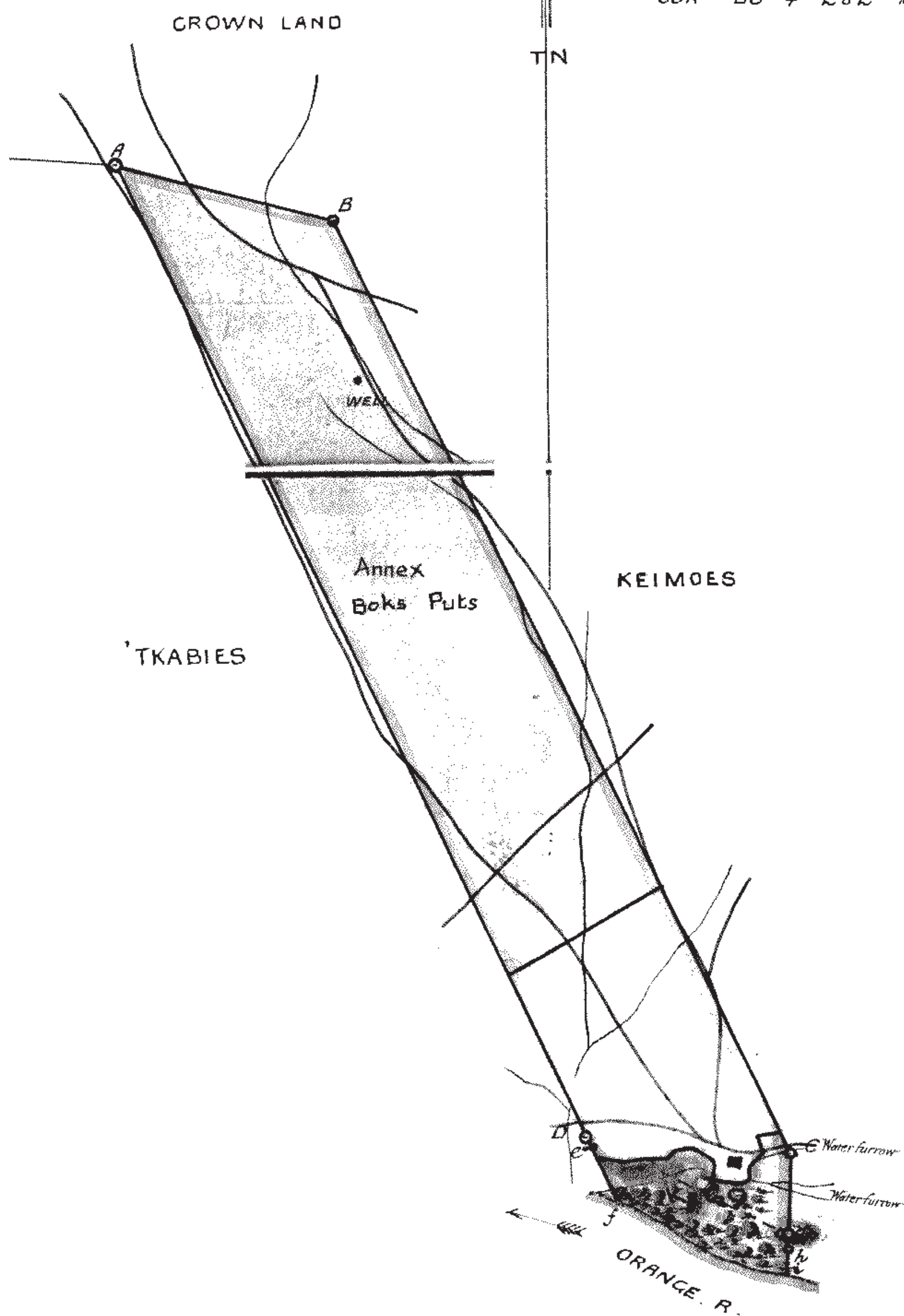
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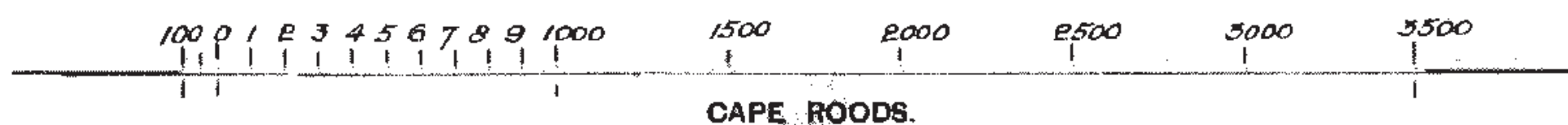
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FOR SUBDIVISIONS OF REMAINDER  
VIDE DEDUCTION PLAN NO. 8605

THE FARM KOUSAS No. 459  
GORDONIA

For full details see Gov. L.B. 65



The above diagram ABCgi, inner edge of Orange River, f D represents the farm KOUSAS in extent 6379 morgen 207 sq. roads, situate in Ward No. division of Gordonia

Bounded North<sup>ds</sup> by Crown Land  
South<sup>ds</sup> " Inner edge of Orange River  
East<sup>ds</sup> " Keimoes  
West<sup>ds</sup> " Tkabies

Framed from actual survey.

by us Tindall & Windley  
Government Surveyors

G J. 8 DDA

I certify that this diagram belongs to the title deed this day issued in favour of Klass Bok 24. 4. 1894

Surveyor General's Office

For list of deductions see back of diagram



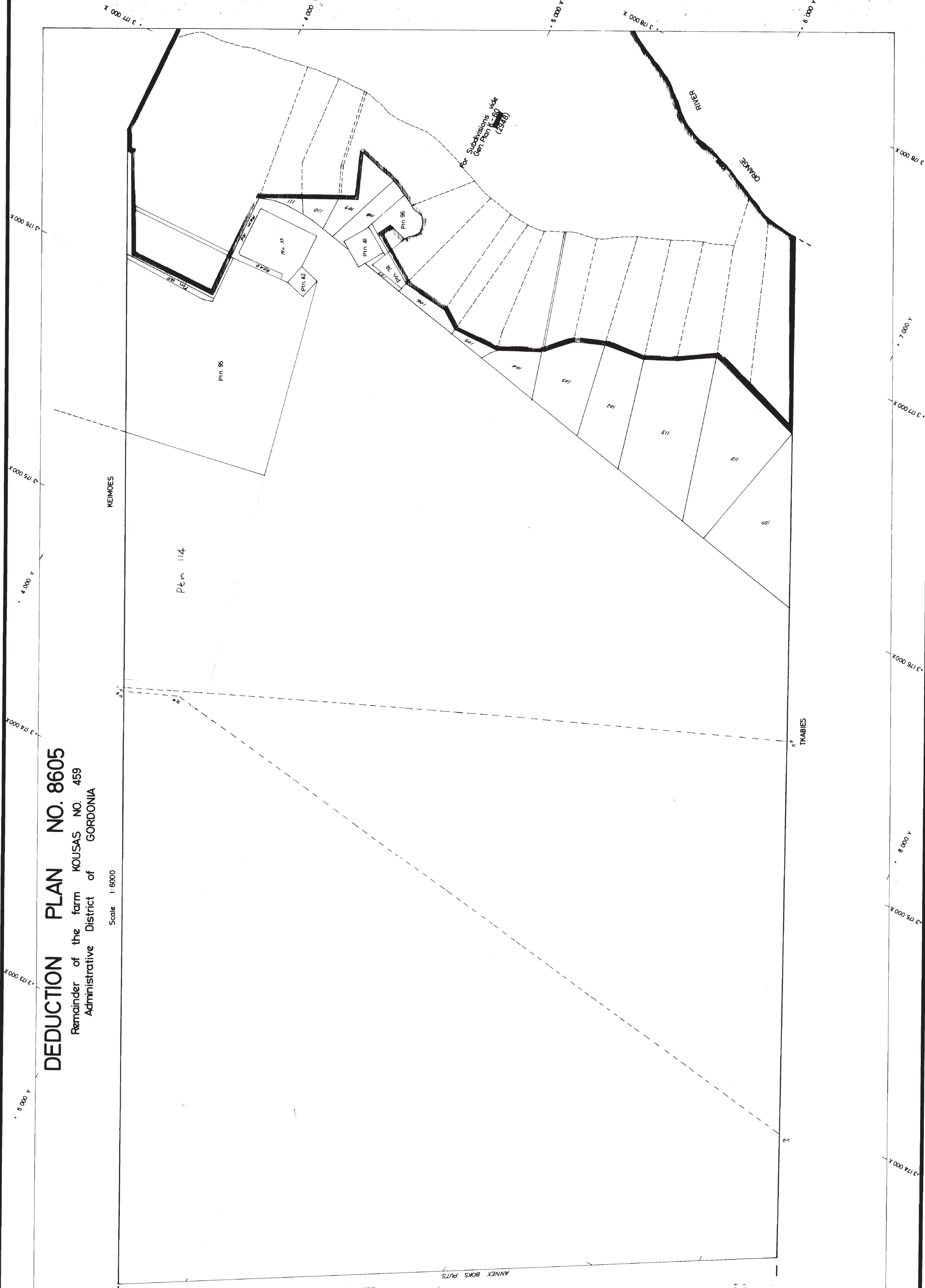
Remainder of the farm KOUSAS NO. 459  
Administrative District of GORDONIA

**KEIMOS**

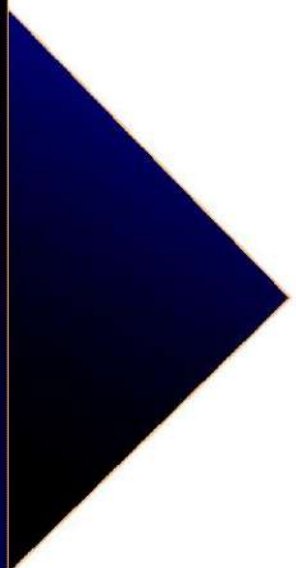
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## ANNEXURE D: SERVICES REPORT





# GAMAKOR HOUSING DEVELOPMENT

## Engineering Services Investigation Report

Investigation of the available and required bulk civil and electrical services for the Gamakor development, Keimoes

May 2020

Prepared for:  
**MACROPLAN**

Attention: Mr Len Fourie

Prepared by:  
**BVi Northern Cape (Pty) Ltd**  
55 Bult Street,  
Upington, 8801

Contact persons: Mr Simon van Blerk (Civil)  
& Mr Ricardo Humphries (Electrical)

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simonvb@bvinc.co.za





## DOCUMENT CONTROL RECORD

Project Name:	Gamakor 1500 Stands – Engineering Services Investigation Report
Project Number:	34072
Report for:	MACROPLAN

### REVISIONS:

Rev #	Date	Revision Details/Status	Prepared by / Author	Reviewed / Approved by
01	2020/05/22	Final report to be circulated to relevant parties.	S.P van Blerk	F.D. Maritz (Pr.Eng)
02	2020/08/17	Removed 1.1 Disclaimer; Added portion under funding (Section 71.); Added update under Electrical Demands and Availability (Section 6.1); Added Annexure A	S.P van Blerk	F.D. Maritz (Pr.Eng)

### APPROVAL:

Author signature		Approver signature	
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## EXECUTIVE SUMMARY

This report was compiled to investigate the bulk infrastructure in Keimoes and to determine whether the bulk infrastructure is adequate for the formalisation of the Gamakor area, Keimoes, through a low-cost housing development.

The bulk engineering services report includes the following categories:

- Bulk Water Infrastructure
- Bulk Sewer Infrastructure
- Bulk Road and Storm Water Infrastructure
- Bulk Electrical Infrastructure

After investigating the infrastructure, it was found that all the bulk infrastructure is not in place to accommodate the Gamakor project. The bulk services for each category that require attention before the project can commence is summarised below:

- **Bulk Water Infrastructure**
  - Repairs to the water treatment works mechanical and electrical components.
  - Replacement of one of the supply pumps at the water treatment works with a larger pump in order to deliver 91 l/s into the distribution system.
  - Construction of a new 4.2km, 450mm diameter supply pipe line;
  - Construction of a new 3ML storage reservoir;
  - Construction of a new 1km, 450mm diameter bulk distribution pipe line.
- **Bulk Sewer Infrastructure**
  - Construction of two new pump stations (37.5 l/s and 53.8 l/s).
  - Construction of two new 250mm rising mains (3.2km and 2km).
  - Construction of a new 2.5ML waste water treatment works;
- **Bulk Electrical Infrastructure**
  - Formal bulk upgrade process to be finalised between Eskom and the municipality;
  - Minor modification to the load centre.

This report can be used both for business plans and funding applications from the various funding schemes available.

## TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 Terms of Reference .....	1
1.2 Site Location.....	2
<b>2. TOPOGRAPHY .....</b>	<b>2</b>
<b>3. WATER SUPPLY .....</b>	<b>3</b>
3.1 Existing Water Infrastructure.....	3
3.2 Water Demands.....	6
3.3 Bulk Water Infrastructure Requirements .....	7
<b>4. SEWERAGE .....</b>	<b>10</b>
4.1 Existing Sewage Infrastructure .....	10
4.2 Sewage Flows .....	14
4.3 Bulk Sewer Infrastructure Requirements.....	15
<b>5. ROADS AND STORMWATER .....</b>	<b>19</b>
5.1 Roads and Access.....	19
5.2 Stormwater Management .....	19
<b>6. ELECTRICAL SUPPLY .....</b>	<b>20</b>
6.1 Electrical Demands and Availability .....	20
6.2 Existing Electrical Network .....	20
6.3 Proposed Electrical Network Extension .....	21
<b>7. COST ESTIMATE .....</b>	<b>23</b>
<b>8. PROJECT TIMELINE .....</b>	<b>25</b>
<b>9. CONCLUSION .....</b>	<b>26</b>





# 1. INTRODUCTION

---

## 1.1 Terms of Reference

- I. BVI Consulting Engineers was appointed by Macroplan to undertake this Bulk Engineering Services Study (Water, Sewer, Electricity and Roads & Storm Water) for the proposed Gamakor 1500 project located in the area of Keimoes within the jurisdiction of the Kai !Garib Local Municipality.
- II. The planned development consists of 1500 low cost houses on 1 site totalling 92.1 Ha in extent.
- III. The purpose of the Bulk Engineering Services Assessment is to determine the availability and capacity of existing bulk services with a view to servicing the proposed development. This report presents the findings of a preliminary visual inspection and desktop investigation relating to bulk services, and further sets out the criteria and standards for the internal services for the new development.
- IV. The Bulk Engineering Services addressed in this report are the following:
  - Water Supply
  - Sewerage
  - Roads and Access
  - Storm Water Management
  - Electricity Supply

## 1.2 Site Location

- I. The site is situated approximately 5km to the north-east from the central business area of Keimoes, Northern Cape (Figure 1 – Locality Plan).
- II. The development is located at the following co-ordinates:  $28^{\circ}41'40''$  S;  $20^{\circ}57'54''$  E

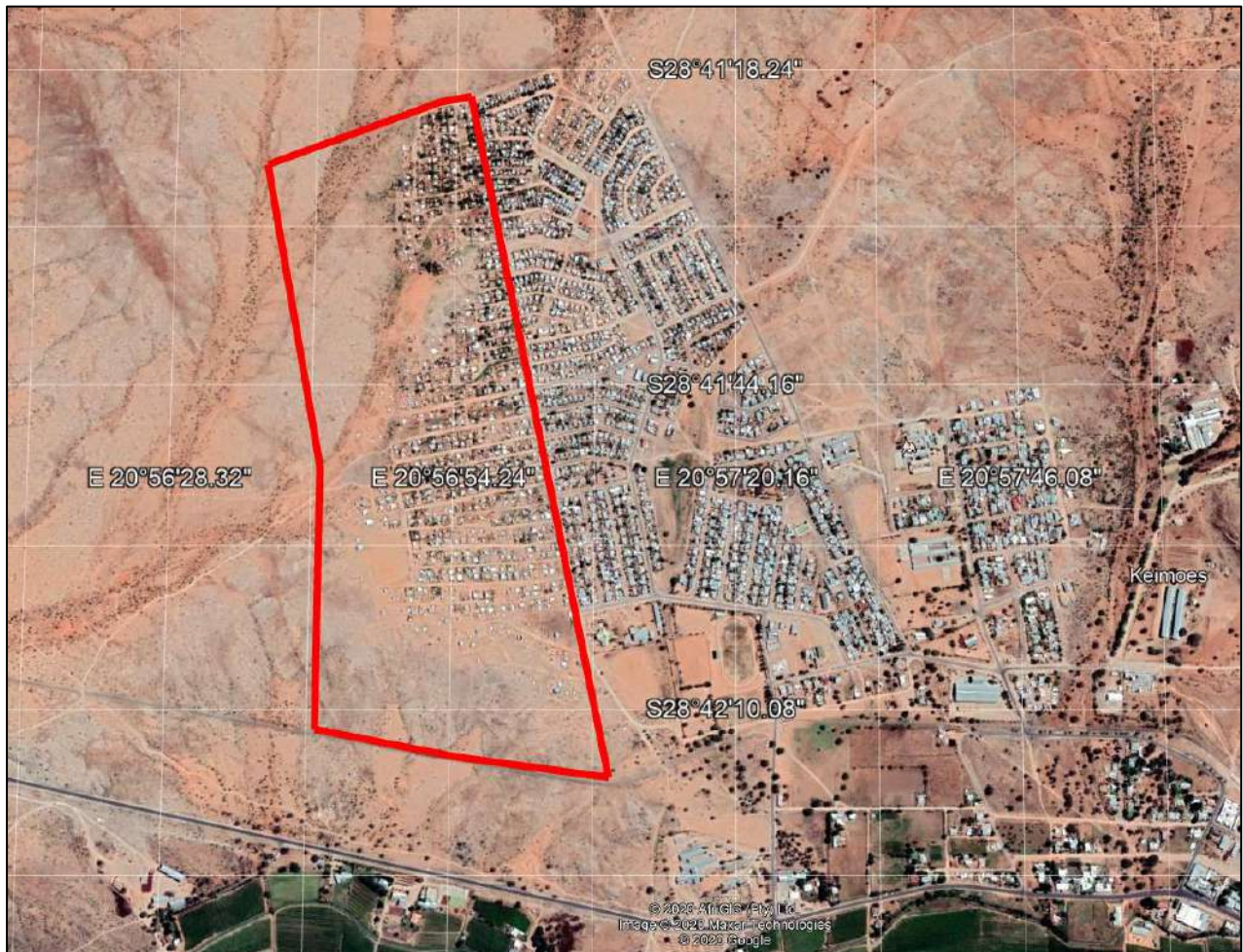


Figure 1: Gamakor Locality Plan

## 2. TOPOGRAPHY

The physical characteristics of the site can be summarized as follows:

- Ground cover comprises mostly of natural veld with short grass;
- Topographically, the site has a relatively gentle sloping terrain.



### 3. WATER SUPPLY

#### 3.1 Existing Water Infrastructure

##### Overview

The bulk water infrastructure of the Keimoes area can be summarised as follows:

- A raw water river pump station;
- A 450mm diameter raw water supply line;
- A conventional water treatment plant;
- Three bulk distribution supply zones:
  - Residential area and informal settlements north of the railway line, serviced by a 2.5ML reservoir which is supplied by a 250mm diameter uPVC bulk supply line.
  - CBD area services by a 1.7ML reservoir and a dedicated supply line;
  - Malanshoek serviced by a 180kl reservoir supplied by a 74mm diameter supply line.

Figure 2 shows the existing bulk water infrastructure for Keimoes.



Figure 2: Existing Bulk Water Infrastructure



## Raw Water Supply

Water supplied to Keimoes is extracted from Orange River by means of pump station fitted on a raft with the switchgear room located above the 1-in-20 year flood line. The pump station consists of three pumps, each with a capacity of 55l/s. The pumps operate as two duty pumps and one standby pump.

Raw water is pumped from the raft pump station towards the purification plant, delivering a maximum flow rate of 110l/s through a 500m long, 450mm diameter steel pipe.

Currently, only one pump is in working condition. The other pumps will have to be repaired in order to achieve the design flow of 110 l/s. The photo below, on the right, was taken after the pumps were installed. Due to poor maintenance of the site, reeds have obstructed the view to the pump raft.



## Water Treatment Plant

The Water Treatment Works (WTW) was upgraded to supply a maximum of 150 l/s.

The WTW consists of a flock canal, dividing water into four horizontal flow, rectangular concrete settlement tanks of 2 x5 m wide, 12m long, 3m deep tanks (see photos below).





Water then flows from the settlement tanks through sand filters and the filtered water is then chlorinated before it flows to a small potable water storage reservoir. Finally, the water is then pumped to the distribution network.

The WTW requires refurbishment for some of the components. This includes the control systems and various mechanical and electrical components.

One of the supply pumps (see photos below) will also have to be replaced with a larger pump to accommodate future demands (see Section 3.3).



## Potable Water Supply and Storage

Potable water is pumped from the WTW using three centrifugal pumps with a maximum supply rate of 150 l/s through the distribution system to three concrete storage reservoirs. However, due to the size of the inlet works at the WTW only a maximum of 95 l/s can be supplied.

The first area supplied is Extension 6 and 7, as well as the Gardenia residential area, north of the railway line. The water is pumped through the reticulation network to a 2.5ML concrete reservoir via a 250mm diameter uPVC bulk water supply line. This reservoir will also service the proposed Gamakor development.

The second area is the Keimoes CBD area. This area makes use of a 1.7ML concrete reservoir. The reservoir was supplied through the reticulation network, but this caused periodic pipe bursts. A new dedicated supply line was constructed from the WTW to 1.7ML reservoir which has solved the problem.

The third area is Malanshoek, an economical residential area 3km to the south. Malanshoek has a 180kl concrete storage reservoir supplied by 75mm diameter pipeline.

## Reticulation System

The potable water supplied to the northern reservoir from the WTW is pumped through the reticulation network. Pumping through the network causes periodic pipe bursts due to the water hammer action resulting from pump operations, as well as the type of pipe material used (unreinforced fibre cement) within the reticulation. To avoid this, a dedicated supply line to the 2.5ML reservoir is recommended.

The newly proposed Gamakor development will have its own water reticulation system consisting of 75mm to 200mm uPVC pipes.



## 3.2 Water Demands

### Land Use Types

The table below shows the different land use types found in the development along with the respective water demands for each land use type used for this investigation, as set out in Human Settlements Guidelines, 2019.

Land Use Type	Water Demand	Unit
Low-income Housing (Waterborne Sewer)	0.60	kL/unit
School	0.06	kL/student
Business/Commercial	21.0	kL/100m <sup>2</sup>
Cemetery	12.0	kL/Ha
Park	12.0	kL/Ha

### Existing Demands

The existing water demands will be divided into two portions for this investigation, namely: 1) *Supply Zone A*: Total demand supplied by the extraction pump station and the Water Treatment Plant; and 2) *Supply Zone B*: Total demand supplied by the existing 2.5 ML concrete reservoir.

- For Supply Zone A, the Total Average Annual Daily Demand (TAADD) for all areas of Keimoes that are fed by the Keimoes Water Treatment Plant are included.
- For Supply Zone B, the TAADD for all areas of fed by the 2.5 ML Reservoir, which include Extension 6 and 7 and the schools in that area.
- For both supply zones, a loss factor of 10% was applied to the AADD to get to a TAADD amount and a further 10% for the losses at the Water Treatment Plant.

The table below lists the TAADD for both supply zones:

Area	TAADD (kL/day)
<b>Supply Zone A</b>	<b>2 141</b>
Keimoes CBD	859
Keimoes Residential (Supply Zone B)	1 178
Malanshoek	104
<b>Supply Zone B</b>	<b>1 178</b>
Extension 6 & 7	855
Extension 4	323





## Future Demands

For future demands, the same supply zones are used, with the following additions to the demands:

- Gamakor 1500 erven development.
- Possible future developments were identified and are also considered in the table below. This includes 1200 erven to the east of the Gamakor development. It is unlikely that this development will take place in the near future and has been omitted in the demand calculations for Supply Zone A (Supply Zone A demands are used to calculate the WTW and raw water supply capacity). It has however been included in the Supply Zone B demands (used for the supply line and water storage capacity calculations).

The table below lists the future TAADD for both supply zones:

Area	TAADD (kL/day)
Gamakor Development Demands	1 035
Total Future Demand for Supply Zone A	3 176
Total Future Demand for Supply Zone B	3 041

### 3.3 Bulk Water Infrastructure Requirements

The table below compares the current infrastructure capacities with the required capacity for the various cases. Cells highlighted in red would require upgrading in order to accommodate the expected demands.

Water Infrastructure	Current Capacity	Existing Requirements	Future Requirements
Bulk Raw Water Supply	150 l/s	76.9 l/s	114.1 l/s
Water Treatment Plant	90-95 l/s	55.8 l/s	82.7 l/s
WTP to Reservoir Supply - Pumps	55 l/s	35.3 l/s	90.2 l/s
WTP to Reservoir Supply – Supply Line	250mm Dia.	250mm Dia.	450mm Dia.
Storage Capacity	2.5 ML	2 ML	5.3 ML

The recommended upgrades to the Keimoes bulk water infrastructure in order to implement the Gamakor development are as follows:

- Construction of a new 3ML concrete storage reservoir to the north of Keimoes (see Figure 3).
- Potable water supply to the proposed 3ML concrete reservoir through a new 4.2km rising main (see Figure 3). The rising main will require that the supply from the WTW pump station be increased. It is proposed that one of the pumps will have to be replaced with a larger pump. The pump will be sized for a nominal flow of 327m<sup>3</sup>/h and 45 m of head.
- Installation of a new 450mm diameter bulk water distribution main to the Gamakor development.
- Repairs at the WTW, including the repair of mechanical and electrical components and the control system.

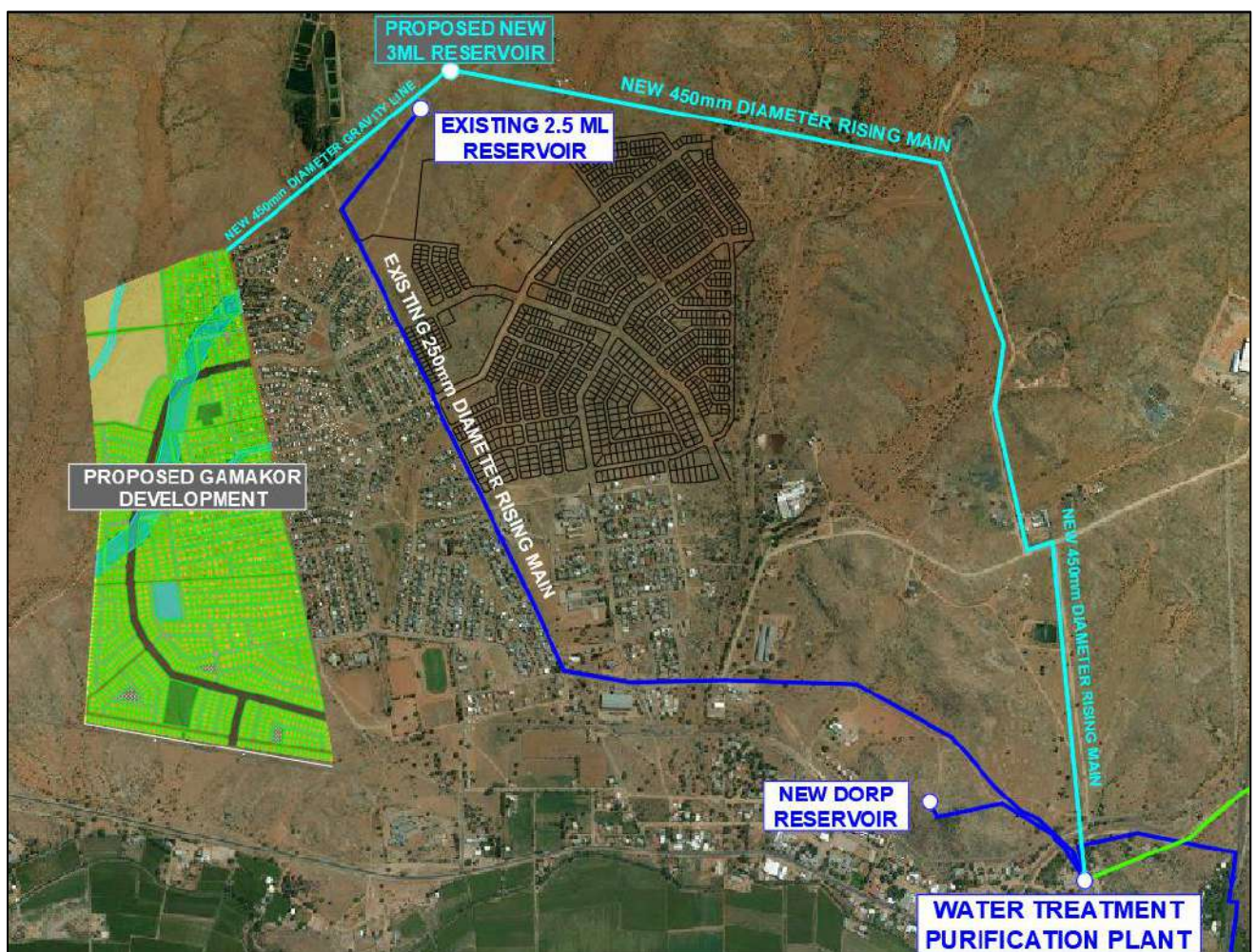


Figure 3: Proposed Water Bulk Infrastructure





## **Fire Fighting Requirements**

Areas to be protected by a fire service should be classified according to a fire-risk category. The new development can be classified as a “Low risk – Group 4” according to the “Guidelines for Human Settlement Planning and Design”.

No specific provision for fire fighting water is required in water storage, or reticulation mains in these areas. Hydrants should, however, be located at convenient points in the area on all mains of 75 mm nominal internal diameter and larger, and in the vicinity of all schools, commercial areas and public buildings.

Fire fighting in areas zoned “Low-risk – Group 4” should generally be carried out using trailer-mounted water tanks or fire appliances that carry water, which can be replenished from the hydrants provided in the reticulation, if necessary.

## 4. SEWERAGE

### 4.1 Existing Sewage Infrastructure

#### Overview

The only neighborhoods in Keimoes with waterborne sewer are Extension 6 (area indicated in blue) and Extension 7 (area indicated in orange) as well as two schools and a school hostel (see Figure 4 below). The rest of Keimoes is served by septic tanks that are emptied by honey sucker trucks periodically. The effluent from the septic tanks are transport and disposed of at the existing oxidation ponds, where it is treated.



Figure 4: Areas Connected to a Sewer Network

The existing bulk sewer system (see Figure 5 below) currently operates as follows:

- Sewer from the Extension 6 neighbourhood gravitates to the Ext. 6 pump station.
- From there the sewer is pumped through a 160mm diameter PVC pipeline (red line) to the Ext. 7 pump station.



- Sewer from the Extension 7 neighbourhood gravitates to Ext. 7 pump station. Two small pump stations in Extension 7 lifts the sewer over the watershed and gravitates towards the Ext. 7 pump station (orange line).
- Sewer from Extension 7, along with the sewer from the Ext. 6 pump station, is pumped through a 150mm diameter A/S pipeline to a booster pump station.
- The booster pump station lifts the sewer from the Ext.7 pump station through a 150mm diameter A/S pipeline to the oxidation ponds (yellow line).

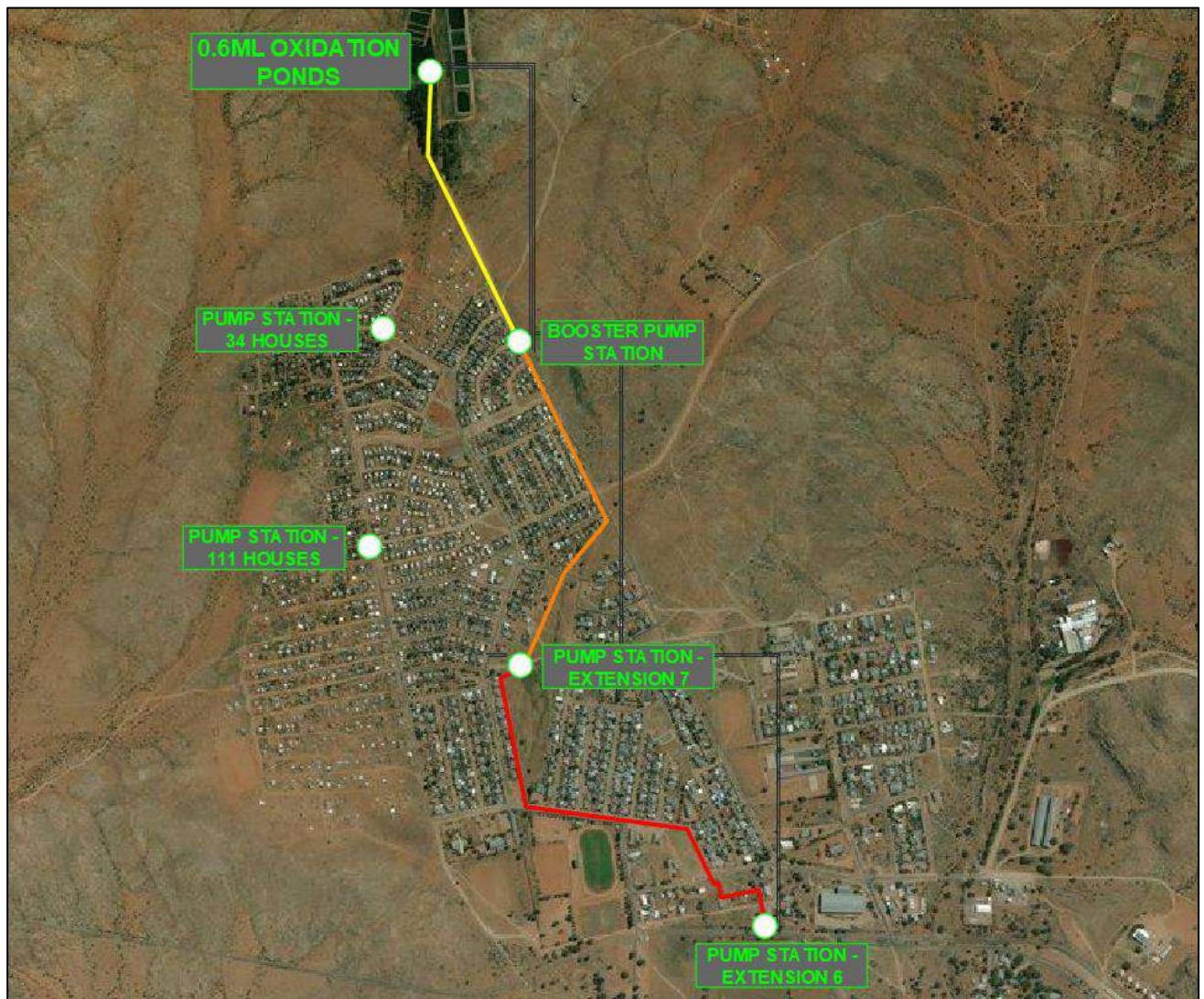


Figure 5: Existing Bulk Sewer Infrastructure

## Waste Water Treatment Plant

Currently, the existing Waste Water Treatment Works (WWTW) consists of two sets of oxidation ponds which are being operated in parallel (see Figure 6 below).

The co-ordinates of the Waste Water Treatment Plant is: 28°41'02.40" S; 20°57'07.92" E.



**Figure 6: Oxidation Ponds**

The capacity of these ponds for effective waste water treatment is 628m<sup>3</sup> per day.

The ponds are 300m away from the nearest residences and less than 600m away from nearest proposed residences within the Gamakor area, posing a public health risk. Guidelines indicated a minimum of 2km away from residences.

The treatment capacity of the oxidation ponds can effectively handle only 50% of the current sewer volume.



## Sewer Pump Stations

The three main pump stations lifting the sewer to the oxidation ponds are not in a good condition. All three pump stations will be upgraded within the year 2020, utilising the Water and Sanitation Infrastructure Grant to the municipality, made available through the Department of Water Affairs.

## Internal Sewer Network

Most of the formal housing in the town is connected to a waterborne sewer system consisting of pipes with sizes ranging between 110mm and 250mm. The network gravitates to local low points at various points where the sewer is collected at pump stations. The sewerage is then pumped from the various pump stations through a rising main (150mm AC pipe) to the WWTW to the north.

Lower lying areas (especially the CBD) and the area of Malanshoek are not connected to the sewer network and makes use of septic tanks.



**Figure 7: Internal Sewer Network**

## 4.2 Sewage Flows

To estimate the sewage effluent generated by the development the following assumptions were made:

- The sewer flows were calculated assuming 60% of the AADD water consumption. The results were also checked against the unit hydrograph method was used to estimate both existing and future sewer flows relevant to the development, as detailed in the *Neighborhood Planning and Design Guide*. The two methods approximated very similar flows;
- A peak day factor of 1.1 and an additional 30% to allow for extraneous flows (storm water infiltration, etc.) was used during the estimates.
- Allowance has been made for groundwater infiltration (roughly 15%) as well as 30% spare capacity for storm water ingress.

### Existing Outflows

The table below indicates the existing Average Daily Wet Weather Flow (ADWWF):

Description	ADWWF (kL/day)
Sub-economic houses (Extension 6 & 7)	446
Economical houses (Extension 4)	128
Economical houses (Town)	231
Economical houses (Malanshoek)	54
Oranjezicht School Hostel	18
Oranjezicht High and Primary School	23
Keimoes Hoërskool Hostel	18
Keimoes Hoërskool	36
Wine Cellars	92
Hospital	18
Businesses	53
<b>Total ADWWF</b>	<b>1 117</b>

The current capacity of sewer infrastructure is as indicated below:

Description	Current Capacity (kL/day)	Current Required Capacity (kL/day)	% of Current Demand
Ext. 6 Pump Station and sewer line	870	275	316%
Ext. 7 & Booster Pump Station and sewer line	1600	717	220%
WWTW (oxidation Ponds)	628	1 117	57%



## Future Outflows

For future demands, the same supply zones are used, with the following additions to the demands:

- Gamakor 1500 Erven development.
- Possible future developments were identified and are also considered in the table below. This includes 1200 erven to the east of the Gamakor development.

The table below indicates the additional future Average Daily Wet Weather Flow (ADWWF):

Description	ADWWF (kL/day)
Sub-economic houses (Gamakor)	540
Sub-economic houses (1200 Stands)	432
Economical Houses (490 A Extension)	353
Existing flows	1 117
<b>Total Future ADWWF</b>	<b>2 413</b>

## 4.3 Bulk Sewer Infrastructure Requirements

The proposal for the bulk sewer upgrades is as follows:

- The current waste water treatment plant infrastructure (oxidation ponds) can only treat 50% of the current sewer outflows. In addition to the capacity problems, the oxidation ponds are only 300 meters away from Extension 7. It is therefore recommended that a new waste water treatment works (WWTW) be constructed. A 2.5ML (based on a future ADWWF of 2 413 kL/day) oxidation pond system is proposed.
- Due to concerns about the future expansion of Keimoes, it is proposed that the new WWTW be located 2.5km away from the Gamakor development. The WWTW will also have to be located at a low elevation relative to Keimoes in order to minimize pumping costs. The proposed location of the WWTW is shown in Figure 8 at No. 3. The entire Keimoes will be accommodated at the new location in the future.



Figure 8: Proposed Bulk Sewer Upgrades

- The Gamakor development area drains to the south-west (90%) and to the south-east (10%) (see Figure 9 below). Sewer from the Gamakor area will therefore drain to two pump stations, namely:
  - Gamakor East Pump Station (No. 1 on Figure 8), which will collect sewer from the 10% of the Gamakor Area, portions of the Extension 6 & 7 areas and about half of the newly planned 1200 stands. From there, the sewer is pumped directly through a 250mm diameter dedicated pump line to the new WWTW.
  - Gamakor West Pump Station (No. 2 on Figure 8), which will collect sewer from Gamakor and two small areas in Extension 7 and will be pumped from there via a new 250mm diameter rising main to the WWTW.

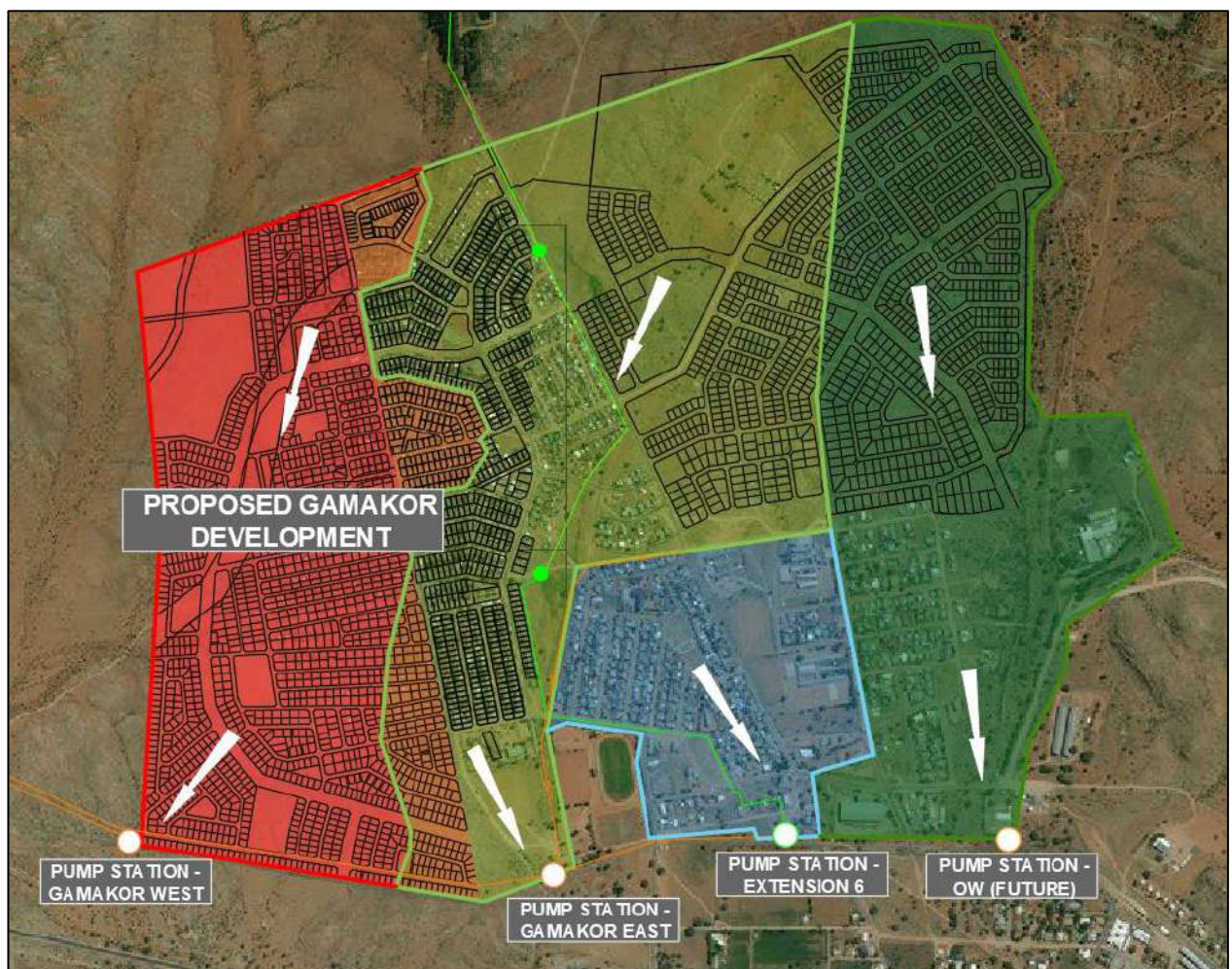


Figure 9: Keimoes Drainage Areas

- A new pump line will also need to be constructed between Extension 6 Pump Station (PS) and Gamakor East Pump Station. Extension 6 PS will then pump sewer collected from part of Extension 6 into Gamakor East PS.

These proposed upgrades to the sewer system will allow most pump stations within Keimoes to be decommissioned resulting in very low pumping costs and will pose less health risks to the community.



The sizes and capacities of the proposed pump stations and rising mains were calculated as follows:

EXTENSION 6 PUMP STATION AND RISING MAIN		
Sewer flow per day – Sub-economic houses (Extension 6)	196 houses @ 500 l/day	98 000 l/day
Sewer flow per day – Economic houses	10 houses @ 750 l/day	7 500 l/day
Sewer flow per day – Hostels	400 persons @ 140 l/day	56 000 l/day
Sewer flow per day – Schools	1 200 persons @ 20 l/day	24 00 l/day
<b>Sewer flow per day – Total</b>		<b>185 500 l/day</b>
Average sewer flow		2.1 l/s
Infiltration	@ 30% infiltration	0.6 l/s
Sewer flow including infiltration		2.8 l/s
Peak network sewer flow	@ 2.21 Peak Factor	6.2 l/s
Flowrate from other pump stations		0 l/s
<b>Total peak flow</b>		<b>6.17 l/s</b>
<b>Actual Pumping Ability</b>	@ 2 times peak flow	<b>12.3 l/s</b>
Theoretical pump station capacity for normal pump operation	@ 0.5 hour of peak flow	11 m <sup>3</sup>
Theoretical pump station capacity for emergency storage	@ 1 hour of normal flow	10 m <sup>3</sup>
<b>Total required theoretical pump station capacity</b>		<b>21 m<sup>3</sup></b>
Pump System Details		
Rising main diameter	125 mm	
Rising main material	PVC	
Rising main length	700 m	
Static head	6 m	
Friction losses	8 m	
Total head required	14 m	

GAMAKOR EAST PUMP STATION AND RISING MAIN		
Sewer flow per day – Sub-economic houses (Gamakor)	295 houses @ 500 l/day	147 500 l/day
Sewer flow per day – Sub-economic houses (Extension 6)	154 houses @ 500 l/day	77 000 l/day
Sewer flow per day – Sub-economic houses (Extension 7)	685 houses @ 500 l/day	342 500 l/day
Sewer flow per day – Sub-economic houses (Future 1200 houses)	606 houses @ 500 l/day	303 000 l/day
<b>Sewer flow per day – Total</b>		<b>870 000 l/day</b>
Average sewer flow		10.1 l/s
Infiltration	@ 30% infiltration	3.0 l/s
Sewer flow including infiltration		13.1 l/s
Peak network sewer flow	@ 2.21 Peak Factor	23.6 l/s
Flowrate from other pump stations		12.3 l/s
<b>Total peak flow</b>		<b>35.9 l/s</b>
<b>Actual Pumping Ability</b>	@ 2 times peak flow	<b>53.8 l/s</b>



Theoretical pump station capacity for normal pump operation	@ 0.5 hour of peak flow	140 m <sup>3</sup>
Theoretical pump station capacity for emergency storage	@ 1 hour of normal flow	199 m <sup>3</sup>
<b>Total required theoretical pump station capacity</b>		<b>339 m<sup>3</sup></b>
<b>Pump System Details</b>		
Rising main diameter	250 mm	
Rising main material	PVC	
Rising main length	3 200 m	
Static head	12 m	
Friction losses	12 m	
Total head required	24 m	

<b>GAMAKOR WEST PUMP STATION AND RISING MAIN</b>		
Sewer flow per day – Sub-economic houses (Gamakor)	1205 houses @ 500 l/day	602 500 l/day
Sewer flow per day – Sub-economic houses (Extension 6)	101 houses @ 500 l/day	50 500 l/day
Sewer flow per day – Economic houses	40 houses @ 500 l/day	20 000 l/day
<b>Sewer flow per day – Total</b>		<b>673 000 l/day</b>
Average sewer flow		7.8 l/s
Infiltration	@ 30% infiltration	2.3 l/s
Sewer flow including infiltration		10.1 l/s
Peak network sewer flow	@ 2.21 Peak Factor	18.7 l/s
Flowrate from other pump stations		0 l/s
<b>Total peak flow</b>		<b>18.73 l/s</b>
<b>Actual Pumping Ability</b>	@ 2 times peak flow	<b>37.5 l/s</b>
Theoretical pump station capacity for normal pump operation	@ 0.5 hour of peak flow	79 m <sup>3</sup>
Theoretical pump station capacity for emergency storage	@ 1 hour of normal flow	146 m <sup>3</sup>
<b>Total required theoretical pump station capacity</b>		<b>224 m<sup>3</sup></b>
<b>Pump System Details</b>		
Rising main diameter	250 mm	
Rising main material	PVC	
Rising main length	2 000 m	
Static head	12 m	
Friction losses	5 m	
Total head required	17 m	



## **5. ROADS AND STORMWATER**

---

### **5.1 Roads and Access**

Access to the development will be from the existing Residential Collector Streets (Class 4b), as listed below:

- Alwyn Street – Main access to the development
- Estelle Street
- Carnation Street
- Rose Street

No problems are foreseen regarding roads and access.

### **5.2 Stormwater Management**

The guiding principle underlying the storm water management strategy is that, where possible, the peak run-off from the post-developed site should not exceed that of the pre-developed site for the full range of storm return periods (1:2 to 1:50). Where possible, measures should be incorporated into the site development plan to attenuate the post-development flows to pre-development rates.

The storm water network must be designed to accommodate (flood frequencies as prescribed by “The Red Book”) the minor storm event (1:5 year) in open channels or side drains of streets. The major storm (1:50 year) should be managed through controlled overland flows, above-ground attenuation storage (if required) and berms at the higher end of the site (if required). As no formal storm water system exists in the area, concentration of storm water must be avoided as far as possible. Earthworks on plots should therefore encourage free drainage of the area.

Areas of erosion should be identified at detail design stage of the storm water system and suitable erosion protection (lined channels, grass blocks, ‘Hyson cells’ etc.) measures implemented.

## 6. ELECTRICAL SUPPLY

### 6.1 Electrical Demands and Availability

This section of the report covers the availability of the Bulk Electrical connection to the future 1500 Gamakor Community stands, an expected load of the proposed development will initially be 1.8MVA as per INEP guidelines and the accommodation of this load will form the basis of this report.

The challenge the project face is the availability of the bulk electrical connection to Keimoes which is currently capped at 5MVA, the information received from the Municipality's Electrical department is that the town maximum demand is currently running at average between 4.8MVA - 4.9MVA ; The Municipality indicated that they are currently engaging with Eskom to upgrade the bulk supply available to 10MVA which is not a problem at this stage.

Rev 2 update: Eskom has denied the municipality's request to upgrade the bulk supply due to outstanding payments from the municipality.

### 6.2 Existing Electrical Network

The existing electrical network in the Keimoes Suburbs & Industrial is connected to Load Centre "Keimoes Nommer2" situated in Industrial Weg, and is connected via a dedicated ASCR WOLF feeder to "Eskom Oasis Substation". This Eskom sub-station is also connected to Load Centre "Keimoes Nommer1" via a dedicated ASCR WOLF feeder servicing the CBD area. Load Centre "Keimoes Nommer1" is operating at 2.9MVA and Load Centre "Keimoes Nommer2" at 2MVA according to information received from Kai !Garib Municipality.

These feeders separately can transfer a maximum of 5.17MVA to the individual Load Centres. (See Figure 10 below).

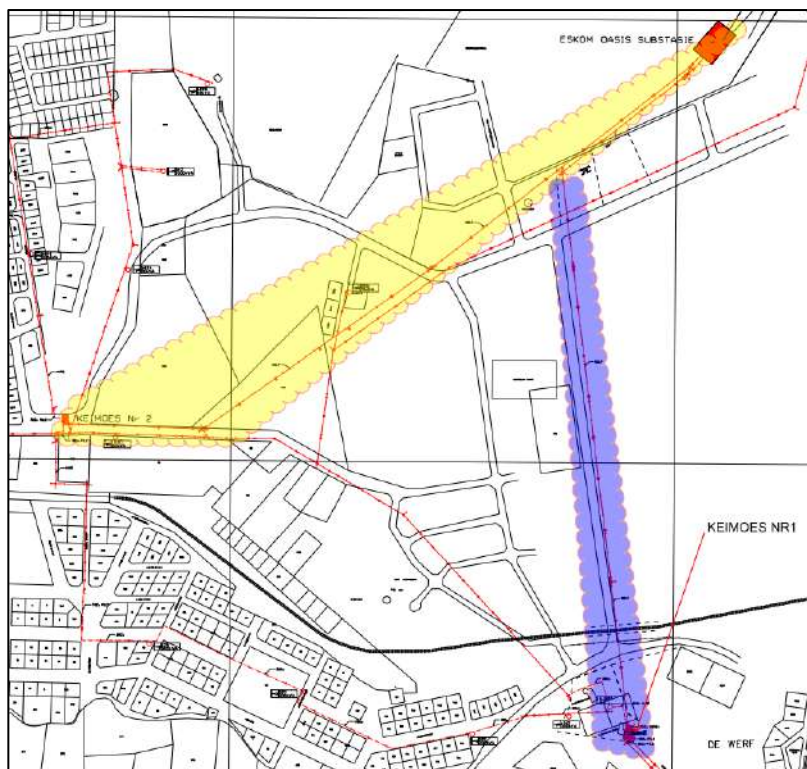


Figure 10: Electrical Infrastructure



It is therefore clear that the expected load (1.8MVA) due to the proposed development can be accommodated by the current load centres without upgrading feeders from the “Eskom Oasis Substation”. However, the Eskom bulk availability connection capacity to town must be upgraded to 10MVA by the Municipality.

### 6.3 Proposed Electrical Network Extension

It is normal and good practise to connect Load Centres through ring feeders to the main substation in order to have a firm supply and to facilitate isolation of faulty cable sections in order to maintain a firm supply to all sections of the network.

As this is not the case with the “Keimoes Nommer 2” Load Centre it is therefore necessary to consider the following upgrading of the network in order to connect the proposed load:

- Provision of a dedicated overhead line feeder of similar size to the existing feeders to create a ring feeder between “Keimoes Nommer 1” and “Keimoes Nommer 2” Load Centres, (See Figure X below)



**Figure 11: Bulk Electrical Line to be upgraded**

- Install suitable MV circuit breakers at both ends of the overhead line feeder,
- Provision of dedicated overhead line feeder to the proposed development from the “Keimoes Nommer 2” Load Centre, (See Figure 16 below)
- Install suitable MV circuit breaker for the dedicated feeder of the proposed development, and
- Minor modifications to MV switchgear in load centre “Keimoes Nommer 2”



**Figure 12: Proposed Bulk Electrical Connection Point**



## 7. COST ESTIMATE

The cost estimate for the proposed activities are as provided below. The level of accuracy is commensurate with a concept level design.

Description	Amount
<b>Water Bulk Services</b>	
New 3 ML reservoir	R 9 958 379,45
4,2km 450mm Ø supply line	R 10 578 876,00
1km 450mm Ø distribution line	R 2 518 780,00
Upgrading of supply pump station	R 1 704 034,81
Necessary refurbishment of Water Treatment Works	R 3 001 460,70
Bulk connection	R 1 500 730,35
<b>Sub-Total (Water)</b>	<b>R 29 262 261,32</b>
<b>Bulk Sewer Services</b>	
New 2.5 ML oxidation pond system	R 26 756 623,55
New sewer pump station (Gamakor West)	R 3 014 830,82
New sewer pump station (Gamakor East)	R 3 447 393,51
2km 250mm Ø uPVC rising main (Gamakor West)	R 2 671 402,27
3,2km 250mm Ø uPVC rising main (Gamakor East)	R 4 274 243,63
<b>Sub-Total (Sewer)</b>	<b>R 35 890 250,15</b>
<b>Roads and Access</b>	
None	R -
<b>Stormwater</b>	
None	R -
<b>Electrical</b>	
O/H ACSR line ring	R 2 300 000,00
Circuit breaker (11kV, LC1&2)	R 1 550 000,00
O/H ACSR line to POC	R 1 850 000,00
<b>Sub-Total (Electrical)</b>	<b>R 5 700 000,00</b>
<b>Sub-Total (All)</b>	<b>R 70 852 511,47</b>
15% P&G's	R 10 627 876,72
<b>Sub-Total</b>	<b>R 81 480 388,19</b>
10% Contingencies	R 8 148 038,82
<b>Sub-Total</b>	<b>R 89 628 427,01</b>
10% Professional fees	R 8 926 842,70
<b>Sub-Total</b>	<b>R 98 591 269,71</b>
15% VAT	R 14 788 690,46
<b>Grand Total</b>	<b>R 113 379 960,16</b>

Notes:

- 1) Base date of the calculations is April 2020;
- 2) No provision was made for EIA, registration and/or land acquisition;
- 3) No allowance was made for institutional and/or social development.



## 7.1 Funding

Funding can be applied for through the Municipal Infrastructure Grant (MIG) and Regional Bulk Infrastructure Grant (RBIG). For repair work at the water treatment works, the Water and Sanitation Infrastructure Grant (WSIG) can also be applied for.

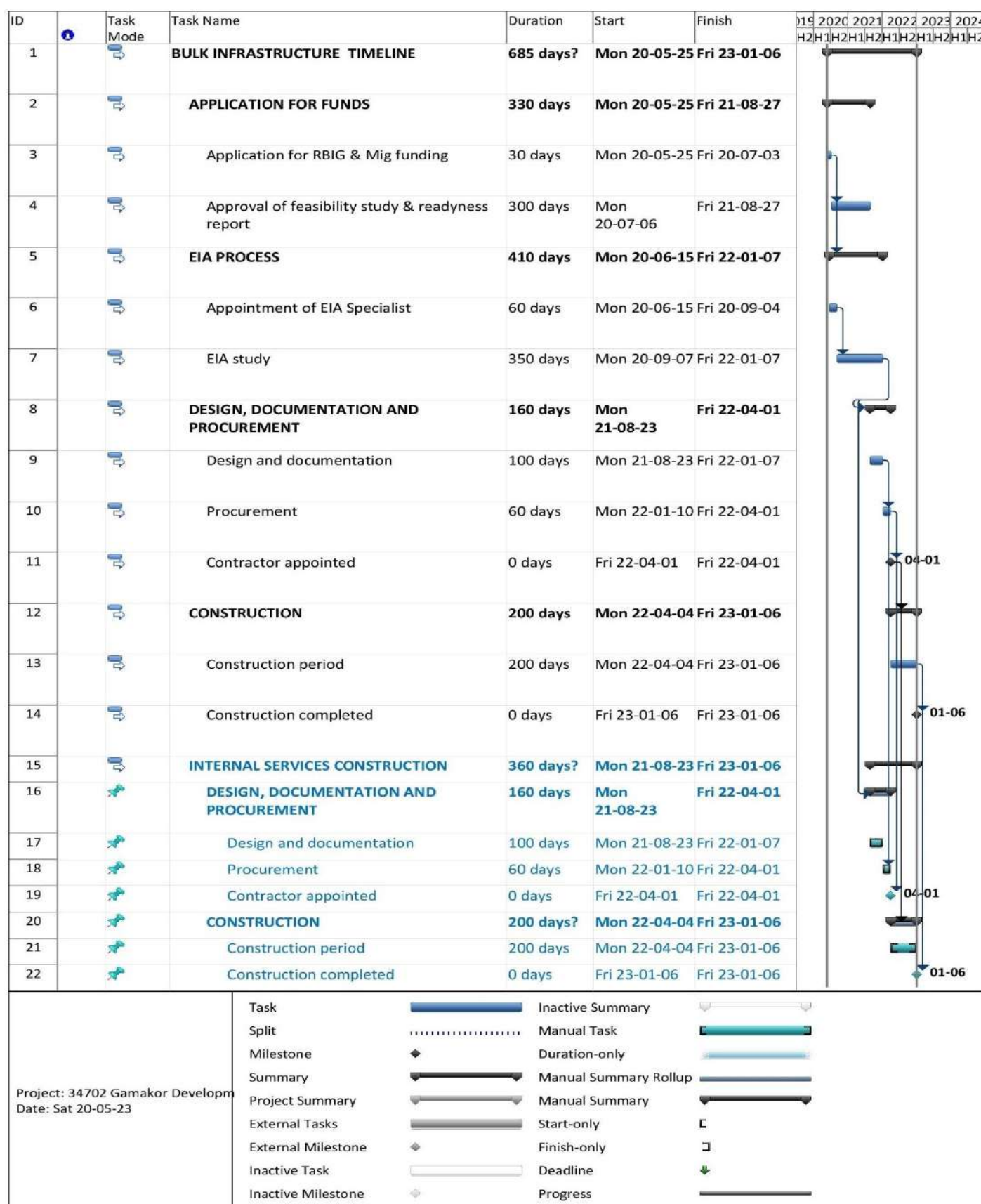
This report can be used for funding application from the various schemes available.

A meeting with the Department of Water and Sanitation (DWS) was held in which the DWS has confirmed the possibility of using the WSIG to fund the bulk water and waste water infrastructure over a period of two years, starting the next financial year. See Annexure A to this report for the email. The DWS suggested approaching the Department of Housing (DoH) to fund the EIA so that the EIA process can start within this year.

A discussion with the Department of Housing's implementing agent, Barzani Group, will be held in middle to late August with regards to DoH funding the EIA.



## 8. PROJECT TIMELINE



## 9. CONCLUSION

Engineering services were assessed to determine spare capacity on the existing bulk infrastructure and compared to the estimated demand of the newly proposed Gamakor 1500 development.

The findings and conclusions in this report are based on a preliminary desktop study, as well as site visits.

- Bulk Water Infrastructure – The current capacity of the bulk water infrastructure is not enough to accommodate the proposed Gamakor development as is. It is proposed that the infrastructure should be upgraded, not only to provide adequate capacity for the Gamakor development, but also for future water demand increases. The following upgrades are proposed:
  - Repairs at the Water Treatment Works for mechanical and electrical components and the control system;
  - Replace one of the supply pumps at the Water Treatment works with a larger pump (sized for 91 l/s and 45m head);
  - Install a new 4.2km 450mm Ø uPVC supply line to the storage reservoir from the waste water treatment works;
  - A new storage reservoir will be required to meet the recommended 48-hour storage requirement. The construction of a new 3ML reservoir is proposed to the north of the development.
  - Install a new 1km 450mm Ø uPVC distribution line from the storage reservoir to the Gamakor area.
- Bulk Sewage Infrastructure - The current capacity of the sewer water infrastructure is not enough to accommodate the proposed Gamakor development, nor is it adequate for the current loading. It is proposed that the infrastructure should be upgraded as soon as possible:
  - Waste Water Treatment Works: Construction of a new 2.5 ML Waste Water Treatment Works. The proposed position of the WWTW is to the south-west of the Gamakor development.
  - Gamakor West pump station and rising main: The western portion of the Gamakor will be able to drain to the south-western corner. It is proposed to construct a pump station with a 1km 250mm diameter rising main to the proposed WWTW;
  - Gamakor East pump station and rising main: The south-eastern portion of the Gamakor drains to the south-eastern corner. It is proposed to construct a pump station with a 2km 250mm diameter rising main to the proposed WWTW. This pump and rising main should be sized to accommodate a large portion of the Keimoes area in order to migrate the sewer flows to the new WWTW in the future in phases.
  - In order to migrate future flows from the current pumping system to the new WWTW, a new pump line will also need to be constructed between Extension 6 Pump Station and Gamakor East Pump Station. However, this is not necessary for the Gamakor development and has been omitted from the costing summary.



- Roads and Access: No bulk infrastructure upgrading required on the roads.
- Storm Water Management: No bulk infrastructure upgrading required on the storm water.
- Electricity Supply – A request was made by the municipality to Eskom for an increase to their electrical supply. Eskom has denied the request to increase their supply due to non-payments from the municipality.
- Electrical Load Centre – The existing Load Centre “Keimoes Nommer 2” can accommodate the future additional load, with only minor modification to be done in the Load Centre and as agreed with the Municipality’s Electrical Department.

In conclusion, the engineering services are not in place (water and sewer) to meet the standard requirements. The infrastructure will have to be upgraded regardless of the implementation of the Gamakor development in order to meet current and expected future needs. The upgrading should be done in such a way as to take in to consideration the Gamakor development. Funding for the EIA will be applied for through the Department of Housing and the EIA process can run in parallel to the rest of the funding applications. A meeting with the Department of Water and Sanitation was held in which the DWS has confirmed the possibility of using the WSIG to fund the bulk water and waste water infrastructure over a period of two years, starting the next financial year.





## ANNEXURE A

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## Simon van Blerk

---

**From:** Simon van Blerk <simonvb@bvinc.co.za>  
**Sent:** Monday, 17 August 2020 13:11  
**To:** 'nc082.pmu@gmail.com'; 'streudersK@dws.gov.za'; 'Niel Maritz'  
**Subject:** Keimoes, Gamakor - Bulk Services Funding

Good day all,

This email serves as a confirmation and summary with respect to the Zoom meeting held between Kai Garib Municipality (Mr. Patrick Wells), the Department of Water and Sanitation (DWS) (Mr. Kobus Streuders) and BVi Consulting Engineers (Messrs. Niel Maritz and Simon van Blerk) on Wednesday, 12 August 2020 at 12h00.

A request was made to the DWS for funding the bulk water and waste water infrastructure required for the implementation of the Gamakor housing project in Keimoes. Mr. Streuders stated that the DWS will not be able to assist with funding within this year, however the DWS could provide the required funding over two years, starting the next financial year. The funding will come from the Water and Sanitation Infrastructure Grant (WSIG).

R400 000 was also requested by the municipality and BVi from the DWS in order to start the EIA process for the bulk infrastructure. Mr. Streuders stated that the DWS will also not be able to assist with this and recommended that the funds for the EIA be applied for from the Department of Housing. The municipality, with the help of BVi, agreed to pursuing this option.

I trust you find the above in order.

Regards,

**Simon van Blerk**

Civil  
Engineer  
Civil Department  
Upington  
[simonvb@bvinc.co.za](mailto:simonvb@bvinc.co.za)

BBBEE Level 1



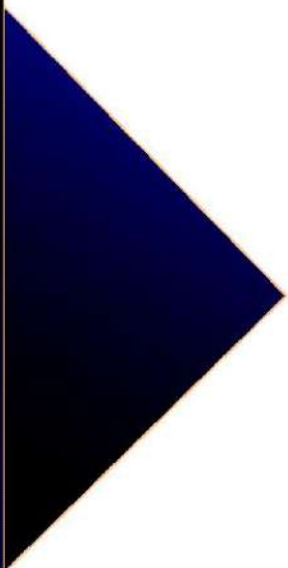
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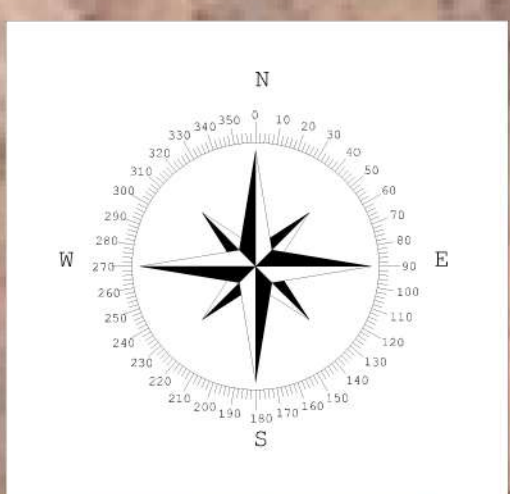
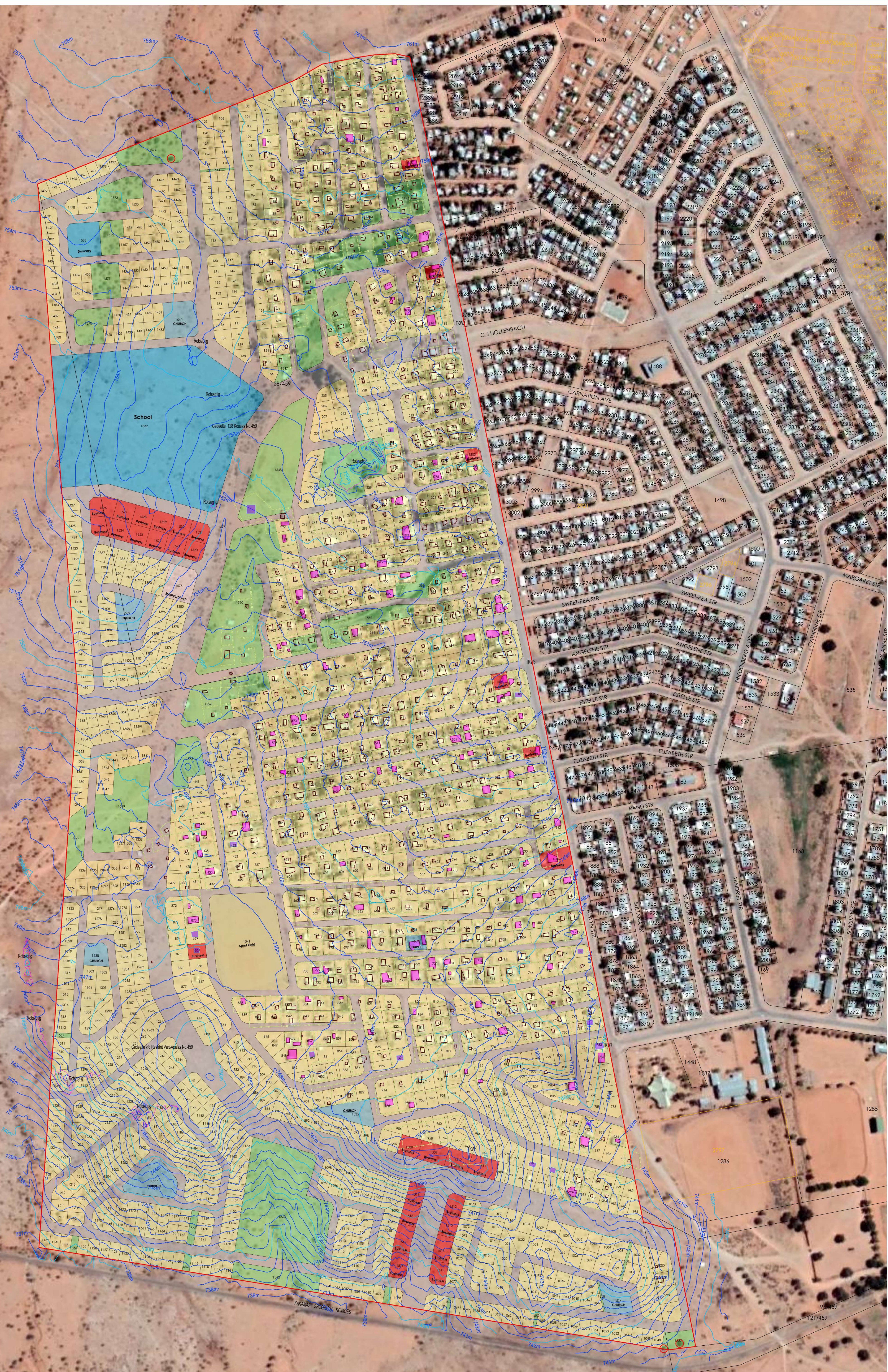
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ANNEXURE E: DETAIL LAYOUT





## FORMALISATION OF GAMAKOR INFORMAL COMMUNITY - FINAL



KAI IGARIB MUNICIPALITY  
**GAMAKOR TOWNSHIP  
FORMALISATION**

Design:	JP Theron (A/2394/2016)
Drawn:	JP Theron (A/2394/2016)
Date:	August 2020
Scale:	1:1750

Detail Layout Plan  
CL/DRW/KAI2020/GAM/FINAL

### Proposed Land Uses in terms of Kai !Garib Land Use Management Scheme

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes total area per use	average size	percentage covered
	Open Space Zone I				
	Open Space Zone II	32	8.4ha	2625m²	9%
	Open Space Zone III	1	1ha	1ha	1%
	Agricultural Zone I				
	Agricultural Zone II				
	Resort Zone II				
	Residential Zone I	1500	54ha	360m²	56%
	Residential Zone II				
	Residential Zone III				
	Residential Zone IV				
	Residential Zone V				
	Residential Zone VI				
	Institutional Zone I	2	4.5ha	2.25ha	4.7%
	Institutional Zone II	7	1ha	1429m²	1%
	Institutional Zone III				
	Authority Zone I	1	0.1ha	1652m²	0.2%
	Authority Zone II				
	Special Zone				

			Schedule of Sizes
--	--	--	-------------------

Colour & Numbers	Land Use Description	Total Units	total area per use	average size	percentage covered by use
	Undetermined Zone				
	Business Zone I	31	2ha	645m²	2%
	Business Zone II				
	Business Zone III				
	Business Zone IV				
	Business Zone V				
	Business Zone VI				
	Industrial Zone I				
	Industrial Zone II				
	Industrial Zone IV				
	Industrial Zone IV				
	Utility Zone I				
	Utility Zone II				
	Utility Zone III				
	Transport Zone I	1	25ha	25ha	26.1%
	Transport Zone II				
	Transport Zone III				
Total:		1575	96ha	N/A	100%

### Topographical Information

Detail	Symbol
Description	
Protected Trees	
Contours	
Fences	
Water furrows	
Existing Houses	
Permanent Houses	
New Permanent Houses since project inception	
Rock Outcrops	
Storm-water Furrow	

**Project Formalisations:**

**Farmalissions of Gamakor Informal Communi**



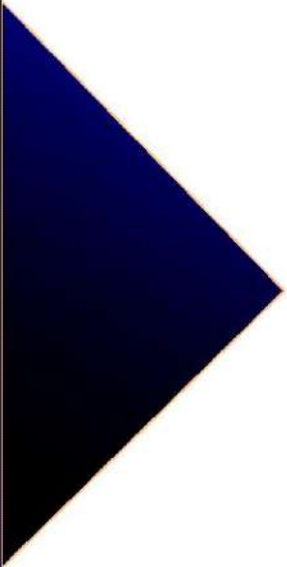
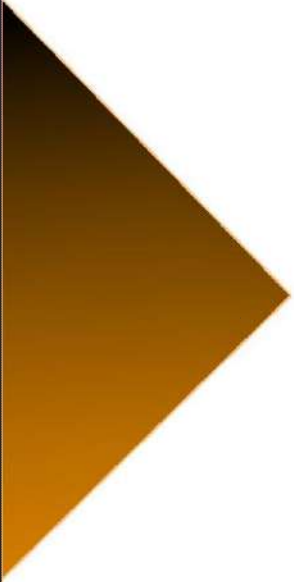
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Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401





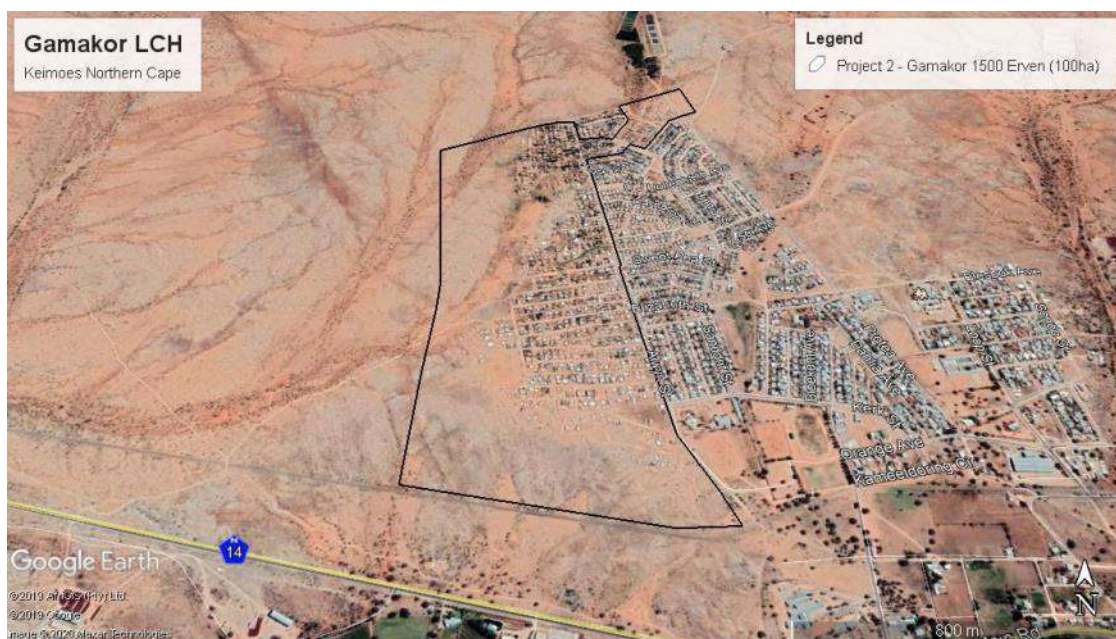
## ANNEXURE F: BOTANICAL ASSESSMENT



# BOTANICAL ASSESSMENT

## GAMAKOR & NOODKAMP LOW COST HOUSING

Proposed formalisation of the Gamakor and Noodkamp housing development on the Remainder and Portion 128 of the Farm Kousas No. 459 and Erven 1470, 1474 and 1480, Gordonia road, Keimoes. Kai !Garib Local Municipality, Northern Cape Province.



6 February 2020

**P.J.J. Botes (Pr.Sci.Nat: 400184/05)**

*Registered Professional Botanical, Environmental and Ecological Scientist*

©



## SUMMARY - MAIN CONCLUSIONS

<b>VEGETATION TYPE</b>	<p><b>Bushmanland Arid Grassland:</b></p> <p>Bushmanland Arid Grassland is not considered a threatened vegetation type, with more than 99% remaining. However only 4% is formally conserved (Augrabies Falls National Park). Further conservation options must thus be investigated. The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness &amp; Oosthuysen, 2016). The NCCBA maps were used to guide the identification of potential significant sites.</p>
<b>VEGETATION ENCOUNTERED</b>	<p>Bushmanland Arid Grassland is generally described as a sparsely vegetated (semi-desert) low shrubland dominated by white grasses (<i>Stipagrostis</i> species) on gently sloping or irregular plains, which can, in years of abundant rainfall, have rich displays of annual herbs. However, the white grasses are usually prominent after recent rains.</p> <p>In this case the absence of recent rains, as well as grazing by domestic livestock meant that the white grassy layer was mostly absent, and only a sparse low shrubland remained. Because of the arid nature of the region (and the unpredictability of rainfall) the carrying capacity of the veld is very low and overgrazing had an extremely negative effect on many vegetation types (with destruction of natural vegetation quite common near settlements). In addition, a large portion (mostly the eastern section) of the footprint was already transformed as a result of informal settlement and housing (Figure 5).</p> <p>Within the remainder of the natural veld two plant communities were observed, closely associated with variations in soil type and depth. They were:</p> <ul style="list-style-type: none"> <li>• On the shallow quartz rich rocky soils a very sparse (semi-desert) low shrubland were observed, dominated by <i>Salsola tuberculata</i> and <i>Justicia australis</i>, with <i>Aloe claviflora</i> also very common.</li> <li>• On the deeper sandy soils in the slight depressions associated with the seasonal watercourses a denser and larger shrub and tree layer was encountered, dominated by <i>Parkinsonia africana</i> and <i>Senegalia mellifera</i>.</li> </ul>
<b>CONSERVATION PRIORITY AREAS</b>	<p>According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located <u>within a terrestrial CBA</u>. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA.</p> <p>The site will not impact on any centre of endemism.</p>
<b>CONNECTIVITY</b>	<p>The proposed activity will result in a permanent footprint enlargement of the existing housing scheme by approximately 100 ha. However, the proposed footprint joins up with the existing urban edge and should not have any significant additional impact on connectivity.</p>
<b>LAND-USE</b>	<p>The footprint is located on municipal land adjacent to an existing urban area. Portions of the footprint is still in relative good conditions (although heavily grazed), but half had already been transformed by illegal structures (settlement). Remaining natural veld is utilised for livestock grazing by the local community.</p>
<b>PROTECTED PLANT SPECIES</b>	<p>Three <i>Vachellia erioloba</i> (Camel Thorn) trees (NFA protected) and five NCNCA protected plant was observed. It is recommended that the Camel thorn trees are protected and that <i>Aloe</i> and <i>Boscia</i> plants are search &amp; rescued.</p>
<b>WATER COURSES AND WETLANDS</b>	<p>The most significant feature of the study area, influencing topography is the seasonal drainage line that runs from northeast to southwest through the northern part of the property, draining towards the Friesdale Spruit, which drains into the Orange River. Please refer to the freshwater specialist report for recommendations (Watsan Africa, 2020).</p>

**MAIN  
CONCLUSION**

The terrestrial habitat associated with the project footprint is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type is classified as least threatened;
- However, the project footprint overlaps a CBA;
- The floral habitat and natural systems have been impacted, by grazing and urban related activities, but portions still functions relatively well;
- The floral diversity is very low;
- No special habitats or features were observed within the footprint;
- No red-list species were encountered, but one nationally protected tree and five provincially protected plant species was encountered.

The proposed development will result in the permanent transformation of approximately 100ha of natural veld for human settlement. According to the impact assessment given in Table 7, with good environmental control, the development is likely to result in a **MEDIUM** impact on the environment.

However, with the correct mitigation it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

**WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED, WITH THE PROPOSED MITIGATION ACTIONS.**

**NO-GO OPTION**

The development will result in significant socio-economic gain, while the no-go option will not contribute significantly to national or provincial conservation targets.

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## **INDEPENDENCE & CONDITIONS**

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PB Consult is an independent entity with no interest in the activity other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and PB Consult have no interest in secondary or downstream development as a result of the authorization of this proposed project. There are no circumstances that compromise the objectivity of this report. The findings, results, observations and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. PB Consult reserve the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

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## **RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR**

---

Mr. Peet Botes holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he had worked for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTR and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, environmental management plans for various industries, environmental compliance audits, environmental control work as well as more than 70 biodiversity & botanical specialist studies.

Towards the end of 2017, Mr Botes started his own small environmental consulting business focusing on biodiversity & botanical assessments, biodiversity management plans and environmental compliance audits.

Mr. Botes is a registered Professional Botanical, Environmental and Ecological Scientists at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.



## DECLARATION OF INDEPENDENCE

### THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Petrus, Jacobus, Johannes Botes, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 13 of GN No. R. 326.

**Note:** The terms of reference must be attached.



Signature of the specialist:

PB Consult (Sole Proprietor)

Name of company:

4 February 2020

Date:

## CONTENTS

<b>SUMMARY - MAIN CONCLUSIONS .....</b>	<b>I</b>
<b>INDEPENDENCE &amp; CONDITIONS.....</b>	<b>III</b>
<b>RELEVANT QUALIFICATIONS &amp; EXPERIENCE OF THE AUTHOR .....</b>	<b>III</b>
<b>DECLARATION OF INDEPENDENCE .....</b>	<b>IV</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1. Terms of reference .....	1
<b>2. STUDY AREA .....</b>	<b>1</b>
2.1. Location & Layout .....	1
2.2. Climate .....	2
2.3. Topography.....	3
2.4. Geology and soils .....	3
<b>3. EVALUATION METHOD.....</b>	<b>3</b>
<b>4. THE VEGETATION .....</b>	<b>5</b>
4.1. The Vegetation in context.....	6
4.2. Vegetation encountered .....	6
4.2.1. Vegetation associated with the shallow rocky soils.....	7
4.2.2. Vegetation associated with the deeper sandy soils.....	9
4.2.3. Transformed area.....	10
4.3. Flora encountered .....	11
4.4. Northern Cape critical biodiversity areas.....	12
4.5. Potential impact on centres of endemism .....	13
4.6. Threatened and protected plant species .....	13
4.6.1. Red list of South African plant species .....	14
4.6.2. NEM: BA protected plant species .....	14
4.6.3. NFA Protected plant species.....	14
4.6.4. NCNCA protected plant species.....	14
<b>5. IMPACT ASSESSMENT METHOD .....</b>	<b>16</b>
5.1. Determining significance .....	16
5.2. Significance categories .....	18
<b>6. DISCUSSING BOTANICAL SENSITIVITY.....</b>	<b>19</b>
6.1. Impact assessment .....	20
<b>7. IMPACT MINIMISATION RECOMMENDATIONS.....</b>	<b>22</b>
7.1. Mitigation actions .....	22
<b>8. REFERENCES.....</b>	<b>23</b>

## LIST OF FIGURES

Figure 1: Map showing the location of Keimoes in the Northern Cape Province .....	2
Figure 2: Location of the proposed Gamakor LCH, to the northwest of Keimoes.....	2
Figure 3: The proposed footprint (black) and the routes followed during the survey (yellow) .....	4
Figure 4: Vegetation map of South Africa (2012 beta 2 version), showing the Keimoes area. ....	5
Figure 5: Google image of the footprint, showing the transformed area (purple) and deeper sandy areas (orange) .....	7
Figure 10: The Northern Cape CBA map showing the location of the proposed development .....	13

## LIST OF TABLES:

Table 1: Average rainfall and temperatures for Keimoes ( <a href="http://www.saexplorer.co.za">www.saexplorer.co.za</a> ).....	3
Table 2: List of indigenous species encountered within or near the proposed footprint .....	11
Table 3: List and location of protected tree species encountered near the proposed site 2, 3 & 9 locations .....	14
Table 4: Plant species protected in terms of the NCNCA encountered within the study area.....	15
Table 5: Categories and criteria used for the evaluation of the significance of a potential impact .....	17
Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002) .....	18
Table 7: Impact assessment associated with the proposed development .....	20



## 1. INTRODUCTION

The Kai !Garib Local Municipality are in the process of formalizing the Gamakor and Noodkamp low cost housing (LCH) project, which is located to the north-west of Keimoes. The aim is to rezone and subdivide about 1 500 new erven for low cost housing, which will include associated infrastructure such as water, electricity, sewage and solid waste removal. The footprint for this development will be approximately 104 ha. However, it must be noted that many of this area has already been settled by local inhabitants.

The study areas includes (Please refer to Figure 1 – 2):

- The remainder of Farm Kousas No. 459, Keimoes;
- Portion 128 of Farm Kousas No. 459, Keimoes;
- Erven 1470, 1474 & 1480, Keimoes

The proposed development will result in the transformation of a further 50-60 ha of remaining natural veld, which triggers NEMA EIA activities. EnviroAfrica was appointed to perform the NEMA EIA application and PB Consult was appointed to conduct a botanical assessment of the proposed development.

Only one vegetation type is expected to be impacted by the proposed development, namely Bushmanland Arid Grassland (considered “Least Threatened” in terms of the National list of ecosystems that are threatened and in need of protection). Desktop studies indicated that the site is still likely to support natural vegetation including potentially protected tree species.

However, the site also shows signs of being partially transformed already (due to existing housing development), while its proximity to the urban edge would certainly have resulted in some impacts associated with urban development, which were supported by the findings of the site visit.

### 1.1. TERMS OF REFERENCE

The terms of reference for this appointment were to:

- Evaluate the proposed site(s) in order to determine whether any significant botanical features will be impacted as a result of the proposed development.
- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require “search & rescue” intervention.
- Make recommendations on impact minimization should it be required
- Consider short- to long-term implications of impacts on biodiversity and highlight irreversible impacts or irreplaceable loss of species.

## 2. STUDY AREA

### 2.1. LOCATION & LAYOUT

Keimoes is located in the Northern Cape Province where the R26 (Brandvlei road) meets the N14 (Springbok-Upington road), Refer to Figure 1). The proposed development is located to the northwest outskirts of Keimoes and overlaps portions of the Remainder and Portion 128 of the Farm Kousas No. 459 as well as Erven 1470, 1474 and 1480 (Keimoes) (Refer to Figure 1 and Figure 2).

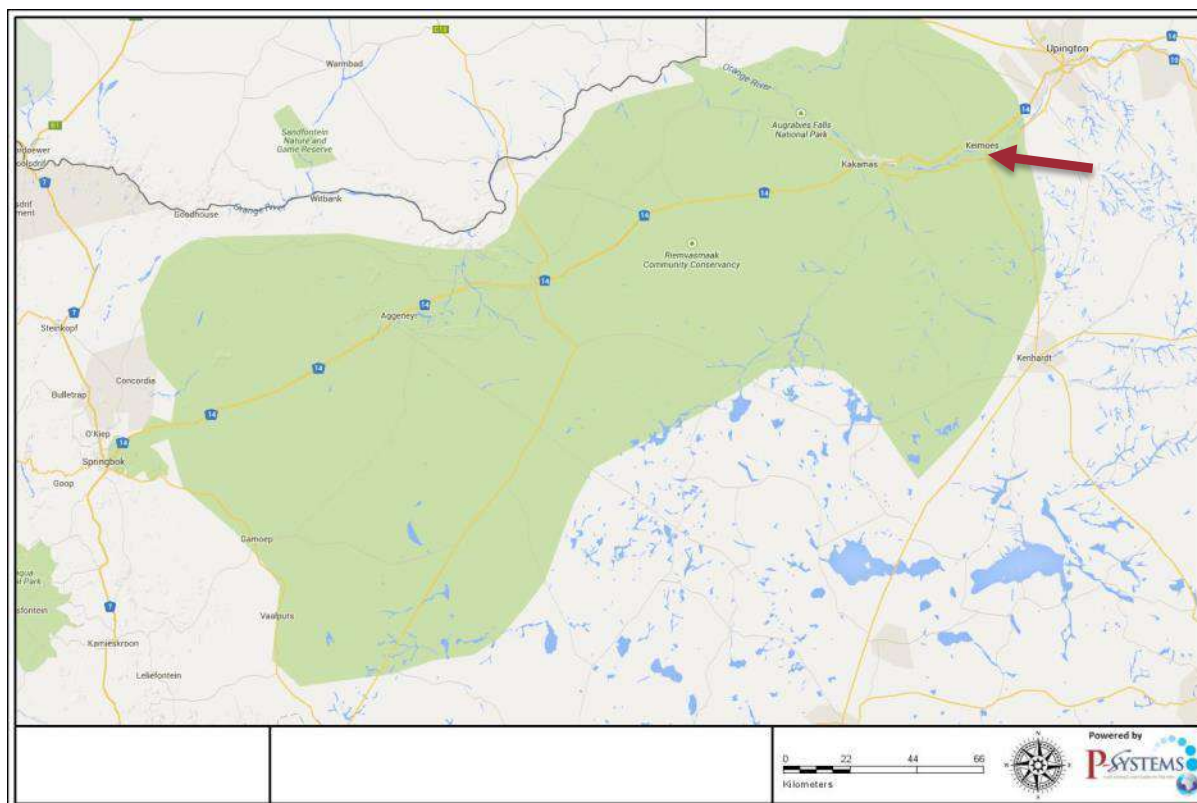


Figure 1: Map showing the location of Keimoes in the Northern Cape Province

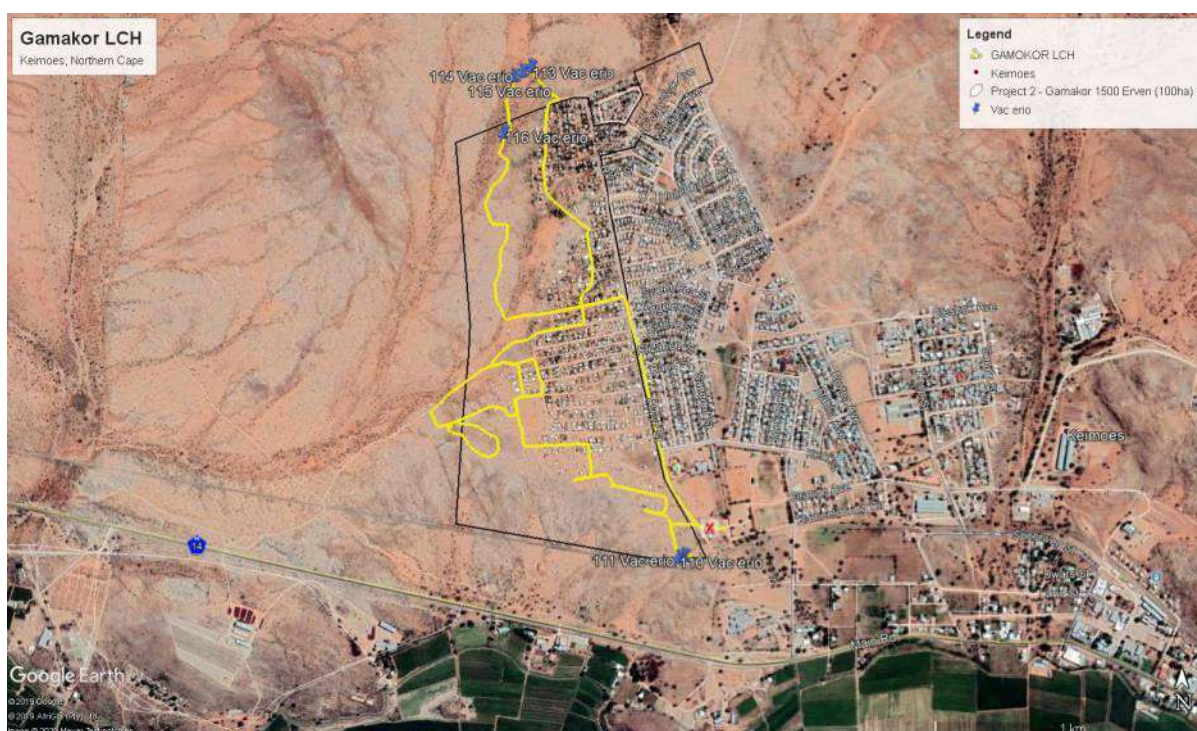


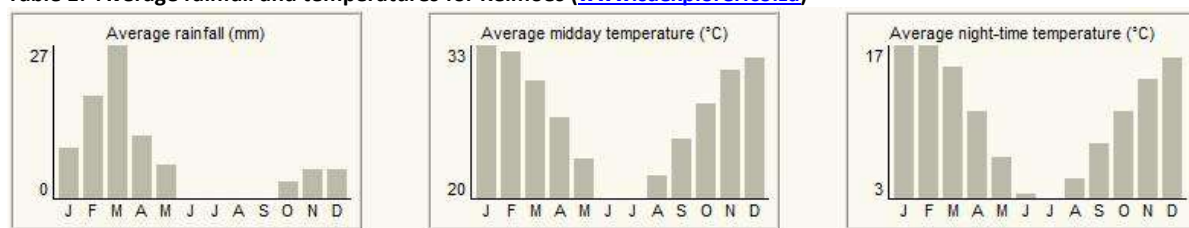
Figure 2: Location of the proposed Gamakor LCH, to the northwest of Keimoes

## 2.2. CLIMATE

All regions with a rainfall of less than 400 mm per year are regarded as arid. Keimoes receives on average approximately 84 mm of rain per year (mainly during autumn). Table 1 below gives the average rainfall values

(left) and average temperatures (centre and right) for Keimoes per month. It receives the lowest rainfall (0 mm) in June and the highest (27 mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Keimoes range from 19.8°C in June to 33°C in January. On average, the coldest nights can be expected during July with night-time temperatures averaging 3°C ([www.saexplorer.co.za](http://www.saexplorer.co.za)).

**Table 1: Average rainfall and temperatures for Keimoes ([www.saexplorer.co.za](http://www.saexplorer.co.za))**



### 2.3. TOPOGRAPHY

The most significant feature of the study area, influencing topography is the seasonal drainage line that runs from northeast to southwest through the northern part of the property, draining towards the Friesdale Spruit, which drains into the Orange River. The study area can be described as flat to slightly undulating (especially the southern portion of the site). However, the site has a slight slope from northeast to southwest (and north to south) as the landscape drains towards the Orange River. Elevation drops from approximately 758 m (northern boundary) to about 738 m (at the southern boundary) over a distance of just more than 1.72 km, with a maximum slope of 1.6% and an average slope of only 0.4%.

In general aspect is not expected to have any significant influence on the vegetation. The main environmental feature that is likely to influence vegetation will be geographical features such as drainage lines and variations in soils. As is typical of this part of the Northern Cape, small seasonal drainage lines were present on the site. In terms of vegetation, most of these drainage lines are probably not significant, apart from the larger indigenous trees that is often associated with such drainage lines and which in turns can support its own localized ecological habitat.

### 2.4. GEOLOGY AND SOILS

According to Mucina & Rutherford (2006), the geology is dominated by mudstones and shales of the Ecca Group (Prince Albert and Volksrust Formations) and Dwyka tillites, both of the early Karoo age. About 20% of rock outcrops are formed by Jurassic intrusive dolerite sheets and dykes. The soils are described as soils with minimal development, usually shallow on hard or weathering rock, Glenrosa and Mispah forms, with lime generally present in the entire landscape (Fc land type) and, to a lesser extent, red-yellow apedal, freely drained soils with a high base status and usually <15% clay (Ah and Ai land types) are also found. The salt content in these soils is very high. Lime is generally present in part or most of the landscape.

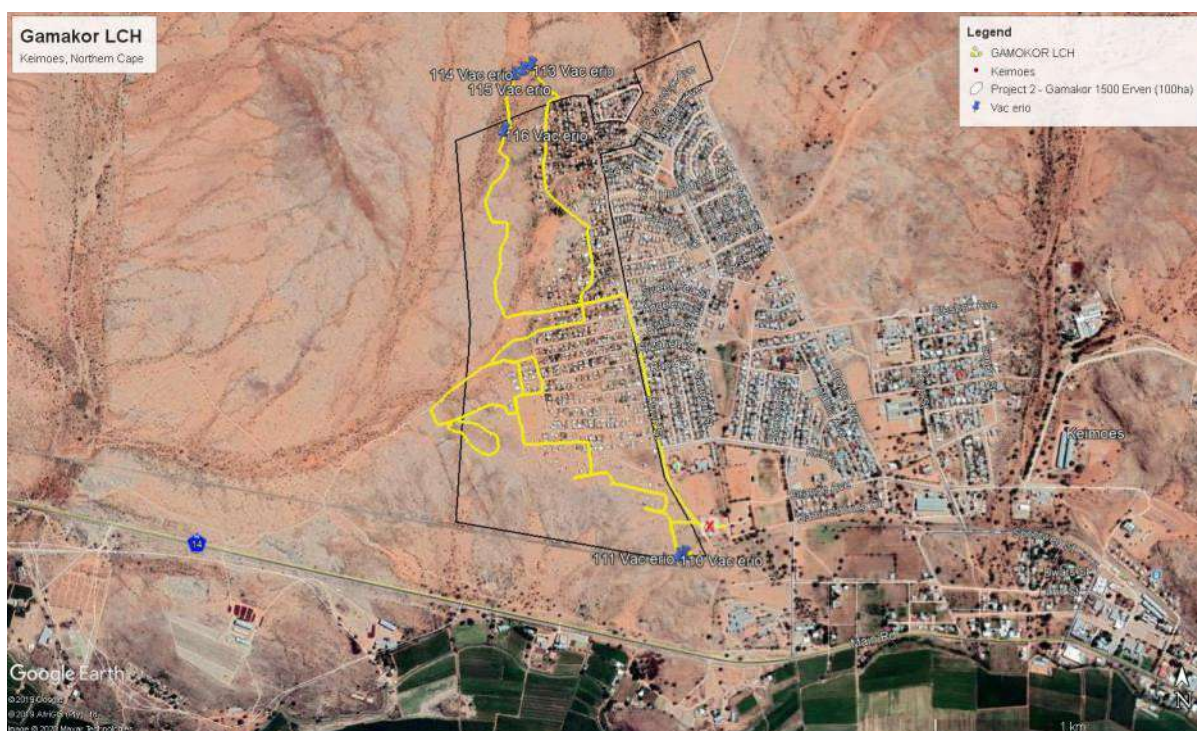
## 3. EVALUATION METHOD

Desktop studies coupled with a site visit were performed. The survey was conducted by walking and driving the site and examining, marking and photographing any area of interest. The yellow line in Figure 3 shows the route that was walked and drive during the site visit. The site visit was conducted during February 2019. The



timing of the site visit was reasonable in that, all perennial plants were identifiable, but the site was clearly very dry at the time of the visit. The author is confident that a fairly good understanding of the biodiversity status of the site was obtained (having done a number of studies in the Keimoes / Kakamas areas). Confidence in the findings is high.

The site visit started by driving slowly through the site in order to get an overall “feel” of the landscape and vegetation within the footprint. It also serves to identify differences in the landscape that may result in differences in plant community or species composition. The actual survey was then done, by walking through the sites. A hand-held Garmin GPSMAP 62s was used to track the sampling route and for recording waypoints of locations of specific importance, like protected trees (Figure 3). During the survey notes, together with a photographic record, were compiled for the vegetation and landscape.



**Figure 3:** The proposed footprint (black) and the routes followed during the survey (yellow)

During the site visit the author endeavoured to identify and record all significant biodiversity features, including rivers, streams or wetlands, special plant species and or specific soil conditions which might indicate special botanical features (e.g. rocky outcrops or silcrete patches).

The following general observations were made from the desktop studies and the site visit or evaluation:

- The western portion of the proposed footprint still include areas covered in natural land, but most of the eastern half of the proposed footprint are already settled or occupied by informal housing;
- The vegetation type conforms to the expected Bushmanland Arid Grassland, but shows two community variations, as a result of variations in soils;
- According to Van Wyk & Smith (2001) the footprint is not located within centre of endemism.



#### 4.1. THE VEGETATION IN CONTEXT

Bushmanland Arid Grassland is part of the Nama-Karoo Biome, which is a large arid landlocked region on the central plateau of the western half of South Africa, extending into Namibia. It is flanked by the Succulent Karoo to the west and south, desert to the northwest, arid Kalahari Savanna to the north, Grassland to the northeast, Albany Thicket to the southeast and small parts of Fynbos to the south. In South Africa, only the Desert Biome has a higher variability in annual rainfall and only the Kalahari Savanna greater extremes in temperature. The Nama-Karoo receives most of its rainfall in summer, especially in late summer (Mucina *et. al.*, 2006).

Climate is essentially continental and with almost no effect of the ameliorating influences of the oceans. Rainfall is low and unreliable, peaking in March. Droughts are unpredictable and often prolonged. Summers are hot and winters cold with temperature extremes ranging from -5°C in winter to 43°C in summer. However, rainfall intensity can be high (e.g. episodic thunderstorm and hail storm events). This coupled with the generally low vegetation cover associated with aridity and grazing pressure by domestic stock over the last two centuries, raises the potential for soil erosion. In semi-arid environments such as the Nama-Karoo, nutrients are generally located near the soil surface, making it vulnerable to sheet erosion (Mucina *et. al.*, 2006).

In contrast with the Succulent Karoo, the Nama-Karoo is not particularly rich in plant species and does not contain any centre of endemism. Local endemism is very low, which might indicate a relative youthful biome linked to the remarkable geological and environmental homogeneity of the Nama-Karoo. Rainfall seasonality and frequency are too unpredictable and winter temperatures too low to enable leaf succulent dominance (as in the Succulent Karoo). It is also too dry in summer for dominance by perennial grasses alone and the soils generally to shallow and rainfall too low for dominance by trees. But soil type, soil depth and local differences in moisture availability can cause abrupt changes in vegetation structure and composition (e.g. small drainage lines support more plant species than surrounding plains) (Mucina *et. al.*, 2006).

#### 4.2. VEGETATION ENCOUNTERED

Bushmanland Arid Grassland is generally described as a sparsely vegetated (semi-desert) low shrubland dominated by white grasses (*Stipagrostis* species) on gently sloping or irregular plains, which can, in years of abundant rainfall, have rich displays of annual herbs. However, the white grasses are usually also only prominent after recent rains.

In this case the absence of recent rains, as well as grazing by domestic livestock meant that the white grassy layer was mostly absent, and only a sparse low shrubland remained. Because of the arid nature of the region (and the unpredictability of rainfall) the carrying capacity of the veld is very low and overgrazing had an extremely negative effect on many vegetation types (with destruction of natural vegetation quite common near settlements). In addition, a large portion (mostly the eastern section) of the footprint was already transformed as a result of informal settlement and housing (Figure 5).

Within the remainder of the natural veld two plant communities were observed, closely associated with variations in soil type and depth. They were:

- On the shallow quartz rich rocky soils a very sparse (semi-desert) low shrubland were observed, dominated by *Salsola tuberculata* and *Justicia australis*, with *Aloe claviflora* also very common.
- On the deeper sandy soils in the slight depressions associated with the seasonal watercourses a denser and larger shrub and tree layer was encountered, dominated by *Parkinsonia africana* and *Senegalia mellifera*.



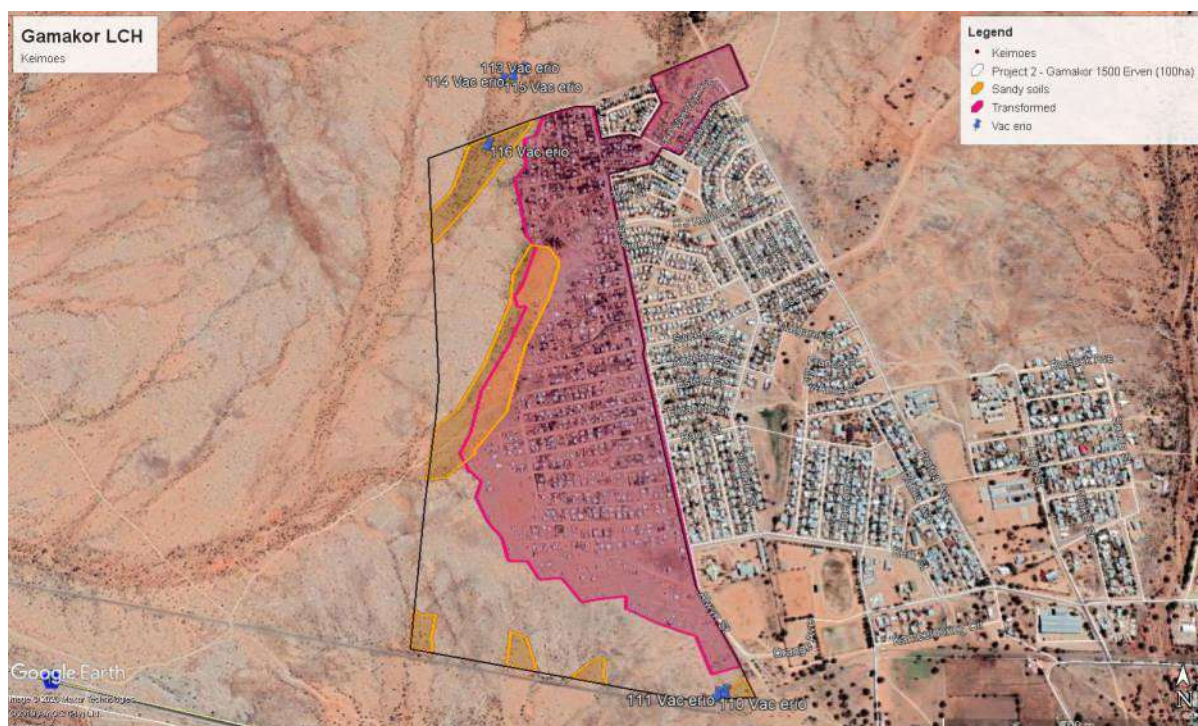


Figure 5: Google image of the footprint, showing the transformed area (purple) and deeper sandy areas (orange)

#### 4.2.1. Vegetation associated with the shallow rocky soils

Most of the remaining natural veld is associated with shallow quartz rich rocky soils. Please note that because of the unpredictability and infrequency of the rainfall the vegetation associated with true quartz fields (e.g. Knersvlakte) will never be able to develop in this area.

The vegetation can be described as a low (<50 cm in height) sparse to very sparse shrubland, low in species composition (not a great variety of species encountered). The shrubland was dominated *Salsola tuberculata* and *Justicia australis* (= *Monechma genistifolium*), with *Aloe claviflora* (Kraalaalwyn), *Mesembryanthemum subnodosum* (often a disturbance indicator) also relatively common.



**Photo 1:** Typical veld associated with the shallow rocky soils. Note the dominance by *Salsola tuberculata* in this photo. However, this was not always the case and mostly *Justicia australis* or *Mesembryanthemum subnodosum* were also present or common.

Other species in the upper layer included: *Barleria lichtensteiniana*, *Cynanchum viminale*, *Kleinia longiflora*, *Parkinsonia africana*, *Rhigozum trichotomum*, *Senegalia mellifera* and the aerial hemiparasite *Tapinanthus oleifolius*. In the lower layer (<20 cm) species like *Acanthopsis disperma* (Halfmensie), *Aptosimum spinescens*

(Doringviooltjie), *Blepharis mitrata* and *Tetraena simplex* were observed. Disturbance indicators like *Galenia africana* (Kraalbos) and *Salsola kali* (tumble weed) were also observed in the disturbed or transformed areas.



**Photo 2:** Looking from west to east over the southern portion of the footprint. Note the dominance by the disturbance indicator, *Mesembryanthemum subnodosum* near the disturbance footprint of the existing houses.



**Photo 3:** Looking from the middle of the site in a south-westerly direction. Note the dominance by *Justicia australis* in middle of the picture.



**Photo 4:** One of the rocky outcrops in the south western portion of the footprint. Note the Kraalaalwyn (*Aloe claviflora*) in the foreground and the larger Blackthorn (*Senegalia mellifera*) and *Parkinsonia africana* in the background.



#### 4.2.2. Vegetation associated with the deeper sandy soils

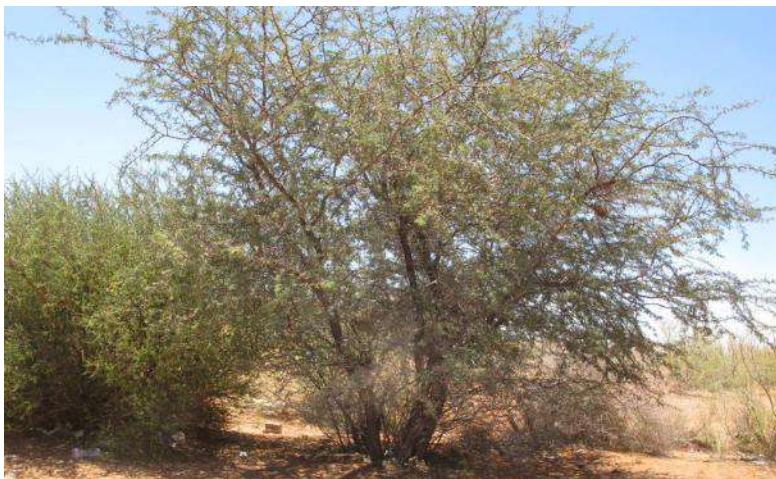
Within the slightly lower lying depressions associated with seasonal drainage lines, deeper sandy soils were encountered, which also supported a denser and larger shrub / small tree layer dominated by *Parkinsonia africana* and *Senegalia mellifera*. Unfortunately, the alien invasive *Prosopis* tree was also common in some of these areas. The following species were observed: *Asparagus cf. cooperi*, *B. foetida* (occasionally), *Euphorbia braunsii*, *Justicia australis*, *Kleinia longifolia*, *Lycium bosciifolium*, *Rhigozum trichotomum* and *Vachellia erioloba* (3 individuals within the proposed footprint).



**Photo 5:** A view over the northern portion of the footprint, overlooking the deeper sandy area in the background.



**Photo 6:** Note the dominance by *Parkinsonia africana* in the deeper sandy area, with the occasional *Senegalia mellifera* also visible.



**Photo 7:** One of the three *Vachellia erioloba* trees within the footprint. This one to the north of the site. Note the large *Senegalia mellifera* next to the Camel Thorn tree.





**Photo 8:** One of the two *Vachellia erioloba* encountered in a sandy spot to the south of the footprint.

#### 4.2.3. Transformed area

Most of the eastern portion of the footprint is already transformed as a result of informal settlement. The purpose of this application is to formalise this area into a formal urban development. The following pictures shows portions of this area.



**Photo 9:** Some of the housing in the north eastern section of the footprint



**Photo 10:** Some of the housing in the south eastern section of the footprint.

### 4.3. FLORA ENCOUNTERED

Table 2 gives a list of the plant species encountered during this study and their status in terms of the Red List of South African plants, National Environmental Management: Biodiversity Act, Act 10 of 2004 (NEM:BA), National Forest Act, Act 84 of 1998 (NFA), the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA) and Conservation of Agricultural Resources Act, Act 43 of 1983 (CARA).

**Table 2: List of indigenous species encountered within or near the proposed footprint**

No.	Species name	FAMILY	Status	Alien & invader species (AIS)
1.	<i>Acanthopsis disperma</i>	ACANTHACEAE	LC	
2.	<i>Aloe claviflora</i>	ASPHODELACEAE	LC NCNCA, Schedule 2 Protected (all species in this Family)	Apply for a NCNCA Flora permit (DENC)
3.	<i>Aptosimum spinescens</i>	SCROPHULARIACEAE	LC	
4.	<i>Asparagus cf. cooperi</i>	ASPARAGACEAE	LC	
5.	<i>Barleria lichtensteiniana</i>	ACANTHACEAE	LC	
6.	<i>Blepharis mitrata</i>	ACANTHACEAE	LC	
7.	<i>Boscia foetida</i>	BRASSICACEAE (CAPPARACEAE)	LC NCNCA, Schedule 2 Protected (all species in this Genus)	Apply for a NCNCA Flora permit (DENC)
8.	<i>Cynanchum viminale</i> (=Sarcostemma viminale)	APOCYNACEAE	NCNCA, Schedule 2 Protected (all species in this Family)	Apply for a NCNCA Flora permit (DENC)
9.	<i>Datura innoxia</i>	BRASSICACEAE	Alien weed	CARA Cat 1; NEMBA Cat 1b
10.	<i>Euphorbia braunsii</i>	EUPHORBIACEAE		
11.	<i>Galenia africana</i>	AIZOACEAE	LC Protected in terms of schedule 2 of the NCNCA	Apply for a NCNCA Flora permit (DENC)
12.	<i>Justicia australis</i> (=Monechma genistifolium)	ACANTHACEAE	LC	
13.	<i>Kleinia longiflora</i>	ASTERACEAE	LC	
14.	<i>Lycium bosciifolium</i>	SOLANACEAE	LC	
15.	<i>Mesembryanthemum subnodosum</i> (=Psilocaulon subnodosum)	AIZOACEAE	LC Protected in terms of schedule 2 of the NCNCA	Apply for a NCNCA Flora permit (DENC)
16.	<i>Parkinsonia africana</i>	FABACEAE	LC	
17.	<i>Prosopis</i> species	FABACEAE	Alien invasive plant species	CARA Cat 2; NEMBA Cat 3
18.	<i>Rhigozum trichotomum</i>	BIGONACEAE	LC	
19.	<i>Salsola kali</i>	AMARANTHACEAE	Naturalised invader	NEMBA Cat 1b
20.	<i>Salsola tuberculata</i>	AMARANTHACEAE		
21.	<i>Senegalia mellifera</i> (=Acacia mellifera)	FABACEAE	LC	
22.	<i>Tapinanthus oleifolius</i>	LORANTHACEAE	LC	
23.	<i>Tetraena simplex</i> (=Zygophyllum simplex)	ZYGOPHYLLACEAE	LC	
24.	<i>Vachellia erioloba</i>	FABACEAE	LC NFA protected species	Apply for a NFA Tree permit (DAFF)

#### 4.4. NORTHERN CAPE CRITICAL BIODIVERSITY AREAS

The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness & Oosthuysen, 2016). The 2016 Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province (including the Namakwa District Biodiversity Sector Plan, 2008). Priorities from existing plans such as the Namakwa District Biodiversity Plan, the Succulent Karoo Ecosystem Plan, National Estuary Priorities, and the National Freshwater Ecosystem Priority Areas were incorporated. Targets for terrestrial ecosystems were based on established national targets, while targets used for other features were aligned with those used in other provincial planning processes.

Critical biodiversity areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI 2007). The primary purpose of CBA's is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. CBA's can also be used to inform protected area expansion and development plans.

- **Critical biodiversity areas (CBA's)** are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.
- **Ecological support areas (ESA's)** are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas.

From a land-use planning perspective it is useful to think of the difference between CBA's and ESA's in terms of where in the landscape the biodiversity impact of any land-use activity action is most significant:

- For CBA's the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat).
- For ESA's a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity).

According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located **within a terrestrial CBA**. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA.



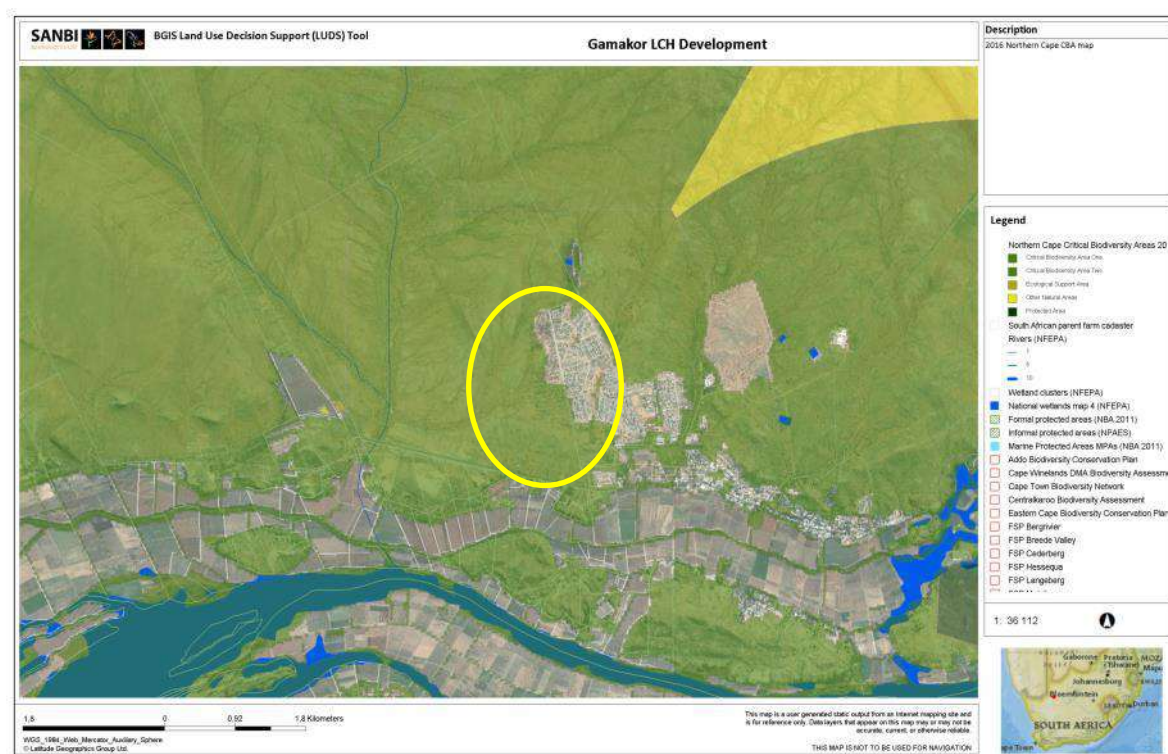


Figure 6: The Northern Cape CBA map showing the location of the proposed development

#### 4.5. POTENTIAL IMPACT ON CENTRES OF ENDEMISM

According to Van Wyk en Smith (2001), the proposed development will not impact on any recognised centre of endemism. The nearest centre of endemism is the Griqualand West Centre which starts west of Delportshoop (approximately 50 km west of the proposed site).

**The proposed site does not fall within any recognised centre of endemism.**

#### 4.6. THREATENED AND PROTECTED PLANT SPECIES

South Africa has become the first country to fully assess the status of its entire flora. Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban expansion, crop cultivation and mines), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods). South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction, but may nonetheless be of high conservation importance. As a result a SANBI uses an amended system of categories in order to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

In the Northern Cape, species of conservation concern are also protected in terms of national and provincial legislation, namely:

- The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007).
- National Forest Act, Act 84 of 1998, provides for the protection of forests as well as specific tree species through the “*List of protected tree species*” (GN 908 of 21 November 2014).
- Northern Cape Nature Conservation Act, Act of 2009, provides for the protection of “*specially protected species*” (Schedule 1), “*protected species*” (Schedule 2) and “*common indigenous species*” (Schedule 3).

#### 4.6.1. Red list of South African plant species

The Red List of South African Plants online provides up to date information on the national conservation status of South Africa’s indigenous plants (SANBI, 2015). **No red-listed species** was observed.

#### 4.6.2. NEM: BA protected plant species

The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007). **No NEM: BA protected species was observed.**

#### 4.6.3. NFA Protected plant species

The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (as updated).

- **Three *Vachellia erioloba* trees were encountered** within the footprint (Refer to Table 3). There should be no reason to remove these trees.

**Table 3: List and location of protected tree species encountered near the proposed site 2, 3 & 9 locations**

Waypoint No.	Species name	Coordinates	Comments	Recommendations
110 Vac erio	<i>Vachellia erioloba</i>	S28° 42' 14.9" E20° 57' 08.4"	Young tree (4m). Picture 8	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).
111 Vac erio	<i>Vachellia erioloba</i>	S28° 42' 14.6" E20° 57' 09.1"	Young tree (4m).	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).
116 Vac erio	<i>Vachellia erioloba</i>	S28° 41' 25.3" E20° 56' 44.9"	Mature tree (5m) Picture 7	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).

#### 4.6.4. NCNCA protected plant species

The Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect on the 12<sup>th</sup> of December 2011, and also provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. NB. Please note that all indigenous plant species are protected in terms of Schedule 3 of this act (e.g. any work within a road reserve).

- The following plant protected in terms of the NCNCA was encountered. Recommendations on impact minimisation also included.

**Table 4: Plant species protected in terms of the NCNCA encountered within the study area**

NO.	SPECIES NAME	COMMENTS	RECOMMENDATIONS
1.	<i>Aloe claviflora</i> <b>Schedule 2 protected</b>	All species in the genus protected by default. Locally abundant.	<b>Search &amp; rescue:</b> Individuals within footprint to be transplanted to surrounding area.
2.	<i>Boscia foetida</i> <b>Schedule 2 protected</b>	Occasionally observe, usually in poor condition and subject to grazing	<b>Search &amp; rescue:</b> Individuals within footprint to be transplanted to surrounding area.
3.	<i>Cynanchum viminalis</i> <b>Schedule 2 protected</b>	Occasionally observed.	Larger <i>Cynanchum</i> plants are expected to transplant poorly. Species protection through topsoil conservation.
4.	<i>Galenia africana</i> <b>Schedule 2 protected</b>	This plant is weedy a disturbance indicator and commonly found in the Northern Cape.	No special measures needed, this is a weedy pioneer species.
5.	<i>Mesembryanthemum subnodosum</i> <b>Schedule 2 protected</b>	This plant is weedy a disturbance indicator and commonly found throughout.	No special measures needed, this is a weedy pioneer species.



## 5. IMPACT ASSESSMENT METHOD

The objective of this study was to evaluate the botanical diversity of the property area in order to identify significant environmental features which might have been impacted as a result of the development. The Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al.*, 2005), were used to evaluate the botanical significance of the property with emphasis on:

- Significant ecosystems
  - Threatened or protected ecosystems
  - Special habitats
  - Corridors and or conservancy networks
- Significant species
  - Threatened or endangered species
  - Protected species

### 5.1. DETERMINING SIGNIFICANCE

Determining impact significance from predictions of the nature of the impact has been a source of debate and will remain a source of debate. The author used a combination of scaling and weighting methods to determine significance based on a simple formula. The formula used is based on the method proposed by Edwards (2011). However, the criteria used were adjusted to suite its use for botanical assessment. In this document significance rating was evaluated using the following criteria (Refer to Table 5).

Significance = Conservation Value x (Likelihood + Duration + Extent + Severity) (Edwards 2011)
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Table 5: Categories and criteria used for the evaluation of the significance of a potential impact

ASPECT / CRITERIA	LOW (1)	MEDIUM/LOW (2)	MEDIUM (3)	MEDIUM/HIGH (4)	HIGH (5)
<b>CONSERVATION VALUE</b> Refers to the intrinsic value of an attribute or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species	The attribute is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.	The attribute is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.	The attribute is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.	The attribute is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.	The attribute is considered critically endangered or is part of a proclaimed provincial or national protected area.
<b>LIKELIHOOD</b> Refers to the probability of the specific impact occurring as a result of the proposed activity	Under normal circumstances it is almost certain that the impact will not occur.	The possibility of the impact occurring is very low, but there is a small likelihood under normal circumstances.	The likelihood of the impact occurring, under normal circumstances is 50/50, it may or it may not occur.	It is very likely that the impact will occur under normal circumstances.	The proposed activity is of such a nature that it is certain that the impact will occur under normal circumstances.
<b>DURATION</b> Refers to the length in time during which the activity is expected to impact on the environment.	Impact is temporary and easily reversible through natural process or with mitigation. Rehabilitation time is expected to be short (1-2 years).	Impact is temporary and reversible through natural process or with mitigation. Rehabilitation time is expected to be relative short (2-5 years).	Impact is medium-term and reversible with mitigation, but will last for some time after construction and may require on-going mitigation. Rehabilitation time is expected to be longer (5-15 years).	Impact is long-term and reversible but only with long term mitigation. It will last for a long time after construction and is likely to require on-going mitigation. Rehabilitation time is expected to be longer (15-50 years).	The impact is expected to be permanent.
<b>EXTENT</b> Refers to the spatial area that is likely to be impacted or over which the impact will have influence, should it occur.	Under normal circumstances the impact will be contained within the construction footprint.	Under normal circumstances the impact might extent outside of the construction site (e.g. within a 2 km radius), but will not affect surrounding properties.	Under normal circumstances the impact might extent outside of the property boundaries and will affect surrounding land owners or – users, but still within the local area (e.g. within a 50 km radius).	Under normal circumstances the impact might extent to the surrounding region (e.g. within a 200 km radius), and will regional land owners or –users.	Under normal circumstances the effects of the impact might extent to a large geographical area (>200 km radius).
<b>SEVERITY</b> Refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur.	It is expected that the impact will have little or no affect (barely perceptible) on the integrity of the surrounding environment. Rehabilitation not needed or easily achieved.	It is expected that the impact will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved.	It is expected that the impact will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved.	It is expected that the impact will have a severe impact on the surrounding environment. Functioning may be severely impaired and may temporarily cease. Rehabilitation will be needed to restore system integrity.	It is expected that the impact will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible due to cost.

## 5.2. SIGNIFICANCE CATEGORIES

The formal NEMA EIA application process was developed to assess the significance of impacts on the surrounding environment (including socio-economic factors), associated with any specific development proposal in order to allow the competent authority to make informed decisions. Specialist studies must advise the environmental assessment practitioner (EAP) on the significance of impacts in his field of specialty. In order to do this, the specialist must identify all potentially significant environmental impacts, predict the nature of the impact and evaluate the significance of that impact should it occur. Potential significant impacts are evaluated, using the method described above, in order to determine its potential significance. The potential significance is then described in terms of the categories given in Table 5.

**Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002)**

SIGNIFICANCE	DESCRIPTION
Insignificant or Positive (4-22)	There is no impact or the impact is insignificant in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or the impact may be positive.
Low (23-36)	An impact barely noticeable in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium Low (37-45)	Impact is of a low order and therefore likely to have little real effect. Mitigation is either easily achieved. Social, cultural and economic activities can continue unchanged, or impacts may have medium to short term effects on the social and/or natural environment within site boundaries.
Medium (46-55)	Impact is real, but not substantial. Mitigation is both feasible and fairly easily possible, but may require modification of the project design or layout. Social, cultural and economic activities of communities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long term effect on the social and/or natural environment, within site boundary.
Medium high (56-63)	Impact is real, substantial and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. Social, cultural and economic activities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long-term effect on the social and/or natural environment, beyond site boundary within local area.
High (64-79)	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted and may come to a halt. These impacts will usually result in long-term change to the social and/or natural environment, beyond site boundaries, regional or widespread.
Unacceptable (80-100)	An impact of the highest order possible. There is no possible mitigation that could offset the impact. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. The impact will result in permanent change. Very often these impacts cannot be mitigated and usually result in very severe effects, beyond site boundaries, national or international.



## 6. DISCUSSING BOTANICAL SENSITIVITY

The aim of impact assessment is to determine the vulnerability of a habitat to a specific impact. In order to do so, the sensitivity of the habitat should be determined by identifying and assessing the most significant environmental aspects of the site against the potential impact(s). For this development the following biodiversity aspects was considered:

- **Location**: The proposed development footprint is located on Municipal property, adjacent to existing housing infrastructure on natural veld that shows varying degrees of disturbance as a result of historical land use and more recent urban settlement and current land use (livestock grazing).
- **Activity**: The proposed activity is expected to result in a permanent footprint of approximately 100 ha of veld (showing varying degrees of disturbance), of which almost half had already been transformed.
- **Geology & Soils**: No special features such as true quartz patches or heuweltjies were observed in or near to the larger footprint area that may result in specialised plant habitat.
- **Land use and cover**: The footprint is located on municipal land adjacent to an existing urban area. Portions of the footprint is still in relative good conditions (although heavily grazed), but half had already been transformed by illegal structures (settlement). Remaining natural veld is utilised for livestock grazing by the local community.
- **Vegetation status**: Bushmanland Arid Grassland is not considered to be of conservation concern, but conservation targets have not yet been met. In general the natural systems associated with the proposed footprint have been impacted, but the western portion of the proposed footprint is still largely natural, although it is under constant urban related pressures.
- **Conservation priority areas**: According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located within a terrestrial CBA. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA. The site will not impact on any centre of endemism.
- **Connectivity**: The proposed activity will result in a permanent footprint enlargement of the existing housing scheme by approximately 100 ha. However, the proposed footprint joins up with the existing urban edge and should not have any significant additional impact on connectivity.
- **Watercourses and wetlands**: A number of small seasonal drainage lines run through the property.
- **Protected or endangered plant species**: Three Camel Thorn trees (NFA protected) and five NCNCA protected plant was observed.
- **Alien and Invasive Plant species**: A number of alien and invasive plant species were observed of which the densities and spread of the alien *Prosopis glandulosa* tree is probably the most concerning.

Conservation value or habitat sensitivity is based on the irreplaceability of the habitat unit, on observations of the abundance and diversity of floral and faunal species present at the time of the assessment, on the presence of endangered or protected species within the habitat units, on the presence of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) and on the degree of disturbance encountered as a result of historical and current activities.

The terrestrial habitat associated with the project footprint is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type is classified as least threatened;
- However, the project footprint overlaps a CBA;

- The floral habitat and natural systems have been impacted, by grazing and urban related activities, but portions still functions relatively well;
- The floral diversity is very low;
- No special habitats or features were observed within the footprint;
- No red-list species were encountered, but one nationally protected tree and five provincially protected plant species was encountered.

## 6.1. IMPACT ASSESSMENT

The following table rates the significance of environmental impacts associated with the proposed development. It also evaluates the expected accumulative effect of the proposed development as well as the No-Go option.

**Table 7: Impact assessment associated with the proposed development**

Impact assessment								
Aspect	Mitigation	CV	Lik	Dur	Ext	Sev	Significance	Short discussion
<b>Geology &amp; soils:</b> Potential impact on special habitats (e.g. true quartz or "heuweltjies")	Without mitigation	3	1	2	3	2	24	No special habitats observed.
	With mitigation	3	1	2	2	1	18	Ensure good environmental control during the construction phase.
<b>Landuse and cover:</b> Potential impact on socio-economic activities.	Without mitigation	3	3	4	3	2	36	Permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants).
	With mitigation	3	2	4	2	1	27	Potential beneficial socio-economic impact (job opportunities).
<b>Vegetation status:</b> Loss of vulnerable or endangered vegetation and associated habitat.	Without mitigation	3	3	4	3	2	36	Permanent transformation of 100ha of partially disturbed Bushmanland Arid Grassland (Least Threatened)
	With mitigation	3	2	4	2	1	27	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint
<b>Conservation priority:</b> Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	Without mitigation	3	5	5	3	3	48	The development will impact on a proposed CBA. However, there is no alternative that will not impact on the CBA, and this area is probably the most logical choice.
	With mitigation	3	3	4	2	2	33	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint
<b>Connectivity:</b> Potential loss of ecological migration corridors.	Without mitigation	3	3	4	3	3	39	The additional footprint joins the existing urban edge and should not add have any significant additional impact on connectivity.
	With mitigation	3	2	2	2	2	24	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint

Impact assessment								
Aspect	Mitigation	CV	Lik	Dur	Ext	Sev	Significance	Short discussion
<b>Watercourses and wetlands:</b> Potential impact on natural water courses and its ecological support areas.	Without mitigation	3	3	4	3	2	36	The proposed development will impact on small ephemeral drainage lines and potentially larger water courses with well-established riparian vegetation.
	With mitigation	3	2	3	2	2	27	Refer to the freshwater specialist report.
<b>Protected &amp; endangered plant species:</b> Potential impact on threatened or protected plant species.	Without mitigation	3	4	4	3	4	45	A number of protected species were observed, most notably a number of nationally protected tree species.
	With mitigation	3	2	3	1	2	24	Protect all significant indigenous tree species and search & rescue other potentially significant protected plant species.
<b>Invasive alien plant species:</b> Potential invasive plant infestation as a result of the activities.	Without mitigation	3	3	4	3	2	36	Stands of Prosopis trees were observed in certain areas.
	With mitigation	3	1	2	1	1	15	Special care must be taken during their removal (in order to avoid re-sprouting).
<b>Veld fire risk:</b> Potential risk of veld fires as a result of the activities.	Without mitigation	3	2	3	2	2	27	Veld fire risk low.
	With mitigation	3	1	3	1	1	18	Address fire danger throughout construction.
<b>Cumulative impacts:</b> Cumulative impact associated with proposed activity.	Without mitigation	3	5	5	3	4	51	Permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants).
	With mitigation	3	3	4	2	2	33	Refer to all the mitigation recommendations above.
<b>The "No-Go" option:</b> Potential impact associated with the No-Go alternative.	Without mitigation	3	3	3	2	3	33	No direct impact on natural veld or protected plant species, but slow deterioration through constant grazing and urban creep.
	With mitigation						0	

According Table 7, the main impacts associated with the proposed development will be on:

- The permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants);
- The potential impact on critical biodiversity areas;
- The potential impact on protected plant species;

Because of the location and the degraded status of the site, the cumulative impact is expected to be **Medium**, but this can be reduced to **Low** by mitigation.



## 7. IMPACT MINIMISATION RECOMMENDATIONS

The proposed development will result in the permanent transformation of approximately 100ha of natural veld for human settlement. According to the impact assessment given in Table 7, with good environmental control, the development is likely to result in a **MEDIUM** impact on the environment.

However, with the correct mitigation it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

### 7.1. MITIGATION ACTIONS

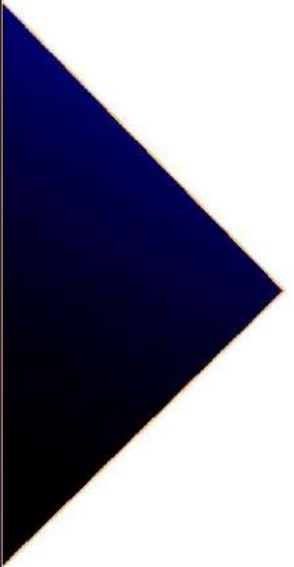
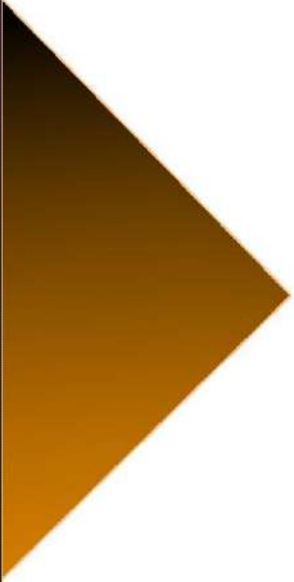
The following mitigation actions are recommended:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EA and the construction phase EMP and any other conditions pertaining to specialist studies.
- **Before any work is done** the development footprint and access routes must be clearly demarcated and approved by the ECO. The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- No *Vachellia erioloba* (Camel Thorn) trees may be removed or damaged (the three trees within the footprint must be protected).
- An effort should be made to transplant some of the *Aloe claviflora* plants as well as all viable (transplantable) *Boscia foetida* shrubs/trees.
- Indiscriminate clearing of any area outside of the construction footprint must be avoided.
- An integrated waste management approach must be implemented during construction.
  - Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
  - All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.
- Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species within the footprint and at least 5 m to the side of the footprint must be removed responsibly.
  - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);
  - Care must be taken to dispose of alien plant material responsibly.

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## ANNEXURE G: GEOTECHNICAL REPORT





# REPORT ON THE GEOTECHNICAL CONDITIONS ON PORTION 128 AND A PORTION OF THE RESTANT OF THE FARM KOUSAS 459, KEIMOE

2020/J032/MCP\_01



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## **EXECUTIVE SUMMARY**

### **1 INTRODUCTION**

It is envisaged to develop some 50 hectare of land on Portion 128 and a portion of the restant of the farm Kousas 459 to the west of Keimoes as a residential area. For this purpose Cedar Land Geotechnical Consult (Pty) Ltd was appointed as subconsultant to Macroplan by Ms Y Botha and Mr R van den Berg of Barzani Town Planning per letter of appointment dated 20 January 2020 to conduct a geotechnical investigation on the property.

### **2 SITE DESCRIPTION**

#### **2.1 Site Location**

Portion 128 and a portion of the restant of the farm Kousas 459 are situated on the western boundary of the existing town of Keimoes in the Northern Cape. The eastern boundary of the property is formed by Aalwyn Street ; the southeastern boundary by the railway line ; the western boundary by vacant land ; and the northern boundary by a powerline. The size of the property is 50 hectare.

#### **2.2 Vegetation and Landscape**

The area of investigation is referred to as Bushmanland Arid Grassland. The landscape features are described as consisting of extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses giving this vegetation type the character of semi-desert steppe.

#### **2.3 Existing Facilities**

##### **2.3.1 Informal Housing**

Informal housing consisting of galvanized iron structures and some masonry structures is present in the western part of the site, bordering Aalwyn Street. Water and electricity are provided to the structures, though it may not always be legal connections.

##### **2.3.2 Vacant Land**

Vacant, undeveloped land is present close to the railway line in the south and to the west of the informal settlement.

### **3 NATURE OF INVESTIGATION**

Thirty five test pits were excavated with a Case 580T TLB. All test pits were excavated to refusal, except where collapse of sidewalls occurred. The test pits were profiled by a professionally registered geotechnical engineer.

Soil testing consisted of the following :

- Conductivity and pH determinations on samples of the in-situ materials to determine the corrosivity thereof.
- Foundation indicator testing on samples of the in-situ materials to determine possible conditions of heave or settlement.
- CBR and road indicator testing to determine the suitability of the in-situ materials to be utilized as road layerworks.

### **4 GEOLOGY, SOIL PROFILES AND GROUNDWATER**

#### **4.1 Stratigraphy**

The area of investigation is located on a subduction zone dating approximately 1000 million years old. The zone is located between the lithology of the Kaapvaal Craton and the Namaqua-Natal mobile belt. The remains of the original geology in the area are referred to as the Kakamas Terrane and the site is located on Friersdale charnockite and Vaalputs granite-gneiss of the Keimoes Suite that is intrusive into the terrane. The charnockite is described as dark grey, unfoliated rock. The texture is fine to medium and uneven grained. Many of the quartz grains have an opalescent blue colour. Charnockite consists of a fine grained groundmass of quartz, feldspar, minor plagioclase and biotite, with larger biotite, hypersthene and augite grains

#### **4.2 Soil Profile**

##### **4.2.1 Colluvium**

The soil profile consists of a surface horizon of colluvium comprising of coarse sand to fine sand containing occasional gravels of banded ironstone, quartz and quartzite. The horizon extended to a maximum depth of 800mm. The colluvium is not expansive or collapsible, but compressible due to its general loose consistency.



#### 4.2.2 Alluvium

A surface horizon of alluvium is present in the drainage gullies on site, comprising of fine sand containing gravels of quartz. Calcification may occur with depth. The horizon extended to a maximum depth of 2700mm. The alluvium is not expansive or collapsible, but highly compressible due to its very loose to loose consistency.

#### 4.2.3 Pebblestone Marker

Only a minor occurrence of the pebblestone marker was encountered in one test pit only. It was 100mm thick maximum, consisting predominantly of gravels of banded ironstone in a matrix of fine sand. The pebblestone marker is not expansive or collapsible and only negligibly compressible and erodible.

#### 4.2.4 Residual Charnockite

Residual charnockite underlies the colluvium and in some instances the pedogenic deposits, occurring from depths between 200mm and 1100mm minimum, extending to 300mm to 1900mm maximum. It can be described as dirty white speckled dark grey varying to light brown gravelly sand. The presence of flakes of biotite was occasionally encountered in the charnockite soil profile. The consistency of the residual charnockite varied between loose and very dense in the test pits. The residual charnockite is not expansive or collapsible and only negligibly compressible and erodible.

#### 4.2.5 Residual Granite-gneiss

Residual granite-gneiss underlies the colluvium, occurring from depths between 200mm and 1100mm minimum, extending to 700mm to 1600mm maximum. The residual granite-gneiss can be described as dirty white speckled dark grey varying to dark grey speckled white gravelly sand. The consistency of the residual granite-gneiss varied between dense and very dense in the test pits. The residual granite-gneiss is not expansive or collapsible and only negligibly compressible and erodible.

#### 4.2.6 Mokalanen Formation

##### 4.2.6(i) Hardpan Calcrete

Hardpan calcrete underlies the colluvium, occurring from depths between 100mm and 200mm minimum, extending to 300mm and 400mm maximum in isolated occurrences. The hardpan calcrete can be described as dirty white, very fine grained and very dense. It was possible to

penetrate the calcrete in the test pits as the horizon is fairly thin and it overlies residual soil material of lesser dense consistency.

#### *4.2.6(ii) Nodular Calcrete*

Nodular calcrete was encountered in variable conditions on site : from underlying the colluvium directly as a pure pedocretes ; to a sub-horizon contained within a horizon of residual soil ; or as an extensively calcified and nodular horizon, especially in the alluvium. It was present between 100mm and 800mm minimum, extending to 300mm to 1600mm maximum. The nodular calcrete can be described as dirty white, rounded fine to medium coarse, concretions contained in a matrix of fine sand. The consistency varies from loose to very dense.

### **4.3 Groundwater**

#### **4.3.1 Perched Water**

Perched groundwater was encountered in TP 3 at a depth of 1500mm and in TP 35 at 1400mm during the investigation. In both cases the presence of the water can be associated with the existing major drainage course through the site. Perched water was not encountered in any of the other test pits on site. It is anticipated that perched water will generally not prove problematic on the site, except in the major water course almost on a permanent basis ; and in the lesser drainage courses after events of inundation.

#### **4.3.2 Permanent Groundwater**

Groundwater is expected to occur at depths between 20 meters and 30 meters in fractures restricted to a zone directly below the water table. The presence of permanent water has no influence on the geotechnical conditions on site.

## **5 SITE CLASS DESIGNATION**

### **5.1 Geotechnical Zone I**

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. The distribution thereof encompasses 15% of the proposed area for development. Slope across the land is less than 2%. Two foundation design alternatives are applicable to the zone, namely conventional strip foundations or slab-on-the-ground foundations placed directly on bedrock of granite-gneiss or charnockite.

## **5.2 Geotechnical Zone II**

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. The distribution thereof encompasses 2% of the proposed area for development. Slope across the land is approximately 5%. The use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. The more viable foundation alternative therefore remains founding by conventional strip foundations.

## **5.3 Geotechnical Zone III**

The zone is classed as S, meaning that the proposed horizon for founding is slightly compressible and rapid settlement less than 10mm is expected. The distribution thereof encompasses 51% of the proposed area for development. Slope across the land is less than 2%. Two foundation design alternatives are applicable to the zone, namely conventional strip foundations or slab-on-the-ground foundations placed directly on medium dense to very dense residual soil or pedocretes.

## **5.4 Geotechnical Zone IV**

The zone is classed as S, meaning that the proposed horizon for founding is slightly compressible and rapid settlement less than 10mm is expected. The distribution thereof encompasses 17% of the proposed area for development. Slope across the land is approximately 5%. The use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. The more viable foundation alternative therefore remains founding by conventional strip foundations placed directly on medium dense to very dense residual soil or pedocretes.

## **5.5 Geotechnical Zone V**

The zone is classed as S1, meaning that the proposed horizon for founding is moderately compressible and rapid settlement between 10mm and 20mm is expected. The distribution thereof encompasses 5% of the proposed area for development. Slope across the land is less than 2%. Structures can be founded by reinforced strip foundations. Alternatively the loose overburden soil can be excavated and replaced with a compacted horizon supporting lightly reinforced strip foundations.



### **5.6 Geotechnical Zone VI**

The zone is classed as S2, meaning that the proposed horizon for founding is highly compressible and rapid settlement in excess of 20mm is expected. The distribution thereof encompasses 8% of the proposed area for development. Slope across the land is less than 2%. Structures can be founded by reinforced strip foundations or concrete rafts. The foundations shall be designed by a suitably qualified and experienced professional engineer.

### **5.7 Geotechnical Zone VII**

The zone is classed as S2, meaning that the proposed horizon for founding is highly compressible and quick settlement in excess of 20mm is expected. The distribution thereof encompasses 2% of the proposed area for development. Slope across the land is approximately 5%. The use of reinforced raft foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. Structures can thus be founded by reinforced strip foundations. The foundations shall be designed by a suitably qualified and experienced professional engineer.

## **6 CONDITIONS OF EXCAVATION**

On average over the entire site bedrock was encountered at depths between 200mm minimum exceeding 3000mm maximum, averaging 950mm deep. The implication of this is that should trenches require excavated depths to 1000mm, 5% of the excavation may be classified as hard, requiring drilling and blasting. Should the required depth of excavation increase to 1500mm, 37% of the excavation may be classified as hard.

### **6.1 Geotechnical Zones I and II**

The average depth to bedrock is 300mm. Refusal of excavation occurred at an average depth of 400mm. The implication of this is that should trenches require excavated depths to 1000mm, 70% of the excavation may be classified as hard, requiring drilling and blasting. Should the required depth of excavation increase to 1500mm, 80% of the excavation may be classified as hard.

### **6.2 Geotechnical Zones III and IV**

The average depth to bedrock is 1090mm. Refusal of excavation occurred at an average depth of 1190mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation.

Should the required depth of excavation increase to 1500mm, 27% of the excavation may be classified as hard, requiring drilling and blasting.

### **6.3 Geotechnical Zone V**

The average depth to bedrock is 1500mm. Refusal of excavation occurred at an average depth of 1800mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation. Should the required depth of excavation increase to 1500mm, 100% of the excavation may still be classified as soft, suitable for TLB excavation.

### **6.4 Geotechnical Zones VI and VII**

In two of the four test pits excavated in the S2 zones, collapse of sidewalls occurred at depths exceeding 2000mm prior to encountering refusal or bedrock. One can thus state that the average depth to bedrock exceeds 1500mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation. Should the required depth of excavation increase to 1500mm, 100% of the excavation may still be classified as soft, suitable for TLB excavation. However, one must also expect the presence of perched water in the proximity of the major non-perennial water course and collapse of the excavation sidewalls.

## **7 LAND SLOPE**

The average slope across the larger part of the land is less than 2%. Only in the southern extreme of the property is the slope approximately 5%. This slope of less than 2% has a detrimental influence on especially the design of a stormwater disposal system depending on gravity to dissipate of the surface water due to downpours. The land slope also affects the design of the sewerage disposal but to a lesser extent as the gradient of the pipes can be adjusted according to design requirements.

## **8 AREAS SUBJECT TO FLOODING**

Three areas that may possibly be subject to flooding have been identified from satellite imagery and the presence of alluvial deposits in these areas confirm the possibility that they serve to dispose of stormwater. In all cases the stormwater is of seasonal nature in an arid area, which may lessen the impact thereof on residential development. Although the gullies located in the northern and southern extremes of the site may be regarded as being of lesser importance, the gully in the central part of the site may also accommodate possible treated effluent from the waste water disposal works.



## 9 MATERIALS UTILIZATION

- *Trench Backfilling* : None of the materials are suitable for selected fill or pipe bedding. With exception of the hardpan calcrete all materials can be used for normal backfill.
- *Layerworks for Paved or Segmental Block Paving* : The residual soils are suitable for the construction of in-situ selected layerworks. The plasticity index of the calcrete exceeds the upper limit applicable for classification its suitability as road construction material. It can therefore be considered suitable only as roadbed only.
- *Wearing Course for Gravel Roads in Urban Areas* : None of the soil materials are 100% suitable for this purpose. The use of these materials will generally result in a road surface subject to raveling and corrugations.

## 10 OTHER CONSIDERATIONS

- *Undermining* : The area is not subject to undermining.
- *Seismic Activity* : The Peak Ground Acceleration expected in 50 years is 0,09g. A low risk for the development of earth tremors therefore exist.
- *Soil Corrosivity* : The in-situ soils and pedocretes are not corrosive due to acidic properties or a high soluble salts content.
- *Dolomite* : The area of investigation is not subject to any restrictions due to the presence of dolomite. Bedrock of dolomite does not occur in the area of investigation.

## 11 SPECIAL PRECAUTIONARY MEASURES

No extraordinary features requiring special precautionary measures to decrease the impact thereof are present on site.

# REPORT ON THE GEOTECHNICAL CONDITIONS ON PORTION 128 AND A PORTION OF THE RESTANT OF THE FARM KOUSAS 459, KEIMOE

2020/J032/MCP\_01

## INDEX

## PAGES

1	INTRODUCTION .....	1
2	TERMS OF REFERENCE .....	1
3	AVAILABLE INFORMATION .....	1
4	SITE DESCRIPTION .....	2
5	NATURE OF INVESTIGATION .....	5
6	SITE GEOLOGY AND GEOHYDROLOGY .....	8
7	GEOTECHNICAL EVALUATION .....	19
8	SITE CLASS DESIGNATIONS .....	29
9	FOUNDATION RECOMMENDATIONS AND SOLUTIONS .....	34
10	DRAINAGE .....	39
11	SPECIAL PRECAUTIONARY MEASURES .....	40
12	CONCLUSIONS .....	40
13	RECOMMENDATIONS .....	48
14	SOURCES OF REFERENCE .....	50
15	ADDENDUM A: TEST PIT PROFILES	
16	ADDENDUM B: RESULTS OF MATERIALS TESTING	





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## **REPORT ON THE GEOTECHNICAL CONDITIONS ON PORTION 128 AND A PORTION OF THE RESTANT OF THE FARM KOUSAS 459, KEIMOE**

### **1 INTRODUCTION**

It is envisaged to develop some 50 hectare of land on Portion 128 and a portion of the restant of the farm Kousas 459 to the west of Keimoes as a residential area. For this purpose Cedar Land Geotechnical Consult (Pty) Ltd was appointed as subconsultant to Macroplan by Ms Y Botha and Mr R van den Berg of Barzani Town Planning per letter of appointment dated 20 January 2020 to conduct a geotechnical investigation on the property.

### **2 TERMS OF REFERENCE**

The requirements of the following documents were adhered to in the conduct of the investigation and reporting of the project :

- The document *Geotechnical Site Investigations for Housing Developments (Generic Specification GFSH-2)*, issued by the National Department of Housing in September 2002.
- The document *SANS 634-1 : Geotechnical Investigations for Township Development*, issued by SABS in February 2012.

### **3 AVAILABLE INFORMATION**

The following sources of available information recording available data obtained in the larger Keimoes area have been consulted for background information :

- *Breytenbach FJ* : Geotechnical Conditions in a Part of Keimoes Extension 7 : A Report for

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the Establishment of 121 Housing Units, issued by Soilkraft cc on behalf of Roadlab/Prehab JV on 12 April 2009.

- *Breytenbach FJ* : Geotechnical Report for the Town of Keimoes : Rezoning and Subdivision of Erf 666, Keimoes, issued by Soilkraft cc on behalf of the Kai !Garib Municipality on 31 July 2012.
- *Breytenbach FJ* : Geotechnical Conditions on the Remainder of Erf 2867 Keimoes : A Phase 3 Report for the Proposed Construction of a New Magistrate's Office, issued by Soilkraft cc on behalf of WorleyParsons (Pty) Ltd on 14 May 2013.

## **4 SITE DESCRIPTION**

### **4.1 Site Location**

Portion 128 and a portion of the restant of the farm Kousas 459 are situated on the western boundary of the existing town of Keimoes in the Northern Cape. The eastern boundary of the property is formed by Aalwyn Street ; the southeastern boundary by the railway line ; the western boundary by vacant land ; and the northern boundary by a powerline. The size of the property is 50 hectare.

Refer to the attached Figure 1 : Locality Plan.

### **4.2 Topography and Drainage**

The land investigated is located between 760,5mamsl and 737,0mamsl, sloping from northeast to southwest at less than 1%. However, the slope is not even and fairly level land and a rocky outcrop are present in the central part of the land at an approximate level of 754mamsl. A series of low hills formed by rocky outcrops and sloping topography are present along the southern boundary.

Drainage takes place by means of sheetwash. The sheetwash is disposed of towards the southwest according to the slope of the land. However, a major non-perennial water course bisects the land from northeast to southwest. Two small non-perennial water courses are also present in the southern and northern extremes of the property. These drainage features are filled with thick deposits of loose and very loose sand. These features are clearly visible on satellite imagery and reproduced as Figure 2 : Drainage Features.



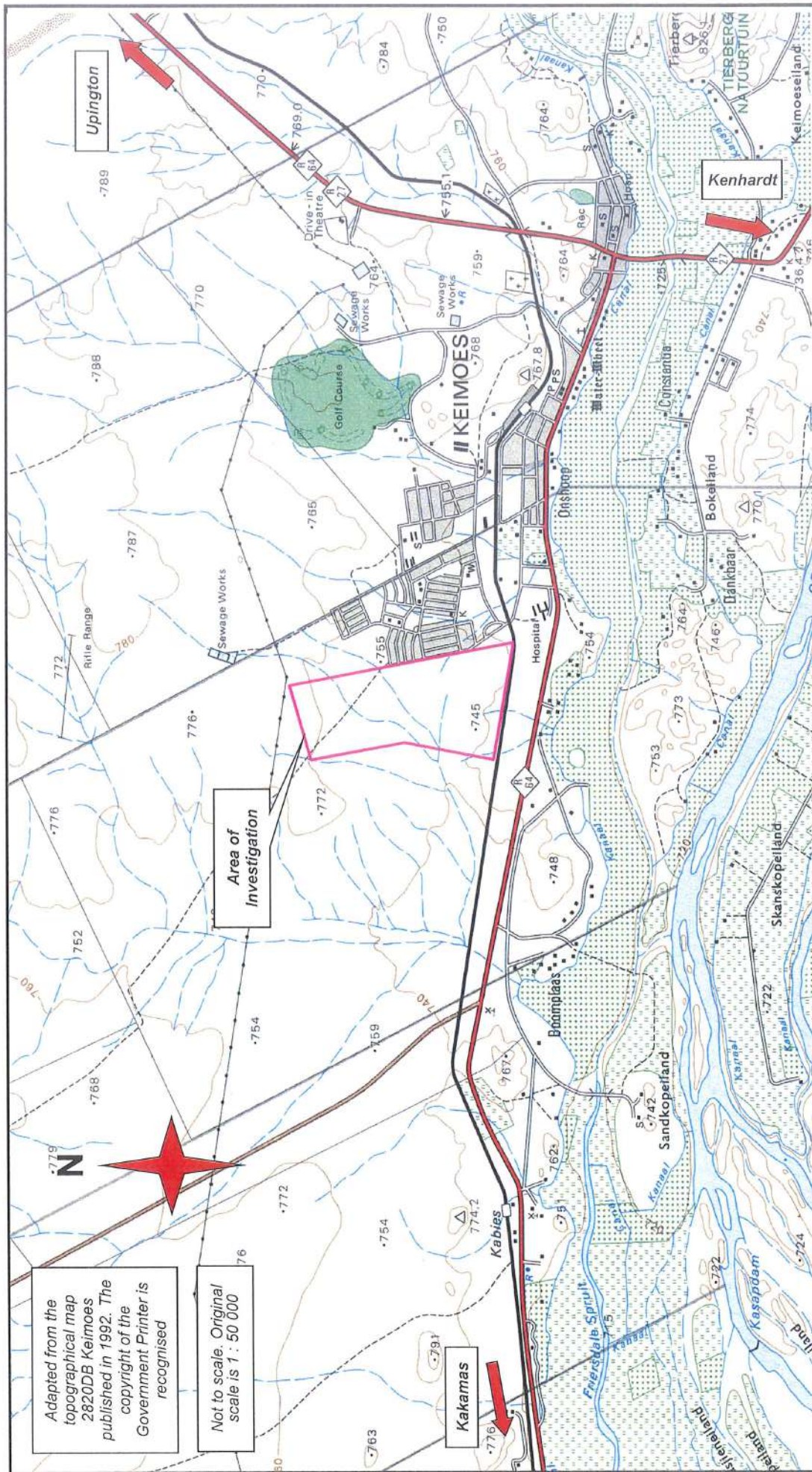
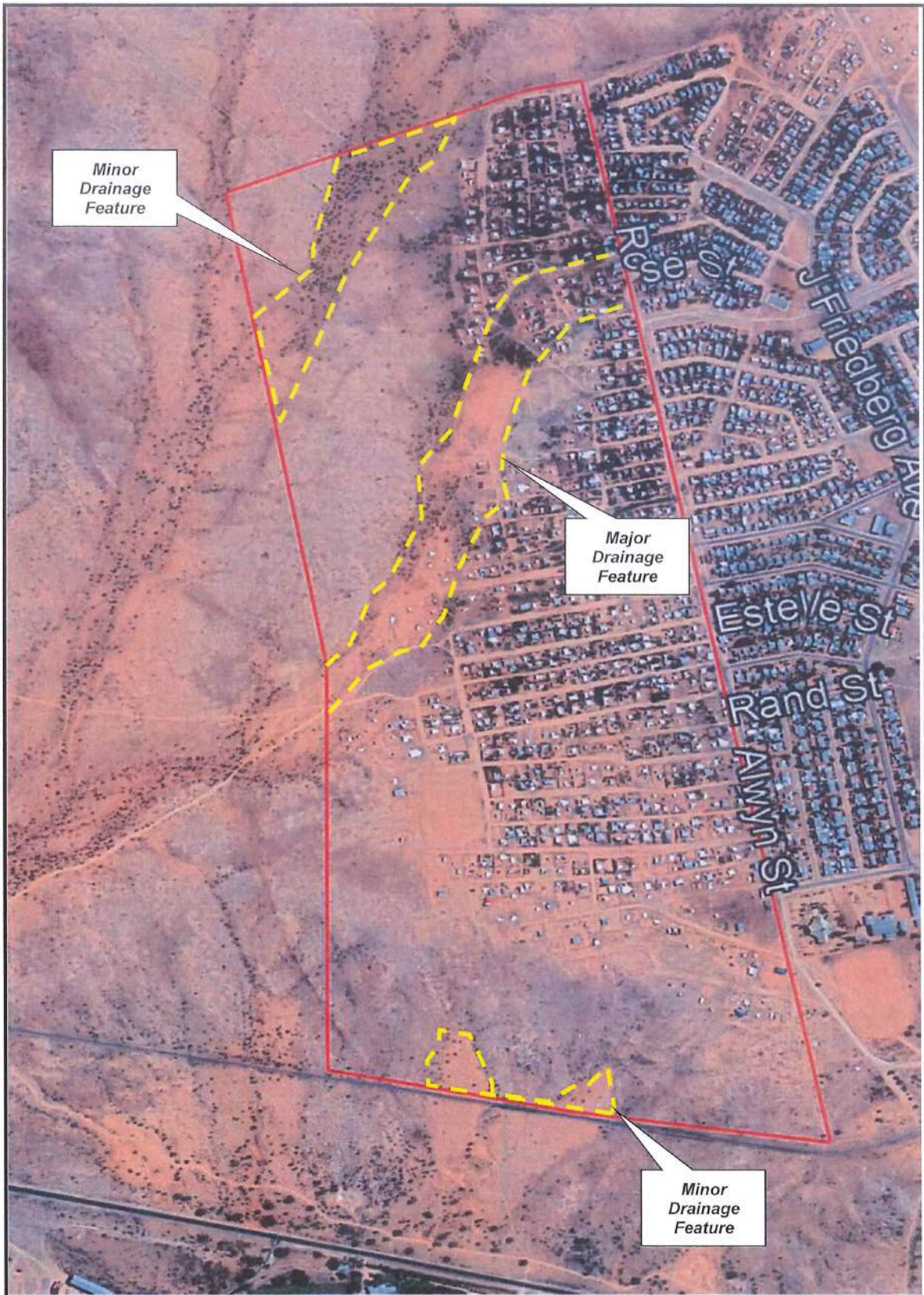


FIGURE 1

## LOCALITY PLAN







**DRAINAGE FEATURES**

**FIGURE 2**



### **4.3 Vegetation and Landscape**

Based on the work done by Mucina<sup>Reference 14.1</sup> the area of investigation is referred to as Bushmanland Arid Grassland. The landscape features are described as consisting of extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses giving this vegetation type the character of semi-desert steppe. In places low shrubs change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected. On site it was found that in the areas where natural vegetation is present it consists of a sparse stand of *Acacia melliflora*, *Prosopis* and *Boscia albitrunca*. Stands of *aloe claviflora* are present, although these plants are removed for herbal medication and extension of urbanization.

Vegetation in the area is illustrated on Photo 1 : Landscape and Vegetation.

### **4.4 Existing Facilities**

Site conditions are illustrated on Photo 2 : Site Conditions. The area can be divided into two zones as follows :

#### **4.4.1 Informal Housing**

Informal housing consisting of galvanized iron structures and some masonry structures is present in the western part of the site, bordering Aalwyn Street. Water and electricity are provided to the structures, though it may not always be legal connections. The presence of high mast street lighting is indicative of the presence of an electricity network in some parts of the area. Sewerage disposal is by means of pit latrines. Some residents have created small vegetable and flower gardens on the stands.

#### **4.4.2 Vacant Land**

Vacant, undeveloped land is present close to the railway line in the south and to the west of the informal settlement.

## **5 NATURE OF INVESTIGATION**

### **5.1 Test Pitting**

In compliance with the requirements of SANS 634 and GFSH-2 test pitting was conducted to provide applicable geotechnical information. On 11 March 2020 35 test pits were excavated with a Case 580T TLB on hire from ALS Plant Rentals. The TLB was equipped with a



**WELL DEVELOPED STAND OF ALOE CLAVIFLORA**



**INNOVATIVE GARDENING**







**CONDITIONS OF INFORMAL HOUSING**



**UNDEVELOPED LAND**



**SITE CONDITIONS**

**PHOTO 2**

700mm wide bucket. All test pits were excavated to refusal, except where collapse of sidewalls occurred.

The test pits were profiled by a professionally registered geotechnical engineer. For the benefit of the non-geotechnical reader of this document, these guidelines are summarized in the attached Table 1 : Soil Profiling Parameters. The profiles of the test pits may be found in Addendum A to this report. The positions of the test pits are indicated on the attached Figure 3 : Site Plan. Provisional co-ordinates for property beacons A to H are indicated on this figure.

## **5.2 Materials Testing**

Soil testing was undertaken by Specialised Testing Laboratory in Koedoespoort, Pretoria.

Soil testing consisted of the following :

- Conductivity and pH determinations on samples of the in-situ materials to determine the corrosivity thereof.
- Foundation indicator testing on samples of the in-situ materials to determine possible conditions of heave or settlement.
- CBR and road indicator testing to determine the suitability of the in-situ materials to be utilized as road layerworks.

The results of the soil testing may be found in Addendum B. However, for easy reference, these results are summarized in the attached Table 2 : Summary of Soil Testing.

Due to general limited vertical extent of the soil profile and coarse nature thereof, it was not feasible to retrieve undisturbed samples to determine properties of settlement or collapse fairly accurately. In the few cases where it was possible to excavate to an appreciable depth undisturbed sampling failed due to the loose consistency and arenaceous nature of the soil.

## **6 SITE GEOLOGY AND GEOHYDROLOGY**

Although the geology of the larger area around Keimoes appears to consist ubiquitously of granitoid rock, it is in fact highly complex and from a stratigraphical viewpoint provides complicated formation. As a background to the site geology an effort is made in this subparagraph to provide a simplified explanation of the regional geology of the area. For this purpose publications by Visser<sup>Reference 14.2</sup>, McCarthy<sup>Reference 14.3</sup>, Cornell<sup>Reference 14.4</sup> and Moen<sup>Reference 14.5</sup> were consulted. Of these four references, the latter two can be regarded as site specific.



**TABLE 1 : SOIL PROFILING PARAMETERS**

**CONSISTENCY : GRANULAR SOILS**

**CONSISTENCY : COHESIVE SOILS**

SPT N	GRAVELS & SANDS Generally free-draining soils			DRY DENSITY (kN/m <sup>3</sup> )	SPT N	SILTS & CLAYS and combinations with SANDS Generally slow draining soils			UCS (kPa)
<4	Very loose	Crumbles very easily when scraped with geological pick. Requires power tools for		<1450	<2	Very soft	Pick point easily pushed in 100mm. Easily moulded by fingers		<50
4-10	Loose	Small resistance to penetration by sharp pick point. Requires many blows by pick point		1450-1600	2-4	Soft	Pick point easily pushed in 30mm to 40mm. Moulded by fingers with some pressure.		50-125
10-30	Medium dense	Considerable resistance to penetration by sharp pick point		1600-1750	4-6	Firm	Pick point penetrates to 10mm. Very difficult to mould with fingers.		125-250
30-50	Dense	Very high resistance to penetration by sharp pick point. Requires many blows by pick point for excavation		1750-1925	8-15	Stiff	Slight indentation by pick point. Cannot be moulded by fingers. Penetrated by thumb nail		250-500
>50	Very dense	High resistance to repeated blows of geological pick. Requires power tools for excavation		>1925	15-30	Very stiff	Slight indentation by blow of pick point. Requires power tools for excavation.		500-1000

**SOIL TYPE**

SOIL TYPE	PARTICLE SIZE (mm)
Clay	<0.002
Silt	0.002-0.06
Sand	0.06-2.0
Gravel	2.0-60.0
Cobbles	60.0-200.0
Boulders	>200.0

**MOISTURE CONDITION**

Dry	No water detectable
Slightly moist	Water just discernable
Moist	Water easily discernable
Very moist	Water can be squeezed out
Wet	Generally below water table

**SOIL STRUCTURE**

COLOUR		STRUCTURE	
Speckled	Very small patches of colour <2mm	Intact	No structure present.
Mottled	Irregular patches of colour 2-6mm	Fissured	Presence of discontinuities, possibly cemented.
Blotched	Large irregular patches 6-20mm	Slickensided	Very smooth, glossy, often striated discontinuity planes
Banded	Approximately parallel bands of varying colours	Shattered	Presence of open fissures. Soil break into gravel size blocks.
Streaked	Randomly orientated streaks of colour	Micro shattered	Small scale shattering, very closely spaced open fissures. Soil breaks into sand size crumbs.
Stained	Local colour variations. Associated with discontinuity surfaces	Residual structures	Residual budding, laminations, foliations etc.

**ORIGIN**

Transported	Alluvium, tillwash, talus etc
Residual pedocretes	Weathered from parent rock, eg residual granite Fermcrete, silcrete, calcrete etc.

**DEGREE OF CEMENTATION OF PEDOCRETES**

TERM	DESCRIPTION	UCS (MPa)
Very weakly cemented	Some material can be crumbled between finger and thumb. Disintegrates under knife blade to a friable state.	0.1-0.5
Weakly cemented	Cannot be crumbled between strong fingers. Some material can be crumbled by strong pressure between thumb and hard surface. Under light hammer blows disintegrate to a friable state.	0.5-2.0
Cemented	Material crumbles under firm blows of sharp pick point. Grains can be dislodged with some difficulty by a knife blade.	2.0-5.0
Strongly cemented	Firm blows of sharp pick point on hand-held specimen show 1-3mm indentations. Grains cannot be dislodged by knife blade.	5.0-10.0
Very strongly cemented	Hand-held specimen can be broken by single firm blow of hammer head. Similar appearance to concrete.	10.0-25

Two concepts must be identified :

- **Craton** : A craton is a block of ancient crust, formed 3000 million years ago and its rocks have essentially remained unchanged. Cratons form the larger parts of the land-building mass.
- **Terrane** : A terrane is a term for a tectonostratigraphic unit, which is a fragment of crustal material formed on, or broken off from, one tectonic plate and accreted or "sutured" to crust lying on another plate. The crustal block or fragment preserves its own distinctive geologic history, which is different from that of the surrounding areas.





TABLE 2 : SUMMARY OF SOIL TESTING

TEST PIT NO	SAMPLE NO (CLG)	DEPTH (mm)	SOIL ORIGIN	SOIL TYPE	GM	PI	LL	ACTIVITY	pH	CONDUCTIVITY (Sm <sup>-1</sup> )	% SOIL MORTAR	OMC	MOD	SOIL CLASS	
														COL TO	PRA UNIFIED
3	04-13	500-1500	Residual charnokite	Gravelly sand	1,79	NP	NP	Low	7,8	0,012	79			A-1-b(0)	SW-SM
13	04-15	0-800	Colluvium	Sand	1,27	NP	NP	Low			97			A-2-4(0)	SM
17	04-16	0-1100	Alluvium	Gravelly sand	1,55	NP	NP	Low			83	6,6	2084	A-2-4(0)	SP-SM
23	04-17	300-1600	Nodular calcrete	Sandy gravel	2,04	28	49	Low			49	10,2	1997	A-2-7(0)	SC
26	04-18	200-1800	Nodular calcrete	Sandy gravel	2,21	NP	NP	Low			44			A-1-a(0)	SP-SM
27	04-19	300-600	Residual charnokite	Weathered rock as sandy gravel	2,61	7	25	Low			23	6,8	2146	A-2-4(0)	SW
29	04-20	0-300	Colluvium	Gravels in sand	1,88	6	21	Low	7,6	0,047	52			A-1-b(0)	SC-SM
31	04-21	700-1400	Residual charnokite	Weathered rock as gravelly sand	1,80	NP	NP	Low	8,3	0,031	76			A-1-b(0)	SW-SM
33	04-22	300-700	Residual gneiss	Gravelly sand	1,96	NP	NP	Low	8,2	0,009	63			A-1-b(0)	SW-SM
34	04-23	300-1500	Residual gneiss	Fine sand & gravel	2,34	NP	NP	Low			43			A-1-a(0)	SW-SM
35	04-24	400-1500	Residual charnokite	Fine sand & gravel	2,12	7	26	Low	8,9	0,02	45			A-2-4(0)	SP-SC

## 6.1 Regional Geology

The regional geology of the area is indicated in Figure 4 : Regional Geology.

The geological processes by which the area under consideration was shaped, initiated some 1000 million years ago with the formation of the supercontinent Rodinia. A mountain chain of global extent formed along the boundaries, underlain by metamorphic rocks that have since then been exposed due to erosion. Metamorphic rocks of this age formed across South Africa to the south and west of the Kaapvaal Craton, known as the Namaqua-Natal Province. The Namaqua-Natal Province can be divided into five tectonostratigraphic subprovinces and terranes, based on marked changes in the lithostratigraphy across structural discontinuities. The five domains so recognized are the Richtersveld Subprovince, the Bushmanland Terrane, Kakamas Terrane, Areachap Terrane and Kaaiken Terrane. The tectonic subdivision as proposed on Figure 2 (Cornell) is reproduced in this document as Figure 5.

The process of landforming can be described as compatible to the modern concept of plate tectonics. In this case the Namaqua plate became buried beneath the Kaapvaal Craton in a subduction zone. Considering the forces involved it can be regarded as a violent process, resulting in the breaking up of the landmass into the five domains as described above, associated with the intrusion of recycled rock material from the subduction zone. In the case of the Kakamas terrane, numerous intrusions occurred during the process of subduction, of which the Keimoes Suite is one. A schematic plate tectonic model showing the process as proposed on Figure 2.40 (Moen) is reproduced in this document as Figure 6. It is on the intrusive rock material of the Keimoes Suite that the proposed Gamakor development is located.

## 6.2 Site Geology

Moen as well as the official geology map 2280 describe the presence of both Vaalputs granite-gneiss and Friersdale charnockite in the area of investigation. Cornell does not differentiate between the two and regards both as charnockite.

On site it was found that Moen's distinction between the two rock types can be applied as follows :

### 6.2.1 Vaalputs Granite-gneiss

The Vaalputs granite-gneiss was encountered in the north eastern and southern parts of the site. It is regarded as an acid igneous rock, consisting of quartz, feldspars and subordinate







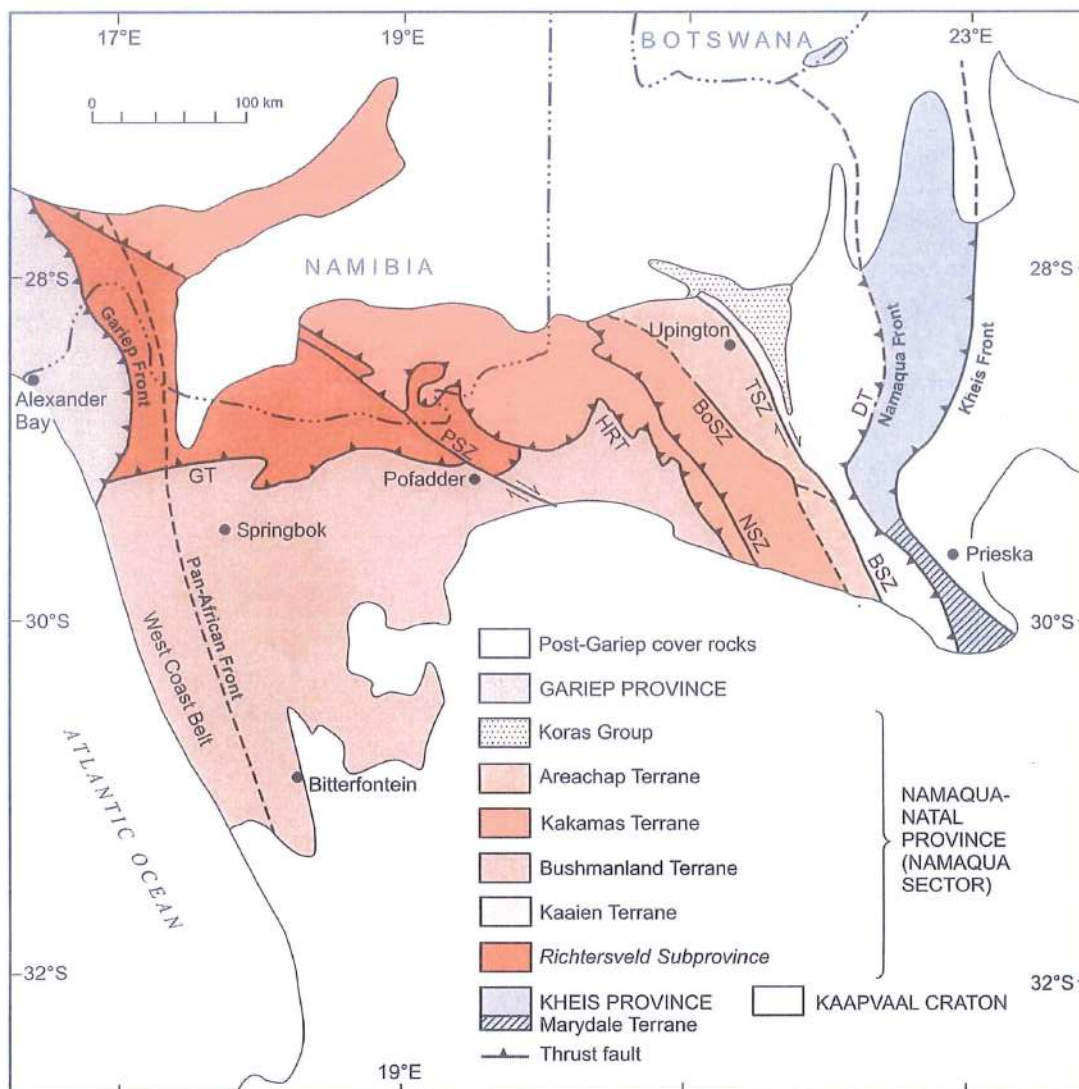


FIGURE 5 : TECTONIC SUBDIVISION OF THE NAMAQUA SECTOR

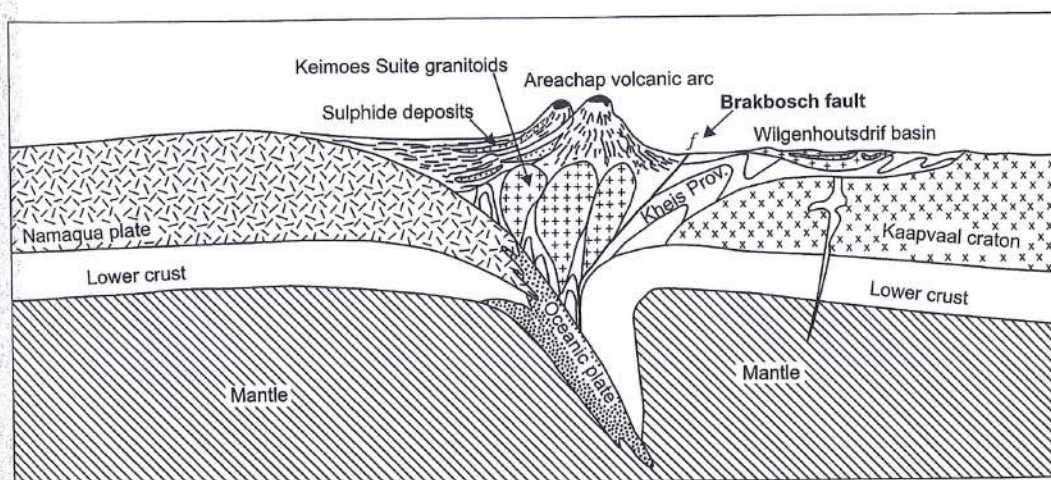


FIGURE 6 : SCHEMATIC PLATE TECTONIC MODEL SHOWING THE GRANITOIDS OF THE KEIMOES SUITE



biotite. It is light grey in colour, with medium grained, equigranular texture and well developed foliation.

The Vaalputs granite-gneiss contains numerous inclusions. The most common are concordant lenses and bands of white quartz. Such inclusions are visible in the southern parts of the site where the Vaalputs granite is present as outcrops.

#### 6.2.2 Friersdale Charnockite

The Friersdale charnockite is the most widely distributed rock material on site. It is regarded as an acid igneous rock and tend to form dark grey exfoliating boulders. The charnockite is described as dark grey, unfoliated rock. The texture is fine to medium and uneven grained. Many of the quartz grains have an opalescent blue colour. Charnockite consists of a fine grained groundmass of quartz, feldspar, minor plagioclase and biotite, with larger biotite, hypersthene and augite grains and can actually be regarded as a charnockitic adamellite porphyry.

#### 6.2.3 Distinguishing between the Friersdale Charnockite and Vaalputs Granite-gneiss

From the above discussion it is clear that visually there are not many features to make a first order distinction between the two materials without reverting to a petrological analysis. Although Cornell in the latest stratigraphic work combines the Vaalputs granite and the Friersdale charnockite under the latter, a clear distinction could be made on site based on a visual appraisal of the rock, and the differentiation between the rock types are maintained on Figure 7 : Site Geology.

The principles relied upon in the identification of the rock material were thus the following based on the characteristics as discussed above in subparagraphs 6.2.1 and 6.2.2 :

- *Foliation* : Foliation was considered as a characteristic of the Vaalputs granite-gneiss and not of the Friersdale charnockite.
- *Lenses and Bands of Quartz* : Lenses and bands of quartz were considered a characteristic of the Vaalputs granite-gneiss and not of the Friersdale charnockite.
- *Presence of Biotite* : The visible presence of large flakes of mica (biotite) was considered as a characteristic of the Friersdale charnockite and not of the Vaalputs granite-gneiss.
- *Colour and Grain Size* : The charnockite is regarded as darker of colour and coarser grained than the granite-gneiss.

FIGURE 7 :  
SITE GEOLOGY

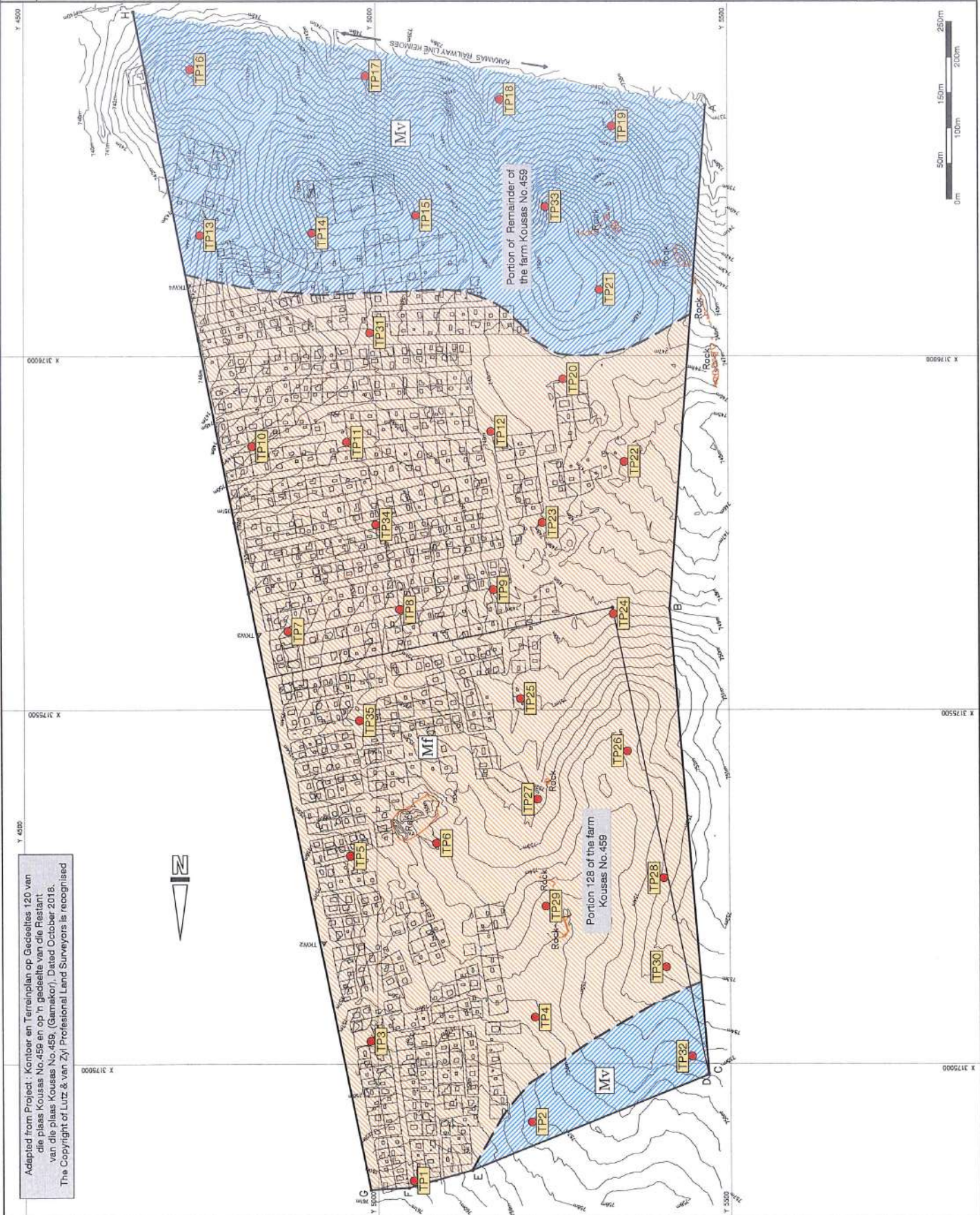
LEGEND

- TEST PIT POSITION  
TP1
- INFERRED MATERIAL BOUNDARY
- FRIERSDALE  
CHARNOKITE :  
WHITE AND GREY  
CHARNOCKITIC  
ADAMELITE
- VAALPUTS GRANITE :  
MESOCRATIC  
WELL-FOLIATED  
ADAMELITIC  
GRANITE-GNEISS



Geological Land Use  
PROJ. NO. 107  
DATE: 10/10/2018  
BY: [Signature]  
SCALE: 1:50,000  
SHEET: 1 OF 1  
PROJECT: [Project Name]  
CLIENT: [Client Name]  
DRAWN BY: [Name]  
CHECKED BY: [Name]  
APPROVED BY: [Name]

Scale: 1:50,000  
Drawing No.: [Number]  
Drawing Date: [Date]  
Drawing Title: [Title]  
Drawing Author: [Name]  
Drawing Checker: [Name]  
Drawing Approver: [Name]



Adapted from Project: Kontoor en Terreinplan op Gedeeltes 120 van die plas Kousas No. 459 en op 'n gedeelte van die Restant van die plas Kousas No. 459, (Gamakor). Dated October 2018. The Copyright of Luz & van Zyl Professional Land Surveyors is recognised



### 6.3 Soil Profile

#### 6.3.1 Colluvium

Colluvial deposits were encountered in TP's 1 to 11 ; 13 to 16 ; 19 to 24 ; 26 to 29 ; and 31 to 35 as a surface horizon between 100mm to 800mm thick. It consists of fine sands with variable contents of gravels in variable proportions, but mostly matrix supported. In the northern parts of the site the gravels consist of quartz and granite ; while in the south abundant banded ironstone, calcrete and quartz gravels are present in the soil matrix. The sand is dry to slightly moist, light brown to red brown in colour. The consistency of the stratum depends on the composition thereof : Mostly arenaceous material tend to be of very loose to loose consistency, but with an increase in gravel content it becomes medium dense.

#### 6.3.2 Alluvium

Alluvium was encountered in TP's 17, 18, 25 and 30 in the alluvial plumes as a surface horizon of minimum 1100mm thick, extending to deeper than 2700mm. It consists of light brown, fine sand containing some matrix supported gravels of quartz. In TP's 25 and 30 the alluvium became calcified at depth, indicating the water courses to be of considerable age. During the investigation the alluvium was dry to slightly moist. The consistency of the alluvium varied between very loose and loose in the test pits. In TP 18 excavation was abandoned at a depth of 2700mm due to collapse of the excavation side walls.

#### 6.3.3 Pebblestone Marker

The pebblestone marker was encountered in TP 20 only, underlying the colluvium. The pebblestone marker was 100mm thick in the test pit. It is described as clast supported coarse gravels of banded ironstone in a matrix of fine, light brown sand. The consistency was loose.

#### 6.3.4 Residual Charnockite

Residual charnockite was encountered in TP's 3, 5, 7, 9, 10 to 11, 17, 20, 22, 24 and 34 to 35. It underlies the colluvium and in some instances the pedogenic deposits, occurring from depths between 200mm and 1100mm minimum, extending to 300mm to 1900mm maximum. The thickness of the horizon varied between 100mm and 1200mm in the test pits. The residual charnockite can be described as dirty white speckled dark grey varying to light brown coarse sand containing fine gravels. The presence of flakes of biotite was occasionally encountered in the charnockite soil profile. The consistency of the residual charnockite varied between loose and very dense in the test pits.

### 6.3.5 Residual Granite-gneiss

Residual granite-gneiss was encountered in TP's 2, 16 and 17, 19, 21, 32 and 33. It underlies the colluvium, occurring from depths between 200mm and 1100mm minimum, extending to 700mm to 1600mm maximum. The thickness of the horizon varied between 400mm and 1200mm in the test pits. The residual granite can be described as dirty white speckled dark grey varying to dark grey speckled white coarse sand containing fine gravels. The consistency of the residual granite-gneiss varied between dense and very dense in the test pits.

### 6.3.6 Mokalanen Formation

Pedogenic deposits associated with the Mokalanen Formation of the Kalahari Group are present on site, both as hardpan and nodular calcrete. The Mokalanen Formation was deposited under the arid climatic conditions straddling the boundary of the Pliocene and the Quaternary epochs. The deposition of the calcrete possibly reflects an interval of global aridification which occurred some 2,6 to 2,8 million years ago.

#### 6.3.6(i) *Hardpan Calcrete*

Hardpan calcrete was encountered in TP's 34 and 35 only. It underlies the colluvium, occurring from depths between 100mm and 200mm minimum, extending to 300mm to 400mm maximum. The thickness of the horizon varied between 100mm and 300mm in the test pits. The hardpan calcrete can be described as dirty white, very fine grained and very dense. It was possible to penetrate the calcrete in the test pits as the horizon is fairly thin and it overlies residual soil material of lesser dense consistency.

#### 6.3.6(ii) *Nodular Calcrete*

Nodular calcrete was encountered in TP's 2, 6, 9, 11, 13 to 15, 20, 23 and 24, 26 and 31. It occurs in variable conditions on site : from underlying the colluvium directly as a pure pedocrete ; to a sub-horizon contained within a horizon of residual soil ; or as an extensively calcified and nodular horizon, especially in the alluvium. It was present between 100mm and 800mm deep minimum, extending to 300mm to 1600mm maximum. The thickness of the horizon varied between 100mm and 1300mm in the test pits. The nodular calcrete can be described as dirty white, rounded fine to medium coarse, concretions contained in a matrix of fine sand. The consistency varies from loose to very dense.



## **6.4 Groundwater**

### **6.4.1 Perched Water**

Perched groundwater was encountered in TP 3 at a depth of 1500mm and in TP 35 at 1400mm during the investigation. In both cases the presence of the water can be associated with the existing major drainage course through the site.

Considering the climate of the area and the nature of in situ materials, it is anticipated that perched water will generally not prove problematic on the site, except in the major water course almost on a permanent basis ; and in the lesser drainage courses after events of inundation. Even if it did occur, the grading of in-situ materials is such that dispersal will take place fairly rapidly. Furthermore, it is expected that perched water and/or surface seepage may occur shortly after precipitation events and in years of excessive rain only.

### **6.4.2 Permanent Groundwater**

Vegter<sup>Reference 14.6</sup> indicates the probability for drilling successfully for water in the area to be between 40% and 60%, and the probability that such a borehole will yield more than 2l/s is less than 10%. Groundwater is expected to occur at depths between 20 meters and 30 meters in fractures restricted to a zone directly below the water table.

## **7 GEOTECHNICAL EVALUATION**

The engineering properties of the in-situ materials are summarized in Table 3 : Summary of Engineering Properties. The characterizations have been derived based on the Unified materials classifications as reported by literature studies.

### **7.1 Engineering and Material Characteristics**

#### **7.1.1 Properties of Heave**

The results of the materials testing as reported in Table 2 indicate the in-situ materials are not expansive. Any future structures will thus not be subject to heave. The content of active clay, that is the material smaller than 0,002mm in diameter, was 1% for all the samples tested, except Sample CLG 04-17 consisting of nodular calcrete from TP 23.

TABLE 3 : SUMMARY OF ENGINEERING PROPERTIES

TEST PIT NO	SAMPLE NO	DEPTH (mm)	SOIL ORIGIN	SOIL TYPE	SOIL CLASS PRA	COHESION <sup>1</sup> (kNm <sup>-2</sup> )	FRICTION ANGLE (°) <sup>1</sup>	COMPRESSIBILITY <sup>2</sup>	EROSION RESISTANCE <sup>2-5</sup>	PERMEABILITY <sup>6</sup> k (cm s <sup>-1</sup> )	SPECIFICATIONS FOR UNPAVED ROADS <sup>3</sup>				SUITABILITY FOR ROAD CONSTRUCTION <sup>4</sup>	
											MAXIMUM SIZE	OVERSIZE INDEX (I <sub>p</sub> )	GRADING COEFFICIENT (G <sub>s</sub> )	SHRINKAGE PRODUCT (S <sub>p</sub> )	CBR @ 95% MOD	PAVED
3	04-13	500-1500	Residual chamokite	Gravelly sand	A-1-b(0)	1 to 22	32° to 38°	Fair to excellent	6 to 8	(7.5±4.8)X10 <sup>-6</sup>	4.75	0.0	20.8	0.0		Ravels & corrugates
13	04-15	0-800	Colluvium	Sand	A-2-4(0)	20 to 22	32° to 35°	Fair	8	(7.5±4.8)X10 <sup>-6</sup>	4.75	0.0	3.0	0.0		Ravels & corrugates
17	04-16	0-1100	Alluvium	Gravelly sand	A-2-4(0)	0 to 22	30° to 39°	Fair	7 to 8	>1.5X10 <sup>-6</sup>	26.5	0.0	11.8	0.0	17	Lower selected
23	04-17	300-1600	Nodular calcrete	Sandy gravel	A-2-7(0)	5 to 10	30° to 35°	Low	5	(3±2)X10 <sup>-7</sup>	26.5	0.0	29.3	288.0	20	Good but dusty
26	04-18	200-600	Nodular calcrete	Sandy gravel	A-1-a(0)	0 to 22	30° to 39°	Fair	7 to 8	>1.5X10 <sup>-6</sup>	37.5	5.0	37.7	0.0		Ravels & corrugates
27	04-19	300-600	Residual chamokite	Weathered rock as sandy gravel	A-2-4(0)	1 to 5	33° to 38°	Negligible	6	Pervious (undetermined)	53.0	23.0	15.5	48	45	Upper selected
29	04-20	0-300	Colluvium	Gravels in sand	A-1-b(0)	5 to 22	30° to 35°	Low	5 to 8	2.7X10 <sup>-7</sup> to 5.0X10 <sup>-7</sup>	37.5	2.0	25.5	123		Good
31	04-21	700-1400	Residual chamokite	Weathered rock as gravelly sand	A-1-b(0)	1 to 22	32° to 38°	Fair to excellent	6 to 8	(7.5±4.8)X10 <sup>-6</sup>	37.5	4.0	18.0	0.0		Ravels & corrugates
33	04-22	300-700	Residual gneiss	Gravelly sand	A-1-b(0)	1 to 22	32° to 38°	Fair to excellent	6 to 8	(7.5±4.8)X10 <sup>-6</sup>	9.5	0.0	30.0	0.0		Ravels & corrugates
34	04-23	300-1500	Residual gneiss	Fine sand & gravel	A-1-a(0)	1 to 22	32° to 38°	Fair to excellent	6 to 8	(7.5±4.8)X10 <sup>-6</sup>	13.2	0.0	39.9	0.0		Ravels & corrugates
35	04-24	400-1500	Residual chamokite	Fine sand & gravel	A-2-4(0)	0 to 10	30° to 39°	Fair to good	5 to 7	>1.5X10 <sup>-6</sup>	53.0	29.0	13.2	108.5		Erodible

1 Obrzd RF and Truly A : The Hardening Soil Model - A Practical Guidebook, 2018 edition, revised 21 October 2018.

2 Brink ABA et al : Soil Survey for Engineering, published in 1982.

3 The Structural Design, Construction and Maintenance of Unpaved Roads (Draft TRH 20), Committee of State Road Authorities 1990.

4 Structural Design of Flexible Pavements for Interurban and Rural Roads (Draft TRH 4), Committee of State Road Authorities 1995.

5 Erosion resistance : 1 is best 10 is poor.



### 7.1.2 Properties of Settlement

#### 7.1.2(i) *Colluvium*

Colluvial deposits were encountered in TP's 1 to 11 ; 13 to 16 ; 19 to 24 ; 26 to 29 ; and 31 to 35 as a surface horizon between 100mm to 800mm thick. The colluvium is generally described as sandy material, often containing some gravels and being of loose to medium dense consistency. Seldom can the consistency be described as very loose, and voided soil matrices were not encountered in the colluvial horizons. The horizon extended generally to less than 500mm thick and only in a few instances were thicker up to 800mm. The properties of the colluvium are thus such that it does not tend to excessive settlement.

#### 7.1.2(ii) *Alluvium*

Alluvium was encountered in TP's 17, 18, 25 and 30 in the alluvial plumes as a surface horizon of minimum 1100mm thick, extending to deeper than 2700mm. It consists of light brown, fine sand containing some matrix supported gravels of quartz. The consistency of the alluvium varied between very loose and loose in the test pits. The soil matrices are described as intact and not voided. Although the soil composition of the alluvium is such that it is not specially subject to settlement, it can be regarded as recent, unconsolidated deposits. Considering the vertical extent of the alluvial deposits, it is regarded as the soil material on site most subject to settlement.

#### 7.1.2(iii) *Residual Soils*

Residual charnockite was encountered in TP's 3, 5, 7, 9, 10 to 11, 17, 20, 22, 24 and 34 to 35 ; and residual granite-gneiss was encountered in TP's 2, 16 and 17, 19, 21, 32 and 33 in horizons 100mm to 800mm thick. Both materials consist predominantly of sand with a high gravel content and medium dense to very dense consistency. The soil matrices are either intact or calcareous cemented. It can thus accommodate stresses imposed by conventional housing structures without undue settlement. Only limited – if any – settlement can thus be expected for structures such as single storey units of masonry construction.

#### 7.1.2(iv) *Pedocretes*

Hardpan calcrete was encountered in TP's 34 and 35 only and nodular calcrete in TP's 2, 6, 9, 11, 13 to 15, 20, 23 and 24, 26 and 31 in horizons between 100mm and 800mm thick. Both materials are of medium dense to very dense consistency. The soil matrices are either intact or calcareous cemented. It can thus accommodate stresses imposed by conventional housing

structures without undue settlement. Only limited – if any – settlement can thus be expected for structures such as single storey units of masonry construction.

### 7.1.3 Corrosivity

When discussing soil corrosivity, it is applicable to consider the guidelines as proposed by Evans<sup>Reference 14,7</sup>. The corrosivity of a soil towards buried, exposed, metallic surfaces is dependent on the following properties of the soil :

- Electrical conductivity.
- Chemical properties of the soil.
- Ability of the soil to support sulphate reducing bacteria.
- Heterogeneity of the soil.

The tests carried out for the compilation of this report must be considered as indicative of the corrosivity of the soils only. The pH of a soil gives an indication of potential acid related problems. Should the soil pH be less than 6,0, corrosion may take place ; and should the pH be less than 4,50, the problem of corrosion may be serious. If the conductivity of the soil is less than  $0,01\text{Sm}^{-1}$ , corrosiveness is generally not a problem. However, the potential for corrosivity of the soil increases with an increase in conductivity. Should the conductivity of the soil exceed  $0,05\text{Sm}^{-1}$ , the soil can be regarded as very corrosive. Should exposed metal pipes pass from argillaceous soils to arenaceous soils or vice versa, electrochemical cells are set up due to the different rates of oxygen diffusion of the soils. Sulphate reducing bacteria is usually present under anaerobic conditions, that is, typically saturated or waterlogged clays.

The results of the chemical testing carried out for this report indicate the following :

- *Acidity* : The pH of the samples of material tested varied between 7,6 and 8,9. The soils are thus regarded as not corrosive due to the acidity there of.
- *Water Soluble Salts Content* : The conductivity of the samples of material tested varied between  $0,009\text{Sm}^{-1}$  for the residual gneiss to  $0,047\text{Sm}^{-1}$  for the colluvium. The soluble salt content does therefore not contribute to the corrosivity of the soils.

Other considerations are :

- *Heterogeneity of the Soil* : Conditions of corrosive soils due to a heterogeneous soil profile do not occur on the property.
- *Water Logged Soils* : Conditions of water logged soils were encountered in TP's 3 and 35 in the unlined stormwater course.



#### 7.1.4 Materials Utilisation

##### *7.1.4(i) Backfilling of Service Trenches*

The hardpan calcrete is not suitable to be used for any type of backfill due to its tendency to break into boulder and cobble sized fragments on excavation. Such fragments cannot be compacted properly on backfilling.

All other materials, that is the alluvium, colluvium, nodular calcrete and residual soils can be used for normal backfilling of services trenches. However, due to the coarse granular composition thereof these materials are not suitable for pipe bedding or selected backfill around pipes.

##### *7.1.4(ii) Construction of Paved or Segmental Block Streets*

Only provisional indicators for future guidance of development are provided as far as material quality for road construction is concerned, complying with the requirements applicable to the level of investigation.

The results of the compaction testing on soil samples show the in-situ materials to be generally of G7 to G8 quality and the calcrete unclassified for purposes of paved road or segmental block road construction. This type of construction is applicable to access roads to townships. The soil materials are therefore suitable only for the construction of in-situ selected layerworks and not for subbase and base course construction.

The case of Sample CLG 04-17 from TP 23 is typical of calcrete. Although the CBR is fairly high, typical of G8 material, the plasticity index of 28 is very high, reducing the classification of the calcrete to non-classifiable.

##### *7.1.4(iii) Wearing Course for Urban Gravel Roads*

The properties to provide guidance for the use of soil materials for the structural design of a wearing course for urban gravel roads are contained in the various sub-columns of the column "Specifications for Unpaved Roads" in Table 3. The various parameters are colour-coded : Green = suitable ; red = unsuitable. The two sub-columns with a light yellow-brown background contain the parameters on which the physical behaviour of the wearing is course is determined.

From the table it is clear that none of the in-situ materials comply in all aspects to the requirements for a gravel wearing course. In most cases the use of these materials will result

in a wearing course subject to raveling and corrugations. This can be attributed the non-cohesive character of most of the materials. In contradiction to the construction of paved roads, calcrete appears to be the material more suitable for gravel wearing course construction, although experience has taught that if a calcrete with a high PI is used for this purpose, the road surface can become slippery in wet conditions.

#### 7.1.5 Other Considerations

The properties discussed in this subsection of the report were obtained from literature reported values based on studies done by the US Army Corps of Engineers as reported by Brink<sup>Reference 14.8</sup> for compacted material. This approach is followed as the arenaceous character of the in-situ materials that did not allow the retrieval of undisturbed sampling. The typical soil properties associated with the Unified classifications of the materials are thus reported.

##### 7.1.5(i) Compressibility

The compressibility of the material can be regarded as a necessary input to pavement design as well as lesser important supporting information for geotechnical classification for site class designation.

- *Colluvium* : The colluvium is regarded as low to fairly compressible with cohesion ( $c_0$ ) of  $5.0\text{ kNm}^{-2}$  to  $22\text{ Nm}^{-2}$  and the effective stress envelope approximately  $30^\circ$  to  $35^\circ$ .
- *Alluvium* : The alluvium is regarded as fairly compressible with cohesion ( $c_0$ ) of zero to  $22\text{ Nm}^{-2}$  and the effective stress envelope approximately  $30^\circ$  to  $39^\circ$ .
- *Nodular Calcrete* : The nodular calcrete is regarded as low to fairly compressible with cohesion ( $c_0$ ) of zero to  $22\text{ Nm}^{-2}$  and the effective stress envelope approximately  $30^\circ$  to  $39^\circ$ .
- *Residual Charnockite* : The residual charnockite is regarded as non-compressible to fairly compressible with cohesion ( $c_0$ ) of zero to  $22\text{ Nm}^{-2}$  and the effective stress envelope approximately  $30^\circ$  to  $39^\circ$ .
- *Residual Gneiss* : The residual gneiss is regarded as non-compressible to fairly compressible with cohesion ( $c_0$ ) of  $1\text{ Nm}^{-2}$  to  $22\text{ Nm}^{-2}$  and the effective stress envelope approximately  $30^\circ$  to  $39^\circ$ .

##### 7.1.5(ii) Permeability

Permeability is an important parameter in the design of surface drainage and seepage drains. As such indicators in this regard are provided.



- *Colluvium* : The colluvium is regarded as semi-pervious to impervious. The soil permeability coefficient varies between  $2,7 \times 10^{-6} \text{cms}^{-1}$  to  $5,0 \times 10^{-7} \text{cms}^{-1}$ .
- *Alluvium* : The permeability of the alluvium is highly variable and regarded as pervious to impervious. The soil permeability coefficient varies between  $2,7 \times 10^{-6} \text{cms}^{-1}$  to  $5,0 \times 10^{-7} \text{cms}^{-1}$ .
- *Calcrete* : The permeability of the calcrete is highly variable depending on the mode of deposition and regarded as pervious to impervious. The soil permeability coefficient varies between more permeable than  $1,5 \times 10^{-5} \text{cms}^{-1}$  to  $5,0 \times 10^{-7} \text{cms}^{-1}$ .
- *Residual Charnockite* : The residual charnockite is regarded as pervious to impervious. The soil permeability coefficient varies between highly permeable (undetermined) to  $12,3 \times 10^{-6} \text{cms}^{-1}$ .
- *Residual Gneiss* : The residual gneiss is regarded as pervious to impervious. The soil permeability coefficient varies between  $(7,5 \pm 4,8) \times 10^{-6} \text{cms}^{-1}$ .

#### 7.1.5(iii) Erosion Potential

All soil materials encountered during the investigation can be regarded as moderately to poorly resistant against erosion. The aspect of erosion potential is important in the area. The thin soil cover of colluvium and residual soils in comparison with the substantially thicker deposits of alluvium is indicative of erodible soil, which may be partially attributed to the low clay content of the soil materials. The net result of these properties is poor founding conditions on the unconsolidated alluvial deposits and favourable founding conditions on the thin horizons of colluvium and residual soil.

## 7.2 Properties of Bedrock Granite-gneiss and Charnockite

The TLB used to excavate the test pits did not penetrate bedrock to any significant extent and refusal of excavation occurred within millimeters after encountering bedrock. It is not customary to penetrate bedrock in the case of a geotechnical investigation for purposes of a residential development. Refusal of excavation on hard rock is accepted as suitable. One can thus accept bedrock to be hard tending to very hard once refusal of excavation was encountered.

As discussed in subparagraph 6.2 above there is very little difference between the granite-gneiss and the charnockite, and that such differences that do occur are mostly regarded as minor in the latest stratigraphic reference work. Difference consist mostly of minor variations in petrology and some physical properties. For purposes of rock strength calculations these properties are not important and the charnockite and granite-gneiss can be treated as similar material.

Parametric calculations with Roclab software results for slightly weathered, moderately to widely jointed, hard rock to very hard rock result in the following properties :

- Cohesion : 26,1MPa
- Friction Angle : 48°
- Tensile Strength : 2,0MPa
- Uni-axle Compressive Strength : 82,2MPa
- Young's Modulus : 115545,7 MPa

All which show a very sound rock.

### **7.3 Excavation Classification with Respect to Services**

#### **7.3.1 Hand Excavation**

##### *7.3.1(i) Colluvium, Alluvium and Pebblestone Marker*

The colluvium and pebblestone marker can be considered as suitable to be excavated by swing tools. However, especially in the alluvium and water courses the sidewalls of excavations can be prone to collapse.

##### *7.3.1(ii) Pedogenic Deposits*

The nodular and hardpan calcrete are of dense to very dense consistency, although occasionally of loose consistency. Such material cannot be considered as suitable to be manually excavated and may as minimum require the use of a 55kW TLB.

##### *7.3.1(iii) Residual Soils*

Both the residual charnockite and granite-gneiss are of medium dense to very dense consistency. In a condition of medium dense consistency it will be possible to excavate these materials manually ; in a state of dense consistency it will be possible to excavate it manually with considerable effort ; and if very dense, not at all and may as minimum require the use of a 55kW TLB.

##### *7.3.1(iv) Bedrock*

Bedrock of charnockite and granite-gneiss cannot be excavated manually successfully.



### 7.3.2 Classification of Material for Machine Excavation

In terms of Table 5 of SANS 634 : 2012 the following is applicable :

#### 7.3.2(i) *Restricted Excavation*

- *Soft Excavation* : All soil strata and the pedocretes can be regarded as soft excavation. The combined thickness of these strata varied between 200mm and 2700mm in the test pits, averaging 1060mm prior to encountering conditions of intermediate or hard rock excavation.
- *Intermediate Excavation* : Refusal of excavation with a TLB occurred in most cases once bedrock of slightly weathered to unweathered rock was encountered. However, the exception was encountered in TP's 6, 12, 13, 21, 23, 26, 27 and 31 where medium weathered to slightly weathered rock was encountered from depths varying between 300mm to 1600mm minimum to 600mm to 2100mm maximum. In these test pits medium to slightly weathered rock can be regarded as intermediate excavation. It was possible to penetrate between 300mm and 800mm into weathered rock, both charnockite and granite-gneiss, averaging 525mm thick, prior to encountering hard rock excavation.
- *Hard Rock Excavation* : Refusal of excavation occurred in all the test pits except TP's 18, 25 and 35 which were abandoned due to unstable sidewall conditions resulting in collapse of the sidewalls. Refusal of excavation occurred in the remainder of the test pits on slightly weathered to unweathered rock at depths varying between 300mm and 2100mm, averaging 1160mm.

#### 7.3.2(ii) *Non-restricted Excavation*

The classification as per subparagraph 7.3.2(i) : Restricted Excavation as above is also applicable for non-restricted excavation.

## 7.4 Seismicity

### 7.4.1 Historical Seismic Data

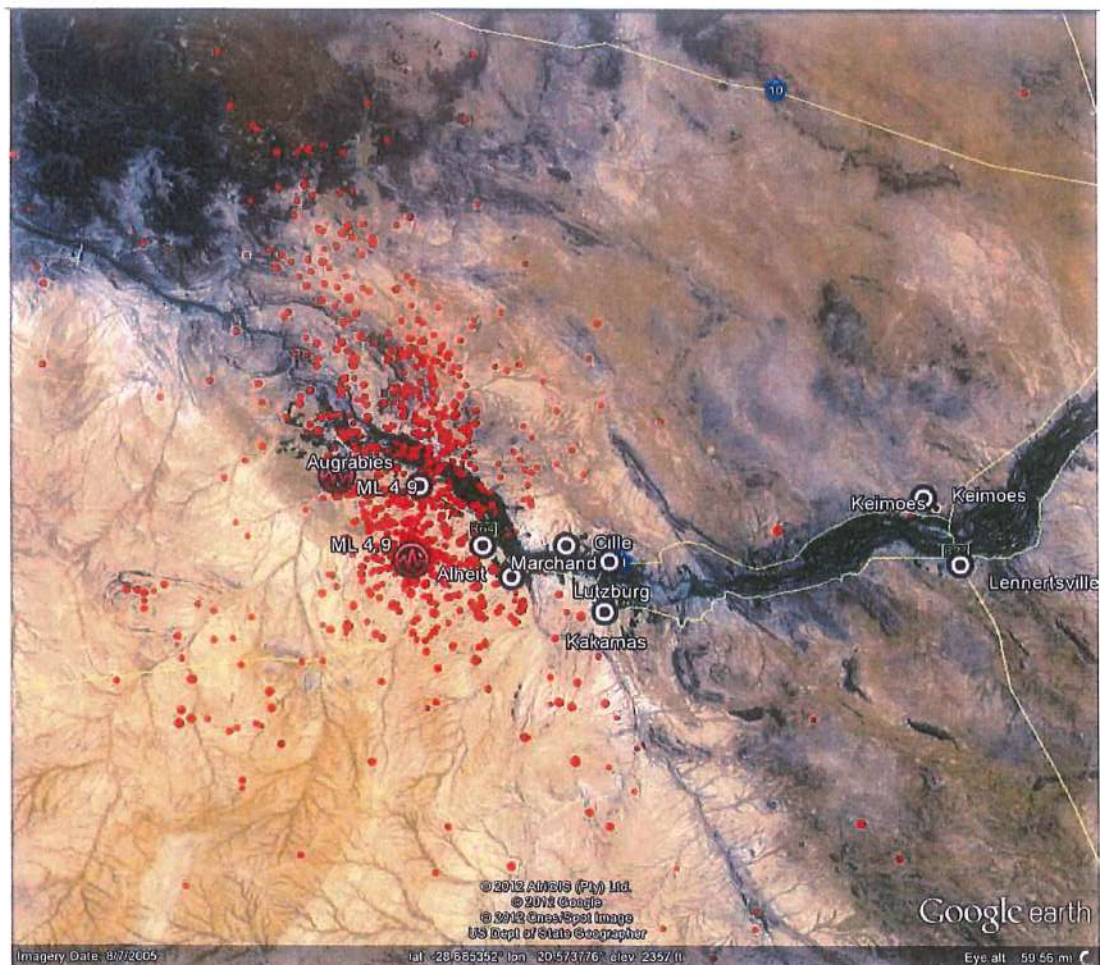
An increase in the occurrence of tremors in the Kai I Garib was encountered up to late 2011. The Council of Geoscience was therefore appointed to compile a desktop study of the available information and to provide indications of the probability and intensity of tremors that may occur in the area. Such a report<sup>Reference 14.9</sup> was made available on 25 July 2012.

The seismicity in the area is dominated by a cluster of seismic events. The events are of low to moderate magnitude with the highest having a magnitude of  $M_L$  5,8 ( $M_L$  = Local Magnitude)

which occurred on 21 February 1976. The largest events within the cluster near Augrabies were two M<sub>L</sub> 4,9 earthquakes which occurred on 12 and 25 January 2011. Although Keimoes falls outside the cluster, it is within the sphere of influence.

The earliest recorded event in the area occurred in 1914 with a magnitude of M<sub>L</sub> 3,0. Since then more than 1100 earthquakes have been recorded. Most of the events were recorded since 1979. The highest number of earthquakes was recorded in 2011 when 760 earthquakes were recorded within a swarm located in the Augrabies area. The earthquakes vary in magnitude from events of magnitude less than one to moderately sized events of which the largest had a magnitude M<sub>L</sub> of 5,8. Most of the earthquakes had small magnitude values around 1,8.

Figure 2.2 from the report of the Council for Geoscience is reproduced here as Figure 8 : Historic Occurrences of Earthquakes in the Kai !Garib Area.



**FIGURE 8 : HISTORIC OCCURRENCES OF ERATHQUAKES IN THE KAI !GARIB AREA**



#### 7.4.2 Site Specific Information

The closest source of seismic measurements to Keimoes under control of the Council for Geoscience is Tontelbos at 31° 10' 12"S and 20° 30' 00"E. Kijko<sup>Reference 14.10</sup> indicates the following :

- The annual probability for an earthquake with intensity of 4,5 on the Modified Mercalli Scale to occur in the area is less than  $10^{-0.7}$  ; and with an intensity of 8,5 to occur the probability is  $10^{-3.8}$ .
- The annual probability for an earthquake with an acceleration of  $10^{-1.9}g$  to occur in the area is less than  $10^{-0.7}$  ; and with an acceleration of  $10^{-0.75}g$  to occur in the area is less than  $10^{-3.8}$ .
- A 10% probability exists that an earthquake with Peak Ground Acceleration exceeding of 0,09g may take place once in 50 years.

A 10% probability of an event with magnitude less than 100cms<sup>-2</sup> to take place once in 50 years is regarded as most favourable ; natural seismic activity with magnitude exceeding 100cms<sup>-2</sup> is regarded as unfavourable.

To put the above information into perspective, Table 4 : Earthquake and Magnitude and Intensity, is attached to this report.

#### 7.5 Undermining

The area of investigation is not undermined.

#### 7.6 Dolomite Stability

The area of investigation is not subject to dolomite related instabilities.

### 8 SITE CLASS DESIGNATIONS

Based on the above discussions the property can be divided into seven zones characterized as follows as per the guidelines posted by SANS 10400 : Section H<sup>Reference 14.11</sup> . The zonation is indicated on Figure 9 : Site Class Designation.

#### 8.1 Geotechnical Zone I

This zone comprises 15% of the area investigated. It is characterized by the materials profiles of TP's 1, 4, 5 and 27 to 29. It consists of a superficial horizon of colluvium and residual soil

less than 400mm thick overlying bedrock of granite-gneiss or charnockite. Several rocky outcrops occur in the area. Slope across the land is less than 2,5%. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in almost negligible settlement if founded directly on the slightly weathered and unweathered hard rock to very hard rock. The area is thus zoned as "R" and regarded as stable.

**TABLE 4 : EARTHQUAKE MAGNITUDE AND INTENSITY**

MODIFIED MERCALLI INTENSITY SCALE	INTENSITY	DESCRIPTION	RICHTER SCALE MAGNITUDE	RADIUS OF PERCEPTIBILITY (km)
I	Instrumental	Detected only by seismography		
II	Feeble	Noted only by sensitive people	3.5 to 4.2	3 to 24
III	Slight	Like the vibrations due to a passing lorry. Felt by people at rest, especially on upper floors		
IV	Moderate	Felt by people while walking Rocking of loose objects, including vehicles	4.3 to 4.8	24 to 48
V	Rather strong	Felt generally ; most sleepers are awakened and bells ring		
VI	Strong	Trees sway and suspended objects swing ; damage by overturning and fling of loose objects	4.9 to 5.4	48 to 112
VII	Very strong	General public alarm ; walls crack ; plaster falls	5.5 to 6.1	110 to 200
VIII	Destructive	Car drivers seriously disturbed ; masonry fissured ; buildings damaged	6.2 to 6.9	200 to 400
IX	Ruinous	Houses collapse ; pipes break		
X	Disasterous	Ground cracks badly ; buildings destroyed ; railway lines bent ; landslides on steep slopes	7.0 to 7.3	400 to 700
XI	Very disasterous	Few buildings remain standing ; bridges destroyed ; all services out of action ; great landslides and floods	7.4 to 8.1	400 to 700
XII	Catastrophic	Total destruction ; objects thrown into the air ; ground rises and falls in waves	>8.1	400 to 700



SITE CLASS DESIGNATION



TEST PIT POSITION

INFERRED

MATERIAL  
BOUNDARY

**Cedar Land Geotechnical Consultants (Pty) Ltd**  
P O BOX 4007  
CENTRAL  
8835  
CELL: 082 530-2767 (Frans)  
CELL: 082 373-2140 (Marnette)  
PO BOX 567  
CENTRAL  
8835  
CELL: 082 370-2767 (Frans)  
CELL: 082 373-2248 (Marnette)  
EPOI@CEGLAND.FRANS@CENTRAL.CO.ZA (Frans)

TAC: OR NAME	Gamakor
SUGGING: SITE	Portion 128 and a Portion of the Remains of the Farm Kousas 496
CLIENT: CLIENT	Mun Kai Garibi
TEKING NO DRAWING NO	Figure 9 :
SATUM DATE	Site Class Designation 06 April 2020

AREA		% OF TOTAL AREA	GEO TECHNICAL CLASS	ESTIMATED SOIL MOVEMENT (mm)	SOIL PROFILE	CONSTRUCTION TYPE	FOUNDATION DESIGN	ASSAULT PROBLEMS	DEVELOPMENT POTENTIAL
I		15.38	R	Negligible	Less than 400mm of colluvium and residual soil overlying bedrock and outcrops of rock	Normal	Normal construction (strip footing or slab-on-the-ground) foundation.	Conditions of hard rock excavation.	Intermediate
II		2.19	R	Negligible	Less than 400mm of colluvium and residual soil overlying bedrock and outcrops of rock	Normal	Normal construction of strip footings.	Conditions of hard rock excavation. Landslide $\pm 5\%$ does not favour slab-on-the-ground foundations.	Intermediate
III		50.64	S	0mm to 10mm compression and collapse settlement	Superficial surface horizon of colluvial sand overlying medium dense and dense nodular calcare and residual soil sand and gravel	Normal	Normal construction (strip footing or slab-on-the-ground) foundation. Foundation bearing pressure not to exceed 50kPa. Good site drainage.	Occasional presence of hard rock excavation.	Favourable
IV		16.94	S	0mm to 10mm compression and collapse settlement	Superficial surface horizon of colluvial sand overlying medium dense and dense nodular calcare and residual soil sand and gravel	Normal	Normal construction of strip footings. Foundation bearing pressure not to exceed 50kPa. Good site drainage.	Occasional presence of hard rock excavation. Landslide $\pm 5\%$ does not favour slab-on-the-ground foundations.	Favourable
V		4.64	S1	10mm to 20mm compression and collapse settlement	Surface horizon of colluvial sand overlying loose to medium dense residual soil or nodular calcare to depths exceeding 1000mm	Modified normal	Reinforced strip foundations with articulation joints at some internal doors and all external doors and light reinforcement in masonry. Site drainage and plumbing precautions. Foundation bearing pressure not to exceed 50kPa.	Occasional presence of hard rock excavation or perched water.	Intermediate
						Compaction of in-situ soils below individual footings	Reinforced in-situ material below foundations to a depth and width of 1.5 times the foundation width or to a suitable soil horizon and replace with material compacted to 83% MOD AASHTO density at -1% to +2% of optimum moisture content. Normal construction with lightly reinforced strip footings and light reinforcement in masonry.		
VI		8.18	S2	>20mm compression and collapse settlement	Loose colluvial soils and alluvial sand exceeding 1500mm deep	Stiffened strip footings, stripped or cellular raft	Stiffened strip footings or stiffened or cellular raft with lightly reinforced or articulated masonry. Foundation bearing pressure not to exceed 50kPa. Mesh reinforcement in floor slabs. Site drainage and services and plumbing precautions.	Collapse of excavation sidewalls. Zoning may possible be affected by seasonal water. Occasional presence of perched water.	Intermediate
VII		2.05	S2	>20mm compression and collapse settlement	Loose colluvial soils and alluvial sand exceeding 1500mm deep	Stiffened strip footings	Stiffened strip footings with lightly reinforced or articulated masonry. Foundation bearing pressure not to exceed 50kPa. Mesh reinforcement in floor slabs. Site drainage and services and plumbing precautions.	Collapse of excavation sidewalls. Zoning may possible be affected by seasonal water. Landslide $\pm 5\%$ does not favour raft foundations.	Intermediate

## **8.2 Geotechnical Zone II**

This zone comprises 2% of the area investigated. It is characterized by the presence of rocky outcrops of granite-gneiss. Test pitting in such conditions is not feasible. Slope across the land is in excess of 5%. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in almost negligible settlement if founded directly on the slightly weathered and unweathered hard rock to very hard rock. The area is thus zoned as "R" and regarded as stable.

## **8.3 Geotechnical Zone III**

This zone comprises 51% of the area investigated. The zone is present in three separate areas on the property. It is characterized by the materials profiles of TP's 2, 3, 6 to 12, 20 to 24, 26, 31 and 32. It consists of a horizon of colluvium approximately 400mm thick overlying medium dense residual sand on nodular calcrete and at depth bedrock of either charnockite or granite-gneiss. Slope across the land is less than 2,5%. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in limited compression settlement less than 10mm if founded directly on the medium dense, nodular calcrete or residual soil. As per the materials profile encountered in the test pits the combined thickness of the strata of nodular calcrete and residual soil is sufficient to dissipate the stresses induced by the foundations effectively. The area is thus zoned as "S" and the materials strata can be regarded as compressible to a maximum of 10mm.

## **8.4 Geotechnical Zone IV**

This zone comprises 17% of the area investigated. The zone is present along the southern perimeter of the site. It is characterized by the materials profiles of TP's 14 to 16, 19 and 33. It consists of a horizon of colluvium approximately 400mm thick overlying medium dense residual sand on nodular calcrete and at depth bedrock of granite-gneiss. Isolated, minor outcrops of granite-gneiss may be present. Slope across the land is in excess of 5%. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in limited compression settlement less than 10mm if founded directly on the medium dense nodular calcrete or residual soil. As per the materials profile encountered in the test pits the combined thickness of the strata of nodular calcrete and residual soil is sufficient to dissipate the stresses induced by the foundations effectively. The area is thus zoned as "S" and the materials strata can be regarded as compressible to a maximum of 10mm.



### **8.5 Geotechnical Zone V**

This zone comprises 5% of the area investigated. The zone is present in three separate areas across the site. It is characterized by the materials profiles of TP's 13, 17 and 30. It consists of a surface horizon of colluvium or alluvium in excess of 800mm thick overlying medium dense nodular calcrete or very dense residual sand at depth. Localised, ill-defined, non-perennial water courses define the characteristics of these areas and surface disposal of water may occur for very short periods after events of rain. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in compression settlement between 10mm and 20mm if founded directly on the loose transported soil. As per the materials profile encountered in the test pits the thickness of the transported soil is such that stresses induced by the foundations will be dissipated in this material. The area is thus zoned as "S1" and the materials strata can be regarded as compressible to a maximum of 20mm.

### **8.6 Geotechnical Zone VI**

This zone comprises 8% of the area investigated. The zone is present in two separate areas on the property. It is characterized by the materials profiles of TP's 25, 34 and 35. It consists of a horizon of loose and very loose colluvium or alluvium exceeding 1500mm thick. A thin lens of 100mm thick very dense, hardpan calcrete may be contained in the materials profile. Slope across the land is less than 2,5%. Foundation stresses induced by conventional strip foundations for single and double storey structures will result in compression settlement exceeding 20mm if founded directly on the transported material. Founding on the hardpan calcrete will not contribute in a positive way to reduce the settlement due to the limit vertical extent thereof. As per the materials profile encountered in the test pits the foundation stresses will be dissipated in the loose and very loose soil strata. The area is thus zoned as "S2" and the materials strata can be regarded as compressible exceeding 20mm settlement.

Cognisance must be taken of the presence of the drainage gully in the area identified by TP's 25 and 35. Perched groundwater was encountered in this area at 1400mm. What is misleading about the conditions that once the horizon of hardpan calcrete is encountered conditions appear to be stable, but should one penetrate the calcrete, conditions of very moist to wet soil prevail and side walls of excavations may collapse. However, one should be careful not to condemn the entire area as problematic, but exclude development only from the identified water course.

### **8.7 Geotechnical Zone VII**

This zone comprises 2% of the area investigated. The zone is present along the southern

perimeter of the site. It is characterized by the materials profiles of TP 18. It consists of a horizon of alluvium exceeding 2700mm thick. The alluvium is of very loose consistency and sidewalls of the test pit tended to collapse during the investigation. The area is located in a well-defined, non-perennial water course, disposing surface water after events of precipitation. Slope across the land is in excess of 5%. As per the materials profile encountered in the test pits the foundation stresses will be dissipated in the loose and very loose soil strata. The area is thus zoned as "S2" and the materials strata can be regarded as compressible exceeding 20mm settlement.

## **9 FOUNDATION RECOMMENDATIONS AND SOLUTIONS**

The foundation design alternatives and ancillary issues as discussed in subparagraphs 9.1 and 9.2 below are summarized in Table 5 : Foundation Design, Building Procedures and Precautionary Measures. In some cases more than one foundation solution is offered in the discussion below. Whichever option is used, the design must adhere strictly on the proposals of SANS 10400H. As geotechnical conditions favour the use of both alternatives, the decision of which option to use must be based on financial and practical considerations. In all cases service trenches shall not be excavated parallel to buildings within 1500mm of the building perimeter.

### **9.1 Geotechnical Zone I**

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. Considering the limited slope across the land of approximately 2% only and the favourable geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone.

The two options can be discussed as follows :

#### **9.1.1 Strip Foundations**

Foundations of 400mm wide placed directly on the very dense hardpan calcrete may be used. Should the areas of the proposed dwellings not exceed 200m<sup>2</sup> foundations for internal non-loadbearing walls may consist of thickened floorslabs. Should this option be adopted the floorslabs shall be reinforced steel mesh.

#### **9.1.2 Slab-on-the-ground Foundations**

The solution of slab-on-the-ground foundations may only be used for dwellings less than 200m<sup>2</sup> in area. Edge beams shall be placed directly on the very dense hardpan calcrete.



TABLE 5 : FOUNDATION DESIGN, BUILDING PROCEDURES AND PRECAUTIONARY MEASURES

AREA	AREA OF PROPERTY (%)	GEOTECHNICAL CLASS	ESTIMATED SOIL MOVEMENT (mm)	SOIL PROFILE	CONSTRUCTION TYPE	FOUNDATION DESIGN AND BUILDING PROCEDURES	ASSOCIATED PROBLEMS	DEVELOPMENT POTENTIAL
I		R	Negligible	Less than 400mm of colluvium and residual soil overlying bedrock and outcrops of rock	Normal	Normal construction (strip footing or slab on the ground) foundations	Complications of hard rock excavation	Favourable
II		R	Negligible	Less than 400mm of colluvium and residual soil overlying bedrock and outcrops of rock	Normal	Normal construction of strip footings	Condition of hard rock excavation Landscape 45% does not favour shallow foundations	Favourable
III		S	0mm to 10mm compression settlement	Superficial surface horizon of colluvial sand overlying medium dense and dense nodular calcare and residual soil sand and gravel	Normal	Normal construction (strip footing or slab on the ground) foundations Foundation bearing pressure not to exceed 50kPa Good site drainage	Occasional presence of hard rock excavation	Favourable
IV		S	0mm to 10mm compression settlement	Superficial surface horizon of colluvial sand overlying medium dense and dense nodular calcare and residual soil sand and gravel	Normal	Normal construction of strip footings Foundation bearing pressure not to exceed 50kPa Good site drainage	Occasional presence of hard rock excavation Landscape 45% does not favour shallow foundations	Favourable
V		S1	10mm to 20mm compression settlement	Surface horizon of colluvial sand overlying loose to medium dense residual soil or nodular calcare to depths exceeding 1000mm	Modified normal	Reinforced strip foundations with articulation points at some internal doors and at external doors and light reinforcement in masonry. Site drainage and service and plumbing installations. Foundation bearing pressure not to exceed 50kPa  Remove in-situ material below foundations to a depth and width of 1.5 times the foundation width to a suitable soil horizon and also with material compacted to 95% MDD AASHTO density at -1% to -2% of optimum moisture content Normal construction with lightly reinforced strip foundations and light reinforcement in masonry.	Occasional presence of hard rock excavation or bedrock water	Favourable
VI		S2	>20mm compression settlement	Loose colluvial soils and alluvial sand exceeding 1500mm deep	Stiffened strip footings or cellular pit	Stiffened strip footings or cellular pit with lightly reinforced or articulated masonry Foundation bearing pressure not to exceed 50kPa Mesh reinforcement in floor slabs Site drainage and service and plumbing precautions	Collapse of excavation sidewalls Zoning may possibly be affected by seismic surface water Occasional presence of bedrock water	Favourable
VII		S2	>20mm compression settlement	Loose colluvial soils and alluvial sand exceeding 1500mm deep	Stiffened strip footings	Stiffened strip footings with lightly reinforced or articulated masonry Foundation bearing pressure not to exceed 50kPa Mesh reinforcement in floor slabs Site drainage and service and plumbing precautions	Collapse of excavation sidewalls Zoning may possibly be affected by seismic surface water Landscape 45% does not favour shallow foundations	Favourable

Foundations for internal non-loadbearing walls shall consist of thickened floorslabs. The foundations shall not contain any changes in surface levels with steps exceeding 400mm and do not support any chimneys or walls which support concrete roofs. Founding by means of strip footings is therefore the only feasible alternative for founding the future structures.

## **9.2 Geotechnical Zone II**

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. Considering the slope across the land of approximately 5% the use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. This latter option of additional earthworks may be costly and hence is not recommended. Based on the favourable geotechnical site classification as per Section 8 above only one founding alternative can be considered, as described below.

Foundations of 400mm wide placed directly on bedrock may be used. Should the areas of the proposed dwellings not exceed 200m<sup>2</sup> foundations for internal non-loadbearing walls may consist of thickened floorslabs. Should this option be adopted the floorslabs shall be reinforced steel mesh.

## **9.3 Geotechnical Zone III**

The zone is classed as S, meaning that less than 10mm of compression settlement may occur. Considering the limited slope across the land of approximately 2% only and the favourable geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone.

The two options can be discussed as follows :

### **9.3.1 Strip Foundations**

Foundations of 400mm wide placed directly on the medium dense to dense nodular calcrete or residual soil may be used. Should the areas of the proposed dwellings not exceed 200m<sup>2</sup> foundations for internal non-loadbearing walls may consist of thickened floorslabs. Should this option be adopted the floorslabs shall be reinforced steel mesh.

### **9.3.2 Slab-on-the-ground Foundations**

The solution of slab-on-the-ground foundations may only be used for dwellings less than 200m<sup>2</sup> in area. Edge beams shall be placed directly on the medium dense to dense nodular



calcrete or residual soil. Foundations for internal non-loadbearing walls shall consist of thickened floorslabs. The foundations shall not contain any changes in surface levels with steps exceeding 400mm and do not support any chimneys or walls which support concrete roofs.

#### **9.4 Geotechnical Zone IV**

The zone is classed as S, meaning that less than 10mm of compression settlement may occur. Considering the slope across the land of approximately 5% the use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. This latter option of additional earthworks may be costly and hence is not recommended. Based on the favourable geotechnical site classification as per Section 8 above only one founding alternative can be considered, as described below.

Foundations of 400mm wide placed directly on bedrock may be used. Should the areas of the proposed dwellings not exceed 200m<sup>2</sup> foundations for internal non-loadbearing walls may consist of thickened floorslabs. Should this option be adopted the floorslabs shall be reinforced steel mesh.

#### **9.5 Geotechnical Zone V**

The zone is classed as S1, meaning that between 10mm and 20mm of compression settlement may occur. Considering the limited slope across the land of approximately 2% only and the intermediate geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone.

The two options can be discussed as follows :

##### **9.5.1 Modified Normal Construction**

The minimum founding depth shall be 500mm. Footings of 600mm wide and reinforced with three Y12 bars shall be used as foundations for load bearing walls. Footings of 450mm wide and reinforced with two Y12 bars shall be used as foundations for non-load bearing walls. Articulation joints shall be provided at some internal doors and all external doors. Light reinforcement (brickforce) shall be installed in the masonry. The site around the structure shall be sloped to allow surface water to drain away from the house. Foundation pressures shall not exceed 50kPa.

#### 9.5.2 Compaction of In-situ Soils Below Individual Footings

This alternative provides for the removal of the in-situ material below foundations to a depth and width of 1,5 times the foundation width or to a suitable horizon and replace with competent material compacted to a density of 93% Modified AASHTO at -1% to +2% of optimum moisture content. In this case "a suitable horizon" is regarded as medium dense to very dense residual soil or pedocrete. "Competent material" is regarded as natural gravel of G6 quality in the COLTO classification system. Normal construction methods shall be applied with lightly reinforced strip foundations and light reinforcement in the masonry.

### 9.6 Geotechnical Zone VI

The zone is classed as S2, meaning that in excess of 20mm of compression settlement may occur. Considering the limited slope across the land of approximately 2% only and the intermediate geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone.

The two options can be discussed as follows :

#### 9.6.1 Stiffened Strip Footings

The minimum founding depth shall be 500mm. Reinforced footings shall be used as foundations for both load bearing and non-load bearing walls. The foundations shall be designed by a suitably qualified and experienced professional engineer. Articulation joints shall be provided at some internal doors and all external doors. Light reinforcement (brickforce) shall be installed in the masonry. The site around the structure shall be sloped to allow surface water to drain away from the house. Foundation pressures shall not exceed 50kPa.

#### 9.6.2 Concrete Raft Foundations

The use of a stiffened, reinforced concrete raft or cellular raft may be considered. The foundations shall be designed by a suitably qualified and experienced professional engineer. Articulation joints shall be provided at some internal doors and all external doors. Light reinforcement (brickforce) shall be installed in the masonry. The site around the structure shall be sloped to allow surface water to drain away from the house. Foundation pressures shall not exceed 50kPa.



## **9.7 Geotechnical Zone VII**

The zone is classed as S2, meaning that in excess of 20mm of compression settlement may occur. Considering the slope across the land of approximately 5% the use of reinforced concrete rafts will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. This latter option of additional earthworks may be costly and hence is not recommended. Based on the intermediate geotechnical site classification as per Section 8 above only one founding alternative consisting of reinforced strip foundations can be considered.

The minimum founding depth shall be 500mm. Reinforced footings shall be used as foundations for both load bearing and non-load bearing walls. The foundations shall be designed by a suitably qualified and experienced professional engineer. Articulation joints shall be provided at some internal doors and all external doors. Light reinforcement (brickforce) shall be installed in the masonry. The site around the structure shall be sloped to allow surface water to drain away from the house. Foundation pressures shall not exceed 50kPa.

## **10 DRAINAGE**

In subparagraph 2.4 and Figure 2 reference is made to the presence of three drainage features. The northern and southern drainage features are regarded as minor features of localised extent. During the time of investigation these gullies were dry and it is clear that they are subjected to the disposal of surface water only during and shortly after during events of rainfall.

The third drainage feature located in the central part of the site and extending northeast to southwest is of more substantial extent. Although standing water could not be identified during the investigation, the presence of water-loving vegetation, high soil moisture contents and the presence of perched water at levels shallower than 1500mm in the water course are all indicative of a more general presence of water in this course than elsewhere. Whether the source of such water is of natural origin, or released as treated water from the waste water treatment facility located upstream falls outside the scope of this geotechnical investigation. However, cognizance must be taken of the fact that in comparison with the surrounding area, raised perched water levels occur in close proximity of the gully, although it does not necessarily occur over the entire area zoned as S2.

Although it cannot be regarded as issues related to the geotechnical conditions on site, the following two drainage issues may influence the development of the property negatively ;

- *Land Slope* : The slope of 1% across the land is regarded as marginal and may result in problems with the design of stormwater and sewerage disposal systems depending on dissipation by gravity.
- *Presence of the Gullies* : If not designed for, the presence of the gullies as discussed above can result in inundation of dwellings during flooding. The presence of these gullies traversing the site may be regarded as less desirable and the flood characteristics thereof must be considered.

## 11 SPECIAL PRECAUTIONARY MEASURES

No extraordinary features requiring special precautionary measures to decrease the impact thereof are present on site.

## 12 CONCLUSIONS

The property is regarded as being of favourable to intermediate suitability for residential development. The only factors that reduce the suitability of the land for development are :

- The presence of hard rock close to the surface. The presence thereof will result in conditions of hard excavation. On the other hand it provides conditions favouring conventional methods of founding.
- Except for the southern part of the site, slope across the land is limited to less than 2%. This will have a detrimental influence on the design of stormwater disposal systems and sewerage reticulation.
- The presence of the drainage features will require design considerations to lessen the impact thereof on the development of the site.
- The alluvium and colluvium can be regarded as moderately compressible soil. This property can be addressed by adopting a suitable foundation design for the structures.

The conclusions as based on the site conditions are summarized in Table 6 : Influence of Constraints per Geotechnical Zoning. This classification is based on the proposals of the document *Geotechnical Site Investigations for Housing Developments (Generic Specification GFSH-2)*, issued by the National Department of Housing in September 2002.

### 12.1 Stratigraphy

The available information shows that the area of investigation is located on a subduction zone dating approximately 1000 million years old. The zone is located between the lithology of the Kaapvaal Craton and the Namaqua-Natal mobile belt. The remains of the original geology in the area are referred to as the Kakamas Terrane and the site is located on Friersdale



TABLE 6 : INFLUENCE OF CONSTRAINTS PER GEOTECHNICAL ZONING

CONSTRAINT	KEY TO CLASSIFICATION			CLASSIFICATION PER GEOTECHNICAL ZONE						
	MOST FAVOURABLE (1)	INTERMEDIATE (2)	LEAST FAVOURABLE (3)	I	II	III	IV	V	VI	VII
Collapseable soil	Any collapsible horizon or consecutive horizons totalling a depth of less than 750mm in thickness	Any collapsible horizon or consecutive horizons with a depth of more than 750mm in thickness	Slablike collapsible horizons totalling a depth of more than 750mm in thickness							
Seepage	Permanent or perched water table more than 1,5m below ground surface	Permanent or perched water table less than 1,5m below ground surface	Seepage in surface							
Active soil	Low soil heave potential anticipated	Moderate soil heave potential anticipated	High soil heave potential anticipated							
Highly compressible soil	Low soil compressibility anticipated	Moderate soil compressibility anticipated	High soil compressibility anticipated							
Erodibility of Soil	Low	Intermediate	High							
Difficulty of excavation to 1,5m depth	Scattered or occasional boulders less than 10% of the total volume	Rock or hardpan pedocretes between 10% and 40% of the total volume	Small to medium boulders between 40% and 60% of the total volume							
Undermined ground	Undermining at a depth greater than 240m below surface, except where total extraction mining has not occurred	Old undermined areas to a depth of 90m to 240m below surface where slope closure has ceased	Extensive undermining to a depth of 240m or more below surface, including all slopes above							
Dolomite and limestone stability	Possibly stable. Areas of dolomite overlain by Karoo rocks or intruded by sills. Areas of Black Reef rocks. Anticipated Inherent Risk Class 1	Potentially characterised by instability. Anticipated Inherent Risk Classes 2 to 5	Extensive undermining and collapse. Anticipated Inherent Risk Classes 6 or 7							
Slope slopes*	Between 2° and 5° in all regions	Slopes between 6° and 18° and less than 2° (Natal and Western Cape) Slopes between 6° and 12° and less than 2° (all other regions)	Slopes between 12° (Natal and Western Cape) and 20° (all other regions) Slopes less than 2° (all other regions)							
Areas of unstable natural slopes*	Low risk	Intermediate risk	High risk (probability of slope failure > 10% in 50 years)							
Areas subject to seismic activity	10% probability of an event less than 100cms <sup>2</sup> within 50 years	Mining induced seismic activity more than 100cms <sup>2</sup>	High induced seismic activity more than 100cms <sup>2</sup>							
Areas subject to flooding	A "most favourable" situation for this constraint does not occur	Areas adjacent to a known drainage channel or floodplain with slope less than 1%	Areas with intermediate drainage or floodplain							

charnockite and Vaalputs granite-gneiss of the Keimoes Suite that is intrusive into the terrane, as described by Moen. Cornell, in the latest stratigraphic reference work includes the granite-gneiss into the charnockite and describes the presence of the latter material only. The charnockite is described as dark grey, unfoliated rock. The texture is fine to medium and uneven grained. Many of the quartz grains have an opalescent blue colour. Charnockite consists of a fine grained groundmass of quartz, feldspar, minor plagioclase and biotite, with larger biotite, hypersthene and augite grains

## **12.2 Soil Profile**

### **12.2.1 Colluvium**

The soil profile consists of a surface horizon of colluvium comprising of coarse sand to fine sand containing occasional gravels of banded ironstone, quartz and quartzite. The horizon extended to a maximum depth of 800mm. The colluvium is not expansive or collapsible, but compressible due to its general loose consistency.

### **12.2.2 Alluvium**

A surface horizon of alluvium is present in the drainage gullies on site, comprising of fine sand containing gravels of quartz. Calcification may occur with depth. The horizon extended to a maximum depth of 2700mm. The alluvium is not expansive or collapsible, but highly compressible due to its very loose to loose consistency.

### **12.2.3 Pebblestone Marker**

Only a minor occurrence of the pebblestone marker was encountered in one test pit only. It was 100mm thick maximum, consisting predominantly of gravels of banded ironstone in a matrix of fine sand. The pebblestone marker is not expansive or collapsible and only negligibly compressible and erodible.

### **12.2.4 Residual Charnockite**

Residual charnockite underlies the colluvium and in some instances the pedogenic deposits, occurring from depths between 200mm and 1100mm minimum, extending to 300mm to 1900mm maximum. It can be described as dirty white speckled dark grey varying to light brown gravelly sand. The presence of flakes of biotite was occasionally encountered in the charnockite soil profile. The consistency of the residual charnockite varied between loose and very dense in the test pits. The residual charnockite is not expansive or collapsible and only negligibly compressible and erodible.



#### 12.2.5 Residual Granite-gneiss

Residual granite-gneiss underlies the colluvium, occurring from depths between 200mm and 1100mm minimum, extending to 700mm to 1600mm maximum. The residual granite-gneiss can be described as dirty white speckled dark grey varying to dark grey speckled white gravelly sand. The consistency of the residual granite-gneiss varied between dense and very dense in the test pits. The residual granite-gneiss is not expansive or collapsible and only negligibly compressible and erodible.

#### 12.2.6 Mokalanen Formation

##### 12.2.6(i) Hardpan Calcrete

Hardpan calcrete underlies the colluvium, occurring from depths between 100mm and 200mm minimum, extending to 300mm and 400mm maximum in isolated occurrences. The hardpan calcrete can be described as dirty white, very fine grained and very dense. It was possible to penetrate the calcrete in the test pits as the horizon is fairly thin and it overlies residual soil material of lesser dense consistency.

##### 12.2.6(ii) Nodular Calcrete

Nodular calcrete was encountered in variable conditions on site : from underlying the colluvium directly as a pure pedocretes ; to a sub-horizon contained within a horizon of residual soil ; or as an extensively calcified and nodular horizon, especially in the alluvium. It was present between 100mm and 800mm minimum, extending to 300mm to 1600mm maximum. The nodular calcrete can be described as dirty white, rounded fine to medium coarse, concretions contained in a matrix of fine sand. The consistency varies from loose to very dense.

### 12.3 Groundwater

#### 12.3.1 Perched Water

Perched groundwater was encountered in TP 3 at a depth of 1500mm and in TP 35 at 1400mm during the investigation. In both cases the presence of the water can be associated with the existing major drainage course through the site. Perched water was not encountered in any of the other test pits on site. It is anticipated that perched water will generally not prove problematic on the site, except in the major water course almost on a permanent basis ; and in the lesser drainage courses after events of inundation. However, it is concluded that the

presence of perched water in the water course is of such extent that it will influence conditions detrimentally only in the direct vicinity thereof and not over the whole area classified as S2.

#### 12.3.2 Permanent Groundwater

Groundwater is expected to occur at depths between 20 meters and 30 meters in fractures restricted to a zone directly below the water table. The presence of permanent water has no influence on the geotechnical conditions on site.

### 12.4 Conditions of Excavation

On average over the entire site bedrock was encountered at depths between 200mm minimum exceeding 3000mm maximum, averaging 950mm deep. The implication of this is that should trenches require excavated depths to 1000mm, 5% of the excavation may be classified as hard, requiring drilling and blasting. Should the required depth of excavation increase to 1500mm, 37% of the excavation may be classified as hard.

Irrespective of which method of excavation is considered, the most important issue is that across the entire site the depth to bedrock that can be regarded as hard rock excavation that is highly variable as follows :

#### 12.4.1 Geotechnical Zones I and II

These zones are classified as R. The average depth to bedrock is 300mm. Refusal of excavation occurred at an average depth of 400mm. The implication of this is that should trenches require excavated depths to 1000mm, 70% of the excavation may be classified as hard, requiring drilling and blasting. Should the required depth of excavation increase to 1500mm, 80% of the excavation may be classified as hard.

#### 12.4.2 Geotechnical Zones III and IV

These zones are classified as S. The average depth to bedrock is 1090mm. Refusal of excavation occurred at an average depth of 1190mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation. Should the required depth of excavation increase to 1500mm, 27% of the excavation may be classified as hard, requiring drilling and blasting.

#### 12.4.3 Geotechnical Zone V

This zone is classified as S1. The average depth to bedrock is 1500mm. Refusal of

excavation occurred at an average depth of 1800mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation. Should the required depth of excavation increase to 1500mm, 100% of the excavation may still be classified as soft, suitable for TLB excavation.

#### 12.4.4 Geotechnical Zones VI and VII

These zones are classified as S2. In two of the four test pits excavated in the S2 zones, collapse of sidewalls occurred at depths exceeding 2000mm prior to encountering refusal or bedrock. One can thus state that the average depth to bedrock exceeds 1500mm. The implication of this is that should trenches require excavated depths to 1000mm, 100% of the excavation may be classified as soft, suitable for TLB excavation. Should the required depth of excavation increase to 1500mm, 100% of the excavation may still be classified as soft, suitable for TLB excavation. However, one must also expect the presence of perched water in the proximity of the major non-perennial water course and collapse of the excavation sidewalls.

### 12.5 Site Class Designation

It is concluded that the entire area is regarded as suitable for residential development as follows :

#### 12.5.1 Geotechnical Zone I

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. The distribution thereof encompasses 15% of the proposed area for development. Slope across the land is less than 2%. Considering the limited slope and the favourable geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone, namely conventional strip foundations or slab-on-the-ground foundations placed directly on bedrock of granite-gneiss or charnockite.

#### 12.5.2 Geotechnical Zone II

The zone is classed as R, meaning that the proposed horizon for founding is stable and negligible soil movement is expected. The distribution thereof encompasses 2% of the proposed area for development. Slope across the land is approximately 5%. The use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. The more viable foundation alternative therefore remains founding by conventional strip foundations.



#### 12.5.3 Geotechnical Zone III

The zone is classed as S, meaning that the proposed horizon for founding is slightly compressible and rapid settlement less than 10mm is expected. The distribution thereof encompasses 51% of the proposed area for development. Slope across the land is less than 2%. Considering the limited slope and the favourable geotechnical site classification as per Section 8 above, two foundation design alternatives are applicable to the zone, namely conventional strip foundations or slab-on-the-ground foundations placed directly on medium dense to very dense residual soil or pedocretes.

#### 12.5.4 Geotechnical Zone IV

The zone is classed as S, meaning that the proposed horizon for founding is slightly compressible and rapid settlement less than 10mm is expected. The distribution thereof encompasses 17% of the proposed area for development. Slope across the land is approximately 5%. The use of slab-on-the-ground foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. The more viable foundation alternative therefore remains founding by conventional strip foundations placed directly on medium dense to very dense residual soil or pedocretes.

#### 12.5.5 Geotechnical Zone V

The zone is classed as S1, meaning that the proposed horizon for founding is moderately compressible and rapid settlement between 10mm and 20mm is expected. The distribution thereof encompasses 5% of the proposed area for development. Slope across the land is less than 2%. Considering the limited slope and the intermediate geotechnical site classification as per Section 8 above, structures can be founded by reinforced strip foundations. Alternatively the loose overburden soil can be excavated and replaced with a compacted horizon supporting lightly reinforced strip foundations.

#### 12.5.6 Geotechnical Zone VI

The zone is classed as S2, meaning that the proposed horizon for founding is highly compressible and rapid settlement in excess of 20mm is expected. The distribution thereof encompasses 8% of the proposed area for development. Slope across the land is less than 2%. Considering the limited slope and the intermediate geotechnical site classification as per Section 8 above, structures can be founded by reinforced strip foundations or concrete rafts. The foundations shall be designed by a suitably qualified and experienced professional engineer.

#### 12.5.7 Geotechnical Zone VII

The zone is classed as S2, meaning that the proposed horizon for founding is highly compressible and quick settlement in excess of 20mm is expected. The distribution thereof encompasses 2% of the proposed area for development. Slope across the land is approximately 5%. The use of reinforced raft foundations will require additional works in the form of the construction of an engineered fill or cutting to establish a level platform for construction. Structures can thus be founded by reinforced strip foundations. The foundations shall be designed by a suitably qualified and experienced professional engineer.

#### 12.6 Land Slope

The average slope across the larger part of the land is less than 2%. Only in the southern extreme of the property is the slope approximately 5%. This slope of less than 2% has a detrimental influence on especially the design of a stormwater disposal system depending on gravity to dissipate of the surface water due to downpours. The land slope also affects the design of the sewerage disposal but to a lesser extent as the gradient of the pipes can be adjusted according to design requirements.

No steep slopes are present on the property.

#### 12.7 Areas Subject to Flooding

Three areas that may possibly be subject to flooding have been identified from satellite imagery and the presence of alluvial deposits in these areas confirm the possibility that they serve to dispose of stormwater. In all cases the stormwater is of seasonal nature in an arid area, which may lessen the impact thereof on residential development. Although the gullies located in the northern and southern extremes of the site may be regarded as being of lesser importance, the gully in the central part of the site may also accommodate possible treated effluent from the waste water disposal works.

It is thus concluded that attention be given to the presence of these gullies through the residential area and the influence they may have on the future development thereof.

#### 12.8 Materials Utilization

- *Trench Backfilling* : None of the materials are suitable for selected fill or pipe bedding. With exception of the hardpan calcrete all materials can be used for normal backfill.
- *Layerworks for Paved or Segmental Block Paving* : The residual soils are suitable for the construction of in-situ selected layerworks. The plasticity index of the calcrete exceeds the

upper limit applicable for classification its suitability as road construction material. It can therefore be considered suitable only as roadbed only.

- *Wearing Course for Gravel Roads in Urban Areas* : None of the soil materials are 100% suitable for this purpose. The use of these materials will generally result in a road surface subject to raveling and corrugations.

## **12.9 Other Considerations**

- *Undermining* : The area is not subject to undermining.
- *Seismic Activity* : The Peak Ground Acceleration expected in 50 years is 0,09g. A low risk for the development of earth tremors therefore exist.
- *Soil Corrosivity* : The in-situ soils and pedocretes are not corrosive due to acidic properties or a high soluble salts content.
- *Dolomite* : The area of investigation is not subject to any restrictions due to the presence of dolomite. Bedrock of dolomite does not occur in the area of investigation.

## **13 RECOMMENDATIONS**

### **13.1 Foundation and Structural Design**

Section 9 of this document provides guidelines for foundation and structural design. These guidelines are based strictly on the contents of SANS 10400H and the NHBRC Home Owners Manual published in 2015. It is recommended that development take place strictly according to these guidelines.

In Geotechnical Zones I, III and VI where more than one alternative for foundation design is provided, the property developer can base his choice on financial constraints.

### **13.2 Areas Subject to Flooding**

Three gully areas have been identified. Although these areas are not subject to continuous flooding, such events may result in damage to infrastructure if not designed for. Of concern is the water course through the central part of the site in which surface water is often present, also resulting in the presence of perched groundwater. As it stands localized puddles of water develop with water-loving plants etc. In some instances it has been found that household waste is dumped in the course of this gully in the informal township.

It is recommended that the flood characteristics of this water course be determined and the water be confined to a suitably designed open concrete channel. Having stated this, it is recognized that a geotechnical document is not a guideline for hydraulic design for urban



development. However, limiting the water course to a lined channel will reduce seepage into the surrounding land and overall reduce detrimental effects resulting from the uncontrolled water course. This is especially applicable to the S2 geotechnical zone which is especially detrimentally affected by the ingress of perched water.

### **13.3 Materials Utilization**

- *Trench Backfill* : With exception of the hardpan calcrete, the in-situ materials may be used for normal backfill of trenches. The hardpan calcrete shall be spoilt and not used at all for this purpose. Material for pipe bedding and selected backfill shall be obtained from commercial sources.
- *Layerworks for Paved or Segmental Block Paving* : Material for subbase and base construction must be obtained from commercial sources. Depending on the pavement design, G6 or G7 material may have to be imported for the construction of selected layerworks. It is recommended that a centerline investigation consisting of test pitting and soil sampling be conducted to allow the consulting engineer to produce suitable pavement designs for the project.
- *Wearing Course for Gravel Roads in Urban Areas* : Material for the construction of a gravel wearing course shall be obtained from commercial sources.

### **13.4 Conditions of Excavation**

Although manual excavation is possible through the colluvium and alluvium, and to some extent through the residual soil, it is considered as not an economic proposition, mostly due to the consistency and composition of the soil. Excavation through these soils shall require the use of a TLB rated at 55kW minimum, or preferably a 30 ton excavator of the very dense pedocretes need to be removed. It is recommended that adequate provision be made for hard rock excavation. In the S2 geotechnical provision must be made for excavation in wet conditions. Workers in the trenches shall be protected against collapse by either reducing slopes of the excavations to 1(V) : 2(H) or the provision of shoring.

### **13.5 Land Slope**

Slope across the larger part of the land is less than 2%. This is regarded as being of intermediate suitability for urban development only. This has an influence on especially the stormwater disposal system but to a lesser extent on the waste water design. In theory the slope of 5% of the land in the south can be regarded as favourable for urban development, but the combination of the slope and presence of rock outcrops result in conditions less desirable for development.

## 14 SOURCES OF REFERENCE

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14.9 Manzunzu B and Zulu B : *Seismic Hazard Analysis at Selected Sites in the Northern Cape Province, South Africa – Report No 2012-0174*, published by the Council for Geoscience in July 2012.

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14.11 SANS 10400 : Section H Edition 3 pages 14 to 28.

A handwritten signature in blue ink, appearing to read 'FJ Breytenbach'.

FJ Breytenbach, Pr Eng

28 May 2020

For Cedar Land Geotechnical Consult (Pty) Ltd












**REPORT ON THE GEOTECHNICAL CONDITIONS ON  
PORTION 128 AND A PORTION OF THE RESTANT OF  
THE FARM KOUSAS 459, KEIMOE**

2020/J032/MCP\_01

**ADDENDUM A: TEST PIT PROFILES**

<b>TRIAL HOLE: 1</b>		<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> <b>P O Box 607</b> <b>Ceres</b> <b>6830</b> <b>Cell: 082 570 2767</b> <b>Email:</b> cedarland.frans@breede.co.za
PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500		
LOGGED BY: FJB		
SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459		
DATE LOGGED: 11/3/2020		
CLIENT: KALIGARIB MUNICIPALITY		
LOCATION: 28°41'21,5" S 20°56'54,0" E		

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 400 mm on hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with matrix supported, medium coarse, angular gravels of gneiss. Colluvium.				
0.40		Dirty white speckled light grey, slightly weathered, hard rock, micaceous CHARNOCKITE.				
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

-  Water encountered
-  Water level
-  Bottom of hole
-  Approximate material change
-  Disturbed sample
-  Undisturbed sample

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 1</b>	<b>FIGURE: A1</b>

<b>TRIAL HOLE: 2</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAIIGARIB MUNICIPALITY  <b>LOCATION:</b> 28°41'24,2" S 20°56'47,8" E	Cedar Land Geotechnical Consult (Pty) Ltd P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
--	--

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1600 mm on very hard rock, granite-gneiss.
0.20		Slightly moist, light brown, loose, intact, fine SAND. Colluvium.				
0.40		Abundant, clast supported, medium coarse, rounded and subrounded concretions of nodular CALCRETE in a matrix of slightly moist, light brown, fine sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60		Slightly moist, dark grey speckled white, very dense, intact, gravelly SAND.				
0.80		Residual granite-gneiss.				
1.00						
1.20						<div style="border: 1px solid black; padding: 5px; margin-top: 10px;">             ▽ Water encountered              ▾ Water level              ▴ Bottom of hole              --- Approximate material change              • Disturbed sample              ■ Undisturbed sample           </div>
1.40						
1.60		Dirty white speckled dark grey, fine grained, unweathered, very hard rock, GRANITE-GNEISS.				
1.80						
2.00						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 2</b>	<b>FIGURE: A2</b>



# TRIAL HOLE: 3

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

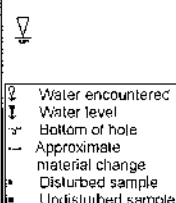

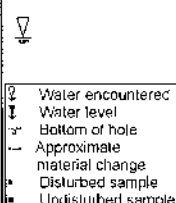
SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI IGARIB MUNICIPALITY

LOCATION: 28°41'27,9" S 20°56'56,2" E

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6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1500 mm due to very slow penetration.  2 Seepage water encountered at 1500 mm.
0.20		Moist, dark red brown, loose, intact, medium coarse SAND. Colluvium.				
0.40						
0.60		Moist, dirty white speckled dark grey, very dense, micaceous gravelly SAND. Residual charnockite.				
0.80						
1.00			CLG-04-13	0,5-1,5		
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 3

FIGURE: A3

**TRIAL HOLE: 4**

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'29,0" S 20°56'47,6" E

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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 300 mm on very hard rock, granite-gneiss.
		Slightly moist, light brown, loose intact, fine SAND. Colluvium.				
0.20		Dirty white speckled dark grey, fine grained, unweathered, very hard rock, GRANITE-GNEISS.				
0.40						
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 4

FIGURE: A4

# TRIAL HOLE: 5

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°41'36,4" S 20°56'57,2" E

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Cell: 082 570 2767  
Email:  
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 400 mm on hard rock, charnockite.
0.20		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, subrounded gravels of calcrete. Colluvium.				
0.40		Slightly moist, light grey speckled white, medium dense, intact, gravelly SAND with lenses of red brown, fine sand. Residual charnockite.				
0.60		Light grey speckled white, medium grained, slightly weathered, hard rock, CHARNOCKITE.				
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 5

FIGURE: A5



# TRIAL HOLE: 6

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'37,0" S 20°56'52,7" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
P O Box 607  
Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1100 mm on hard rock, charnockite.
0.20		Abundant, clast supported, medium coarse, angular, GRAVELS of quartz and medium coarse, subrounded GRAVELS of banded ironstone in a matrix of dry, light brown sand. Overall consistency is medium dense. Colluvium.				
0.40		Abundant, clast supported, medium coarse, rounded concretions of nodular CALCRETE in a matrix of slightly moist, light brown, fine sand. Overall consistency is dense. Pedogenic deposit.				
0.60		Dark grey speckled white, coarse grained, medium weathered becoming slightly weathered with depth, soft rock tending to medium hard rock at depth, CHARNOKITE.				
0.80						1 Water encountered 2 Water level 3 Bottom of hole 4 Approximate material change 5 Disturbed sample 6 Undisturbed sample
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 6

FIGURE: A6

# TRIAL HOLE: 7

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'46,7" S 20°57'00,4" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
P O Box 607  
Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 700 mm on hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with matrix supported, coarse, angular gravels of calcrete. Colluvium.				
0.40		Slightly moist, dirty white speckled dark grey, very dense, micaceous gravelly SAND. Residual charnockite.				
0.60		Dirty white speckled light grey, coarse grained, slightly weathered, hard rock, micaceous CHARNOCKITE.				<div>  Water encountered   Water level   Bottom of hole   Approximate material change   Disturbed sample   Undisturbed sample </div>
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 7

FIGURE: A7

# TRIAL HOLE: 8

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

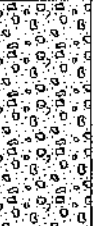







SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'47,7" S 20°56'54,6" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
P O Box 607  
Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 600 mm on hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with matrix supported, coarse, angular gravels of calcrete and subrounded cobbles of granite-gneiss. Colluvium.				
0.40						
0.60		Dirty white speckled light grey, coarse grained, slightly weathered, hard rock, micaceous CHARNOCKITE.				<div>  Water encountered   Water level   Bottom of hole   Approximate material change   Disturbed sample   Undisturbed sample                 </div>
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 8

FIGURE: A8



# TRIAL HOLE: 9

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°41'48,6" S 20°56'49,7" E

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Consult (Pty) Ltd  
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Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1100 mm on hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with matrix supported, coarse, angular gravels of calcrete. Colluvium.				
0.40		Dirty white speckled light grey, very fine grained, dense, intact, concretions of nodular CALCRETE. Pedogenic deposit.				
0.60						
0.80		Moist, light grey speckled white, very dense, micaceous, gravelly SAND. Residual charnockite.				
1.00		Dirty white speckled light grey, very fine grained, slightly weathered, hard rock, micaceous CHARNOCKITE.				<div>                         ▽ Water encountered                          ↓ Water level                          ▬ Bottom of hole                          --- Approximate material change                          • Disturbed sample                          ▬ Undisturbed sample                     </div>
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 9

FIGURE: A9

# TRIAL HOLE: 10

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI!GARIB MUNICIPALITY

LOCATION: 28°41'55,2" S 20°57'02,3" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
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6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1000 mm on very dense, tightly packed boulders of charnockite.
0.20		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, fine, rounded gravels of quartz. Colluvium.				
0.40		Slightly moist, dirty white speckled dark grey, medium dense, intact, gravelly SAND with pockets of pale light brown, silty sand and corestones of charnockite with diameter 300 mm - 500 mm. Residual charnockite.				
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						2 Water encountered 3 Water level 4 Bottom of hole 5 Approximate material change 6 Disturbed sample 7 Undisturbed sample
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 10

FIGURE: A10

# TRIAL HOLE: 11

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'55,4" S 20°56'57,3" E

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Consult (Pty) Ltd  
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6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1300 mm on hard rock, charnockite.
0.20		Slightly moist, light red brown, very loose, intact, fine SAND. Colluvium.				
0.40		Abundant, clast supported, angular, coarse gravels and cobbles of nodular <b>CALCRETE</b> in a matrix of slightly moist, light brown, sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60		Slightly moist, pale light brown, loose, intact, fine SAND with matrix supported, fine, rounded gravels of quartz. Residual charnockite.				
0.80		Dirty white speckled light grey, very fine grained, dense, intact, concretions of nodular <b>CALCRETE</b> . Pedogenic deposit.				
1.00						1 Water encountered 2 Water level 3 Bottom of hole 4 Approximate material change 5 Disturbed sample 6 Undisturbed sample
1.20		Dirty white speckled light grey, slightly weathered, hard rock, micaceous <b>CHARNOCKITE</b> .				
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 11

FIGURE: A11



# TRIAL HOLE: 12

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB


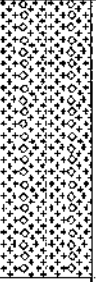
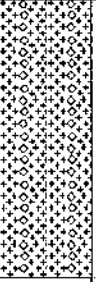
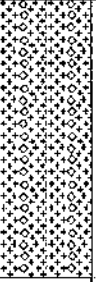
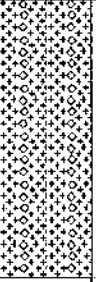
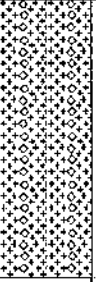
SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KATIGARIB MUNICIPALITY

LOCATION: 28°41'55.9" S 20°56'49.8" E

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Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1300 mm on medium hard rock, charnockite.
0.20		Abundant, clast supported, angular, coarse GRAVELS of quartz and medium coarse, subrounded GRAVELS of banded ironstone in a matrix of dry, light brown, fine sand. Overall consistency is loose. Colluvium.				
0.40						
0.60						
0.80		Light grey speckled white, fine grained, medium weathered to slightly weathered, fine grained, medium hard rock, CHARNOKITE with pockets of light red, fine sand.				
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

- ② Water encountered
- ↓ Water level
- ~ Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

Contractor: ALS Plant Hire  
Date Drilled: 11/3/2020  
Machine: Case 580T

Hole Diameter: 700 mm  
Water Depth:  
Sheet: 1 of 1

SOIL PROFILE: TEST PIT 12

FIGURE: A12

# TRIAL HOLE: 13

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI GARIB MUNICIPALITY

LOCATION: 28°42'04,9" S 20°57'05,0" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
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Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 2100 mm on medium hard rock, granite-gneiss.
0.20		Slightly moist, light brown, loose, intact, SAND. Colluvium.				
0.40			CLG-04-15	0-0,8	●	
0.60						
0.80		Abundant, clast supported, rounded, medium coarse to coarse, concretions of nodular <i>CALCRETE</i> in a matrix of dry, light brown, fine sand.				
1.00		Overall consistency is dense. Pedogenic deposit.				
1.20						
1.40		Dirty white speckled black, fine grained, medium weathered, foliated, soft rock, <i>GRANITE-GNEISS</i> with pockets of light brown, fine sand.				
1.60		Rock hardness improves to medium hard at depth.				
1.80						
2.00						
2.20						

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm


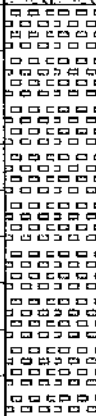
Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 13

FIGURE: A13

<b>TRIAL HOLE: 14</b>		<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> <b>P O Box 607</b> <b>Ceres</b> <b>6830</b> <b>Cell: 082 570 2767</b> <b>Email:</b> <b>cedarland.frans@breede.co.za</b>
<b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500		
<b>LOGGED BY:</b> FJB		
<b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459		
<b>DATE LOGGED:</b> 11/3/2020		
<b>CLIENT:</b> KATHGARIB MUNICIPALITY		<b>LOCATION:</b> 28°42'05,0" S   20°56'59,1" E

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1200 mm on very dense, nodular calcrete.
0.20		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, medium coarse, rounded gravels of banded ironstone. Colluvium.				
0.40		Abundant, clast supported, rounded, medium coarse to coarse, concretions of nodular CALCRETE in a matrix of dry, light brown, fine sand. Overall consistency is very dense. Pedogenic deposit.				
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 14</b>	
<b>FIGURE: A14</b>	



# TRIAL HOLE: 15

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°42'05,8" S 20°56'53,7" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
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Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 700 mm on very hard rock, granite-gneiss.
0.20		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, medium coarse, rounded, gravels of banded ironstone. Colluvium.				
0.40		Abundant, clast supported, very fine grained, rounded and subrounded concretions of nodular CALCRETE in a matrix of dry, pale light brown, fine sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60		Light grey speckled white streaked pink, very fine grained, unweathered, very hard rock, GRANITE-GNEISS.				
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 15

FIGURE: A15

# TRIAL HOLE: 16

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB









SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°42'12,5" S 20°57'05,5" E

Cedar Land Geotechnical  
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6830  
Cell: 082 570 2767  
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 900 mm on very hard rock, granite-gneiss.
0.20		Abundant, clast supported, coarse, angular GRAVELS of quartz in a matrix of dry, light brown, fine sand. Overall consistency is loose. Colluvium. Abundant roots are present in the horizon.				
0.40		Dry, light grey mottled white, very dense, intact, gravelly SAND. Residual granite-gneiss.				
0.60						
0.80		Dark grey speckled white, medium coarse grained, unweathered, very hard rock, GRANITE-GNEISS.				
1.00						
1.20						
1.40						
1.60						 Water encountered  Water level  Bottom of hole  Approximate material change  Disturbed sample  Undisturbed sample
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 16

FIGURE: A16

# TRIAL HOLE: 17

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI!GARIB MUNICIPALITY

LOCATION: 28°42'12,2" S 20°56'56,3" E

Cedar Land Geotechnical  
Consult (Pty) Ltd  
P O Box 607  
Ceres  
6830  
Cell: 082 570 2767  
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cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 2000 mm on very hard rock, granite-gneiss.
0.20		Dry, light brown, loose, intact, fine SAND with matrix supported, fine, subrounded gravels of quartz. Alluvium.				
0.40						
0.60		Dry, light grey mottled white, very dense, intact, gravelly SAND. Residual granite-gneiss.	CLG-04-16	0-1.1		
0.80						
1.00						
1.20		Dark grey speckled white, medium coarse grained, unweathered, very hard rock, GRANITE-GNEISS.				
1.40						
1.60						
1.80		Dark grey speckled white, medium coarse grained, unweathered, very hard rock, GRANITE-GNEISS.				
2.00						
2.20						

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1


SOIL PROFILE: TEST PIT 17

FIGURE: A17



*Cedar Land Geotechnical  
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Email:  
cedarland.frans@breede.co.za




LOCATION: 28°42'11,1" S 20°56'49,3" E







Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Excavation unstable and sidewalls collapse.
0.20		Dry, light brown, very loose, intact, fine SAND with matrix supported, fine, subrounded gravels of quartz.				
0.40		Alluvium.				
0.60		Abundant roots are present in the horizon.				
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						
2.20						
2.40						
2.60						
2.80						
3.00						

Hole Diameter: 700 mm  
Water Depth:  
Sheet: 1 of 1

FIGURE: A18

<b>TRIAL HOLE: 19</b>		<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> <b>P O Box 607</b> <b>Ceres</b> <b>6830</b> <b>Cell: 082 570 2767</b> <b>Email:</b> <b>cedarland.frans@breede.co.za</b>
PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500		
LOGGED BY: FJB		
SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459		
DATE LOGGED: 11/3/2020		
CLIENT: KAIIGARIB MUNICIPALITY		
LOCATION: 28°42'09,9" S 20°56'43,4" E		

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1200 mm on very hard rock, granite-gneiss.
0.20		Abundant, clast supported, coarse, angular GRAVELS of quartz and fine to medium coarse, subrounded GRAVELS of banded ironstone in a matrix of dry, light brown, fine sand. Overall consistency is loose. Colluvium.				
0.40		Dry, light grey mottled white, very dense, intact, gravelly SAND. Residual granite-gneiss.				
0.60						
0.80						
1.00						
1.20		Dark grey speckled white, medium coarse grained, unweathered, very hard rock, GRANITE-GNEISS.				
1.40						
1.60						
1.80						
2.00						

-  Water encountered
-  Water level
-  Bottom of hole
-  Approximate material change
-  Disturbed sample
-  Undisturbed sample

Contractor: ALS Plant Hire  
 Date Drilled: 11/3/2020  
 Machine: Case 580T

Hole Diameter: 700 mm  
 Water Depth:  
 Sheet: 1 of 1

SOIL PROFILE: TEST PIT 19

FIGURE: A19

# TRIAL HOLE: 20

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KATIGARIB MUNICIPALITY

LOCATION: 28°41'58,3" S 20°56'46,0" E

Cedar Land Geotechnical

Consult (Pty) Ltd

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Email:

cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1600 mm on medium hard rock, charnockite.
0.20		Dry, light brown, loose, intact, fine SAND with matrix supported, fine, subrounded gravels of quartz. Colluvium.				
0.40		Abundant, clast supported, rounded and subrounded, coarse GRAVELS of banded ironstone in a matrix of dry, light brown, fine sand. Overall consistency is loose. Pebblestone marker.				
0.60		Abundant, clast supported, fine and medium coarse, rounded, concretions of nodular CALCRETE in a matrix of dry, light brown, fine sand. Overall consistency is loose. Pedogenic deposit.				
0.80		Dry, dark grey speckled white, dense, calcareous, gravelly SAND. Residual charnockite.				
1.00						 Water encountered  Water level  Bottom of hole  Approximate material change  Disturbed sample  Undisturbed sample
1.20						
1.40		Grey speckled white, medium grained, medium weathered to slightly weathered, medium hard rock, CHARNOKITE.				
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:



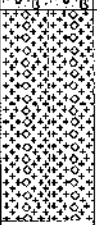
Sheet: 1 of 1

SOIL PROFILE: TEST PIT 20

FIGURE: A20



<b>TRIAL HOLE: 21</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJR  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KALLIGARIB MUNICIPALITY  <b>LOCATION:</b> 28°42'02,4" S 20°56'44,1" E	<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> <b>P O Box 607</b> <b>Ceres</b> <b>6830</b> <b>Cell: 082 570 2767</b> <b>Email:</b> cedarland.frans@breede.co.za
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 2100 mm on medium hard rock, granite-gneiss.
0.20		Abundant, clast supported, rounded and subrounded, GRAVELS of banded ironstone and coarse, angular, GRAVELS of quartz and coarse, subrounded concretions of nodular calcrete in a matrix of dry, light brown, sand. Overall consistency is loose. Colluvium.				
0.40						
0.60		Dry, dark grey speckled white, dense, calcareous, gravelly SAND. Residual granite-gneiss.				
0.80						
1.00						
1.20						
1.40						
1.60		Grey speckled white, coarse grained, medium weathered to slightly weathered, medium hard rock, GRANITE-GNEISS.				
1.80						
2.00						
2.20						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 21</b>	<b>FIGURE: A21</b>

# TRIAL HOLE: 22

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAIIGARIB MUNICIPALITY

LOCATION: 28°41'54,5" S 20°56'42,8" E

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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1200 mm on medium hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with fine, subrounded and subangular, gravels of quartz. Colluvium.				
0.40						
0.60						
0.80		Dry, light brown, dense, intact, <i>gravelly SAND</i> . Residual charnockite.				
1.00						
1.20		Dull light green stained light brown on discontinuities, very fine grained, slightly weathered, hard rock, feldspate-rich <i>CHARNOKITE</i> . A feldspathic vein is present in the charnockite.				
1.40						
1.60						
1.80						Water encountered Water level Bottom of hole Approximate material change Disturbed sample Undisturbed sample
2.00						
2.20						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 22

FIGURE: A22

# TRIAL HOLE: 23

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°41'51,7" S 20°56'47,1" E

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Email:

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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b> 1 Refusal of excavation at 1900 mm on medium hard rock, charnockite.
0.20		Slightly moist, light brown, medium dense, intact, fine SAND with fine, subrounded and subangular, gravels of quartz. Colluvium.				
0.40		Abundant, clast supported, medium coarse, rounded, concretions of nodular CALCRETE in a matrix of slightly moist, light brown, fine sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60						
0.80						
1.00			CLG-04-17	0,3-1,6		
1.20		Grey speckled white, coarse grained, medium weathered to slightly weathered, medium hard rock, CHARNOCKITE.				
1.40						
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 23

FIGURE: A23



# TRIAL HOLE: 24

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KALIGARIB MUNICIPALITY

LOCATION: 28°41'47,5" S 20°56'43,4" E

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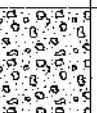
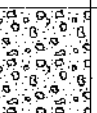
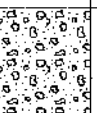
Ceres







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Email:

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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 2000 mm on medium hard rock, charnockite.
0.20		Abundant, clast supported, angular, medium coarse GRAVELS of quartz and subrounded gravels of banded ironstone in a matrix of dry, light brown sand. Overall consistency is medium dense. Colluvium.				
0.40		Abundant, clast supported, medium coarse, rounded, concretions of nodular CALCRETE in a matrix of slightly moist, light brown, fine sand.				
0.60		Pedogenic deposit.				
0.80		Dry, dark grey speckled white, dense, calcareous, gravelly SAND. Residual charnockite.				
1.00						
1.20						
1.40						
1.60						
1.80						
2.00		Grey speckled white, coarse grained, medium weathered to slightly weathered, medium hard rock, CHARNOCKITE.				

-  Water encountered
-  Water level
-  Bottom of hole
-  Approximate material change
-  Disturbed sample
-  Undisturbed sample

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 24

FIGURE: A24

# TRIAL HOLE: 25

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB








SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°41'43,6" S 20°56'48,3" E

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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 No refusal of excavation.
0.20		Slightly moist, light brown, loose, intact, fine SAND with fine, subrounded gravels of quartz. Alluvium.				
0.40						
0.60		Slightly moist, light brown, loose, intact, fine SAND with fine, subrounded gravels of quartz with pockets of loose, white, nodular calcrete concretions. Calcified alluvium.				
0.80						Water encountered Water level Bottom of hole Approximate material change Disturbed sample Undisturbed sample
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						
2.20						
2.40						
2.60						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

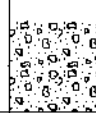
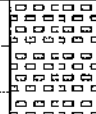

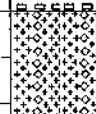
Water Depth:







Sheet: 1 of 1

SOIL PROFILE: TEST PIT 25

FIGURE: A25

<b>TRIAL HOLE: 26</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KATHGARIB MUNICIPALITY  <b>LOCATION:</b> 28°41'41,2" S 20°56'42,7" E		Cedar Land Geotechnical Consult (Pty) Ltd P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
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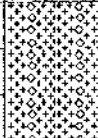

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1400 mm on medium hard rock, charnockite.
0.20		Abundant, clast supported, angular, medium coarse GRAVELS of quartz and subrounded GRAVELS of banded ironstone in a matrix of dry, light brown sand. Overall consistency is medium dense.				
0.40		Colluvium. Abundant, clast supported, medium coarse, rounded, concretions of nodular CALCRETE in a matrix of slightly moist, light brown, fine sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60			CLG-04-18	0,2-1,0		
0.80						
1.00		Grey speckled white, coarse grained, medium weathered to slightly weathered, medium hard rock, CHARNOKITE.				
1.20						
1.40						
1.60						
1.80						
2.00						







-  Water encountered
-  Water level
-  Bottom of hole
-  Approximate material change
-  Disturbed sample
-  Undisturbed sample

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 26</b>	
<b>FIGURE: A26</b>	



<b>TRIAL HOLE: 27</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAI !GARIB MUNICIPALITY  <b>LOCATION:</b> 28°41'39,0" S 20°56'47,4" E	Cedar Land Geotechnical Consult (Pty) Ltd P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 600 mm on medium hard rock, charnockite.
0.20		Abundant, clast supported, angular, medium coarse GRAVELS of quartz and subrounded GRAVELS of banded ironstone in a matrix of dry, light brown sand. Overall consistency is medium dense. Colluvium.				
0.40		Dirty white speckled dark grey stained light brown, fine grained, slightly weathered to medium weathered, soft rock to medium hard rock, CHARNOKITE.	CLG-04-19	0,3-0,6		
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

 Water encountered  
 Water level  
 Bottom of hole  
 Approximate material change  
 Disturbed sample  
 Undisturbed sample

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample



**Contractor:** ALS Plant Hire  
**Date Drilled:** 11/3/2020  
**Machine:** Case 580T

**Hole Diameter:** 700 mm  
**Water Depth:**  
**Sheet:** 1 of 1

**SOIL PROFILE: TEST PIT 27**









**FIGURE: A27**

<b>TRIAL HOLE: 28</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAIIGARIB MUNICIPALITY  <b>LOCATION:</b> 28°41'35,4" S 20°56'40,8" E	<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 500 mm on hard rock, charnockite.
0.20		Dry, light brown, loose, intact, fine SAND with matrix supported, fine to coarse, subrounded gravels of quartz. Colluvium.				
0.40		Dark grey speckled white, coarse grained, medium weathered becoming slightly weathered with depth, soft rock tending to medium hard rock at depth, CHARNOKITE.				
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 28</b>	<b>FIGURE: A28</b>



<p style="text-align: center;"><b>TRIAL HOLE: 29</b></p> <p><b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500</p> <p style="text-align: center;"><b>LOGGED BY:</b> FJB</p> <p><b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459</p> <p style="text-align: center;"><b>DATE LOGGED:</b> 11/3/2020</p> <p><b>CLIENT:</b> KAI IGARIB MUNICIPALITY</p> <p style="text-align: center;"><b>LOCATION:</b> 28°41'34,1" S 20°56'47,0" E</p>	<p><i>Cedar Land Geotechnical Consult (Pty) Ltd</i></p> <p><b>P O Box 607 Ceres 6830</b></p> <p><b>Cell: 082 570 2767</b></p> <p><b>Email:</b> cedarland.frans@breede.co.za</p>
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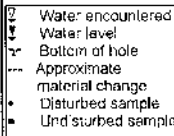
Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<p><b>NOTES:</b></p> <p>1 Refusal of excavation at 300 mm on unweathered, very hard rock, charnockite.</p>
0.20		<p>Abundant, clast supported, angular, medium coarse GRAVELS of quartz and subrounded GRAVELS of banded ironstone in a matrix of dry, light brown sand.</p> <p>Overall consistency is medium dense.</p> <p>Colluvium.</p>	CLG-04-20	0-0,3		
0.40						<div style="font-size: small;">  Water encountered   Water level   Bottom of hole   Approximate material change   Disturbed sample   Undisturbed sample </div>
0.60						
0.80						
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 29</b>	<b>FIGURE: A29</b>



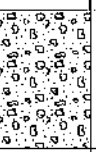


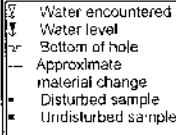
<b>TRIAL HOLE: 30</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAIIGARIB MUNICIPALITY  <b>LOCATION:</b> 28°41'31,3" S 20°56'40,7" E	<i>Cedar Land Geotechnical Consult (Pty) Ltd</i> <b>P O Box 607</b> <b>Ceres</b> <b>6830</b> <b>Cell: 082 570 2767</b> <b>Email:</b> cedarland.frans@breede.co.za
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Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1300 mm on unweathered, very hard rock, charnockite.
0.20		Dry, light brown, loose, intact, fine SAND with matrix supported, fine, subrounded gravels of quartz and quartzite. Alluvium.				
0.40						
0.60						
0.80						
1.00						
1.20		Dry, pale light brown, very dense, calcareous, coarse SAND. Calcified alluvium.				
1.40						
1.60						
1.80						
2.00						



<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 30</b>	<b>FIGURE: A30</b>

<b>TRIAL HOLE: 31</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP SAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAI IGARIB MUNICIPALITY  <b>LOCATION:</b> 28°42'00,4" S 20°56'56,1" E		Cedar Land Geotechnical Consult (Pty) Ltd P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
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

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1400 mm on medium hard rock, charnockite.
0.20		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, fine, rounded gravels of quartz. Colluvium.				
0.40		Abundant, clast supported, rounded, medium coarse to coarse, concretions of nodular <b>CALCRETE</b> in a matrix of dry, light brown, silty sand. Overall consistency is medium dense. Pedogenic deposit.				
0.60		Dirty white speckled black, medium weathered, fine grained, foliated, soft rock, <b>CHARNOCKITE</b> with pockets of light brown, fine sand. At depth the rock is medium hard.				
0.80						
1.00			CLG-04-21	0,7-1,4		
1.20						
1.40						
1.60						
1.80						
2.00						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 31</b>	<b>FIGURE: A31</b>





<b>TRIAL HOLE: 33</b>  <b>PROJECT:</b> PROPOSED TOWNSHIP GAMAKOR 1500  <b>LOGGED BY:</b> FJB  <b>SITE:</b> PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459  <b>DATE LOGGED:</b> 11/3/2020  <b>CLIENT:</b> KAI !GARIB MUNICIPALITY  <b>LOCATION:</b> 28°42'06,2" S 20°56'46,9" E	Cedar Land Geotechnical Consult (Pty) Ltd P O Box 607 Ceres 6830 Cell: 082 570 2767 Email: cedarland.frans@breede.co.za
--	--

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 900 mm on very hard rock, granite-gneiss.
0.20		Abundant, clast supported, coarse, angular GRAVELS of quartz in a matrix of dry, light brown, fine sand. Overall consistency is medium dense. Colluvium.				
0.40		Dry, light grey mottled white, very dense, intact, gravelly SAND. Residual granite-gneiss.				
0.60			CLG-04-22	0,3-0,7		
0.80		Dark grey speckled white, medium coarse grained, unweathered, very hard rock, GRANITE-GNEISS.				
1.00						
1.20						
1.40						
1.60						
1.80						
2.00						

<b>Contractor:</b> ALS Plant Hire <b>Date Drilled:</b> 11/3/2020 <b>Machine:</b> Case 580T	<b>Hole Diameter:</b> 700 mm <b>Water Depth:</b> <b>Sheet:</b> 1 of 1
<b>SOIL PROFILE: TEST PIT 33</b>	<b>FIGURE: A33</b>

# TRIAL HOLE: 34

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB

SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI !GARIB MUNICIPALITY

LOCATION: 28°41'51,6" S 20°56'55,8" E

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Consult (Pty) Ltd  
P O Box 607  
Ceres  
6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Refusal of excavation at 1700 mm on hard rock, charnockite.
		Dry, light brown, loose, intact, fine SAND. Colluvium.				
0.20		Dirty white and light grey, very fine grained, very dense, hardpan CALCRETE. Pedogenic deposit.				
0.40		Slightly moist, light brown, loose, intact, fine SAND with matrix supported, angular, medium coarse, gravels of calcrete and fine rounded gravels of charnockite. Calcretised residual charnockite.				
0.60						
0.80						<b>NOTES:</b>  1 Refusal of excavation at 1700 mm on hard rock, charnockite.
1.00			CLG-04-23	0,3-1,5	●	
1.20						
1.40						
1.60		Dirty white speckled light grey, slightly weathered, hard rock, micaceous CHARNOCKITE.				
1.80						<b>NOTES:</b>  1 Refusal of excavation at 1700 mm on hard rock, charnockite.
2.00						

- Water encountered
- Water level
- Bottom of hole
- Approximate material change
- Disturbed sample
- Undisturbed sample

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 34

FIGURE: A34

# TRIAL HOLE: 35

PROJECT: PROPOSED TOWNSHIP GAMAKOR 1500

LOGGED BY: FJB









SITE: PORTIONS 128 AND A PART OF THE RESTANT OF THE FARM KOUSAS NO 459

DATE LOGGED: 11/3/2020

CLIENT: KAI IGARIB MUNICIPALITY

LOCATION: 28°41'42,6" S 20°56'56,7" E

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6830  
Cell: 082 570 2767  
Email:  
cedarland.frans@breede.co.za

Depth (m)	Legend	PROFILE	SAMPLE			Remarks
			Number	Type	Symbol	
0.00		Ground Surface				<b>NOTES:</b>  1 Test pit collapses from 400 mm.  2 Test pit abandoned.  3 Water seepage from 1400 mm.
		Moist, dark red brown, loose, intact, medium coarse SAND. Colluvium.				
0.20		Dirty white, very fine grained, very dense, hardpan CALCRETE. Pedogenic deposit.				
0.40		Very moist, light red brown, very loose, intact, fine SAND with matrix supported, coarse, angular gravels of calcrete. Calcretised residual chamosite.				
0.60						
0.80						
1.00			CLG-04-24	0,4-1,5		
1.20						
1.40						 Water encountered  Water level  Bottom of hole  Approximate material change  Disturbed sample  Undisturbed sample
1.60						
1.80						
2.00						

Contractor: ALS Plant Hire

Date Drilled: 11/3/2020

Machine: Case 580T

Hole Diameter: 700 mm

Water Depth:

Sheet: 1 of 1

SOIL PROFILE: TEST PIT 35

FIGURE: A35



**REPORT ON THE GEOTECHNICAL CONDITIONS ON  
PORTION 128 AND A PORTION OF THE RESTANT OF  
THE FARM KOUSAS 459, KEIMOE**

2020/J032/MCP\_01

**ADDENDUM B: RESULTS OF MATERIALS TESTING**



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**Client Name:** Cedar Land Geotechnical Consult (Pty) Ltd

**Project Name:** Gamakor

**Job Number:** CLG-04

**Date:** 27-May-20

**Method:** SANS 3001 GR1, GR3, GR10, GR12 GR20, GR30, GR31, GR40, GR50, GR53, GR54 & BS 1377 (where applicable)

### SUMMARY OF TEST DATA

#### Grading & Hydrometer Analysis (% Passing)

Sample	TP 3	TP 13	TP 17	TP 23	TP 26	TP 27	TP 29	TP 31
Depth (mm)	500 - 1500	0 - 800	0 - 1100	300 - 1600	200 - 1000	300 - 600	0 - 300	700 - 1400
Lab No	CLG-04-13	CLG-04-15	CLG-04-16	CLG-04-17	CLG-04-18	CLG-04-19	CLG-04-20	CLG-04-21
53.0	100	100	100	100	100	92	100	100
37.5	100	100	100	100	95	77	98	96
26.5	100	100	96	97	93	66	90	96
19.0	100	100	93	82	91	59	89	95
13.2	100	100	93	74	89	52	83	93
9.5	100	100	92	70	87	49	79	92
6.7	100	100	92	65	80	41	74	91
4.75	99	99	91	61	77	36	67	90
2.00	79	97	83	49	44	23	52	76
1.00	52	85	70	39	31	16	46	52
0.425	34	60	51	32	25	12	41	34
0.250	20	46	38	27	20	9	33	23
0.150	14	34	26	21	15	6	26	16
0.075	8	16	11	15	10	4	19	10
0.060	5	8	5	10	6	2	11	8
0.050	4	6	4	9	5	2	9	7
0.035	2	3	3	7	3	1	6	5
0.020	2	2	2	6	2	1	4	4
0.006	1	2	1	4	1	1	2	2
0.002	1	1	1	3	1	1	1	1
GM	1.79	1.27	1.55	2.04	2.21	2.61	1.88	1.80

#### Atterberg Limits

LL (%)	-	-	-	49	-	26	21	-
PI (%)	NP	NP	NP	21	NP	7	6	NP
LS (%)	0.0	0.0	0.0	9.0	0.0	4.0	3.0	0.0

#### pH & Conductivity

pH	7.8					7.6	8.3
EC (S/m)	0.012					0.047	0.031

#### MDD / OMC

MDD (kg/m <sup>3</sup> )			2084	1997		2146	
OMC (%)			6.6	10.2		6.8	

#### CBR

100%			82	48		100	
98%			43	33		73	
97%			31	28		62	
95%			17	20		45	
93%			9	14		32	
90%			3	9		20	
Swell (%)			0.0	0.6		0.0	

#### UCS (MPa)

100%							
97%							
90%							

#### COLTO Classification

			G8	*		G7	
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Remarks: \* = Not Classifiable

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**Client Name:** Cedar Land Geotechnical Consult (Pty) Ltd

**Project Name:** Gamakor

**Job Number:** CLG-04

**Date:** 27-May-20

**Method:** SANS 3001 GR1, GR3, GR10, GR12 GR20, GR30, GR31, GR40, GR50, GR53, GR54 & BS 1377 (where applicable)

### SUMMARY OF TEST DATA

#### Grading & Hydrometer Analysis (% Passing)

Sample	TP 33	TP 34	TP 35				
Depth (m)	300 - 700	300 - 1500	400 - 1500				
Lab No	CLG-04-22	CLG-04-23	CLG-04-24				
53.0	100	100	79				
37.5	100	100	71				
26.5	100	100	69				
19.0	100	100	67				
13.2	100	98	63				
9.5	94	93	60				
6.7	89	81	57				
4.75	81	70	55				
2.00	63	43	45				
1.00	46	28	37				
0.425	32	18	31				
0.250	22	13	24				
0.150	15	8	19				
0.075	9	5	12				
0.060	6	3	8				
0.050	5	3	7				
0.035	3	2	4				
0.020	2	1	3				
0.006	2	1	2				
0.002	1	1	1				
GM	1.96	2.34	2.12				

#### Atterberg Limits

LL (%)	-	-	26				
PI (%)	NP	NP	7				
LS (%)	0.0	0.0	3.5				

#### pH & Conductivity

pH	8.2		8.9				
EC (S/m)	0.009		0.02				

#### MDD / OMC

MDD (kg/m <sup>3</sup> )							
OMC (%)							

#### CBR

100%							
98%							
97%							
95%							
93%							
90%							
Swell (%)							

#### UCS (MPa)

100%							
97%							
90%							

#### COLTO Classification

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Remarks:

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<b>Project Name:</b>	Gamakor
<b>Job Number:</b>	CLG-04
<b>Date:</b>	2020-05-27
<b>Method:</b>	SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

FOUNDATION INDICATOR						Sheet Ref: R-STL-011-Rev02	
Grading & Hydrometer Analysis (Particle Size (mm) & % Passing)				Atterberg Limits & Classification			
Sample	TP 3	TP 13	TP 17	Sample	TP 3	TP 13	TP 17
Depth (mm)	500 - 1500	0 - 800	0 - 1100	Depth (mm)	500 - 1500	0 - 800	0 - 1100
Lab No	CLG-04-13	CLG-04-15	CLG-04-16	Lab No	CLG-04-13	CLG-04-15	CLG-04-16
53.0	100	100	100	Liquid Limit (%)	-	-	-
37.5	100	100	100	Plastic Limit (%)	-	-	-
26.5	100	100	96	Plasticity Index (%)	NP	NP	NP
19.0	100	100	93	Linear Shrinkage (%)	0.0	0.0	0.0
13.2	100	100	93	PI of whole sample	-	-	-
9.5	100	100	92				
6.7	100	100	92	% Gravel	21	3	17
4.75	99	99	91	% Sand	74	89	78
2.00	79	97	83	% Silt	4	7	4
1.00	52	85	70	% Clay	1	1	1
0.425	34	60	51	Activity	0.0	0.0	0.0
0.250	20	46	38				
0.150	14	34	26	% Soil Mortar	79	97	83
0.075	8	16	11				
0.060	5	8	5	Grading Modulus	1.79	1.27	1.55
0.050	4	6	4	Moisture Content (%)	N / T	N / T	N / T
0.035	2	3	3	Relative Density (SG)*	2.65	2.65	2.65
0.020	2	2	2				
0.006	1	2	1	Unified (ASTM D2487)	SW-SM	SM	SP-SM
0.002	1	1	1	AASHTO (M145-91)	A - 1 - b	A - 2 - 4	A - 2 - 4

Remarks: \*: Assumed

N / T: Not Tested

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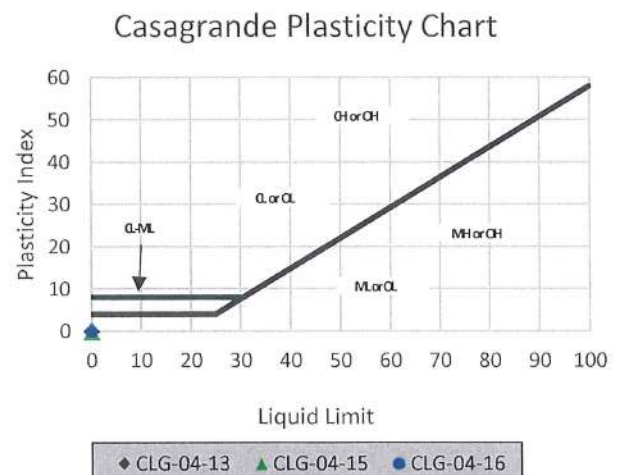
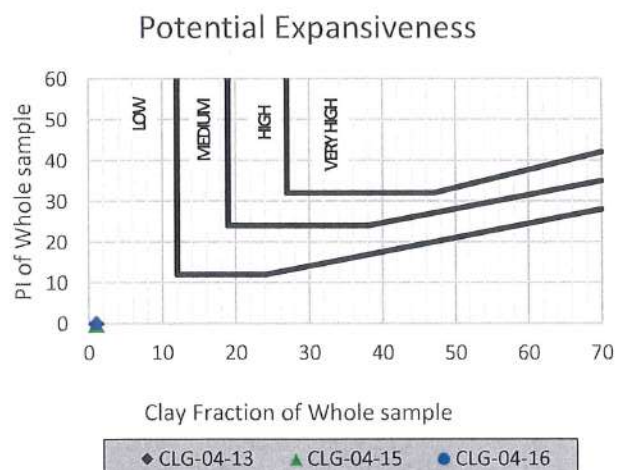
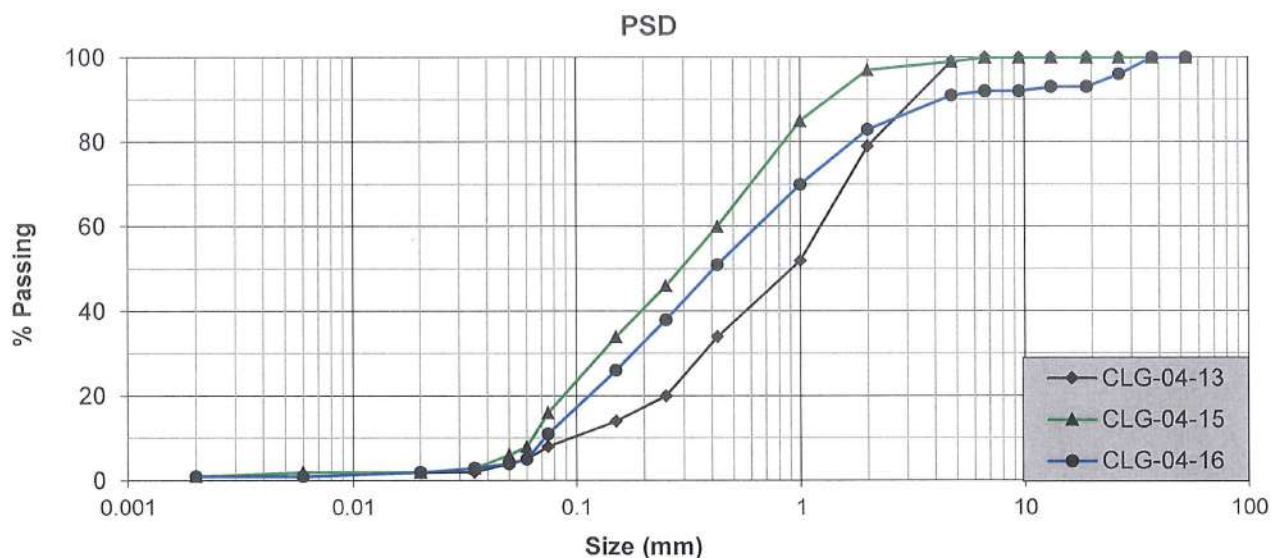
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**Project Name:** Gamakor  
**Job Number:** CLG-04  
**Date:** 2020-05-27  
**Method:** SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

## FOUNDATION INDICATOR

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<b>Client Name:</b>	Cedar Land Geotechnical Consult (Pty) Ltd
<b>Project Name:</b>	Gamakor
<b>Job Number:</b>	CLG-04
<b>Date:</b>	2020-05-27
<b>Method:</b>	SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

FOUNDATION INDICATOR						Sheet Ref: R-STL-011-Rev02	
Grading & Hydrometer Analysis (Particle Size (mm) & % Passing)				Atterberg Limits & Classification			
Sample	TP 23	TP 26	TP 27	Sample	TP 23	TP 26	TP 27
Depth (mm)	300 - 1600	200 - 1000	300 - 600	Depth (mm)	300 - 1600	200 - 1000	300 - 600
Lab No	CLG-04-17	CLG-04-18	CLG-04-19	Lab No	CLG-04-17	CLG-04-18	CLG-04-19
53.0	100	100	92	Liquid Limit (%)	49	-	26
37.5	100	95	77	Plastic Limit (%)	28	-	19
26.5	97	93	66	Plasticity Index (%)	21	NP	7
19.0	82	91	59	Linear Shrinkage (%)	9.0	0.0	4.0
13.2	74	89	52	PI of whole sample	7	-	1
9.5	70	87	49				
6.7	65	80	41	% Gravel	51	56	77
4.75	61	77	36	% Sand	39	38	21
2.00	49	44	23	% Silt	7	5	1
1.00	39	31	16	% Clay	3	1	1
0.425	32	25	12	Activity	7.0	0.0	7.0
0.250	27	20	9				
0.150	21	15	6	% Soil Mortar	49	44	23
0.075	15	10	4				
0.060	10	6	2	Grading Modulus	2.04	2.21	2.61
0.050	9	5	2	Moisture Content (%)	N / T	N / T	N / T
0.035	7	3	1	Relative Density (SG)*	2.65	2.65	2.65
0.020	6	2	1				
0.006	4	1	1	Unified (ASTM D2487)	SC	SP-SM	SW
0.002	3	1	1	AASHTO (M145-91)	A - 2 - 7	A - 1 - a	A - 2 - 4

Remarks: \*: Assumed

N / T: Not Tested

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**Client Name:** Cedar Land Geotechnical Consult (Pty) Ltd  
**Project Name:** Gamakor  
**Job Number:** CLG-04  
**Date:** 2020-05-27  
**Method:** SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

## FOUNDATION INDICATOR

Sheet Ref:  
R-STL-011-Rev02

Grading & Hydrometer Analysis (Particle Size (mm) & % Passing)				Atterberg Limits & Classification			
Sample	TP 29	TP 31	TP 33	Sample	TP 29	TP 31	TP 33
Depth (mm)	0 - 300	700 - 1400	300 - 700	Depth (mm)	0 - 300	700 - 1400	300 - 700
Lab No	CLG-04-20	CLG-04-21	CLG-04-22	Lab No	CLG-04-20	CLG-04-21	CLG-04-22
53.0	100	100	100	Liquid Limit (%)	21	-	-
37.5	98	96	100	Plastic Limit (%)	15	-	-
26.5	90	96	100	Plasticity Index (%)	6	NP	NP
19.0	89	95	100	Linear Shrinkage (%)	3.0	0.0	0.0
13.2	83	93	100	PI of whole sample	2	-	-
9.5	79	92	94				
6.7	74	91	89	% Gravel	48	24	37
4.75	67	90	81	% Sand	41	68	57
2.00	52	76	63	% Silt	10	7	5
1.00	46	52	46	% Clay	1	1	1
0.425	41	34	32	Activity	6.0	0.0	0.0
0.250	33	23	22				
0.150	26	16	15	% Soil Mortar	52	76	63
0.075	19	10	9				
0.060	11	8	6	Grading Modulus	1.88	1.80	1.96
0.050	9	7	5	Moisture Content (%)	N / T	N / T	N / T
0.035	6	5	3	Relative Density (SG)*	2.65	2.65	2.65
0.020	4	4	2				
0.006	2	2	2	Unified (ASTM D2487)	SC-SM	SW-SM	SW-SM
0.002	1	1	1	AASHTO (M145-91)	A - 1 - b	A - 1 - b	A - 1 - b

Remarks: \*: Assumed  
N / T: Not Tested

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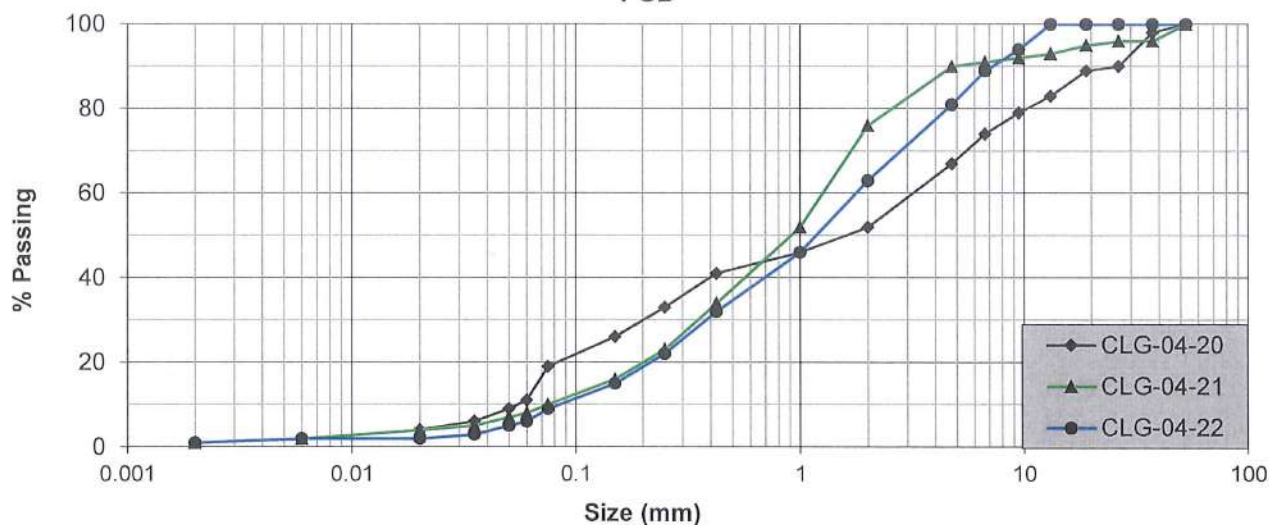
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**Project Name:** Gamakor  
**Job Number:** CLG-04  
**Date:** 2020-05-27  
**Method:** SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

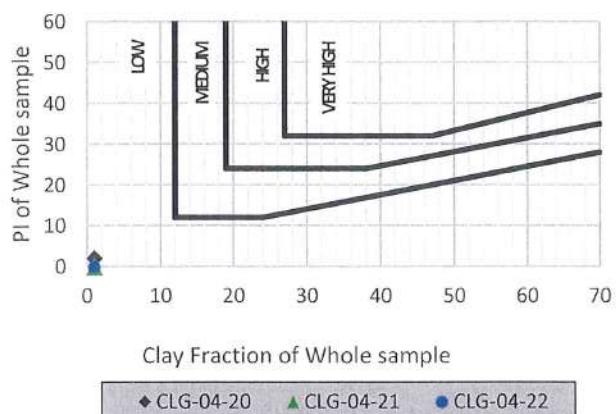
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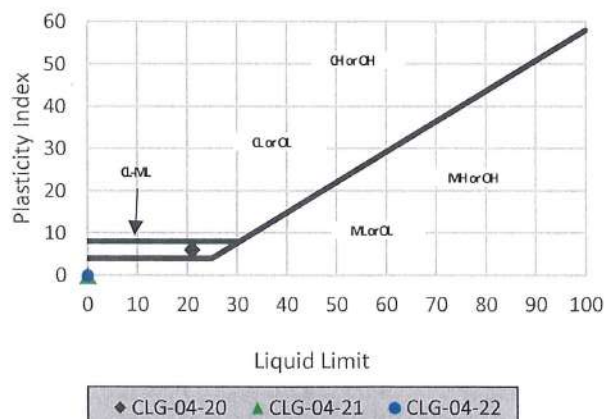
### PSD



### Potential Expansiveness



### Casagrande Plasticity Chart



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<b>Client Name:</b>	Cedar Land Geotechnical Consult (Pty) Ltd
<b>Project Name:</b>	Gamakor
<b>Job Number:</b>	CLG-04
<b>Date:</b>	2020-05-27
<b>Method:</b>	SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

FOUNDATION INDICATOR						Sheet Ref: R-STL-011-Rev02	
Grading & Hydrometer Analysis (Particle Size (mm) & % Passing)				Atterberg Limits & Classification			
Sample	TP 34	TP 35		Sample	TP 34	TP 35	
Depth (mm)	300 - 1500	400 - 1500		Depth (mm)	300 - 1500	400 - 1500	
Lab No	CLG-04-23	CLG-04-24		Lab No	CLG-04-23	CLG-04-24	
53.0	100	79		Liquid Limit (%)	-	26	
37.5	100	71		Plastic Limit (%)	-	19	
26.5	100	69		Plasticity Index (%)	NP	7	
19.0	100	67		Linear Shrinkage (%)	0.0	3.5	
13.2	98	63		PI of whole sample	-	2	
9.5	93	60					
6.7	81	57		% Gravel	57	55	
4.75	70	55		% Sand	40	37	
2.00	43	45		% Silt	2	7	
1.00	28	37		% Clay	1	1	
0.425	18	31		Activity	0.0	7.0	
0.250	13	24					
0.150	8	19		% Soil Mortar	43	45	
0.075	5	12					
0.060	3	8		Grading Modulus	2.34	2.12	
0.050	3	7		Moisture Content (%)	N / T	N / T	
0.035	2	4		Relative Density (SG)*	2.65	2.65	
0.020	1	3					
0.006	1	2		Unified (ASTM D2487)	SW-SM	SP-SC	
0.002	1	1		AASHTO (M145-91)	A - 1 - a	A - 2 - 4	
Remarks: *: Assumed							
N / T: Not Tested							
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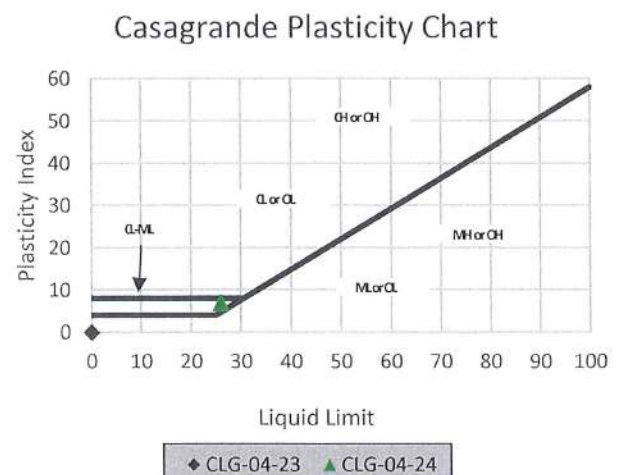
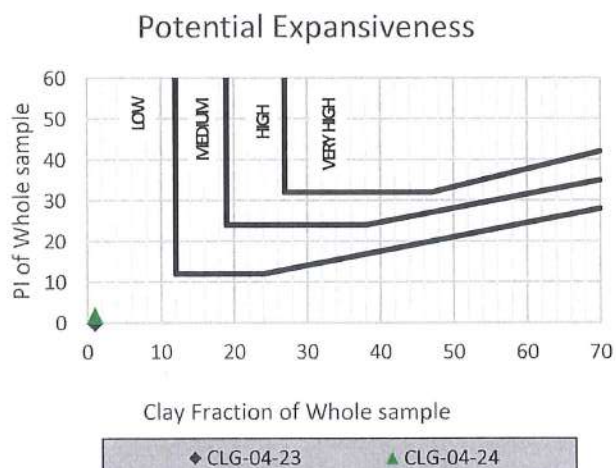
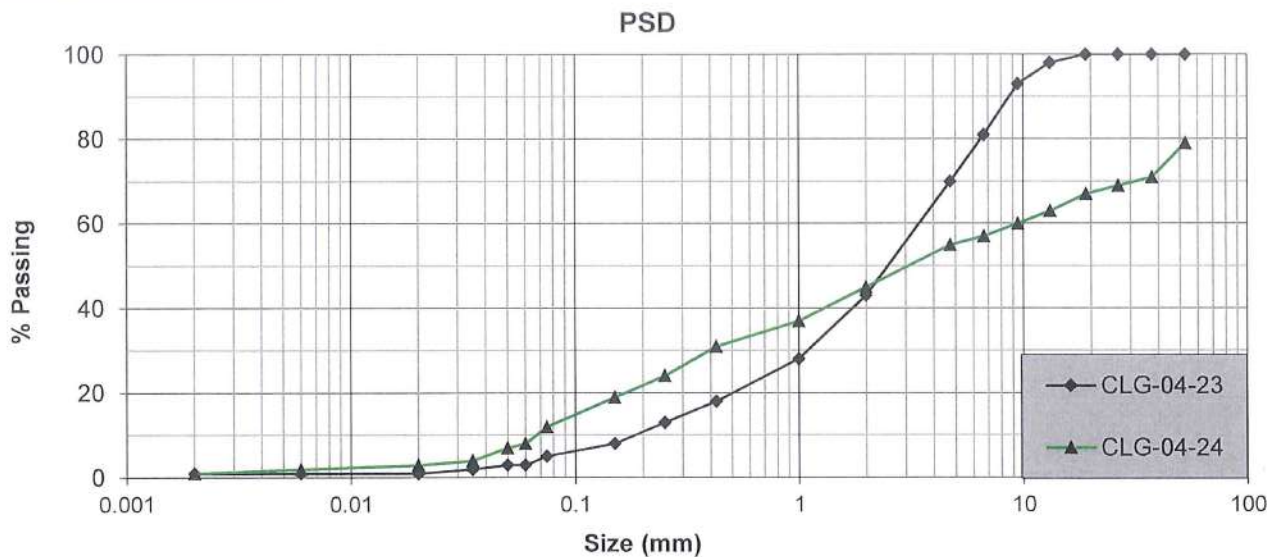
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**Client Name:** Cedar Land Geotechnical Consult (Pty) Ltd  
**Project Name:** Gamakor  
**Job Number:** CLG-04  
**Date:** 2020-05-27  
**Method:** SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

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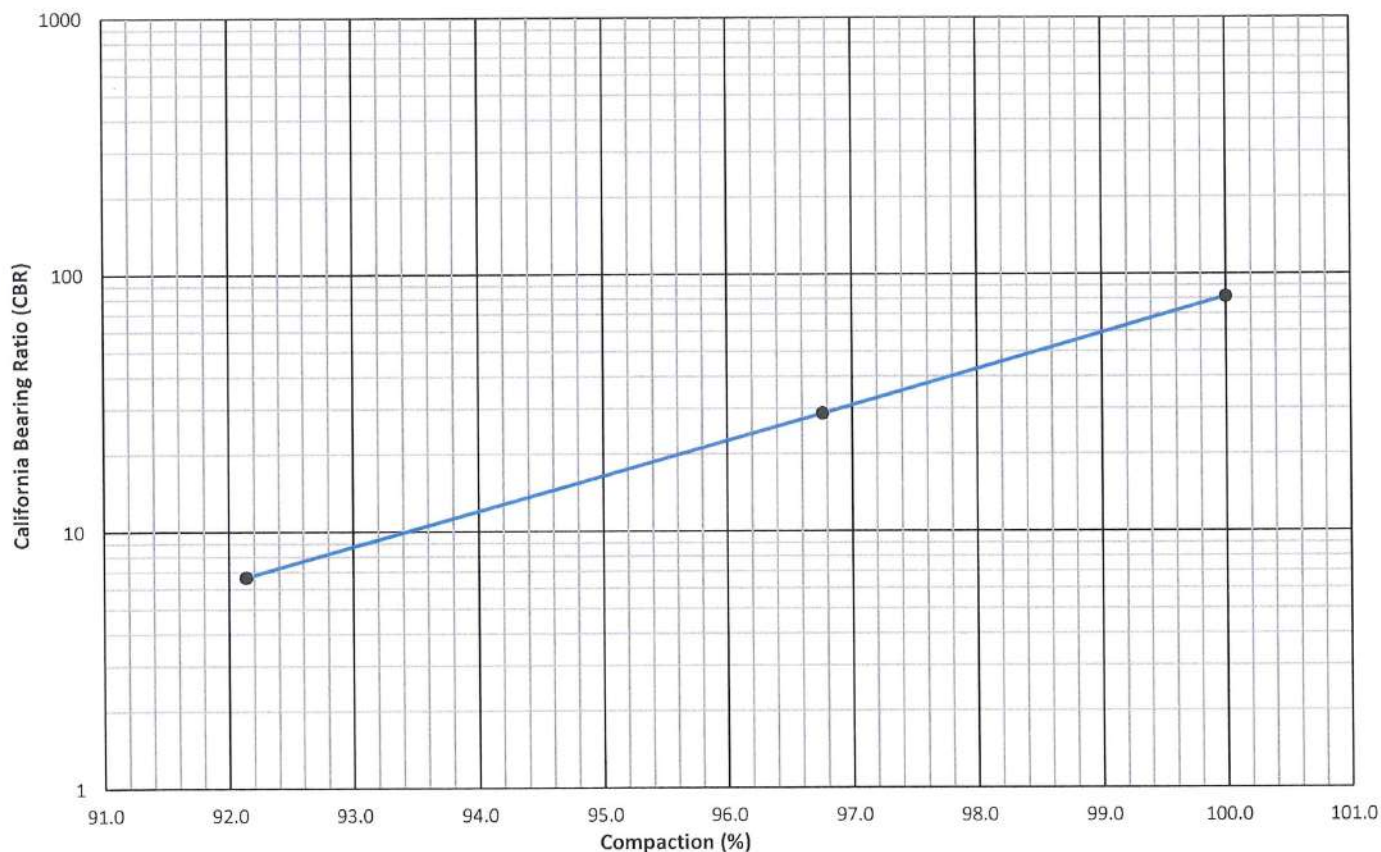
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Client Name: Cedar Land Geotechnical Consult (Pty) Ltd  
Project Name: Gamakor  
Sample: TP 17  
Depth: (mm) 0 - 1100

Job Number: CLG-04  
Lab Number: CLG-04-16  
Method: SANS 3001 GR40  
Date: 27-May-20

## CALIFORNIA BEARING RATIO

Mod. AASHTO Values		Compaction Data: CBR			Swell	CBR at (mm)			CBR Values	
MDD	OMC	Dry Dens.	MC	Comp.		2.5	5.0	7.5	Compaction (%)	CBR
(kg/m <sup>3</sup> )	(%)	(kg/m <sup>3</sup> )	(%)	(%)	(%)					
2084	6.6	2073	6.8	100.0	0.0	82	102	94	100	82
									98	43
									97	31
2084	6.6	2006	6.8	96.8	0.0	29	38	41	95	17
									93	9
2084	6.6	1910	6.8	92.1	0.0	7	7	7	90	3



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**Project Name:** Gamakor  
**Sample:** TP 17  
**Depth: (mm)** 0 - 1100

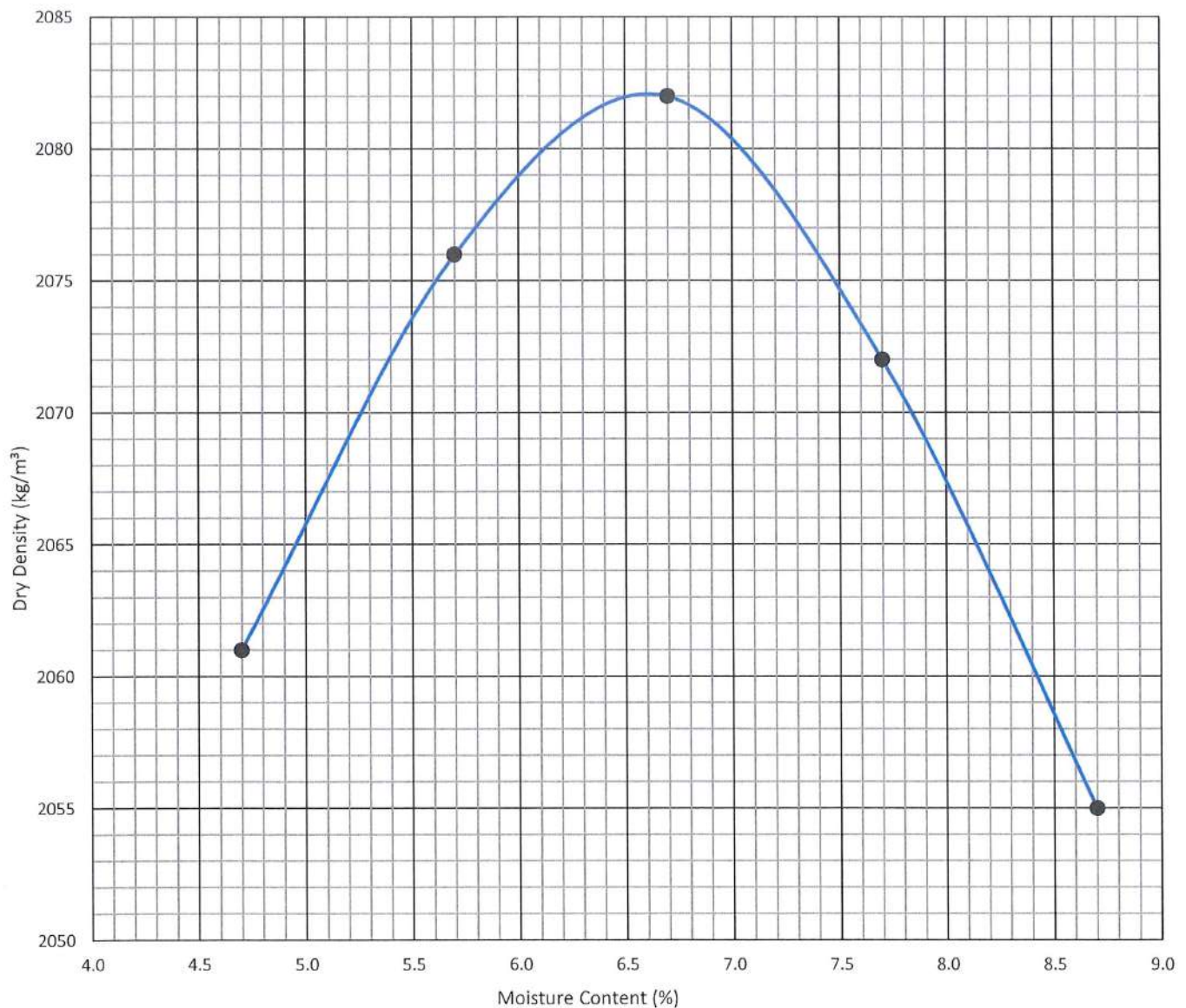
**Job Number:** CLG-04  
**Lab Number:** CLG-04-16  
**Method:** SANS 3001 GR30  
**Date:** 27-May-20

### MDD & OMC DETERMINATION (Mod. AASHTO)

Maximum Dry Density:  kg/m<sup>3</sup>

Optimum Moisture Content:  %

Moisture Content (%):	4.7	5.7	6.7	7.7	8.7			
Dry Density (kg/m <sup>3</sup> )	2061	2076	2082	2072	2055			



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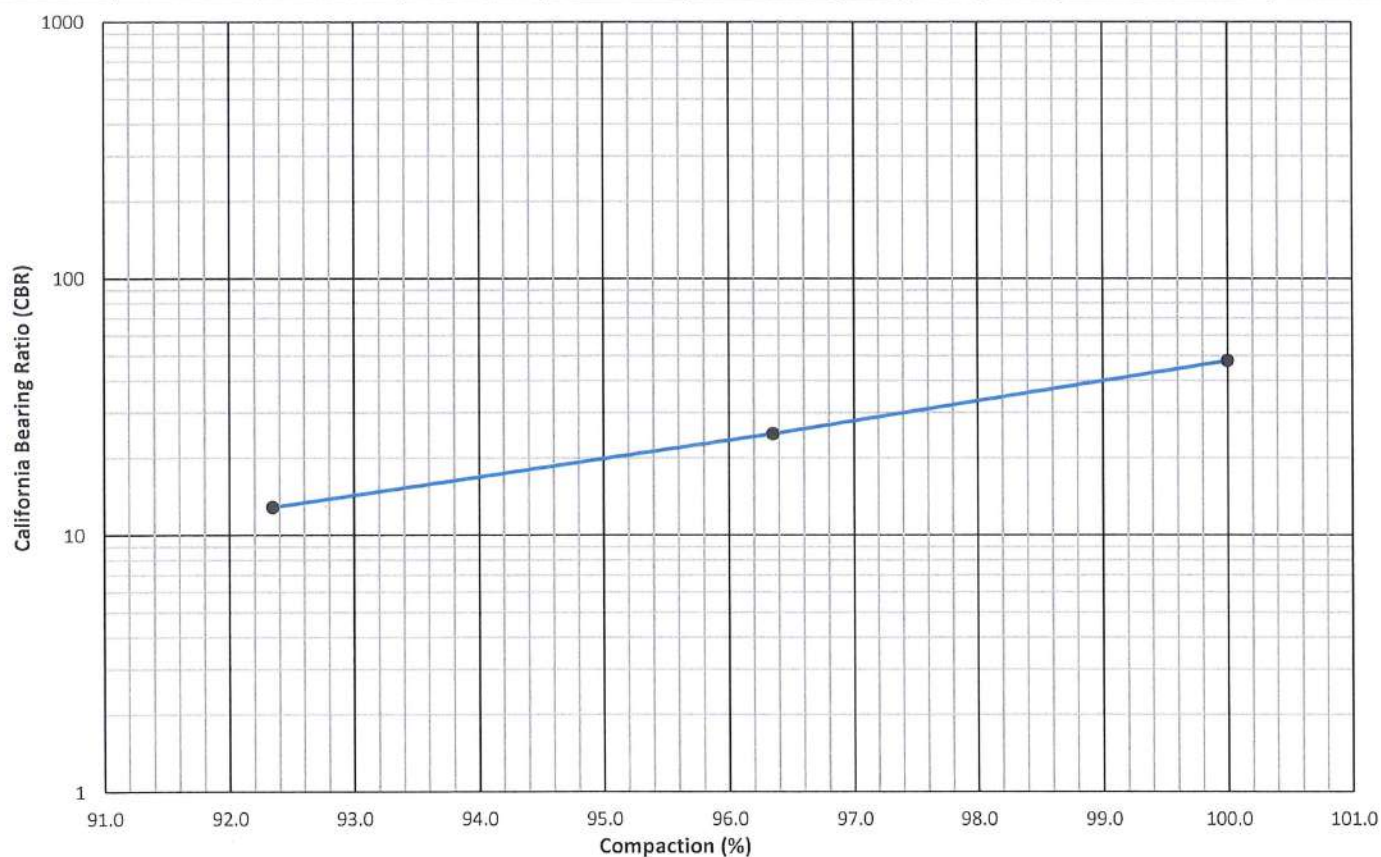
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Client Name: Cedar Land Geotechnical Consult (Pty) Ltd  
Project Name: Gamakor  
Sample: TP 23  
Depth: (mm) 300 - 1600

Job Number: CLG-04  
Lab Number: CLG-04-17  
Method: SANS 3001 GR40  
Date: 27-May-20

## CALIFORNIA BEARING RATIO

Mod. AASHTO Values		Compaction Data: CBR			Swell	CBR at (mm)			CBR Values	
MDD	OMC	Dry Dens.	MC	Comp.		2.5	5.0	7.5	Compaction (%)	CBR
(kg/m <sup>3</sup> )	(%)	(kg/m <sup>3</sup> )	(%)	(%)	(%)					
1997	10.2	1947	10.3	100.0	0.6	48	64	71	100	48
									98	33
1997	10.2	1876	10.3	96.4	1.0	25	31	32	97	28
									95	20
1997	10.2	1798	10.3	92.3	1.3	13	15	15	93	14
									90	9



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**Project Name:** Gamakor  
**Sample:** TP23  
**Depth: (mm)** 300 - 1600

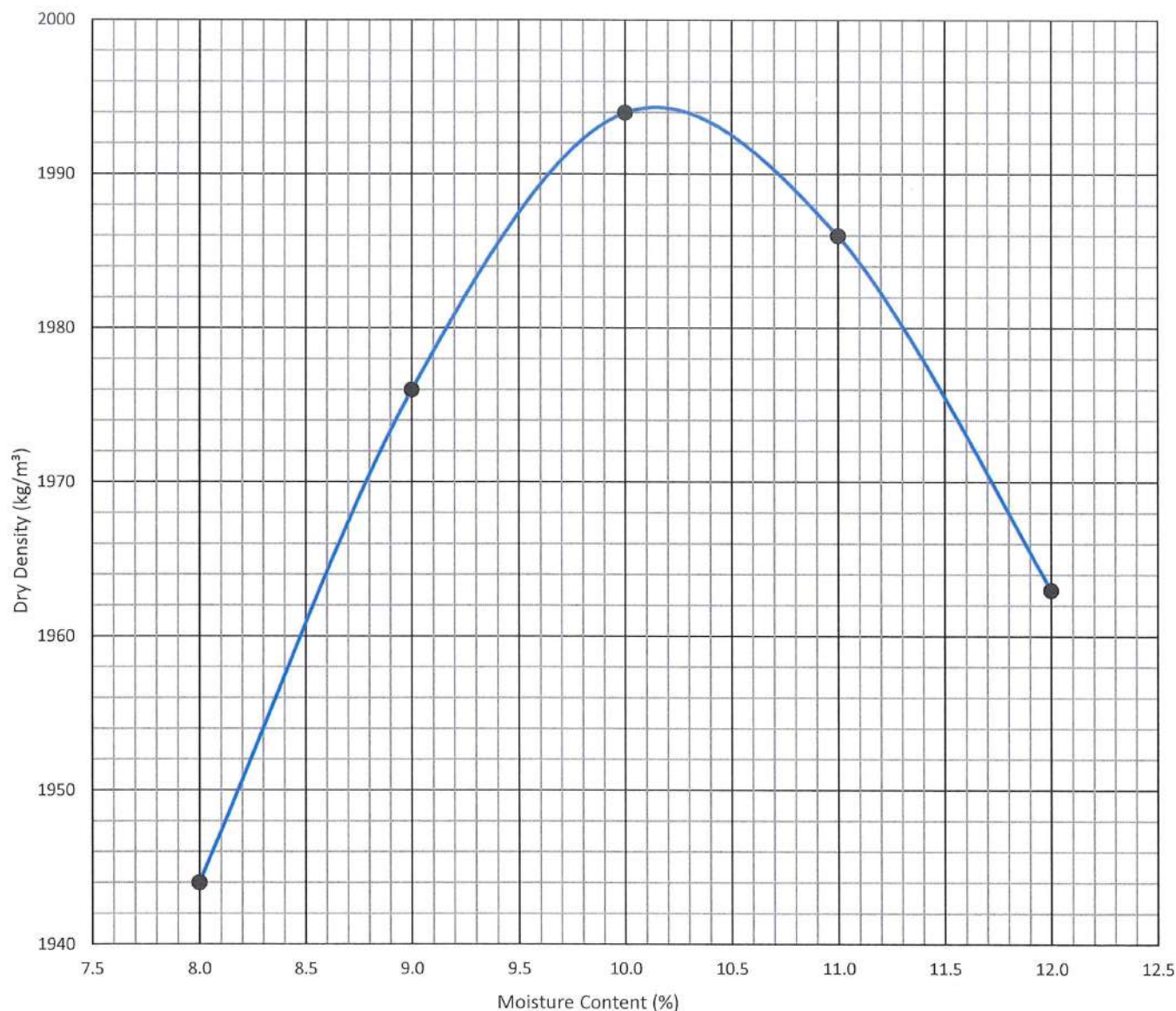
**Job Number:** CLG-04  
**Lab Number:** CLG-04-17  
**Method:** SANS 3001 GR30  
**Date:** 27-May-20

### MDD & OMC DETERMINATION (Mod. AASHTO)

Maximum Dry Density: **1997** kg/m<sup>3</sup>

Optimum Moisture Content: **10.2** %

Moisture Content (%):	8.0	9.0	10.0	11.0	12.0			
Dry Density (kg/m <sup>3</sup> )	1944	1976	1994	1986	1963			



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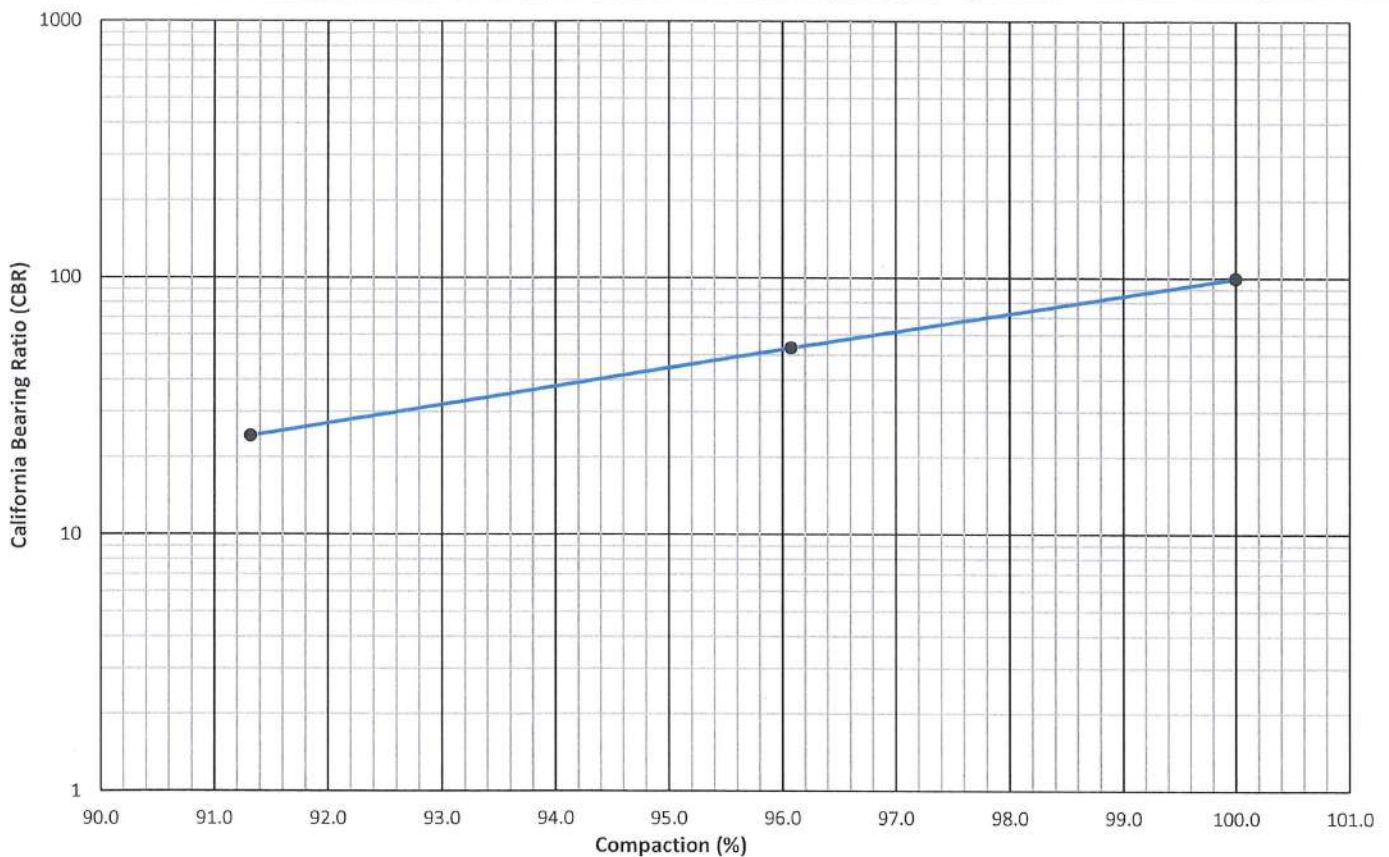
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Client Name: Cedar Land Geotechnical Consult (Pty) Ltd  
Project Name: Gamakor  
Sample: TP 27  
Depth: (mm) 300 - 600

Job Number: CLG-04  
Lab Number: CLG-04-19  
Method: SANS 3001 GR40  
Date: 27-May-20

## CALIFORNIA BEARING RATIO

Mod. AASHTO Values		Compaction Data: CBR			Swell	CBR at (mm)			CBR Values	
MDD	OMC	Dry Dens.	MC	Comp.		2.5	5.0	7.5	Compaction (%)	CBR
(kg/m <sup>3</sup> )	(%)	(kg/m <sup>3</sup> )	(%)	(%)	(%)					
2146	6.8	2166	6.9	100.0	0.0	100	131	147	100	100
									98	73
2146	6.8	2081	6.9	96.1	0.0	53	67	70	97	62
									95	45
2146	6.8	1978	6.9	91.3	0.0	24	29	29	93	32
									90	20



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**Client Name:** Cedar Land Geotechnical Consult (Pty) Ltd  
**Project Name:** Gamakor  
**Sample:** TP 27  
**Depth: (mm)** 300 - 600

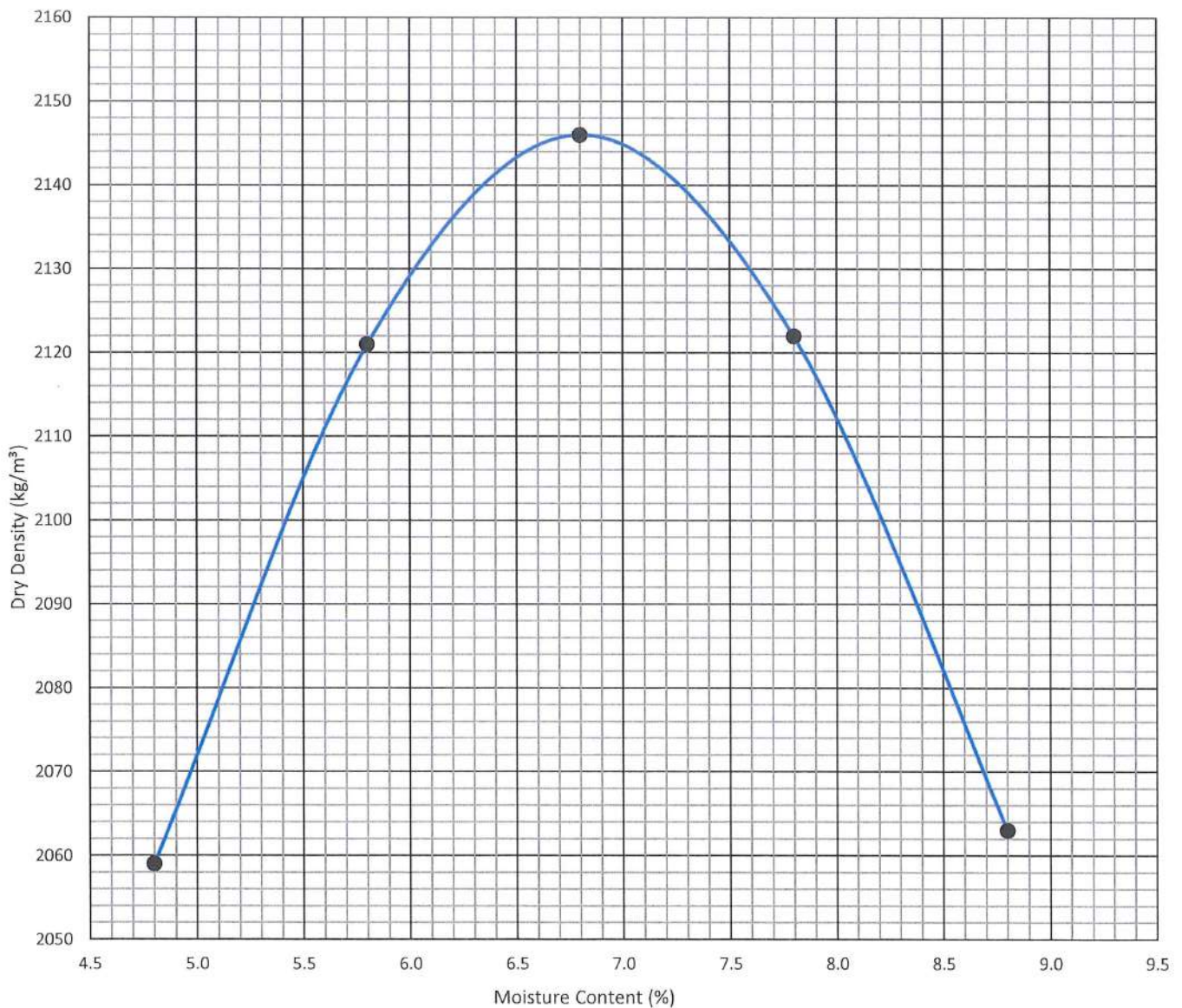
**Job Number:** CLG-04  
**Lab Number:** CLG-04-19  
**Method:** SANS 3001 GR30  
**Date:** 27-May-20

### MDD & OMC DETERMINATION (Mod. AASHTO)

Maximum Dry Density: **2146** kg/m<sup>3</sup>

Optimum Moisture Content: **6.8** %

Moisture Content (%):	4.8	5.8	6.8	7.8	8.8			
Dry Density (kg/m <sup>3</sup> )	2059	2121	2146	2122	2063			



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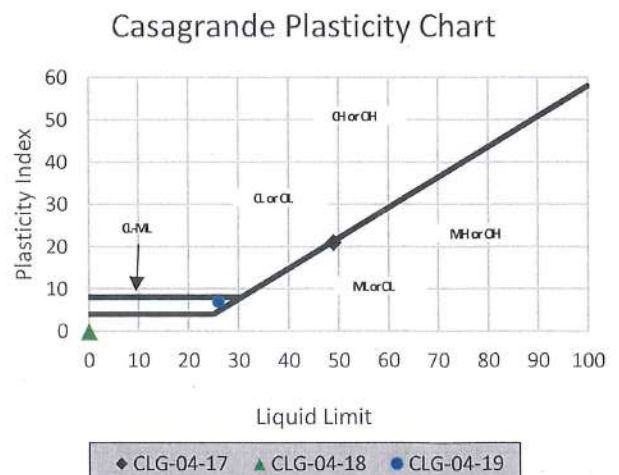
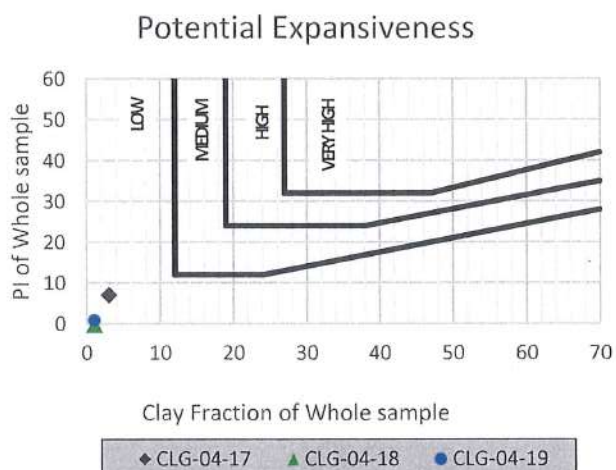
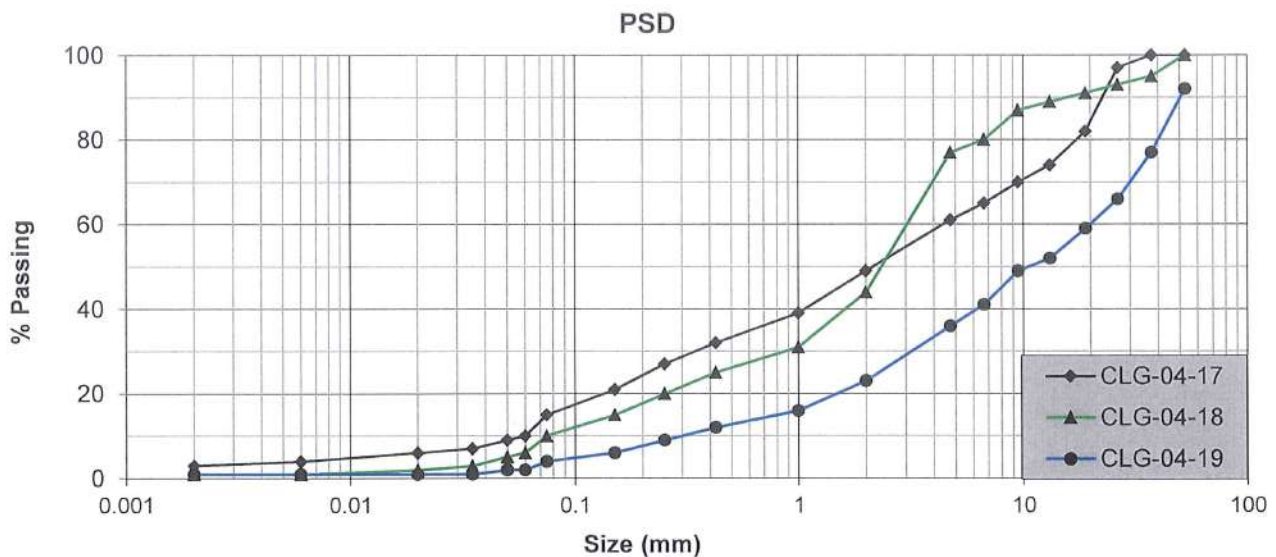
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**Job Number:** CLG-04  
**Date:** 2020-05-27  
**Method:** SANS 3001 GR1, GR3, GR10 GR12 & BS 1377 (where applicable)

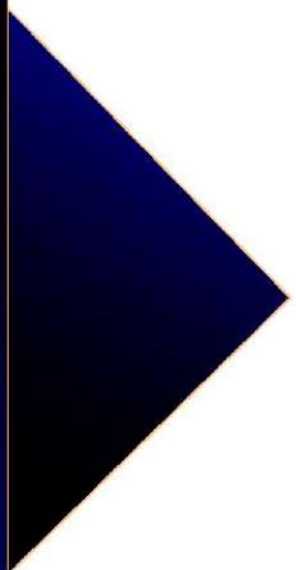
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## ANNEXURE H: FRESHWATER REPORT







**FRESH WATER REPORT**  
**Housing on Portion 128 and the Remainder of Farm Kousas 459 Gordonia RD**  
**KEIMOE**  
**NORTHERN CAPE**

**A requirement in terms of Section 21 (c) and (i) of the  
National Water Act (36 of 1998)**

January 2020



## Index

	Abbreviations	3
	List of Figures	4
	List of Tables	4
1	Introduction	5
2	Legal Framework	6
3	Climate Keimoes	6
4	Quaternary Catchment	7
5	Vegetation	8
6	Housing Scheme	9
7	Sub-Catchments and Drainage Lines	10
8	Runoff	15
9	Wastewater Treatment Works	16
10	Existing Housing	18
11	Biomonitoring the Lower Orange River	20
12	Impacts on the Lower Orange River	20
13	Lower Orange River Biomonitoring Results	21
14	Keimoes Biomonitoring	23
15	Present Ecological State	27
16	Ecological Importance	30
17	Ecological Sensitivity	30
18	Possible Impacts	31
19	Mitigation Measures	31
20	Impact Assessment	31
21	Risk Matrix	32
22	Resource Economics	35
23	Conclusions	38
24	References	39
25	Declaration	40
26	Résumé	41
27	Appendix	44
27.1	Biomonitoring Score Sheet	44
27.2	Methodology used in determining significance of impacts	45
27.3	Risk Matrix Methodology	49

## Abbreviations

Critical Biodiversity Area	CBA
Department of Water and Sanitation	DWA
Ecological Importance	EI
Ecological Sensitivity	ES
Ecological Support Area	ESA
Environmental Impact Assessment	EIA
Electronic Water Use License Application (on-line)	eWULAA
Government Notice	GN
Hectares	ha
Metres Above Sea Level	masl
National Environmental Management Act (107 of 1998)	NEMA
National Freshwater Environment Priority Area	NFEPA
National Water Act (36 of 1998)	NWA
Present Ecological State	PES
South Africa National Biodiversity Institute	SANBI
Section of an Act of Parliament	S
Water Use License Application	WULA



## List of Figures

Figure 1	Kiemoes Climate	7
Figure 2	<i>Aloe claviflora</i>	8
Figure 3	Housing Scheme	9
Figure 4	Sub-Catchment	10
Figure 5	Sandy Drainage Line	11
Figure 6	Confluence	12
Figure 7	Adjacent Catchment	13
Figure 8	Keimoes Drainage Lines	14
Figure 9	Railway Bridge	15
Figure 10	N14 Road Bridge	16
Figure 11	Wastewater Treatment Works	16
Figure 12	Wastewater Treatment Works Drainage	17
Figure 13	Existing Housing	18
Figure 14	Existing Housing Continued	19
Figure 15	New Dwellings	19
Figure 16	Lower Orange River Biomonitoring Results	22
Figure 17	Sampling Point	23
Figure 18	Bridge	24
Figure 19	Vegetation at the Sampling Point	24
Figure 20	Irrigation Pipes	25
Figure 21	Resource Economic Footprint of the Larger Drainage Lines	36
Figure 22	Resource Economic Footprint of the Adjacent Drainage Lines	37
Figure 23	Minimum Requirements for a S21(c) and (i) Application	38

## List of Tables

Table 1	Biomonitoring in the Lower Orange River	21
Table 2	Water Quality	25
Table 3	Biomonitoring Score	25
Table 4	Habitat Integrity	27
Table 5	Present Ecological State of the Larger Drainage Lines	28
Table 6	Present Ecological State of the Adjacent Drainage Lines	29
Table 7	Ecological Importance	30
Table 8	Impact Assessment	32
Table 9	Risk Matrix	33
Table 10	Goods and Services	34

## **1 Introduction**

The Kai !Garib Municipality encompasses several towns in the Northern Cape. Keimoes on the banks of the Orange River is among these towns, where the expansion of a human settlement on 100ha of land is now necessary. This is on the farm Kousas 459 in the Gordonia registration district. In fact, this land has long been under discussion. Approximately half of it is already under informal housing and new residents arrive regularly. It has become urgent that the necessary administrative processes are now being concluded in order to officially establish the settlement.

The municipality appointed the town and regional planners Macroplan of Upington to deal with this administrative process. Macroplan, in turn, has appointed Enviro Africa of Somerset West to deal with the legally required EIA in terms of NEMA.

The proposed housing scheme at Keimoes stretches over mostly dry drainage lines, which are tributaries of the Orange River. These are, in terms of the NWA, deemed as legitimate water resources. In conjunction to the EIA, a WULA is required as well. Consequently, Dr Dirk van Driel of WATSAN Africa has been appointed to carry out the WULA, along with the Fresh Water Report and the Risk Matrix, as is prescribed on the DWS webpage.

The Fresh Water Report has been developed over a number of years to include aspects that now have officially been specified. Apart from answering to WULA requirements, an impact assessment is included to specifically satisfy the requirements of the EIA as well.

It is concluded that the drainage lines have only limited value as water resources and environmental assets. Hence it was advised that the development should go ahead and that a General Authorization is the correct level of authorization.

## 2 Legal Framework

The proposed development “triggers” sections of the National Water Act. These are the following:

### *S21 I Impeding or diverting the flow of a water course*

The proposed housing scheme transverses a number of drainage lines. The drainage lines could possibly be altered, should the development go ahead.

### *S21 (i) Altering the bed, bank, course of characteristics of a water course.*

The proposed housing scheme may alter the characteristics of the drainage lines.

Government Notice 267 of 24 March 2017

Government Notice 1180 of 2002. *Risk Matrix.*

The Risk Matrix as published on the DWS official webpage must be completed and submitted along with the Water Use Licence Application (WULA). The outcome of this risk assessment determines if a letter of consent, a General Authorization or a License is required.

Government Notice 509 of 26 August 2016

An extensive set of regulations that apply to any development in a water course is listed in this government notice in terms of Section 24 of the NWA. No development take place within the 1:100 year-flood line without the consent of the DWS. If the 1:100-year flood line flood line is not known, no development may take place within a 100m from a water course without the consent of the DWS. Likewise, no development may take place within 500m of a wetland without the consent of the DWS.

This report deals with S21 I and I of the NWA.

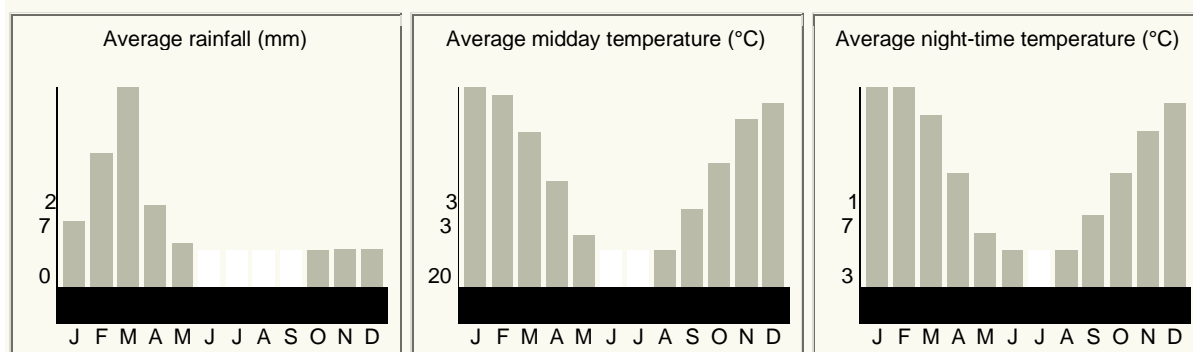
National Environmental Management Act (107 of 1998)

NEMA and regulations promulgated in terms of NEMA determines that no development without the consent and permission of the DEA and its regional agencies, in this case the DENC of the Northern Cape Provincial Government, may take place within 32m of a water course. The mostly dry drainage lines are perceived to be legitimate water courses.



## 2 Climate Keimoes

Keimoes normally receives about 84mm of rain per year, with most rainfall occurring mainly during autumn. The chart below (Figure 1, lower left) shows the average rainfall values for Keimoes per month. It receives the lowest rainfall (0mm) in June and the highest (27mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Keimoes range from 19.8°C in June to 33°C in January. The region is the coldest during July when the mercury drops to 3°C on average during the night.



**Figure 1** Climate Keimoes

The rainfall is really low, tantamount to desert conditions. Keimoes is located on the southern edge of the Kalahari Desert. The larger part of the economy and agriculture entirely depends on irrigation out of the Orange river.

Nevertheless, violent thunderstorms occur from time to time, with rainfall of 40mm and more over a period of 24 hours. This may cause flow in the drainage lines.

## 3 Quaternary Catchment

Keimoes is in the D42E quaternary catchment

#### 4 Vegetation

The veld type where the proposed housing scheme is going to be is listed as Bushmanland Arid Grassland, which is least threatened, according to the SANBI webpage.

The vegetation type on the banks of the Orange River is listed as Lower Gariep Alluvial Vegetation, which is critically endangered. But then the housing development is not going to be anywhere near the banks of the river.

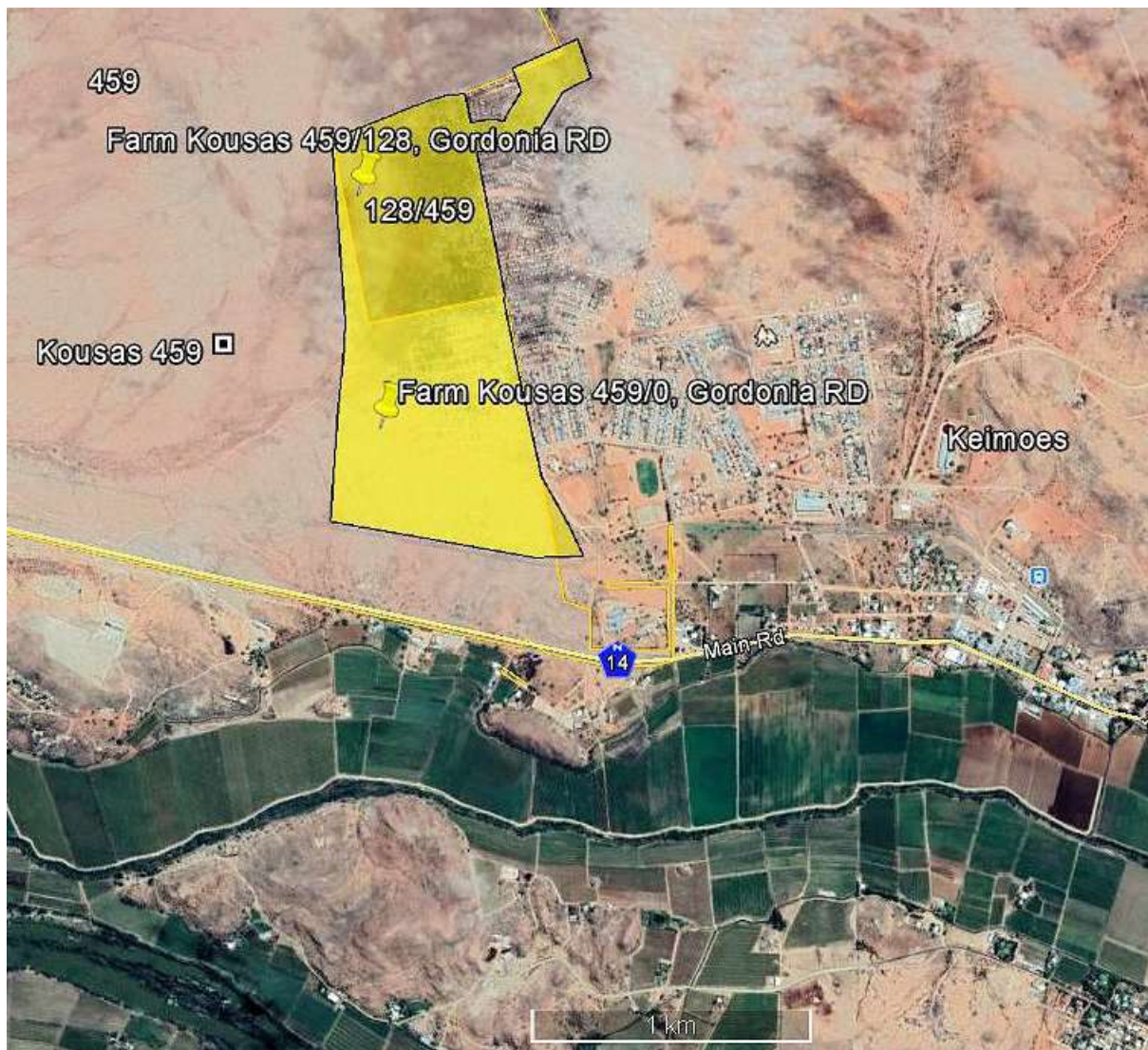
The kraal aalwyn *Aloe claviflora* (Figure 2) grows on the higher quartzites. These are valuable and should be transplanted and conserved prior to the area being developed into housing. The swarthaak *Senegalia mellifera* is the common in the lower drainage lines, but there are a number of other thorn tree species as well. The Kalahari, especially along the drainage lines, is dotted with the protected camel thorn tree *Vachellia erioloba*, but none were observed on the farm Kousas.

The vegetation was green on the day of the site visit (8 February 2019) following the recent rains.



**Figure 23** *Aloe claviflora*

## 5 The Housing Scheme



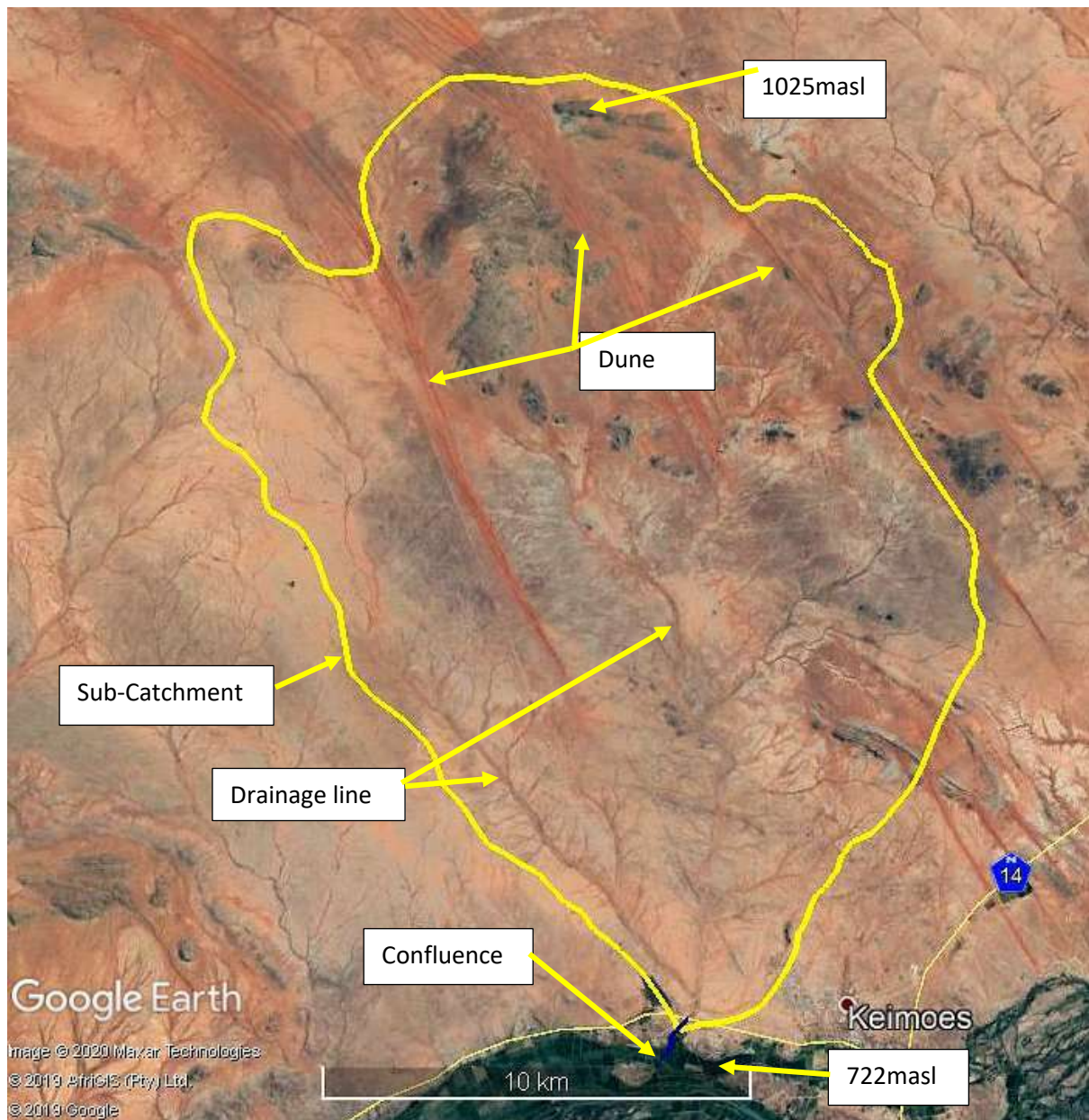
**Figure 3** Housing Scheme (Macroplan)

The proposed housing scheme is demarcated in Figure 3. It is planned on Portion 128 of Farm Kousas 459 Gordonia and on the Remainder of the same farm. It covers a surface area of approximately 100 ha, with a circumference of 6km.

According to plan, there will be 1500 plots. A large part of the assigned land, perhaps half of it, has already been built up, just about all of it with informal housing.



## 6 Sub-Catchments and Drainage Lines



**Figure 4** Sub-Catchment

The sub-catchment (Figure 4) is one of the larger ones along the banks of the lower Orange River. It covers an area of approximately 31 000 ha. It is approximately 26km long and it is 16.8km wide at its widest.

It was demarcated by connecting the highest points around the drainage line system with the polygon function of Google Earth. This is made possible by the coloration of the drainage lines, visible on Google Earth, as iron oxide accumulates in the sandy drainage lines (Figure 5), left there by the occasional storm water.

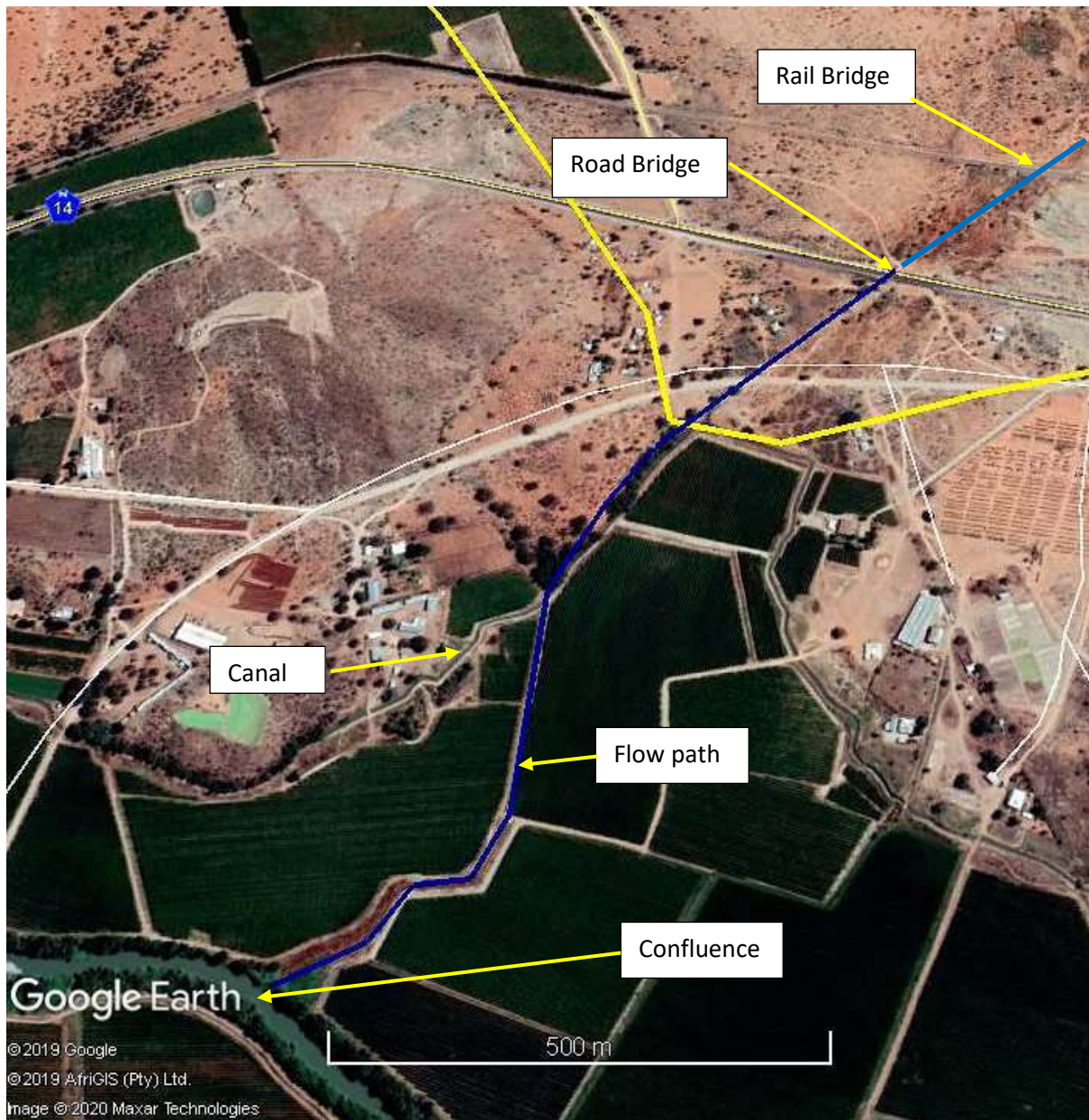


**Figure 5** Sandy drainage line

Its highest point is a rocky outcrop in the very north. It is 1025masl. The lowest point at the confluence with the Orange River is 722masl. This is just less than a horizontal meter drop over a distance of 1km. This is a very gentle slope that does not make for fast flowing water downhill or a strong erosion potential.

The sub-catchment is intersected by typical red Kalahari sand dunes (Figure 4).





**Figure 6** Confluence

The drainage line passes underneath the railway and the N14 trunk road through bridges. It has been interrupted by the vineyards and the irrigation canal. The final reach is flanked by vineyards (Figure 6).





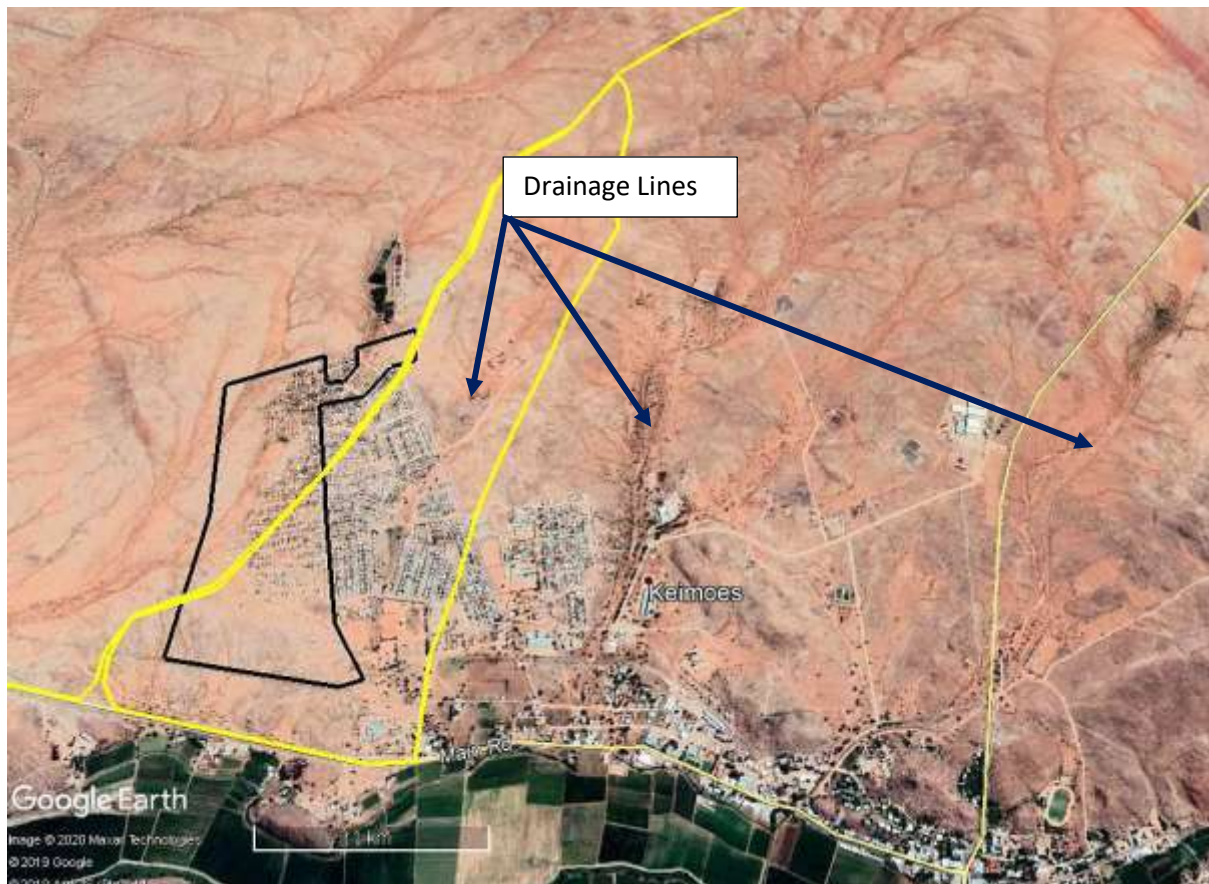
**Figure 7 Adjacent Sub-Catchment**

However, approximately only half of the proposed housing development is in this very large sub-catchment. The other half is located in the adjacent sub-catchment (Figure 7).

This is a much smaller sub-catchment.

In the past, prior to the development of Keimoes and the vineyards along the Orange River, the 3 drainage lines that run through the town of Keimoes (Figure 8) were probably all part of the same catchment, with a single confluence to the river. The locality where these drainage lines came together now has been replaced with vineyards and constructed drainage canals in among the blocks of vineyard. This is

only guessing, we do not really know, because of the lost evidence. We do not really know where the original flow paths were.



**Figure 8** Keimoes drainage lines

The only part of this original sub-catchment of concern is the land around the eastern tributary of the original drainage line system. It is only 314ha in size. For the sake of this discussion it is named the adjacent sub-catchment.

Approximately half of the proposed housing development is located in this adjacent part of the sub-catchment (Figure1).

The drainage line of the adjacent sub-catchment, still faintly visible on the Google Earth Image, where it passes through the urban area, has been impacted, obliterated. It just misses the south eastern corner of the new housing development.

Downstream from the proposed housing development, towards the N14 trunk road, all that remained of the original system are a number of faint drainage lines out of a broad area of sand deposition that each disappear where the vineyards start.



## 7 Runoff

If the very scarce, but quite possible heavy rainfall event occurs of 40mm in 24 hours, this very large sub-catchment of 31 000ha theoretically generates a runoff of 12.4 million m<sup>3</sup>. If only a fraction of this reaches the point of discharge at the Orange River, it would be a significant flow capable of doing damage to infrastructure.

This explains the very long railway bridge with plenty of room underneath to accommodate these occasional large floods (Figure 9). Likewise, the N14 road bridge just downstream from the railway bridge is an equally sturdy structure (Figure 10).

These large floods are responsible for maintaining the integrity of the drainage lines. If it were not for these flows, the drainage lines would probably fill in with wind-driven sand.

Sand mobilized by flood water is deposited downstream that typically creates these wide floodplains lower down the catchment. Mobilized and deposited sand often makes it difficult to “read” the boundary between sub-catchments and in which direction the next flood will head, also because the land is very flat, with the elevation staying the same over a large swat of land.

The size of that part of the sub-catchment directly upstream of the housing development is small and the possibility of floods is remote.



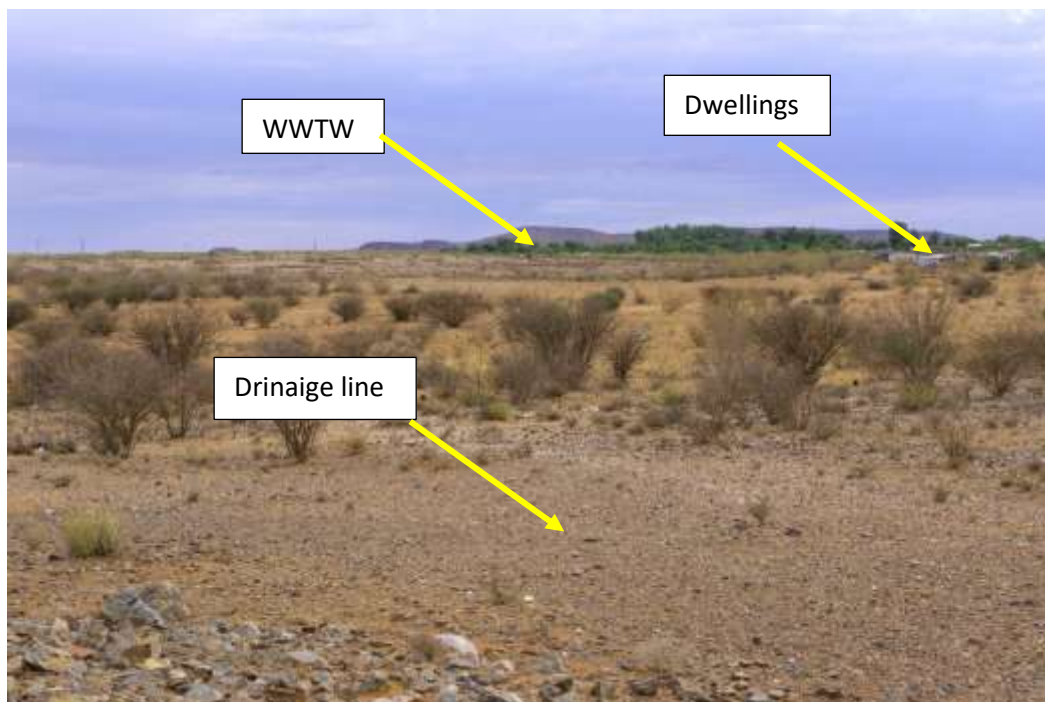
**Figure 9** Railway Bridge



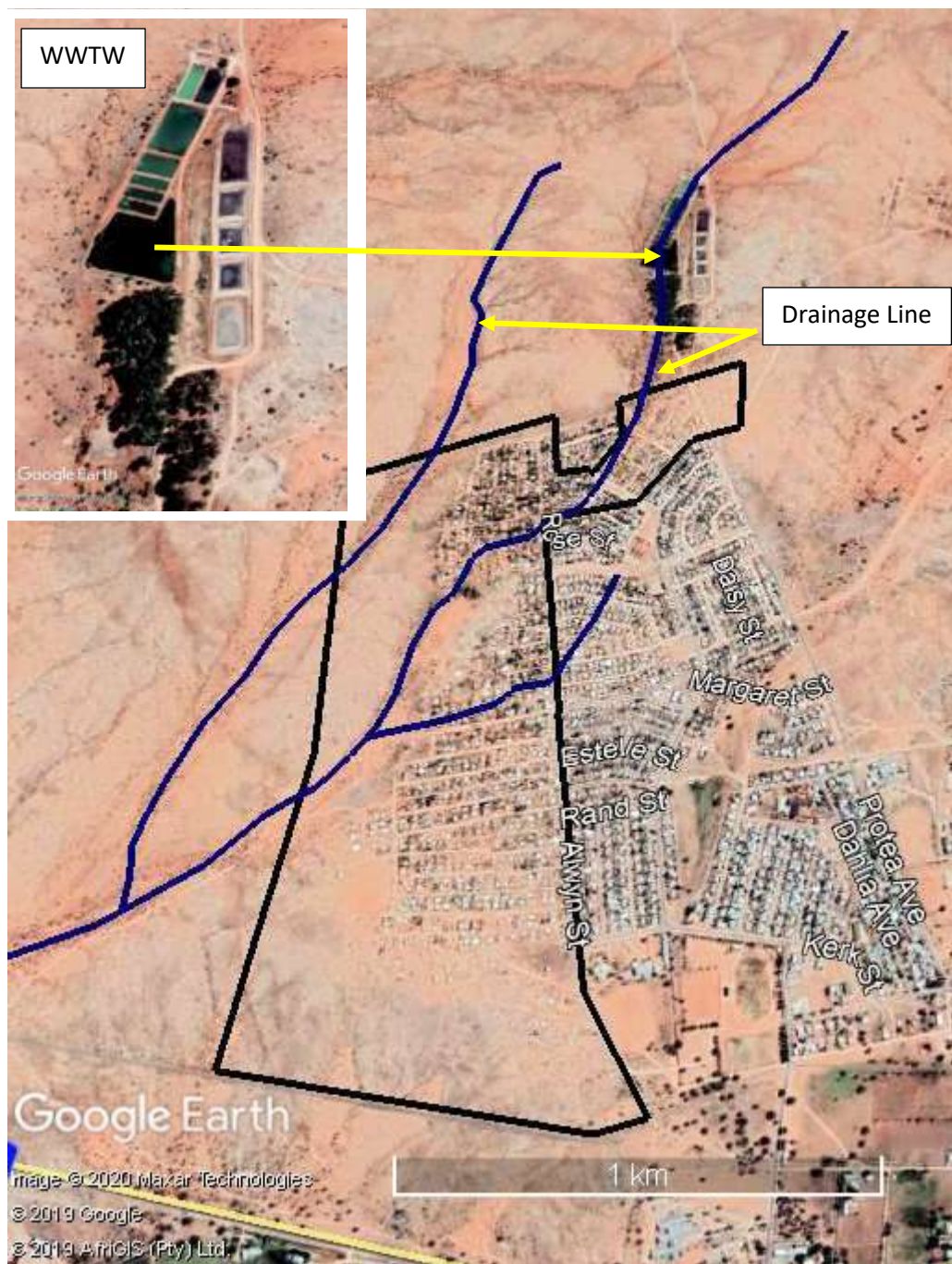


**Figure 10** N14 Road Bridge.

## **8 Wastewater Treatment Works**



**Figure 11** WWTW and dwellings



**Figure 12 Wastewater Treatment Works Drainage**

The Keimoes WWTWs (Figure 11 and 12) is located adjacent and just to the north of the proposed housing development. This is an anaerobic pond system. It was constructed in a drainage line. This drainage line passes through the proposed housing development (Figure 12, details supplied by Macroplan).

The distance between the last active ponds and the first houses is less than 400m.



There are problems at the WWTW. Reportedly, spills occur from time to time, to the discomfort of the existing residents in the already built-up part of the proposed housing. Obviously, these problems need to be addressed, probably by constructing a proper and formalized drainage channel, where the drainage line is today.

Better still, an extra pond should be constructed large enough to contain spills, instead of letting partly treated sewage down the drainage line and through the housing. That is if the entire works in not in need of upgrading.

The other drainage lines running though the proposed development, as indicated in Figure 1, should be channelized as well, to contain storm water in the event of a high rainfall event.

## 9 Existing Housing



**Figure 13** Existing Housing





**Figure 14** Existing housing Continued



**Figure 15** New dwellings

Existing housing in the proposed housing scheme is mostly of the informal type (Figure 13) Some residents have built themselves proper houses with brick and mortar (Figure 14).

New informal dwellings (Figure 15) are constructed on a daily basis.

Litter (Figure 1) is an enormous problem, with current clean-up services clearly not coping, apart from inadequate community awareness levels that is not helpful.

## **10 Biomonitoring the Lower Orange River**

The biomonitoring was carried out according to the description of Dickens & Graham (2002).

Biomonitoring was carried out on the Lower Orange River during site visits for successive WULAs. So far 10 samples have been analyzed at 9 localities (Table 1). The site furthest east was at Hopetown and furthest west at Augrabies, with Upington in the middle. All of these are located upstream of the Augrabies Falls.

Another sample was analyzed at Styerkraal just east of the border post of Onseepkans downstream of the Augrabies Falls.

The river is mostly braided, with many smaller streams and with islands in the middle. The river sports many rapids and riffles, but also pool-like features where the river is broad and slower flowing.

The bottom is mainly muddy, with some large rocky outcrops in the middle of the river.

## **11 Impacts on the Lower Orange River**

The river is heavily utilized for agriculture, with the banks entirely modified into cultured vineyards. A multitude of large electric water pumps have been placed in the river for abstracting large volumes of water for irrigation. Abstraction significantly lowers the flow in the river.

Berms for the purpose of flood protection have been constructed on the banks of the river for most of its length. These berms have been constructed by the Department of Water Affairs and now have been a feature of the landscape for many decades. The berms keep flood water out of adjacent agricultural land and has denaturalised the riparian zone.

The single most impact on the Orange River are the two very large dams, The Gariep Dam and the Vanderkloof Dam. The river flow has been modified to a much even regime, different from the varied flow with high peak flows and low drought flows.

The Lower Orange River is lined with a dense system of mostly dry drainage lines. These drainage lines only flow during and shortly after heavy rains. Their contribution to the flow of the Orange River is insignificant. Most of the flow comes from the Lesotho Highlands and some from the Vaal River. However, many of these drainage lines have been transformed into engineered agricultural return flow furrows that carries the excess of over irrigation back to the Orange River. Agricultural return flow adds much to the nutrient load of the Orange River because runoff contains fertilizer.

Nitrogen is added in large quantities. Since phosphorus readily binds to the soil, not much phosphorus is added.

Return flow can contain a heavy silt load, thereby elevating turbidity in the river.

It is suspected that pesticides in agricultural return flow have a heavy impact on biomonitoring results, significantly reducing the SASS5 score.

The banks of the Orange River in the area is densely overgrown with Spaanse Riet (*Arundo donax*). This is classified as an aggressive and exotic invasive plant, which effectively prevents access to the river. The reeds result in a homogeneous aquatic habitat. This lack of variation suppresses the SASS5 score, with only a limited number of aquatic macroinvertebrate species present in this habitat.

## 12 Lower Orange River Biomonitoring Results

The biomonitoring results have been captured in Table 1 and depicted in Figure 16.

The classes from A to F in Figure 1 has been assigned for mature rivers on flood plains such as the Lower Orange River.

Only 2 of the samples were classified a good and relatively unimpacted (Class A). Four were in Class B and C, which can be regarded as acceptable under the circumstances of an impacted river reach. These classes can possible be labelled as the ideal, a compromise between agriculture and aquatic ecological functioning.

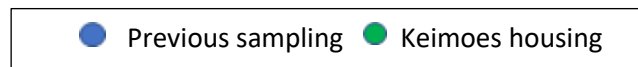
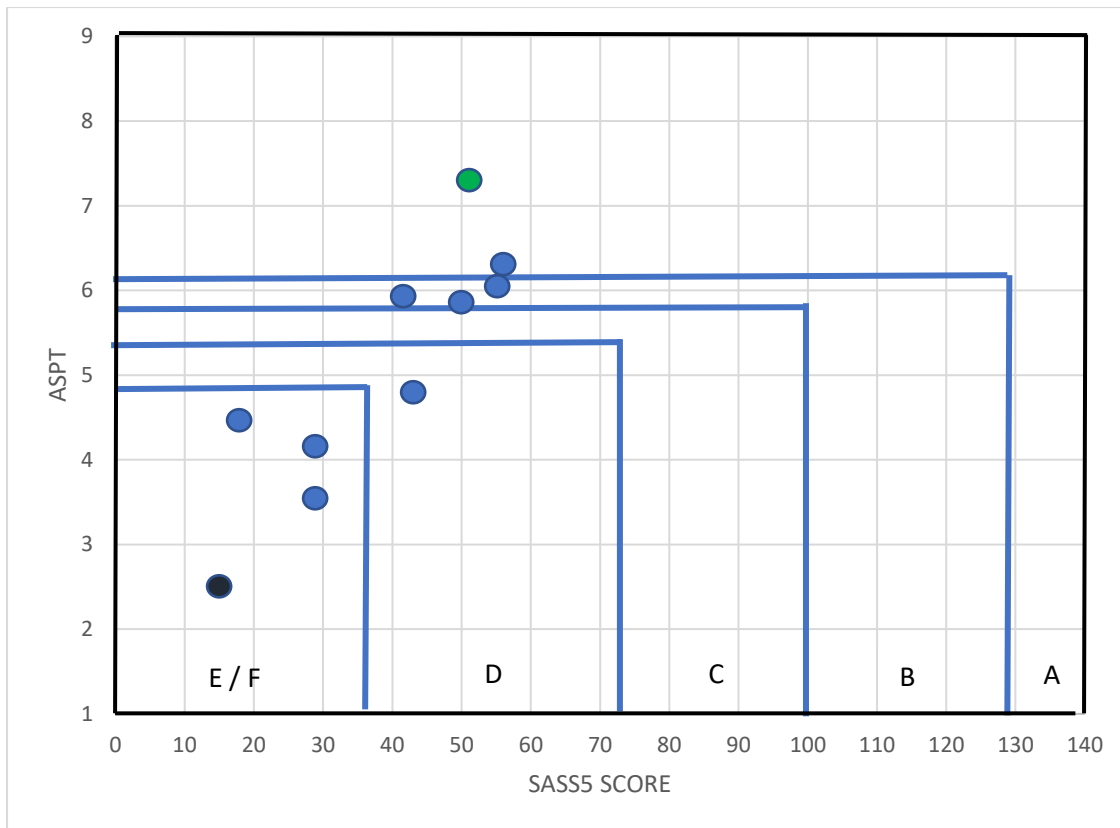
Four samples were poor (Classes E and F), an undesirable state of affairs.

The one sample downstream of the Augrabies Falls was extremely poor.

**Table 1** Biomonitoring in the Lower Orange River

Locality	Coordinates	Date	SASS 5	No Taxa	ASPT
Augrabies Lair trust	28°38'41.53S 20°26'08.49E	5/09/17	18	4	4.5
Augrabies Lair Trust	28°38'41.53S 20°26'08.49E	5/10/17	43	9	4.8
Grobbershoop	28°52'31.80S 21°59'13.49E	14/8/18	41	7	5.9
Kakamas Triple D	28°45'08.37S 20°35'06.16E	15/8/18	50	9	5.6
Hopetown Sewer	29°36'05.07S 24°06'05.00E	7/10/18	29	7	4.1
Hopetown Sewer	29°36'08.06S 24°21'06.16E	7/10/18	29	8	3.6
Keimoes Housing	28°42'37.12S 20°55'07.81E	8/02/19	51	7	7.3
Upington Erf 323	28°27'11.91S 21°16'14.02E	12/2/19	56	9	6.2
Upington Affinity	28°27'11.91S 21°16'14.02E	20/5/19	54	9	6
Styerkraal	28°27'25.28S 21°15'01.87E	21/5/19	15	6	2.5

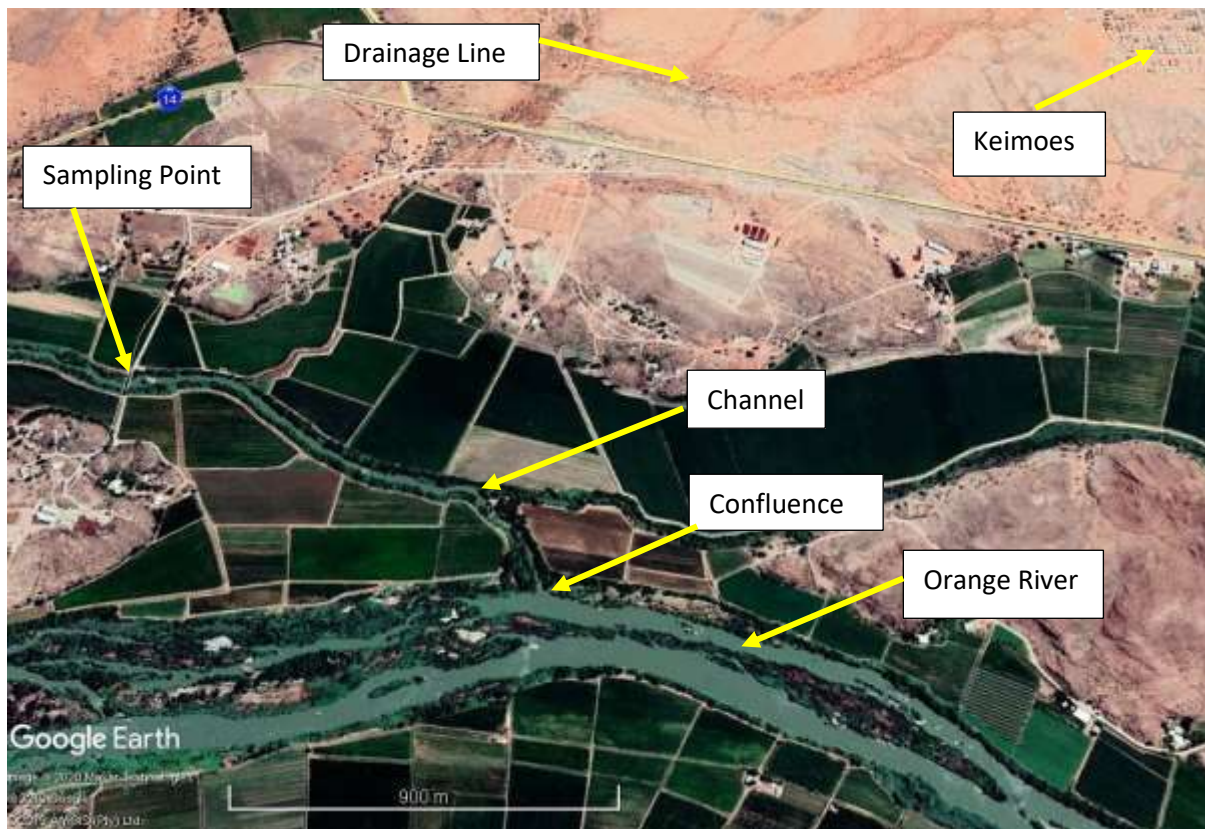




Integrity Class	Description
A	Pristine; not impacted
B	Very Good; slightly impacted
C	Good; measurably impacted with most ecological functioning intact
D	Fair; impacted with some loss of ecological functioning
E	Poor; loss of most ecological function
F	Very Poor; loss of all ecological function

**Figure 16** Lower Orange River Biomonitoring Results

### 13 Keimoes Biomonitoring



**Figure 17** Sampling Point

The sampling point for biomonitoring was chosen as close as possible to the confluence of the drainage line with the Orange River (Figure 17). This is where the new housing development would have an impact, if approved. These two points were 350m apart.

Access to the river was a consideration, which was made possible by a road to a bridge (Figure 18). This bridge was over a side channel of the Orange River. The road and bridge led to a large island, cut off from the main land by the channel. The channel flows back into the Orange River 8.7km downstream, as the crow flies.

The river at the sampling points was fast flowing,  $1\text{ms}^{-1}$  and more in the middle, slower on the sides. It was overgrown with spaanse riet *Arundo donax* and a willow tree *Salix* sp., probably *S. babylonica* (Figure 19). The river here was a homogeneous, fast-flowing channel without any features such as rapids and natural bedrock.

Access to the water was allowed over the pipes from the pump installation on the river's bank (Figure 20). The river here became deep quite abruptly that rendered sampling hazardous.

The substrate on the bottom was muddy. The bridge's pylons and the pipes where taken as bedrock, for the purpose of sampling and habitat diversity.



**Figure 18** Bridge



**Figure 19** Vegetation at sampling point





**Figure 20** Irrigation pipes

**Table 2** Water Quality

Parameter	Value
Dissolved Oxygen $\text{mg l}^{-1}$	5.8
Temperature $^{\circ}\text{C}$	27.5
pH	8.2
Electrical conductivity $\text{mSm}^{-1}$	34

**Table 3** Biomonitoring Score

Parameter	Score
SASS5 score	51
Number of taxa	7
ASPT	7.3

The oxygen concentration (Table 2) was rather low on the day of sampling, which is not unusual for such a high temperature of more than 27 degrees centigrade. The oxygen concentration was still high enough to support a varied macro-invertebrate fauna.

The electrical conductivity indicated that the water was fresh, without much saltiness.

The pH was slightly on the alkaline side, but not enough to have an impact on the score. But then a purposeful effort with the sampling collection net only rendered 7 taxa.

The SASS5 score (Table 3) was 51, which was quite high for such a homogeneous habitat, with only a little submerged vegetation, emerging vegetation, muddy bottom and bedrock, impacted by surrounding vineyards. In fact, it rendered an “A” classification (Figure 16), which was much better than the rest of samples that were taken by WATSAN along the Orange River for the purpose of comparison. This is perhaps unusual and it can be expected that the score will be lower during follow-up sampling rounds.

It is not expected that the proposed housing development will significantly lower the score at the sampling point, unless something disastrous happens, such as a large sewage spill during a high rainfall event.

## 14 Present Ecological State

The PES is a protocol that have been produced by Dr Neels Kleynhans (Table 4, 5 and 6) in 1999 of the then DWAF to assess river reaches. The scores given are solely that of the practitioner and are based on expert opinion.

**Table 4** Habitat Integrity according to Kleynhans, 1999

Category	Description	% of maximum score
A	Unmodified, natural	90 – 100
B	Largely natural with few modifications. A small change in natural habitats and biota, but the ecosystem function is unchanged	80 – 89
C	Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged	60 – 79
D	Largely modified. A significant loss of natural habitat, biota and ecosystem function.	40 – 59
E	Extensive modified with loss of habitat, biota and ecosystem function	20 – 39
F	Critically modified with almost complete loss of habitat, biota and ecosystem function. In worse cases ecosystem function has been destroyed and changes are irreversible	0 - 19

The larger drainage line and its catchment (31 000ha) is for most of its surface area still in a near-pristine condition. The proposed Keimoes housing scheme in the south eastern corner covers only 0.16% of the sub-catchment. The sub-catchment is heavily impacted along the Orange River, with the drainage line entirely transformed into irrigation return flow canals and with most of its original ecological functioning lost. This stark contrast complicates the PES evaluation. Cattle and sheep in the sub-catchment were regarded as exotic fauna. There is a patch of exotic blue gum trees around and downstream of the WWTW. Water quality is affected by the WWTW and the large-scale agriculture.

The assessment of the much smaller adjacent drainage line rendered an entirely different result as the proposed development is 16.9% of the total surface area and as



much of the adjacent sub-catchment has already been developed. Moreover, the lower part of the adjacent sub-catchment makes up a much larger portion and is entirely transformed.

The reason that it did not score much lower than it did is because there is little if any water abstraction from the drainage line. A classification of C for both instream and riparian are probably a class too high for the conditions on the ground. In these arid environments the scope for water abstraction is limited and it should weigh much less for this specific assessment.

**Table 5** Present Ecological State of the larger drainage line

Instream				Maximum
	Score	Weight	Product	score
Water abstraction	24	14	336	350
Flow modification	18	13	234	325
Bed modification	18	13	234	325
Channel modification	17	13	221	325
Water quality	22	14	308	350
Inundation	19	10	190	250
Exotic macrophytes	22	9	198	225
Exotic fauna	15	8	120	200
Solid waste disposal	16	6	96	150
Total		100	1937	2500
% of total			77.5	
Class			C	
Riparian				
Water abstraction	24	13	312	325
Inundation	19	11	209	275
Flow modification	18	12	216	300
Water quality	22	13	286	325
Indigenous vegetation removal	22	13	286	325
Exotic vegetation encroachment	22	12	264	300
Bank erosion	23	14	322	350
Channel modification	17	12	204	300
Total			2099	2500
% of total			84.0	
Class			B	

**Table 6** Present Ecological State of the adjacent drainage line

Instream				
	Score	Weight	Product	Maximum score
Water abstraction	24	14	336	350
Flow modification	8	13	104	325
Bed modification	9	13	117	325
Channel modification	8	13	104	325
Water quality	10	14	140	350
Inundation	5	10	50	250
Exotic macrophytes	18	9	162	225
Exotic fauna	4	8	32	200
Solid waste disposal	4	6	24	150
Total		100	1069	2500
% of total			42.8	
Class			C	
Riparian				
Water abstraction	24	13	312	325
Inundation	5	11	55	275
Flow modification	8	12	96	300
Water quality	12	13	156	325
Indigenous vegetation removal	4	13	52	325
Exotic vegetation encroachment	18	12	216	300
Bank erosion	23	14	322	350
Channel modification	8	12	96	300
Total			1305	2500
% of total			52.2	
Class			C	

The proposed housing development is not about to change the classification of the larger sub-catchment. The development's surface area as a part of the whole is too small to have a significant impact. Unless a mishap such as a major sewage spill happens, but only if the WWTW is upgraded into a much larger plant capable of larger spills.

It can be expected that the classification of the smaller adjacent sub-catchment will be adjusted to a lower class, once the new expansion of the housing takes hold. The question can be asked if it really matters, because there is little if any of the original ecological function left and that not much more can be lost if impacts increase.

## 15 Ecological Importance

The Ecological Importance (EI) is based on the presence of especially fish species that are endangered on a local, regional or national level (Table 7).

There are no fish the drainage lines, as there is no permanent water. According to this assessment, which is prescribed for WULA's, the drainage lines are not important. Neither were any other organisms observed during the site visit that could be described as endangered.

**Table 7** Ecological Importance according to endangered organisms (Kleynhans, 1999).

Category	Description
1	One species or taxon are endangered on a local scale
2	More than one species or taxon are rare or endangered on a local scale
3	More than one species or taxon are rare or endangered on a provincial or regional scale
4	One or more species or taxa are rare or endangered on a national scale (Red Data)

## 16 Ecological Sensitivity

Ecological Sensitivity (ES) is often described as the ability of aquatic habitat to assimilate impacts. It is not sensitive if it remains the same despite of the onslaught of impacts. Put differently, sensitive habitat changes substantially, even under the pressure of slight impacts.

The Ecological Sensitivity also refers to the potential of aquatic habitat to bounce back to an ecological condition closer to the situation prior to human impact. If it recovers, it is not regarded as sensitive.

The drainage lines will predictably not recover to anything resembling their original, un-impacted state, despite the housing development being removed. Once developed, it is most unlikely that the houses and streets will ever be removed.

From this perspective, the aquatic environment and its surrounds can be regarded as ecologically sensitive.



## **17 Possible Impacts**

The impacts of the new housing development would be severe on the aquatic environment and surrounds, as all housing development do. The smaller, fainter drainage lines would inevitably make way for streets and houses and the larger more prominent ones will have to be canalised with formal structures to accommodate any flood water during large rainfall events.

## **18 Mitigation Measures**

The footprint of the proposed housing scheme should be kept as small as possible. Construction vehicles and building material should be kept inside of the demarcated development area and not be allowed onto adjacent land.

Loose sediments, rubble and building material should not be allowed to wash down the catchment during rainfall events.

Litter collection systems should be installed in the drainage lines downstream of the new housing scheme. Litter that accumulates here should be regularly collected and disposed of properly on the municipal waste disposal site.

Protection measures should be put in place to conserve those drainage lines of the larger sub-catchment that are relatively untouched and still in a reasonably good state. Trampling by cattle and goats, as well as humans, is always a concern in similar developments.

Leaky sewerage and potable water provision systems can change the arid state of the drainage lines and surrounds. Leaks should be prepared as not to change the status of the aquatic environment.

## **19 Impact Assessment**

Some of the decision-making authorities prescribe an impact assessment according to a premeditated methodology (Table 26.1, Appendix).

The main benefit of this exercise is that it allows for the evaluation of mitigation measures. Later follows the Risk Matrix. This is different from the Impact Assessment as it does not attempt to weigh the success of mitigation measures.

The results of the impact assessment are given in Table 8.

Like with most urban developments, the impact on the aquatic environment is definite and severe. In this case mitigation measures are not about to make a difference.

Environmental authorities will have to decide if the little and degraded aquatic habitat that was and probably still is available on the site is worth saving, instead of giving the go-ahead for the proposed development.

It is surmised that the aquatic habitat that consists of already degraded drainage lines do not have adequate conservation value prevent the proposed urban development.

The inefficiency of mitigation should therefore not be a consideration. The best that can be done is to ensure that the near-pristine drainage lines adjacent to the new housing scheme are not impacted.

**Table 8 Impact Assessment**

<b>Description of impact</b>  Clearing of the site Construction of roads Trenching of potable water supply and sewage lines Trenching of electricity supply Construction of houses Landscaping of terrain Removal of vegetation Destruction of aquatic habitat, drainage lines								
<b>Mitigation measures</b>  Do not disturb any land outside of designated site Construct outside of rainy season Construct underground storm water system.								
Type Nature	Spatial Extent	Severity	Duration	Significance	Probability	Confidence	Reversibility	Irreplaceability
Without mitigation								
Direct	Local	High	Permanent	High	Definite	Certain	Irreversible	Irreplaceable
With mitigation measures								
Direct	Local	High	Permanent	High	Definite	Certain	Irreversible	Irreplaceable

## 20 Risk Matrix

The assessment was carried out according to the interactive Excel table that is available on the DWS webpage. Table 9 is a replica of the Excel spreadsheet that has been adapted to fit the format of this report.

The purpose of the Risk Matrix is to determine if a General Authorisation of a License is applicable.

The methodology is set out in the Appendix. It has been copied directly out of the DWS webpage.

**Table 9 Risk Matrix**

No.	Activity	Aspect	Impact	Significance	Risk Rating
1	Clearing of the site Construction of roads Trenching of potable water supply and sewage lines Trenching of electricity supply Construction of houses Landscaping of terrain	Mobilise sediments	Sediment deposition of downstream drainage lines. Altering of habitat	32,5	Low
2	Hardening of urban surfaces	Alter flow regime	Altering aquatic habitat	45	Low
3.1	Habitation of new housing scheme	Litter	Litter in drainage line	40	Low
3.2		Trampling	Altering of drainage lines	47.5	Low

**Table 9 Continued Risk Rating**

No	Flow	Water Quality	Habitat	Biota	Severity	Spatial scale	Duration	Consequence
1	1	2	1	1	1.25	1	1	3.25
2	2	2	1	1	1.5	1	2	4.5
3.1	1	1	1	1	1	1	2	4
3.2	1	1	3	2	1.75	1	2	4.75

No	Frequency of activity	Frequency of impact	Legal issues	Detection	Likelihood	Significance	Risk Rating
1	2	2	5	1	10	32.5	Low
2	2	2	5	1	10	45	Low
3.1	2	2	5	1	10	40	Low
3.2	2	2	5	1	10	47.5	Low



The following assumptions were made for the completion of the Risk Matrix:

- Since the housing development would destroy aquatic habitat, it would serve no purpose to assess the area that is about to be destroyed. The outcome is predictable. It would inevitably result a “Medium” or “High” rating.
- Moreover, a direct environmental risk will predictably render a rating of high, for which a License is required. To expect the DWS head office in Pretoria to produce a License for each and every small housing development in the country would prove an enormous task, untenable, an impossible situation.
- It is assumed that the decision-making authorities will decide that the sacrifice of the aquatic habitat is permissible for the sake of providing essential housing.
- In this event, at Keimoes, the sacrifice will be small, as the area to be developed forms a miniscule part of the available sub-catchment area.
- The assessment should made provision for the fact that the affected parts of the sub-catchments are already heavily impacted.
- The assessment is best done on the drainage lines and aquatic habitat downstream and adjacent of the proposed housing scheme, as this is the only area that can realistically be assessed, given the nature of most housing developments.
- For the construction phase, the frequency of activity and the frequency of the impact, it can be reasoned that it only once, only during construction, after which it ends.
- It can be reasoned that the diversion of flow only happens during very occasional rainfall events, once in several years, during the operational phase, post-construction, of the development. The impact is permanent and would last in perpetuity. However, the altering of the flow regime will make little if any difference to the downstream PES.

These conditions and assumptions are in a high degree valid for all of the new housing developments in the arid areas in the Northern Cape.

The environmental risk, given these assumptions, came out as “Low”.

Hence, it is recommended that a General Authorization is granted for this proposed housing development. A License is not required.

## 21 Resource Economics

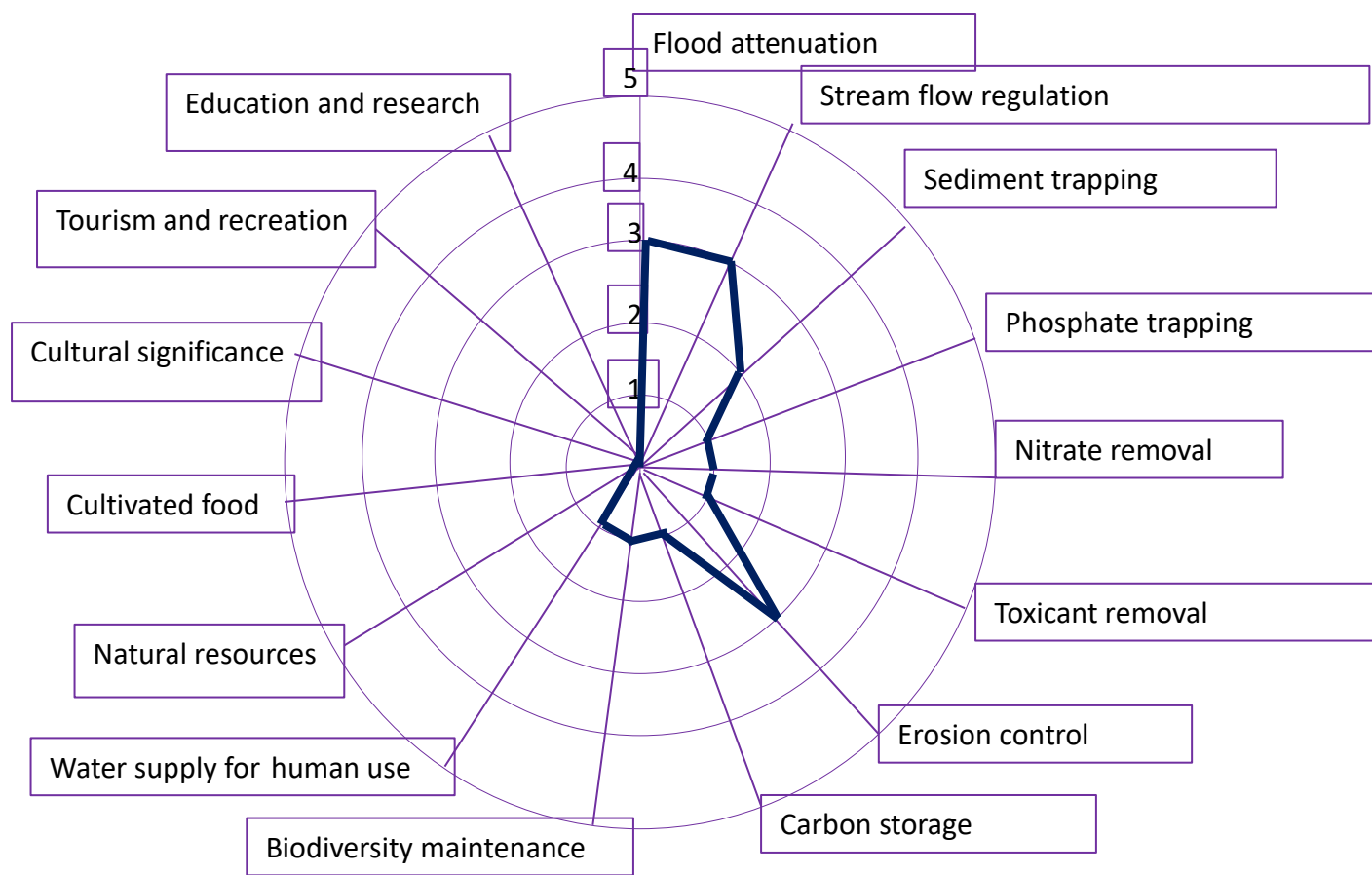
The goods and services delivered by the environment, in this case the drainage lines, is a Resource Economics concept as adapted by Kotze *et al* (2009). The methodology was designed for the assessments of wetlands, but in the case of these environments, the goods and services delivered are particularly applicable, hence it was decided to include it in the report.

The diagram (Figure 21 and 22) is an accepted manner to visually illustrate the resource economic footprint the drainage line, from the data in Table 10. The size of the star shape is important. Large star shape will attract the attention of the decision-making authorities.

**Table 10.** Goods and Services

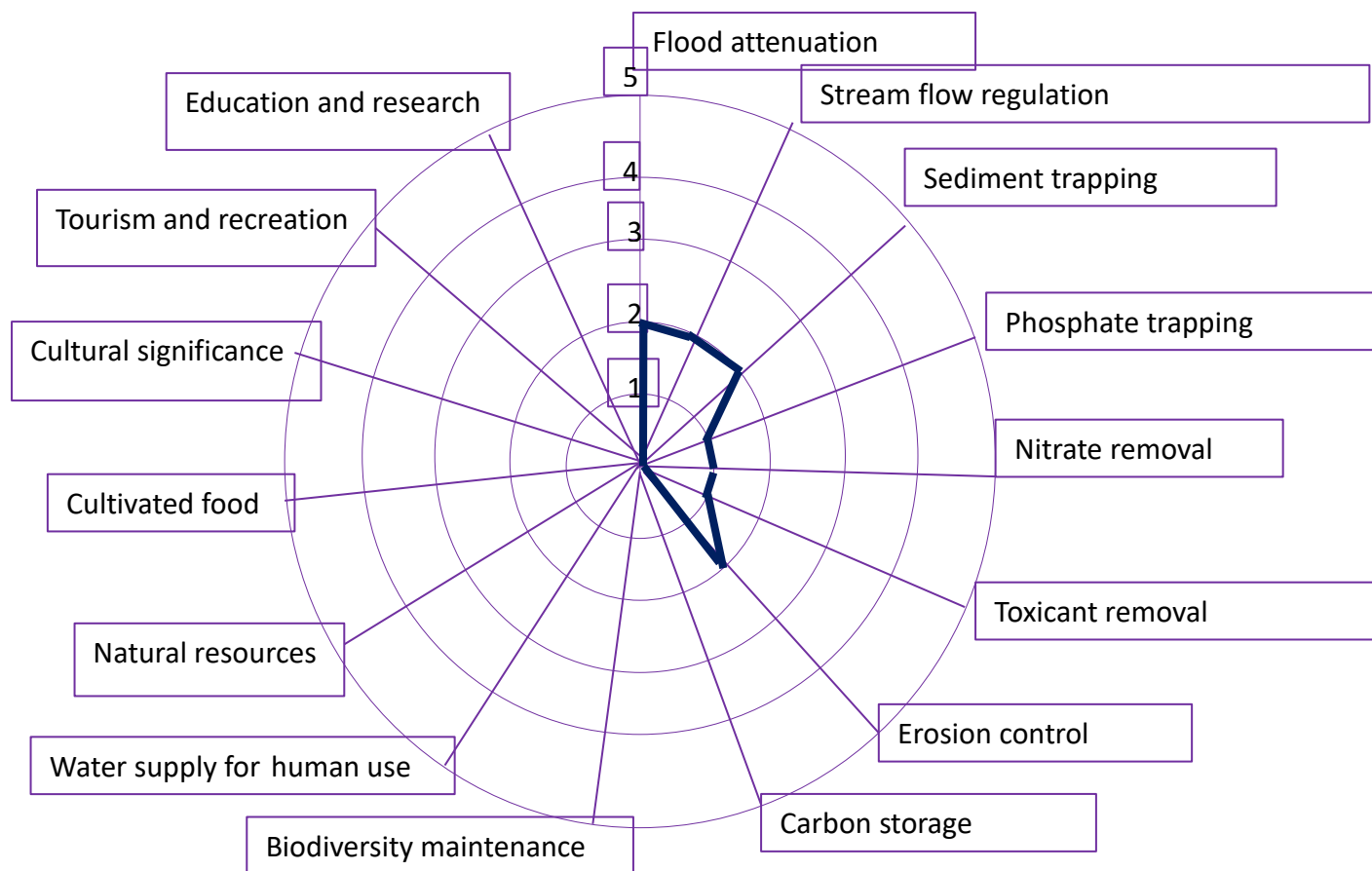
Goods & Services	Drainage Line Large Catchment	Drainage Line Adjacent Catchment
Flood attenuation	3	2
Stream flow regulation	3	2
Sediment trapping	2	2
Phosphate trapping	1	1
Nitrate removal	1	1
Toxicant removal	1	1
Erosion control	3	2
Carbon storage	1	0
Biodiversity maintenance	1	0
Water supply for human use	0	0
Natural resources	0	0
Cultivated food	0	0
Cultural significance	0	0
Tourism and recreation	0	0
Education and research	0	0

Again, these assessments were carried out for only the drainage lines directly downstream of the proposed housing scheme.



**Figure 21.** Resource Economics Footprint of the Larger Drainage Lines





**Figure 22.** Resource Economics Footprint of the Adjacent Drainage Lines

The star shapes of these spider diagrams are small to very small. The environmental goods and services of the drainage lines are extremely limited. As the houses and streets are constructed, the environmental services will decrease even more.

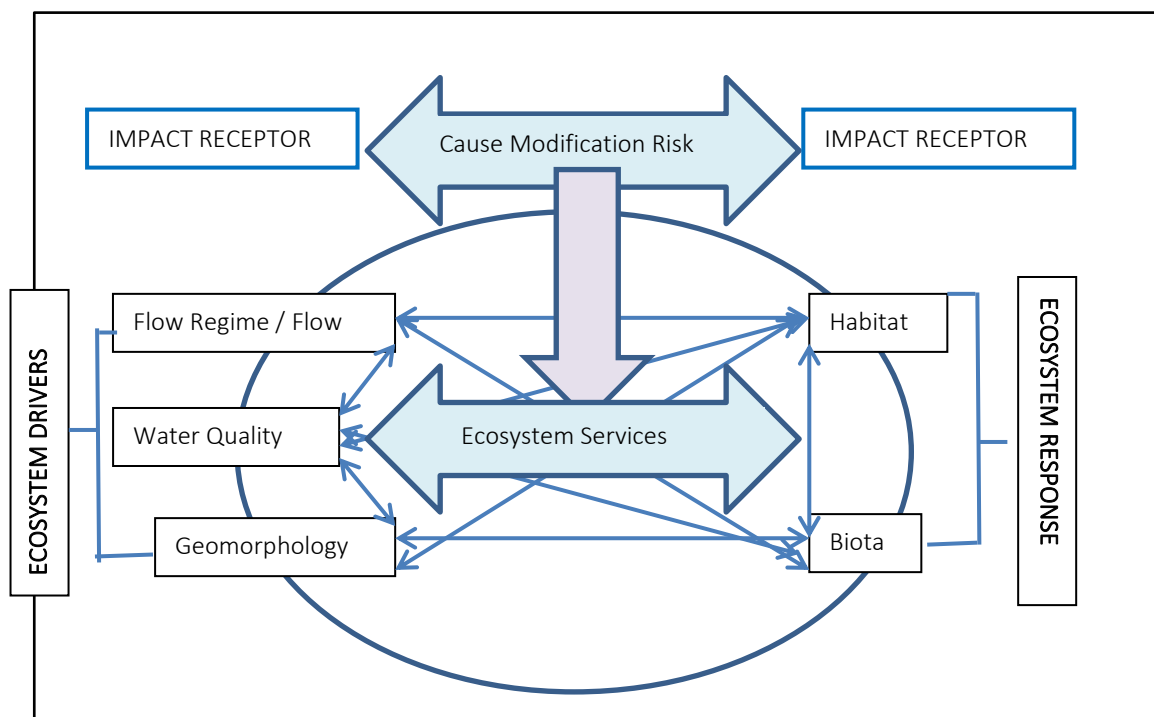
Not much will be lost in terms of services because of the proposed housing scheme.

## 22 Conclusions

An anthropogenic activity can impact on any of the ecosystem drivers or responses and this can have a knock-on effect on all of the other drivers and responses. This, in turn, will predictably impact on the ecosystem services (Figure 23). The WULA and the EAI must provide mitigation measured for these impacts.

Figure 23 has been adapted from one of the most recent DWS policy documents.

The driver of the mostly dry drainage lines is the occasional flood that follows sudden and intense rainfall events. This is followed by prolonged droughts and intense summer heat that prevents the development of any viable aquatic habitat. This is apart from shallow ground water that explains the growth of vegetation along the drainage lines.



**Figure 23** Minimum Requirements for a S21(c) and (i) Application

The proposed urban development will entirely alter the drainage lines. The lines would be replaced with streets and houses. As the aquatic habitat is insignificant, this does not indicate a loss of aquatic ecosystem functioning.

The conservation of drainage lines along the Lower Orange River deserves and demands attention by decision-making authorities, environmental practitioners, the conservation and farming community alike. As more of these drainage lines are impacted upon, and because impacts are radical by nature, because sections of drainage lines are replaced by vineyards or other forms of agriculture, or transformed

into return flow infrastructure, or housing schemes, the necessity for a widely accepted conservation policy becomes urgent as development escalates.

A percentage of still unimpacted drainage lines should be identified, prioritised and set aside for conservation. Only specified practices with no or limited impacts should be allowed in these sub-catchments and their drainage lines.

A General Authorization is the appropriate level of approval for this particular WULA. A License is not called for.

## 23 References

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## 24 Declaration of Independence

I, Dirk van Driel, as the appointed independent specialist hereby declare that I:

- Act/ed as the independent specialist in this application
- Regard the information contained in this report as it relates to my specialist input/study to be true and correct and;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management act;
- Have and will not have vested interest in the proposed activity;
- Have disclosed to the applicant, EAP and competent authority any material information have or may have to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the environmental Impact Assessment Regulations, 2010 and any specific environmental management act.
- Am fully aware and meet the responsibilities in terms of the NEMA, the Environmental Impacts Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R543) and any specific environmental management act and that failure to comply with these requirements may constitute and result in disqualification;
- Have ensured that information containing all relevant facts on respect of the specialist input / study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties facilitated in such a manner that all interested and affected parties were provided with reasonable opportunity to participate and to provide comments on the specialist input / study;
- Have ensured that all the comments of all the interested and affected parties on the specialist input were considered, recorded and submitted to the competent authority in respect of the application;
- Have ensured that the names of all the interested and affected parties that participated in terms of the specialist input / study were recorded in the register of interested and affected parties who participated in the public participation process;
- Have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable or not and;
- Am aware that a false declaration is an offence in terms of regulation 71 of GN No. R543.

Signature of the specialist:



31 January 2020

## 25 Résumé

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<b>City of Cape Town</b> Acting Head: Scientific Services, Manager: Hydrobiology.	<b>1999-2007</b>
<b>Department of Water &amp; Sanitation, South Africa</b> Senior Scientist	<b>1989 – 1999</b>
<b>Tshwane University of Technology, Pretoria</b> Head of Department	<b>1979 – 1998</b>
<b>University of Western Cape and Stellenbosch University 1994- 1998</b> part-time <ul style="list-style-type: none"><li>- Lectured post-graduate courses in Water Management and Environmental Management to under-graduate civil engineering students</li><li>- Served as external dissertation and thesis examiner</li></ul>	

### Service Positions

- Project Leader, initiator, member and participator: Water Research Commission (WRC), Pretoria.
- Director: UNESCO West Coast Biosphere, South Africa
- Director (Deputy Chairperson): Grotto Bay Home Owner's Association
- Member Dassen Island Protected Area Association (PAAC)

### Membership of Professional Societies

- South African Council for Scientific Professions. Registered Scientist No. 400041/96
- Water Institute of South Africa. Member
- South African Wetland Society

## Reports

- Process Review Kathu Wastewater Treatment Works
- Effluent Irrigation Report Tydstroom Abattoir Durbanville
- River Rehabilitation Report Slangkop Farm, Yzerfontein
- Fresh Water and Estuary Report Erf 77 Elands Bay
- Ground Water Revision, Moorreesburg Cemetery
- Fresh Water Report Delaire Graff Estate, Stellenbosch
- Fresh Water Report Quantum Foods (Pty) Ltd. Moredou Poultry Farm, Tulbagh
- Fresh Water Report Revision, De Hoop Development, Malmesbury
- Fresh Water Report, Idas Valley Development Erf 10866, Stellenbosch
- Wetland Delineation Idas Valley Development Erf 10866, Stellenbosch
- Fresh Water Report, Idas Valley Development Erf 11330, Stellenbosch
- Fresh Water Report, La Motte Development, Franschhoek
- Ground Water Peer Review, Elandsfontein Exploration & Mining
- Fresh Water Report Woodlands Sand Mine Malmesbury
- Fresh Water Report Brakke Kuyl Sand Mine, Cape Town
- Wetland Delineation, Ingwe Housing Development, Somerset West
- Fresh Water Report, Suurbraak Wastewater Treatment Works, Swellendam
- Wetland Delineation, Zandbergfontein Sand Mine, Robertson
- Storm Water Management Plan, Smalblaar Quarry, Rawsonville
- Storm Water Management Plan, Riverside Quarry
- Water Quality Irrigation Dams Report, Langebaan Country Estate
- Wetland Delineation Farm Eenzaamheid, Langebaan
- Wetland Delineation Erf 599, Betty's Bay
- Technical Report Bloodhound Land Speed Record, Hakskeenpan
- Technical Report Harkerville Sand Mine, Plettenberg Bay
- Technical Report Doring Rivier Sand Mine, Vanrhynsdorp
- Rehabilitation Plan Roodefontein Dam, Plettenberg Bay
- Technical Report Groenvlei Crusher, Worcester
- Technical Report Wiedouw Sand Mine, Vanrhynsdorp
- Technical Report Lair Trust Farm, Augrabies
- Technical Report Schouwtoneel Sand Mine, Vredenburg
- Technical Report Waboomsrivier Weir Wolseley
- Technical Report Doornkraal Sand Mine Malmesbury
- Technical Report Berg-en-Dal Sand Mine Malmesbury
- Wetland Demarcation, Osdrif Farm, Worcester
- Technical Report Driefontein Dam, Farm Agterfontein, Ceres
- Technical Report Oewerzicht Farm Dam, Greyton
- Technical Report Glen Lossie Sand Mine, Malmesbury
- Preliminary Report Stellenbosch Cemeteries
- Technical Report Toeka & Harmony Dams, Houdenberg Farm, Koue Bokkeveld
- Technical Report Kluitjieskraal Sand & Gravel Mine, Swellendam
- Fresh Water Report Urban Development Witteklip Vredenburg
- Fresh Water Report Groblershoop Resort, Northern Cape
- Fresh Water Report CA Bruwer Quarry Kakamas, Northern Cape
- Fresh Water Report, CA Bruwer Sand Mine, Kakamas, Northern Cape
- Fresh Water Report, Triple D Farms, Agri Development, Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Hopetown
- Fresh Water Report Hopetown Sewer
- Fresh Water Report Hoogland Farm Agricultural Development, Touws River



- Fresh Water Report Klaarstroom Waste Water Treatment Works
- Fresh Water Report Calvinia Sports Grounds Irrigation
- Fresh Water Report CA Bruwer Agricultural Development Kakamas
- Fresh Water Report Zwartfontein Farm Dam, Hermon
- Statement Delsma Farm Wetland, Hermon
- Fresh Water Report Lemoenshoek Farms Pipelines Barrydale
- Fresh Water Report Water Provision Pipeline Brandvlei
- Fresh Water Report Erf 19992 Upington
- Botanical Report Zwartejongensfontein Sand Mine, Stilbaai
- Fresh Water Report CA Bruwer Feldspath Mine, Kakamas
- Sediment Yield Calculation, Kenhardt Sand Mine
- Wetland Demarcation, Grabouw Traffic Center
- Fresh Water Report, Osdrift Sand Mine, Worcester
- Fresh Water Report, Muggievlag Storm Water Canal, Vredenburg
- Fresh Water Report, Marksman's Nest Rifle Range, Malmesbury
- Fresh Water Report Bruintjiesrivier Farm Dam, Bonnievale

## 26 Appendix

### 26.1 Biomonitoring Score Sheet

SASS5 Score Sheet										
Date	08 Feb 19	Taxon	Weight	Score	Taxon	Weight	Score	Taxon	Weight	Score
Locality	Orange River	Porifera	5		<b>Hemiptera</b>			<b>Diptera</b>		
	Keimoes	Coelenterata	1		Belostomatidae	3		Athericidae	10	
		Turbellaria	3		Corixidae	3		Blepharoceridae	15	
		Oligochaeta	1		Gerridae	5	5	Ceratopogonidae	5	
Coordinates	28°42' 37.12"	Huridinea	3		Hydrometridae	6		Chironomidae	2	
	20°55'07.81"	<b>Crustacea</b>			Naucoridae	7	7	Culicidae	1	
		Amphipodae	13		Nepidae	3		Dixidae	10	
DO mg/l	5.8	Potamonautidae	3		Notonectidae	3		Empididae	6	
Temperature °C	27.5	Atyidae	8	8	Pleidae	4		Ephydriidae	3	
pH	8.2	Palaemonidae	10		Veliidae	5		Muscidae	1	
EC mS/m	34	Hydracarina	8		<b>Megaloptera</b>			Psychodidae	1	
		<b>Plecoptera</b>			Corydalidae	10		Simuliidae	5	
SASS5 Score	51	Notonemouridae	14		Sialidae	8		Syrphidae	1	
Number of Taxa	7	Perlidae	12		<b>Trichoptera</b>			Tabanidae	5	
ASPT	7,3	<b>Ephemeroptera</b>			Dipseudopsidae	10		Tipulidae	5	
		Baetidae 1 sp	4		Ecmonidae	8		<b>Gastropoda</b>		
Other Biota	<i>Oreochromis</i>	Baetidae 2 sp	6	6	Hydropsychidae 1 sp	4		Ancylidae	6	
	<i>mossambica</i>	Baetidae >3 sp	12		Hydropsychidae 2 sp	6		Bulinidae	3	
	<i>Cyprinus carpio</i>	Caenidae	6		Hydropsychidae <2 sp	12		Hydrobiidae	3	
		Ephemeridae	15		Phylopotamidae	10		Lymnaeidae	3	
		Heptageniidae	13		Polycentropodidae	12		Physidae	3	
		Leptophlebiidae	9		Psychomyiidae	8		Planorbidae	3	
		Oligoneuridae	15		<b>Cased Caddis</b>			Thiaridae	3	
Comments		Polymitarcyidae	10		Barbarochthonidae	13		Viviparidae	5	
		Prosopistomatida	15		Calamoceratidae	11		<b>Pelecypoda</b>		
		Teloganodidae	12	12	Glossostomatidae	11		Corbiculidae	5	
		Trichorythidae	9		Hydroptilidae	6		Sphariidae	3	
		<b>Odonata</b>			Hydrosalpingidae	15		Unionidae	6	
		Calopterygidae	10		Leptostomatidae	10				
		Clorocyphidae	10		Leptoceridae	6				
		Chorolestidae	8		Petrothrincidae	11				
		Coenagrionidae	4		Pisulidae	10				
		Lestidae	8		Sericostomatidae	13				
		Platycnemidae	10		<b>Coleoptera</b>					
		Protoneuridae	8		Dyticidae	5	5			
		Aesthidae	8		Elmidae Dryopidae	8				
		Corduliidae	8	8	Gyrinidae	5				
		Gomphidae	6		Haliplidae	5				
		Libellulidae	4		Helodidae	12				
		<b>Lepidoptera</b>			Hydraenidae	8				
		Pyrilidae	12		Hydrophilidae	5				
					Limnichidae	10				
					Psephenidae	10				
Score				34			17			0

## 26.2 Methodology used in determining significance of impacts

The methodology to be used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives is provided in the following tables:

**Table 26.2.1** Nature and type of impact

Nature and type of impact	Description
Positive	An impact that is considered to represent an improvement to the baseline conditions or represents a positive change
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new negative factor
Direct	Impacts that result from the direct interaction between a planned project activity and the receiving environment / receptors
Indirect	Impacts that result from other activities that could take place as a consequence of the project (e.g. an influx of work seekers)
Cumulative	Impacts that act together with other impacts (including those from concurrent or planned future activities) to affect the same resources and / or receptors as the project



**Table 26.2.2** Criteria for the assessment of impacts

Criteria	Rating	Description
Spatial extent of impact	National	Impacts that affect nationally important environmental resources or affect an area that is nationally important or have macro-economic consequences
	Regional	Impacts that affect regionally important environmental resources or are experienced on a regional scale as determined by administrative boundaries or habitat type / ecosystems
	Local	Within 2 km of the site
	Site specific	On site or within 100m of the site boundary
Consequence of impact/ Magnitude/ Severity	High	Natural and / or social functions and / or processes are severely altered
	Medium	Natural and / or social functions and / or processes are notably altered
	Low	Natural and / or social functions and / or processes are slightly altered
	Very Low	Natural and / or social functions and / or processes are negligibly altered
	Zero	Natural and / or social functions and / or processes remain unaltered
Duration of impact	Temporary	Impacts of short duration and /or occasional
	Short term	During the construction period
	Medium term	During part or all of the operational phase
	Long term	Beyond the operational phase, but not permanently
	Permanent	Mitigation will not occur in such a way or in such a time span that the impact can be considered transient (irreversible)

**Table 26.2.3** Significance Rating

Significance Rating	Description
High	<p>High consequence with a regional extent and long-term duration</p> <p>High consequence with either a regional extent and medium-term duration or a local extent and long-term duration</p> <p>Medium consequence with a regional extent and a long-term duration</p>
Medium	<p>High with a local extent and medium-term duration</p> <p>High consequence with a regional extent and short-term duration or a site-specific extent and long-term duration</p> <p>High consequence with either local extent and short-term duration or a site-specific extent with a medium-term duration</p> <p>Medium consequence with any combination of extent and duration except site-specific and short-term or regional and long term</p> <p>Low consequence with a regional extent and long-term duration</p>
Low	<p>High consequence with a site-specific extent and short-term duration</p> <p>Medium consequence with a site-specific extent and short-term duration</p> <p>Low consequence with any combination of extent and duration except site-specific and short-term</p> <p>Very low consequence with a regional extent and long-term duration</p>
Very low	<p>Low consequence with a site-specific extent and short-term duration</p> <p>Very low consequence with any combination of extent and duration except regional and long term</p>
Neutral	Zero consequence with any combination of extent and duration

**Table 26.2.4** Probability, confidence, reversibility and irreplaceability

Criteria	Rating	Description
Probability	Definite	>90% likelihood of the impact occurring
	Probable	70 – 90% likelihood of the impact occurring
	Possible	40 – 70% likelihood of the impact occurring
	Unlikely	<40% likelihood of the impact occurring
Confidence	Certain	Wealth of information on and sound understanding of the environmental factors potentially affecting the impact
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact
Reversibility	Reversible	The impact is reversible within 2 years after the cause or stress is removed
	Irreversible	The activity will lead to an impact that is in all practical terms permanent
Irreplaceability	Replaceable	The resources lost can be replaced to a certain degree
	Irreplaceable	The activity will lead to a permanent loss of resources.



## 26.3 Risk Matrix Methodology

### RISK ASSESSMENT KEY (Referenced from DWA RISK-BASED WATER USE AUTHORISATION APPROACH AND DELEGATION GUIDELINES)

#### Negative Rating

TABLE 1- SEVERITY

How severe does the aspects impact on the environment and resource quality characteristics (flow regime, water quality, geomorphology, biota, habitat)

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means	

TABLE 2 – SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and/or REC not impacted
One month to one year, PES, EIS and/or REC impacted but no change in status
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation
Life of the activity, PES, EIS and/or REC permanently lowered
More than life of the organisation/facility, PES and EIS scores, a E or F

TABLE 4 – FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES

How is the activity governed by legislation?

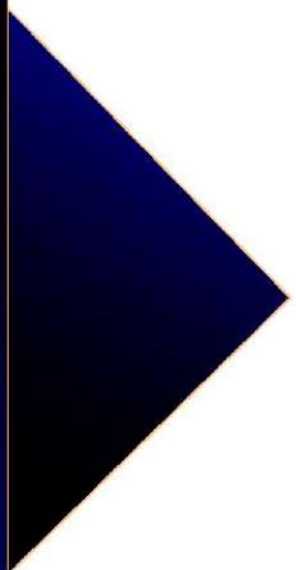
No legislation
Fully covered by legislation (wetlands are legally governed)
Located within the regulated areas

<b>TABLE 7 – DETECTION</b>	
How quickly can the impacts/risks of the activity be observed on the environment (water resource)	
Immediately	
Without much effort	
Need some effort	
Remote and difficult to observe	
Covered	

<b>TABLE 8: RATING CLASSES</b>		
<b>RATING</b>	<b>CLASS</b>	<b>MANAGEMENT DESCRIPTION</b>
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	(M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale
A low risk class must be obtained for all activities to be considered for a GA		

<b>TABLE 9: CALCULATIONS</b>
Consequence = Severity + Spatial Scale + Duration
Likelihood=Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Significance \Risk= Consequence X Likelihood

## ANNEXURE I: FINAL SCOPING REPORT





**PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

**FINAL ENVIRONMENTAL SCOPING REPORT  
AND PLAN OF STUDY**



**JULY 2020**

**KAI !GARIB LOCAL MUNICIPALITY**

**PROPOSED FORMALISATION OF GAMAKOR LOW COST  
HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF  
FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480,  
KEIMOE, GORDONIA RD, KAI !GARIB LOCAL  
MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY,  
NORTHERN CAPE PROVINCE**

---

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## CONTENTS

1. INTRODUCTION .....	6
2. NEED AND DESIRABILITY .....	7
2.1 NEED .....	7
2.2 DESIRABILITY .....	8
3. LEGAL REQUIREMENTS .....	10
3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA.....	10
3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) .....	10
3.3 NATIONAL HERITAGE RESOURCES ACT.....	13
3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES.....	13
3.5 NATIONAL WATER ACT(ACT NO. 36 OF 1998).....	14
3.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT.....	14
3.7 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (ACT 16 OF 2013).....	14
4. ALTERNATIVES .....	15
4.1 SITE ALTERNATIVES .....	15
4.2 ACTIVITY ALTERNATIVES .....	15
4.3 LAYOUT ALTERNATIVES.....	15
4.3 NO-GO ALTERNATIVE .....	15
5. SITE DESCRIPTION .....	16
5.1 LOCATION .....	16
5.2 VEGETATION .....	21
5.3 FRESHWATER .....	22
5.4 CLIMATE.....	23
5.5 SOCIO-ECONOMIC CONTEXT .....	24
5.6 HERITAGE FEATURES.....	26
6. SERVICES.....	27
6.1 WATER .....	27
6.2 SEWER .....	27
6.3 ROADS.....	27
6.4 STORMWATER .....	27
6.5 SOLID WASTE (REFUSE REMOVAL).....	27
6.6 ELECTRICITY .....	27
7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS.....	28
8. DETAILS OF THE PUBLIC PARTICIPATION PROCESS .....	30
9. PLAN OF STUDY FOR THE EIA.....	32
9.1 TASKS TO BE UNDERTAKEN.....	32
9.2 PUBLIC PARTICIPATION AND INTERESTED AND AFFECTED PARTIES.....	33
9.3 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS .....	34
10. CONCLUSION AND RECOMMENDATIONS.....	37
11. DETAILS AND EXPERTISE OF THE EAP.....	38



## FIGURES

<b>Figure 1:</b> Kai !Garib Municipality IDP 2017 – 2018 - Housing Demand	8
<b>Figure 2:</b> Google Earth Aerial image showing the locality of the site	9
<b>Figure 3:</b> Google Earth Aerial image of the surrounding landscape	16
<b>Figure 4:</b> General view of part of the proposed site	17
<b>Figure 5:</b> General view of part of the proposed site	17
<b>Figure 6:</b> General view of part of the proposed site	18
<b>Figure 7:</b> General view of part of the proposed site	18
<b>Figure 8:</b> General view of part of the proposed site	19
<b>Figure 9:</b> General view of part of the proposed site	19
<b>Figure 10:</b> General view of part of the proposed site	20
<b>Figure 11:</b> General view of part of the proposed site	20
<b>Figure 12:</b> General view of part of the proposed site	21
<b>Figure 13:</b> SANBI Vegetation map of the area	22
<b>Figure 14:</b> SANBI NFEPA map of the area	23
<b>Figure 15:</b> Summary of the EIA process and public participation process	33

## TABLES

<b>Table 1:</b> Criteria used for evaluating impacts	34
<b>Table 2:</b> Impact Statement Example	36

## APPENDICES

APPENDIX 1A:	INITIAL NOTIFICATION LETTER TO I&APS
APPENDIX 1B:	NEWSPAPER ADVERTISEMENTS (AND PROOF)
APPENDIX 1C:	NOTIFICATION LETTERS (AND PROOF)
APPENDIX 1D:	SITE NOTICES AND LETTER DROPS (AND PROOF)
APPENDIX 1E:	INITIAL COMMENTS RECEIVED AND RESPONSES
APPENDIX 1F:	INITIAL COMMENTS AND RESPONSE REPORT
APPENDIX 1G:	BIODIVERSITY IMPACT ASSESSMENT
APPENDIX 1H:	HERITAGE IMPACT ASSESSMENT
APPENDIX 1I:	FRESHWATER REPORT
APPENDIX 1J:	SITE CO-ORDINATES
APPENDIX 1K:	LIST OF I&APS
APPENDIX 1L:	S240 NOTIFICATION ON DRAFT SCOPING REPORT
APPENDIX 1M:	DRAFT SCOPING REPORT COMMENTS RECEIVE AND RESPONSES
APPENDIX 1N:	DRAFT SCOPING REPORT COMMENTS AND RESPONSES REPORT

## ACRONYMS

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DENC	Department of Environment and Nature Conservation
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
WULA	Water Use Licence Application

# 1. INTRODUCTION

## 1.1 BACKGROUND

Consideration is being given to the development of a new township, consisting of low income housing, at Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgqawu District Municipality, Northern Cape.

The applicant is Kai !Garib Local Municipality who will undertake the activity should it be approved. EnviroAfrica CC has been appointed as the independent Environmental Assessment Practitioner ("EAP") responsible for undertaking the relevant Environmental Impact Assessment ("EIA") and the Public Participation Process ("PPP") required in terms of the National Environmental Management Act (Act 107 of 1998) ("NEMA").

This Scoping Report, which will be submitted to the Department of Environment and Nature Conservation ("DE&NC") for consideration, forms part of the EIA process.

The purpose of this Final Environmental Scoping Report is to describe the proposed project, the process followed to date, to present alternatives and to list issues identified for further study and comment by specialists.

Should the EIA process be authorised by DE&NC, the Specialist Studies (noted in Section 8) will be undertaken and the significant issues (noted in Section 6) will be investigated and assessed during the next phase of this application.

## 1.2 DESCRIPTION OF THE PROPOSED ACTIVITY

Kai !Garib Municipality is proposing that formalised and develop low cost housing in the Gamakor community located within Keimoes.

The study area are as follows:

- PORTION 0 OF FARM KOUSAS NO. 459
- PORTION 128 OF FARM KOUSAS NO. 459
- Erf 1470
- Erf 1474
- Erf 1480

The project entails the formalisation of approximately 1500 erven for the community of Gamakor, Keimoes and the current zoning of the site is Agricultural Zone I and Undetermined. A Spatial Planning Land Use Application ("SPLUMA") application will be submitted for the rezoning and subdivision of land use change for rezoning to various land uses for the community of Gamakor, and subdivision of 1500 erven, including the public streets and any other land uses needed. The new proposed land uses will include the following land uses: Residential Zone IV, Open Space Zone I, and Transport Zone II. The project includes the associated infrastructure such as water, electricity, sewage, and solid waste removal. The total area to be developed measures 104 (one hundred and four) hectares.

The site is located in Gamakor, Keimoes, in the Kai !Garib Municipality, Northern Cape. Please refer to Appendix 1J for the site co-ordinates.



## 2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, as amended, EIA 2014 regulations the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e. the question of what is the most sustainable use of land.

### 2.1 NEED

Housing is a national need, including in the Kai Garib Local Municipality.

According to the Kai Garib Municipality, the proposed development represents a significant step towards service delivery and housing objectives within the municipality and broader Keimoes area. As such, this initiative is a positive step towards better governance and service delivery and will benefit the broader Keimoes community. Furthermore, this development will not only meet the pressing needs of adequate housing within the municipality but will also be in line to support of the municipal IDP objectives to provide housing for the poor and decrease the city’s housing backlog as well as fulfil the Constitutional mandate to provide adequate housing and basic services to citizens.

According to the Kai Garib Municipality’s Integrated Development Plan (IDP 2017 – 2018), ... *the municipality has indicated that there is a pressing need for houses, especially low cost houses, as well as serviced plots within all of the communities within the Kai !Garib area. However, it is quite satisfying to see that a great deal of progress was made in the delivering brick houses to communities since 1994. Unfortunately, the communities need for houses exceed the speed at which houses are built on individual erven.*

*According to the Census 2011 (Stats SA) 88.4 % of the population live in formal dwellings and 43.1 % households live in houses which they own and have fully paid off. However, according to service delivery data from the Municipality, the number of informal settlements is growing overnight and the demand for service provision in these areas pose great challenges.*

**Table 14.6: Housing Demand**

WARDS	1	2	3	4	5	6	7	8	9	TOTAL
<b>NEEDS BASED ON LAND USE SURVEY AND OUTSTANDING PROJECTS</b>										
Informal Structures on Stands	138	39	50	0	93	0	17	0	0	337
Informal Structures in backyards & landless	83	8	185	0	62	0	54	0	2	394
<b>LAND NEEDED</b>										
Land needed in ha for landless and backyard dwellings (Stand size 400m <sup>2</sup> )	4.742	0.457	10.571	0	3.542	0	3.085	0	0.114	22.838ha
<b>ADDITIONAL HOUSEHOLDS, PLANNED PROJECTS AND LAND NEEDS</b>										
Expected additional households 2014-2019	153	95	102	84	78	86	65	89	83	835
Expected land needs (ha) based on 5 year growth (Stand size 400m <sup>2</sup> )	8.742	5.428	5.828	4.80	4.457	4.914	3.714	5.085	4.742	47.71ha
<b>PREFERRED HOUSING PROGRAMMES in %</b>										
Fully subsidised (low cost/rental/ Informal Settlements Upgrading Programme	10 112	7572	7984	5611	4423	6988	4447	5163	5669	57 969
Institutional/GAP/FLI SP Housing/People's Housing	167	166	316	179	302	242	111	132	256	1 871
Bonded housing	1129	453	1217	585	774	455	298	256	754	5 921

Source: Kai !Garib Local Municipality, 2015

**Figure 1: Kai !Garib Municipality IDP 2017 – 2018 - Housing Demand**

## 2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed development.

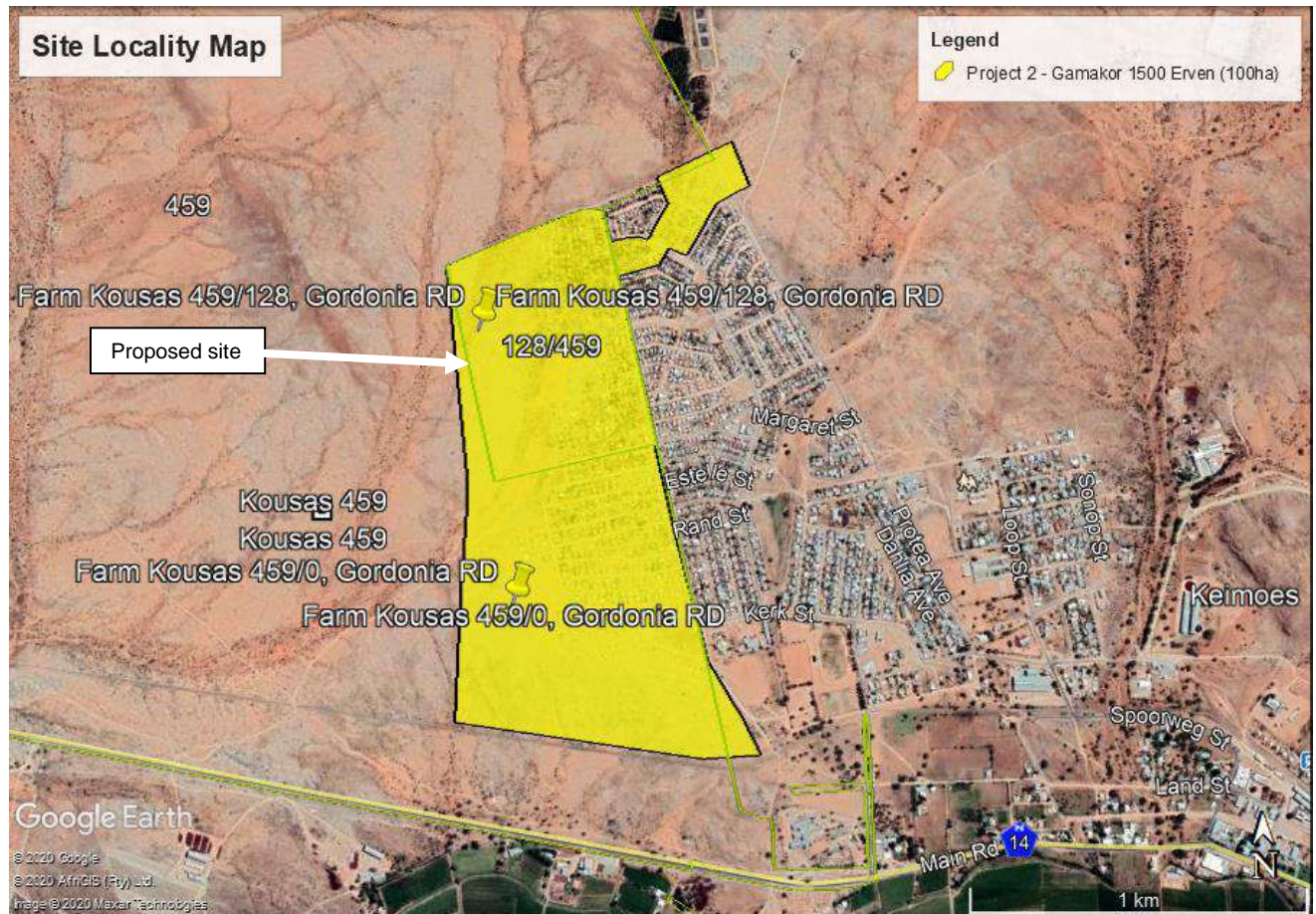
### 2.2.1 Location and Accessibility

The proposed location is considered to be a viable option. The proposed site is adjacent to the existing residential area of Gamakor, Keimoes, allowing accessibility and linking to the existing services infrastructure. Any upgrades or additional services infrastructure that will be required will be investigated and included in the Environmental Impact Report ("EIR").

The desirability and location of the proposed development will be further investigated in the Environmental Impact Report.

### 2.2.2 Compatibility with the Surrounding Area

The proposed site is directly adjacent to the existing residential area of Gamakor within Keimoes. As stated above, this would provide accessibility and allow the proposed development to link to the existing services infrastructure.



**Figure 2:** Google Earth image showing the locality of the site (yellow polygon). The proposed development will be an extension of the existing township located to the west.



### 3. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA) ("NEMA"), to be read with section 24 (5): NEMA Environmental Impact Assessment ("EIA") Regulations 2014, as amended. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

#### 3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

#### 3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (Act 107 of 1998) ("NEMA"), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment ("EIA").

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed housing development:

Government Notice R327 (Listing Notice 1) listed activities:

- 9 The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;
  - (i) with an internal diameter of 0,36 metres or more; or
  - (ii) with a peak throughput of 120 litres per second or more;
 excluding where;
  - a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or
  - b) where such development will occur within an urban area.

- 10** The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes
- (i) with an internal diameter of 0,36 metres or more; or
  - (ii) with a peak throughput of 120 litres per second or more;
- excluding where;
- a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or
  - b) where such development will occur within an urban area.
- 12** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
  - (ii) infrastructure or structures with a physical footprint of 100 square metres or more;
- where such development occurs;
- (a) within a watercourse;
  - (b) in front of a development setback; or
  - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
- 19** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;
- (a) will occur behind a development setback;
  - (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
  - (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.
- 24** The development of a road -
- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or
  - (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;
- but excluding a road—
- (a) which is identified and included in activity 27 in Listing Notice 2 of 2014;
  - (b) where the entire road falls within an urban area; or
  - (c) which is 1 kilometre or shorter.
- 28** Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:
- (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or
  - (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;
- excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.

Government Notice R325 (Listing notice 2) listed activities:

- 15** 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.

Government Notice R324 (Listing notice 3) listed activities:

- 4** The development of a road wider than 4 metres with a reserve less than 13.5 metres
- 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
- 14** The development of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;
  - (ii) infrastructure or structures with a physical footprint of 10 square metres or more;**
- where such development occurs;
- (a) within a watercourse;
  - (b) in front of a development setback; or
  - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;
- Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;

An Application Form has been submitted to DE&NC on 18 March 2020 and EnviroAfrica as the appointed Environmental Assessment Practitioner ("EAP") is still awaiting the acknowledgement letter for the NEMA Application Form. This Scoping Process is being undertaken to identify potential issues.

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural and social interests. The activity seeks to provide additional employment and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people, especially developmental and social benefits, as well providing additional employment and economic development opportunities.*
- Development will be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures will be included in the Environmental Management Programme ("EMPr").*
- Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the EMPr – *this will be included in the EIR.*
- The use of non-renewable natural resources will be responsible and equitable.



- The negative impacts on the environment and on people's environmental rights will be anticipated, investigated and prevented, and where they cannot be prevented, will be minimised and remedied.
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process.
- The social, economic and environmental impacts of the activity will be considered, assessed and evaluated, including the disadvantages and benefits.
- The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

### 3.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency ("SAHRA") is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent;*
- *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

### 3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEA&DP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
  - ✓ *Guideline on Transitional Arrangements*
  - ✓ *Generic Terms of Reference for EAPs and Project Schedules*
  - ✓ *Guideline on Alternatives*
  - ✓ *Guideline on Public Participation*
  - ✓ *Guideline on Exemption Applications*

- ✓ *Guideline on Appeals*
- ✓ *Guideline on Need and Desirability*
- Department of Environmental Affairs and Tourism (DEAT) *Integrated Environmental Management Information Series*

### **3.5 NATIONAL WATER ACT**

Besides the provisions of NEMA for this EIA process, the proposed development may also require authorizations under the National Water Act (Act NO. 36 of 1998). The Department of Water and Sanitation (DWS), who administer that Act, will be a leading role-player in the EIA.

If, and as required by the Department of Water and Sanitation, a Water Use Licence Application (WULA) may be compiled and submitted.

### **3.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT**

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities. The need to protect listed ecosystems is addressed (*Section 54*).

### **3.7 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (ACT 16 OF 2013)**

The subject area falls under the jurisdiction of Kai !Garib local municipality and the appropriate zoning and subdivision would need to be allocated in order to permit the development of the land for the intended purpose.

## **4. ALTERNATIVES**

Alternatives to the proposed development are very limited and have therefore not been considered for the following reasons described below.

### **4.1 SITE ALTERNATIVES**

The proposed site is the only viable site available at this stage and the only one that will be investigated in this application. Housing is a constant need in the municipality, with other sites possibly earmarked for residential development that will not form part of this application. These will be addressed in the Environmental Impact Assessment Report.

### **4.2 ACTIVITY ALTERNATIVES**

Activity alternatives are also very limited with no feasible alternatives besides residential development to assess. Due to the need for housing in the Kai !Garib Local Municipality, the housing development and associated infrastructure on the property is therefore the only activity considered.

The development may include a number of different land-uses however, besides just residential opportunities. These will be investigated during the Environmental Impact Assessment Report phase.

### **4.3 LAYOUT ALTERNATIVES**

Various layout alternatives will be investigated during the Environmental Impact Assessment Report. These will be compiled with input from the municipality and its requirements, as well as input and/or recommendations of the various specialists, as well as input from Interested and Affected Parties, including the community.

### **4.4 NO-GO ALTERNATIVE**

This is the option of not developing the proposed residential development.

Although the no-go development might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not constructing the residential development will not be realised. The need for additional housing opportunities in the Kai !Garib Local Municipality will not be realised. These potential negative and/or positive environmental impacts will be assessed in the Environmental Impact Assessment Report.



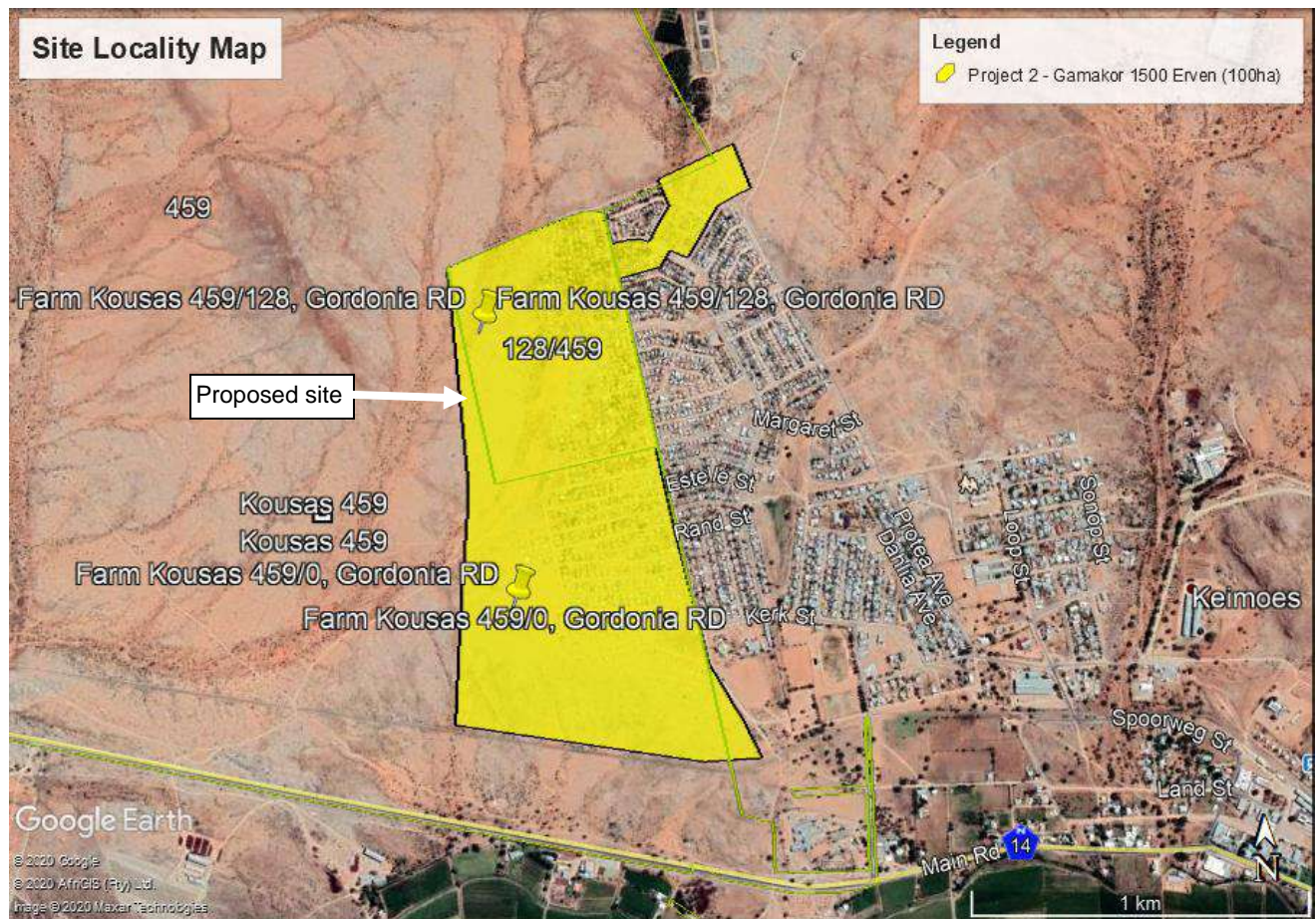
## 5. SITE DESCRIPTION

### 5.1 LOCATION

The proposed site is located along Gordonia Road, adjacent to the existing residential area in Gamakor, Keimoes.

The study area is as follows:

- Portion 0 of Farm Kousas No. 459;
- Portion 128 of Farm Kousas No. 459;
- Erf 1470, Keimoes;
- Erf 1474, Keimoes; and
- Erf 1480.



**Figure 3:** Google Earth Aerial image of the surrounding landscape.



**Figure 4:** General view of part of the proposed site, looking west. The existing informal dwellings can be seen in the background.



**Figure 5:** General view of part of the proposed site, looking north. The existing informal structures can be seen in the background.





**Figure 6:** General view of part of the proposed site, looking in a north-western direction. The existing informal structures can be seen in the background. A number of alien trees present on site.



**Figure 7:** General view of part of the proposed site, looking south-west. A number of alien trees are found on site.





**Figure 8:** General view of part of the proposed site, looking south-west. A number of alien trees are found on site.



**Figure 9:** General view of part of the proposed site, looking south-west. A number of alien trees are found on site.



**Figure 10:** General view of part of the proposed site, looking north-west. The existing informal structures can be seen in the background.



**Figure 11:** General view of part of the proposed site, looking north-west. The existing informal structures can be seen in the background.



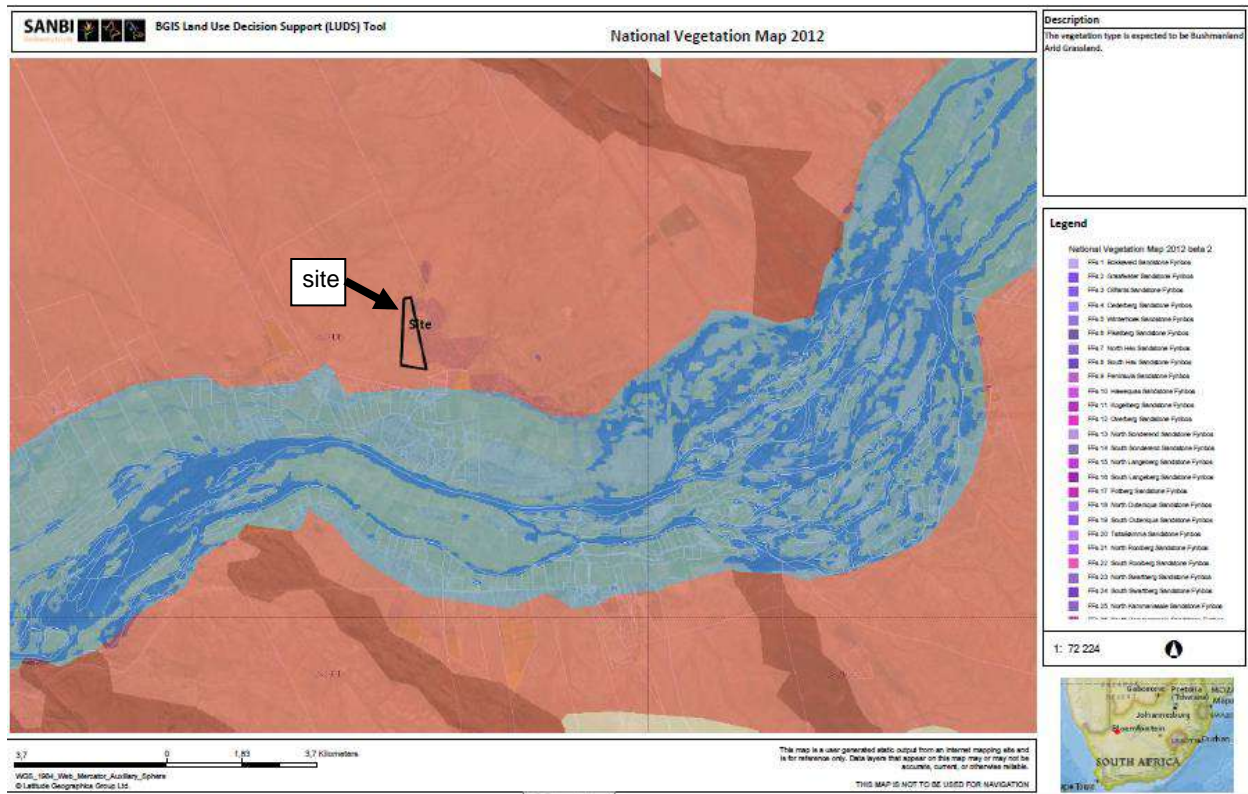
**Figure 12:** General view of the site as viewed from Alwyn Street, looking in a western direction.

## 5.2 VEGETATION

The proposed site of the residential development is partly developed and has some natural vegetation present. The edges of the site, especially adjacent to the existing residential areas (along Alwyn Street), are heavily disturbed. This can be seen in figures 4 – 12 above. Three *Vachellia erioloba* (Camel Thorn) trees (NFA protected) and five NCNCA protected plant was observed. It is recommended that the Camel thorn trees are protected and that Aloe and Boscia plants are search & rescued (refer to **Appendix 1G** for the Botanical Impact Assessment ("BIA")).

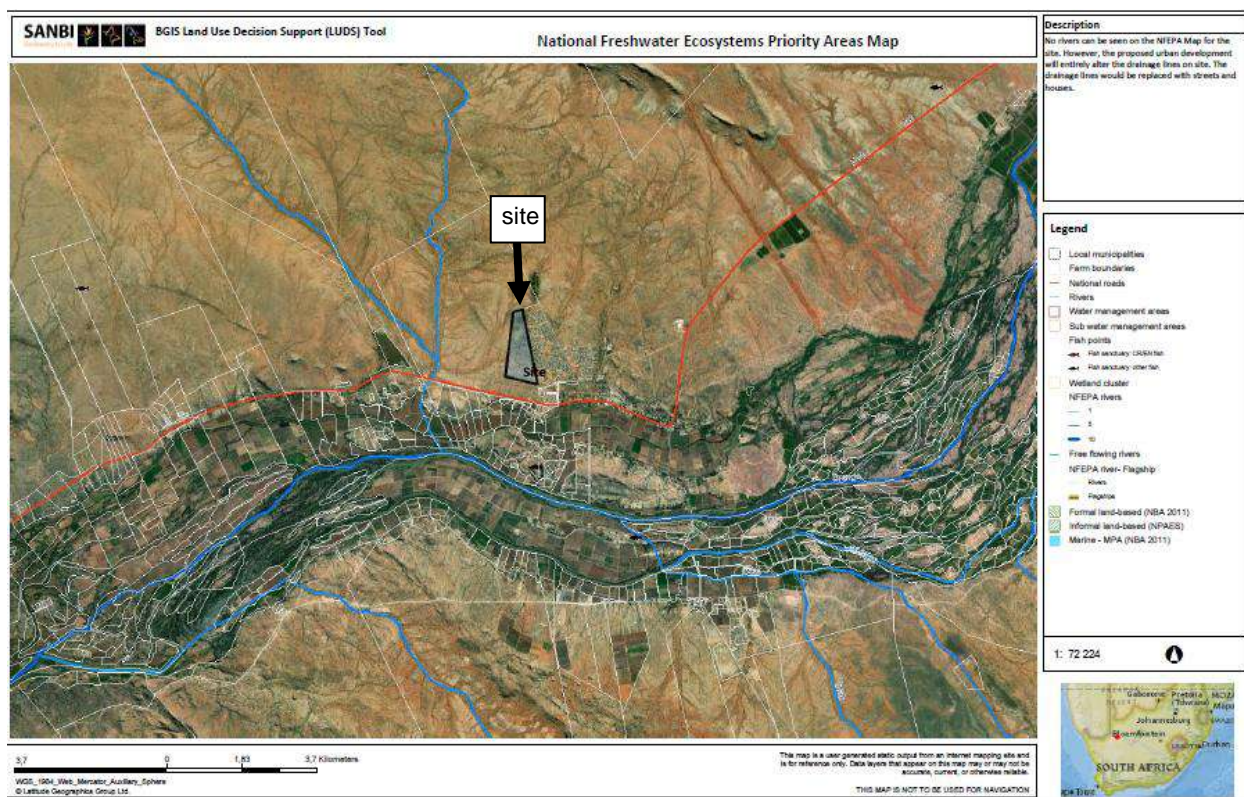
According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) the vegetation type is expected to be Bushmanland Arid Grassland. Bushmanland Arid Grassland is not considered a threatened vegetation type, with more than 99% remaining. However only 4% is formally conserved (Augrabies Falls National Park). According to the 2016 Northern Cape CBA map, the proposed development footprint is located within a terrestrial CBA. Unfortunately, there are no logical alternative sites available to the Kai !Garib Municipality, which will not impact on the CBA. The site will not impact on any centre of endemism. Please refer to **Appendix 1G** for the BIA and figure 13 below.





### 5.3 FRESHWATER

From the SANBI National Freshwater Ecosystem Priority Areas (“NFEPA”) map (see Figure 14 below), there are no natural watercourses on the proposed site. However, from the site visit and Google earth images, and the Freshwater Report (**Appendix 1I**), the proposed housing development transverse a number of drainage lines. According to the Freshwater Report (attached as **Appendix 1I**), the proposed housing development will entirely alter the drainage lines. The lines would be replaced with streets and houses. However, as the aquatic habitat is insignificant, this does not indicate a loss of aquatic ecosystem functioning. A General Authorisation is required from Department of Water and Sanitation (“DWS”). The impact of the proposed development on these watercourses are to investigated in the Environmental Impact Assessment Report.



**Figure 14:** SANBI NFEPA map of the area.

## 5.4 CLIMATE

Keimoes normally receives about 84mm of rain per year, with most rainfall occurring mainly during autumn. The chart below (Figure 1, lower left) shows the average rainfall values for Keimoes per month. It receives the lowest rainfall (0mm) in June and the highest (27mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Keimoes range from 19.8°C in June to 33°C in January. The region is the coldest during July when the mercury drops to 3°C on average during the night. The rainfall is really low, tantamount to desert conditions. Keimoes is located on the southern edge of the Kalahari Desert. The larger part of the economy and agriculture entirely depends on irrigation out of the Orange river. Nevertheless, violent thunderstorms occur from time to time, with rainfall of 40mm and more over a period of 24 hours. This may cause flow in the drainage lines

## 5.5 SOCIO-ECONOMIC CONTEXT

According to the Kai !Garib Municipality Integrated Development Plan (IDP) (Final IDP 2019 – 2020), the municipal area falls within the ZF Mgcawu District Municipality's Area and consists of 3 large towns: Kakamas, Keimoes and Kenhardt. According to the municipality's Spatial Development Framework [SDF], adopted in October 2012, the Municipal area occupies 26 358km<sup>2</sup>, the equivalent of 25.71% of the mentioned District Municipality and 2.16% of the whole of South Africa.

The population projection of Kai !Garib Local Municipality shows an estimated average annual growth rate of 0.9% between 2018 and 2023. The average annual growth rate in the population over the projection period for ZF Mgcawu District Municipality, Northern Cape Province and South Africa is 1.2%, 1.3% and 1.3% respectively. The Northern Cape Province is estimated to have an average growth rate of 1.3% which is very similar than that of the Kai !Garib Local Municipality. The South Africa as a whole is estimated to have an average annual growth rate of 1.3% which is very similar than that of Kai !Garib's projected growth rate (Kai !Garib Municipality IDP 2019 – 2020).

In 2018, the Kai !Garib Local Municipality's population consisted of 28.46% African (20 100), 7.00% White (4 930), 63.32% Coloured (44 600) and 1.23% Asian (865) people. The largest share of population is within the young working age (25-44 years) age category with a total number of 24 200 or 34.4% of the total population. The age category with the second largest number of people is the babies and kids (0-14 years) age category with a total share of 21.3%, followed by the teenagers and youth (15-24 years) age category with 14 900 people. The age category with the least number of people is the retired / old age (65 years and older) age category with only 4 500 people is indicated by the statistics (Kai !Garib Municipality IDP 2019 – 2020).

With the Coloured population group representing 63.3% of the Kai !Garib Local Municipality's total population, the overall population pyramid for the region will mostly reflect that of the African population group. The chart below compares Kai !Garib's population structure of 2018 to that of South Africa.

- There is a significantly larger share of young working age people - aged 20 to 34 (32.8%) - in Kai !Garib, compared to the national picture (27.5%).
- The area appears to be a migrant receiving area, with many of people migrating into Kai !Garib, either from abroad, or from the more rural areas in the country looking for better opportunities.
- Fertility in Kai !Garib is significant lower compared to South Africa as a whole.
- Spatial policies changed since 1994.
- The share of children between the ages of 0 to 14 years is significant smaller (21.3%) in Kai !Garib compared to South Africa (29.0%). Demand for expenditure on schooling as percentage of total budget within Kai !Garib Local Municipality will therefore be lower than that of South Africa (Kai !Garib Municipality IDP 2019 – 2020).

If the number of households is growing at a faster rate than that of the population it means that the average household size is decreasing, and vice versa. In 2018, the Kai !Garib Local Municipality comprised of 18 400 households. This equates to an average annual growth rate of 0.24% in the number of households from 2008 to 2018. With an average annual growth rate of 0.87% in the total population, the average household size in the Kai !Garib Local Municipality is by implication increasing. This is confirmed by the data where the average household size in 2008 increased from approximately 3.6 individuals per household to 3.8 persons per household in 2018 (Kai !Garib Municipality IDP 2019 – 2020).



In 2018, there were 37 100 people living in poverty, using the upper poverty line definition, across Kai !Garib Local Municipality - this is 5.92% lower than the 39 400 in 2008. The percentage of people living in poverty has decreased from 59.57% in 2008 to 51.92% in 2018, which indicates a decrease of 7.65 percentage points (Kai !Garib Municipality IDP 2019 – 2020).

Within Kai !Garib Local Municipality, the number of people without any schooling decreased from 2008 to 2018 with an average annual rate of -3.17%, while the number of people within the 'matric only' category, increased from 6,420 to 8,920. The number of people with 'matric and a certificate/diploma' increased with an average annual rate of 1.35%, with the number of people with a 'matric and a Bachelor's' degree increasing with an average annual rate of 0.07%. Overall improvement in the level of education is visible with an increase in the number of people with 'matric' or higher education (Kai !Garib Municipality IDP 2019 – 2020).

The number of people without any schooling in Kai !Garib Local Municipality accounts for 29.53% of the number of people without schooling in the district municipality, 5.26% of the province and 0.15% of the national. In 2018, the number of people in Kai !Garib Local Municipality with a matric only was 8,920 which is a share of 20.33% of the district municipality's total number of people that has obtained a matric. The number of people with a matric and a Postgrad degree constitutes 15.53% of the district municipality, 2.59% of the province and 0.03% of the national (Kai !Garib Municipality IDP 2019 – 2020). A total of 42 800 individuals in Kai !Garib Local Municipality were considered functionally literate in 2018, while 13 400 people were considered to be illiterate. Expressed as a rate, this amounts to 76.11% of the population, which is an increase of 0.1 percentage points since 2008 (66.12%). The number of illiterate individuals decreased on average by -2.27% annually from 2008 to 2018, with the number of functional literate people increasing at 2.63% annually (Kai !Garib Municipality IDP 2019 – 2020).

Kai !Garib Local Municipality's functional literacy rate of 76.11% in 2018 is lower than that of ZF Mgcawu at 79.67%, and is lower than the province rate of 78.61%. When comparing to National Total as whole, which has a functional literacy rate of 84.42%, it can be seen that the functional literacy rate is higher than that of the Kai !Garib Local Municipality (Kai !Garib Municipality IDP 2019 – 2020).

The agricultural sector is still the main economic sector who made the biggest contribution to the economy of Kai !Garib. The Agriculture sector is also a major employer in the Municipality in terms of all formal employment. It is also the sector with the largest potential for economic growth. The commercial farmers farm especially with grapes for export, raisins and wine, while citrus types of fruit are also becoming more prevalent in the area (Kai !Garib Municipality IDP 2019 – 2020).

The municipality has indicated that there is a pressing need for houses, especially low cost houses, as well as serviced plots within all of the communities within the Kai !Garib area. However, it is quite satisfying to see that a great deal of progress was made in the delivering brick houses to communities since 1994. Unfortunately, the communities need for houses exceed the speed at which houses are built on individual erven (Kai !Garib Municipality IDP 2019 – 2020). According to the Census 2011 (Stats SA) 88.4 % of the population live in formal dwellings and 43.1 % households live in houses which they own and have fully paid off. However, according to service delivery data from the Municipality, the number of informal settlements is growing overnight and the demand for service provision in these areas pose great challenges. When looking at the formal dwelling unit backlog (number of households not living in a formal dwelling) over time, it can be seen that in 2007 the number of households not living in a formal dwelling were 1 840 within Kai !Garib Local Municipality. From 2007 this number increased annually at 4.51% to 2 860 in 2017 (Kai !Garib Municipality IDP 2019 – 2020).

## 5.6 HERITAGE FEATURES

Due to the nature and size of the proposed development, potential heritage resources may be affected by the proposed development. Heritage resources include any of the following, as defined by the National Heritage Resources Act (Act 25 of 1999):

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- Ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment; places to which oral traditions are attached or which are associated with living heritage; historical settlements and townscapes;
- landscapes and natural features; geological sites of scientific or cultural importance;
- archaeological and palaeontological sites; graves and burial grounds;
- public monuments and memorials; sites of significance relating to the history of slavery in South Africa; movable objects, but excluding any object made by a living person; and battlefields.

A **Heritage Impact Assessment ("HIA")** was conducted and is attached to this report as **Appendix 1H**. The HIA identified the following heritage resources on site:

- One incidence of lithics was recorded within the development footprint. This included four pieces of MSA/Early LSA debitage/flakes scattered ex situ in a heavily disturbed area made from the highly utilised banded ironstone formation (BIF) and is of low significance;
- An isolated chunk was recorded outside the development footprint and will be of low significance; and
- No formal or informal graves were identified on site. The area on which the site is located has zero palaeontological significance.

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

- The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue.
- Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find.

## **6. SERVICES**

Due to the scale of the development and the level of development that is occurring within Keimoes, the availability of bulk services for the development will need to be investigated. The Kai !Garib Municipality will more than likely be the service provider for the bulk services. BVI Consulting Engineers will prepare the Bulk Engineering Services Reports on the external services for the proposed housing development.

### **6.1 WATER**

The water source, upgrades to existing water reticulation infrastructure and connection with the proposed internal water network will need to be determined. Back-up storage will also need to be investigated. The availability and confirmation that sufficient capacity exists to service the proposed development will need to be addressed, and confirmation received from the engineers and/or municipality.

### **6.2 SEWER**

The availability of sewer services in the Gamakor, Keimoes area is of concern. Potential upgrades to existing infrastructure or the potential development of new infrastructure to adequately service the proposed development will need to be investigated. The availability and confirmation that sufficient capacity exists to service the proposed development will need to be addressed and confirmed by the engineers and/or the municipality.

### **6.3 ROADS**

The internal road network and design standards, including any access roads, will need to be determined in line with the proposed layout design. The main entrance to the Gamakor Settlement (site) is from Alwyn Street, located to the east of the site.

### **6.4 STORMWATER**

The internal stormwater network and links and upgrades to the existing external stormwater network, will need to be determined and addressed in the Bulk Engineering Services Reports. This will be determined once a conceptual site layout plan has been developed.

### **6.5 SOLID WASTE (REFUSE) REMOVAL**

Refuse removal will be via the Municipal waste stream and disposed of at the nearest municipal bulk solid waste disposal site. Sufficient capacity to adequately service the proposed development will need to be confirmed by the engineers and municipality.

### **6.6 ELECTRICITY**

The proposed internal electrical network, electrical infrastructure requirements, upgrades to the existing external electrical network, including the provider and confirmation of sufficient capacity will need to be determined and addressed in the Bulk Engineering Services Reports.



## 7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Environmental issues were raised through informal discussions with the project team, specialists and authorities. All issues raised will be assessed in the specialist reports and will form part of the Environmental Impact Report. Additional issues raised during the public participation will be listed in the Final Scoping Report.

The following potential issues have been identified:

### 7.1 BOTANICAL

A Botanical Impact Assessment (“BIA”) was conducted to determine if there is any sensitive or endangered vegetation on the proposed site. Due to the size of the development (approximately 104ha), there will be a loss of vegetation during the construction phase of the project. The BIA is attached to this report as **Appendix 1G**.

According BIA, the proposed site is covered with Bushmanland Arid Grassland and is not considered a threatened vegetation type, with more than 99% remaining. However only 4% is formally conserved (Augrabies Falls National Park).

The terrestrial habitat associated with the project footprint is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type is classified as least threatened;
- However, the project footprint overlaps a CBA;
- The floral habitat and natural systems have been impacted, by grazing and urban related activities, but portions still functions relatively well;
- The floral diversity is very low;
- No special habitats or features were observed within the footprint;
- No red-list species were encountered, but one nationally protected tree and five provincially protected plant species was encountered.

Three *Vachellia erioloba* (Camel Thorn) trees (NFA protected) and five NCNCA protected plant was observed. It is recommended that the Camel thorn trees are protected and that Aloe and *Boscia* plants are search & rescued.

The proposed development will result in the permanent transformation of approximately 100ha of natural veld for human settlement. According to the impact assessment, with good environmental control, the development is likely to result in a MEDIUM impact on the environment.

However, with the correct mitigation it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

## 7.2 FRESHWATER

A **Freshwater Report** was compiled and is attached to this report as **Appendix 1I**. According to the Freshwater Report, the proposed housing development transverses a number of drainage lines. The proposed housing development will entirely alter the drainage lines. The drainage lines would be replaced with streets and houses. However, as the aquatic habitat is insignificant, this does not indicate a loss of aquatic ecosystem functioning. A General Authorisation is required from Department of Water and Sanitation ("DWS"). The impact of the proposed development on these watercourses are to be investigated in the Environmental Impact Assessment Report.

## 7.3 HERITAGE

A Heritage Impact Assessment ("HIA") was conducted and is attached to this report as **Appendix 1H**. The HIA identified the following heritage resources on site:

- One incidence of lithics was recorded within the development footprint. This included four pieces of MSA/Early LSA debitage/flakes scattered ex situ in a heavily disturbed area made from the highly utilised banded ironstone formation (BIF) and is of low significance;
- An isolated chunk was recorded outside the development footprint and will be of low significance; and
- No formal or informal graves were identified on site. The area on which the site is located has zero palaeontological significance.

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

- The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue.
- Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).
- Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find.

## 7.4 VISUAL IMPACT

The potential impact on the sense of place of the proposed development will also be considered. However, due to the nature of the activity, the surrounding land-uses, and that the sense of place is not expected to be significantly altered by the proposed development, no further studies are suggested.

## 7.5 OTHER ISSUES IDENTIFIED

Any further issues raised during the public participation process or by the Competent Authority not mentioned in this section, will be dealt with during the EIA phase.

## 8. DETAILS OF THE PUBLIC PARTICIPATION PROCESS

Interested and Affected Parties ("I&APs") have been and will be identified throughout the process. Landowners adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 1K**.

Public Participation will be conducted for the proposed development in accordance with the requirements outlined in Regulation 41 of the NEMA EIA Regulations, 2014 (as amended). The issues and concerns raised during the scoping phase will be dealt with in the EIA phase of this application. An initial round of public participation was undertaken on the Draft Scoping Report, please refer to **Appendix 1M** and **Appendix 1N** for the comments received and responses.

As such each subsection of Regulation 41 contained in Chapter 6 of the NEMA EIA Regulations, 2014 (as amended) will be addressed separately to thereby demonstrate that all potential Interested and Affected Parties ("I&AP's") were notified of the proposed development.

### **R54 (2) (a):**

**R41 (2) (a) (i):** The site notices (A2 and A3 sizes) were placed at different locations around the project site as well as at the municipality office in town. (please refer to **Appendix 1D**)

The posters contained all details as prescribed by R41(3) (a) & (b) and the size of the on-site poster was at least 60cm by 42cm as prescribed by section R41 (4) (a).

**R41 (2) (a) (ii):** N/A. There is no alternative site.

### **R41 (2) b):**

**R41 (2) (b) (i):** N/A. The Applicant is the landowner

**R41 (2) (b) (ii):** The Initial notification letter (**Appendix 1A**) was circulated to residents within a 200m radius of the project site. Also see **Appendix 1D** for the letter drops.

**R41 (2) (b) (iii):** An initial notification letter was sent to the municipal Ward councillor at the Kai !Garib Municipality, for the ward in which the site is situated (please refer to **Appendix 1C** for proof of notification letters sent).

**R41 (2) (b) (iv):** An initial notification letter was sent to the Kai !Garib Municipality as the municipality is the Applicant. Please refer to **Appendix 1C**.

**R54 (2) (b) (v):** Initial notification letter (please refer to **Appendix A1** and **Appendix 1C** for proof of notification letters sent) will be sent to the following organs of state having jurisdiction in respect of any aspect of the activity:

- Department of Water and Sanitation;
- Department of Agriculture and Land Reform;
- Department of Roads and Public Works;



- Department of Agriculture, Forestry and Fisheries;
- Department of Co-operative Governance, Human Settlements and Traditional Affairs;
- Department of Environment and Nature Conservation (D:E&NC);
- South African Heritage Resources Agency;
- Kai !Garib Municipality; and
- ZF Mgcawu District Municipality.

**R41 (2) (c) (i):** An advertisement was placed in the local newspaper, Kalahari Bulletin, on **17 January 2019** (please refer to **Appendix 1B** for proof of advertisement).

**R41 (2) (d):** N/A

**R41 (6):**

**R41 (6) (a):** All relevant facts in respect of the application were made available to potential I&AP's.

**R41 (6) (b):** I&AP's were given more than a 30-day registration and comment period on the proposed application during the first round of public participation. Please refer to **Appendix 1M** and **Appendix 1N** for the comments received and responses.

**R42 (a), (b), (c) and R43(2):** A register of interested and affected parties was opened, maintained and is available to any person requesting access to the register in writing (please refer to **Appendix 1K** for the list of I&APs).

Please find attached in **Appendix 1:**

- Proof of Notice boards, advertisements and notices that were sent out;
- List of potential interested and affected parties;
- Site Co-ordinates;
- Summary of issues raised by interested and affected parties;
- Biodiversity Impact Assessment;
- Heritage Impact Assessment;
- Freshwater Report;
- S24O Notification on Draft Scoping Report;
- Comments Received and Responses; and
- Comments and Responses Report.

## 9. PLAN OF STUDY FOR THE EIA

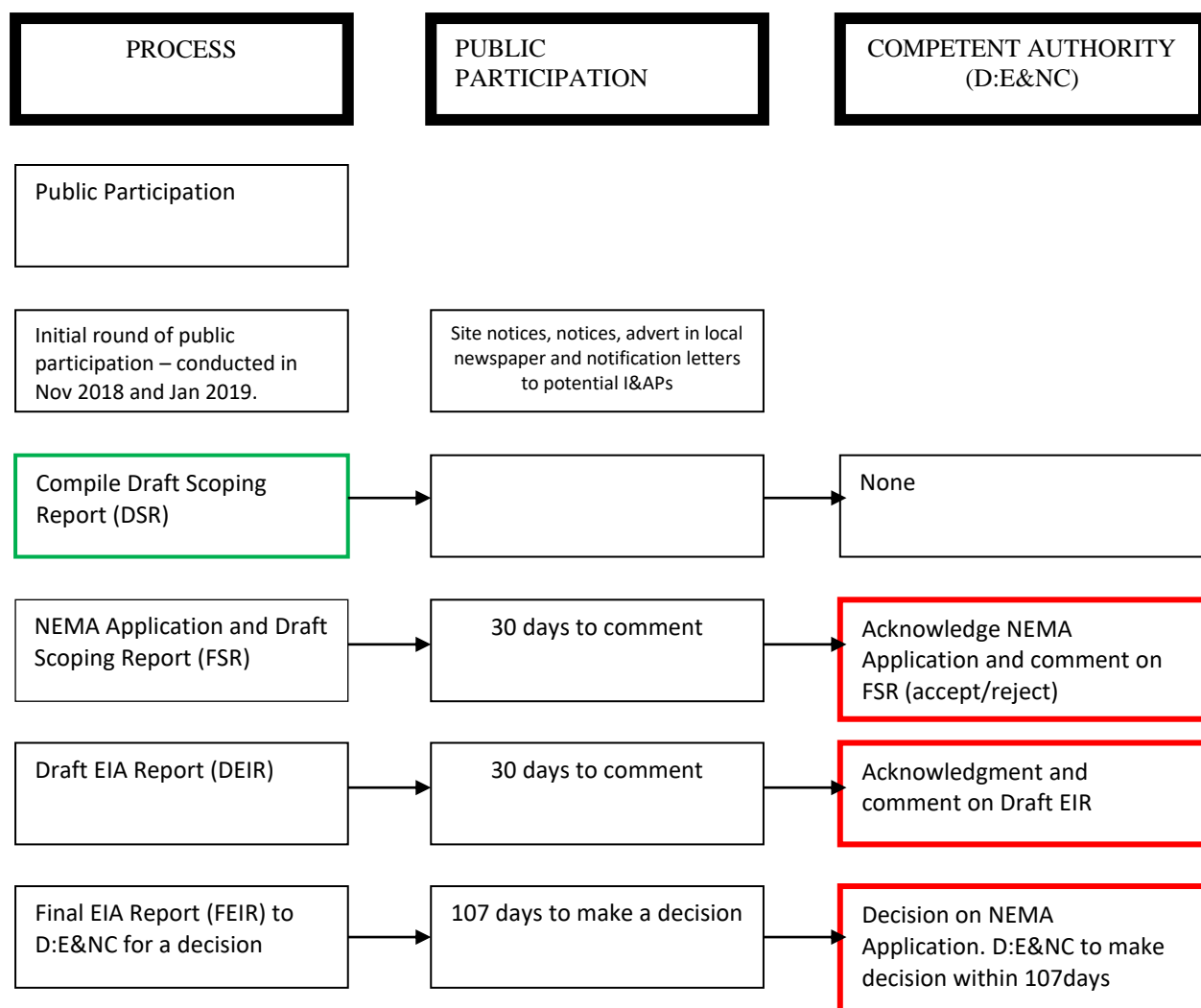
### 9.1.1 TASKS TO BE UNDERTAKEN

Due to the nature of the proposed development there are a number of activities that will still need to be undertaken during the next phase of the project. The proposed process is as described as follows (This follows from a Scoping process to be accepted by the D:E&NC):

The NEMA Application Form will be submitted to D:E&NC along with the Draft Scoping Report available for a 30-day comment period starting from **20 March 2020 to 24 April 2020**. The EAP, however, has given I&APs until **30 July 2020** to provide comment on the Draft Scoping Report. Comments received during the Public Participation Process ("PPP") was be incorporated into the Final Scoping Report, to be submitted to D:E&NC for a decision / acceptance.

The following is a list of tasks to be performed as part of the EIA Process. Should the process be modified significantly, changes will be copied to D:E&NC.

EIA PROCESS	
TASK	TIMEFRAMES
Submit NEMA Application and Draft Scoping Report (DSR) and Plan of Study for EIA to D:E&NC and distribute to registered I&APs for comment	March 2020
Submit Final Scoping Report and Plan of Study to D:E&NC for a decision	July 2020
Receive approval for the FSR and the Plan of Study for EIA.	September 2020
Undertake specialist studies.	Specialist Studies already received.
Compile the Draft Environmental Impact Report (EIR) for public comment based on specialist information.	August 2020
Submit Draft EIR for public comment.	September 2020 - November 2020
Receive responses to the Draft EIR.	November 2020
Preparation of a FINAL EIR and submission to D:E&NC for Decision.	November 2020 - December 2020



**Figure 15.** Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

## 9.2 PUBLIC PARTICIPATION AND INTERESTED AND AFFECTED PARTIES

Please refer to Figure 15 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties will have a chance to view and comment on all the reports that are submitted. The figures also indicated what timeframes are applicable to what stage in the process. If required, meetings with key stakeholders will be held.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR). The Final EIR will then be submitted to D:E&NC for consideration and decision-making.



Correspondence with I&APs will be via post, fax, telephone, email, and newspaper advertisements.

Should it be required, this process may be adapted depending on input received during the on-going process and as a result of public input. D:E&NC will be informed of any changes in the process.

### 9.3 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

As a result of the environmental issues and potential impacts identified in *Section 6*, the need for the following specialist studies has been identified:

- Biodiversity Assessment
- Freshwater Assessment
- Heritage Impact Assessment
- Geotechnical Assessment

The impacts of the proposed activity on the various components of the receiving environment will be evaluated in terms of duration (time scale), extent (spatial scale), magnitude and significance as outlined in Table 1. These impacts could either be positive or negative.

The magnitude of an impact is a judgment value that rests with the individual assessor while the determination of significance rests on a combination of the criteria for duration, extent and magnitude. Significance thus is also a judgment value made by the individual assessor.

Table 1: Criteria used for evaluating impacts

Criteria	Category
<b>Nature of impact</b>	This is an evaluation of the effect that the construction, operation and maintenance of a proposed dam would have on the affected environment. This description should include what is to be affected and how.
<b>Duration</b> (Predict whether the lifetime of the Impact will be temporary (less than 1 year) short term (0 to 5 years); medium term (5 to 15 years); long term (more than 15 years, with the Impact ceasing after full implementation of all development components with mitigations); or permanent.	<b>Temporary:</b> < 1 year (not including construction) <b>Short-term:</b> 1 – 5 years <b>Medium term:</b> 5 – 15 years <b>Long-term:</b> >15 years (Impact will stop after the operational or running life of the activity, either due to natural course or by human interference) <b>Permanent:</b> Impact will be where mitigation or moderation by natural course or by human interference will not occur in a particular means or in a particular time period that the impact can be considered temporary
<b>Extent</b> (Describe whether the impact occurs on a scale limited to the site area; limited to broader area; or on a wider scale)	<b>Site Specific:</b> Expanding only as far as the activity itself ( <i>onsite</i> ) <b>Small:</b> restricted to the site's immediate environment within 1 km of the site ( <i>limited</i> ) <b>Medium:</b> Within 5 km of the site ( <i>local</i> ) <b>Large:</b> Beyond 5 km of the site ( <i>regional</i> )
<b>Intensity</b> (Describe whether the magnitude (scale/size) of the Impact is high; medium; low; or negligible. The specialist study must attempt to	<b>Very low:</b> Affects the environment in such a way that natural and/or social functions/processes are not affected <b>Low:</b> Natural and/or social functions/processes are slightly altered <b>Medium:</b> Natural and/or social functions/processes are notably altered in a modified way

quantify the magnitude of impacts, with the rationale used explained)	<b>High:</b> Natural and/or social functions/processes are severely altered and may temporarily or permanently cease
<b>Probability of occurrence</b> Describe the probability of the Impact <u>actually</u> occurring as definite (Impact will occur regardless of mitigations)	<b>Improbable:</b> Not at all likely <b>Probable:</b> Distinctive possibility <b>Highly probable:</b> Most likely to happen <b>Definite:</b> Impact will occur regardless of any prevention measures
<b>Status of the Impact</b> Describe whether the Impact is positive, negative (or neutral).	<b>Positive:</b> The activity will have a social/ economical/ environmental benefit <b>Neutral:</b> The activity will have no affect <b>Negative:</b> The activity will be socially/ economically/ environmentally harmful
<b>Degree of Confidence in predictions</b> State the degree of confidence in predictions based on availability of information and specialist knowledge	<b>Unsure/Low:</b> Little confidence regarding information available (<40%) <b>Probable/Med:</b> Moderate confidence regarding information available (40-80%) <b>Definite/High:</b> Great confidence regarding information available (>80%)
<b>Significance</b> (The impact on each component is determined by a combination of the above criteria and defined as follows) The significance of impacts shall be assessed <u>with and without mitigations</u> . The significance of identified impacts on components of the affected biophysical or socio-economic environment (and, where relevant, with respect to potential legal requirement/s) shall be described as follows:	<b>No change:</b> A potential concern which was found to have no impact when evaluated <b>Very low:</b> Impacts will be site specific and temporary with no mitigation necessary. <b>Low:</b> The impacts will have a minor influence on the proposed development and/or environment. These impacts require some thought to adjustment of the project design where achievable, or alternative mitigation measures <b>Moderate:</b> Impacts will be experienced in the local and surrounding areas for the life span of the development and may result in long term changes. The impact can be lessened or improved by an amendment in the project design or implementation of effective mitigation measures. <b>High:</b> Impacts have a high magnitude and will be experienced regionally for at least the life span of the development, or will be irreversible. The impacts could have the no-go proposition on portions of the development in spite of any mitigation measures that could be implemented.

In addition to determining the individual impacts against the various criteria, the element of mitigation, where relevant, will also be brought into the assessment. In such instances the impact will be assessed with a statement on the mitigation measure that could/should be applied. An indication of the certainty of a mitigation measure considered, achieving the end result to the extent indicated, is given on a scale of 1-5 (1 being totally uncertain and 5 being absolutely certain), taking into consideration uncertainties, assumptions and gaps in knowledge.

Table 2: The stated assessment and information will be determined for each individual issue or related groups of issues and presented in descriptive format in the following table example or a close replica thereof.

<b>Impact Statement:</b>		
<b>Mitigation:</b>		
<b>Ratings</b>	Duration	
	Extent	
	Intensity	
	Probability of impact	
	Status of Impact (Positive/negative)	
	Degree of confidence	
<b>Significances</b>	Significance <b>without</b> Mitigation	
	Significance <b><u>WITH</u></b> Mitigation	
Indication of the certainty of a mitigation measure considered, achieving the end result to the extent indicated, is given on a scale of 1-5 (1 being totally uncertain and 5 being absolutely certain), taking into consideration uncertainties, assumptions and gaps in knowledge		
<b>Legal Requirements</b> (Identify and list the specific legislation and permit requirements which are relevant to this development):		



## 10. CONCLUSION AND RECOMMENDATIONS

A scoping exercise is being undertaken to present the proposed activities to the Interested and Affected Parties (“I&APs”) and to identify environmental issues discussed in this report and concerns raised as a result of the proposed development alternatives to date. The issues and concerns were raised by I&APs, authorities, the project team as well as specialist input, based on baseline studies undertaken.

This Final Scoping Report, being undertaken in terms of NEMA, summarises the process undertaken, the alternatives presented, and the issues and concerns raised.

As a result of the above, the need for the following specialist studies, have been identified:

- Biodiversity Assessment
- Freshwater Assessment
- Heritage Impact Assessment
- Geotechnical Assessment

Any further issues raised as a result of the Public Participation Process (“PPP”) will be dealt with during the Environmental Impact Assessment (“EIA”) phase. Please refer to **Appendix 1M** and **Appendix 1N** for the comments received and responses.

The significance of the impacts associated with the alternatives proposed will be assessed in these specialist studies, as part of the EIA. Once the specialist studies have been completed, they will be summarised in an Environmental Impact Report (“EIR”), which integrates the findings of the assessment phase of the EIA.

Based on the significance of the issues raised during the ongoing PPP Process and Scoping Phase, it is evident that an EIA is required. ***It is therefore recommended that authorisation for the commencement of an EIA for the proposed development is granted.*** Should the EIA process be authorised, the significant issues raised in the process to date will be addressed and the specialist studies noted in this report, will be undertaken.

## 11. DETAILS AND EXPERTISE OF THE EAP

This Final Scoping Report was prepared by Emile Esquire who has a BA. Degree in Geography and Environmental Studies. Emile Esquire was employed as an Environmental Officer at the Western Cape Department of Environmental Affairs and Development Planning ("DEA&DP"), administering Section 24G Rectification Applications, for a period of 3 years and 6 months. Emile Esquire joined EnviroAfrica CC during May 2017; is employed as an Environmental Assessment Practitioner ("EAP") and is working on variety of projects in the Western Cape and Northern Cape. Emile is generally performing duties as an EAP with regards to the NEMA EIA Applications. The whole process and report are supervised by Bernard de Witt who has more than 20 years experience in environmental management and environmental impact assessments.

(-----END-----)

## APPENDIX 1 – PUBLIC PARTICIPATION PROCESS

APPENDIX 1A: INTIAL NOTIFICATION LETTER TO I&APS

APPENDIX 1B: NEWSPAPER ADVERTISEMENT

APPENDIX 1C: NOTIFICATION LETTERS (AND PROOF)

APPENDIX 1D: SITE NOTICES / POSTER PLACEMENT

APPENDIX 1E: INITIAL COMMENTS RECEIVED AND RESPONSES

APPENDIX 1F: INTIAL COMMENTS AND RESPONSES REPORT

APPENDIX 1G: BIODIVERSITY IMPACT ASSESSMENT

APPENDIX 1H: HERITAGE IMPACT ASSESSMENT

APPENDIX 1I: FRESWATER REPORT

APPENDIX 1J: SITE CO-ORDINATES

APPENDIX 1K: INTERESTED AND AFFECTED PARTIES LIST

APPENDIX 1L: S240 NOTIFICATION ON DRAFT SCOPING REPORT

APPENDIX 1M: DRAFT SCOPING REPORT COMMENTS RECEIVED  
AND RESPONSES

APPENDIX 1N: DRAFT SCOPING REPORT COMMENTS AND  
RESPONSES REPORT



## APPENDIX 1A – INTIAL NOTIFICATION LETTER TO I&APS

## APPENDIX 1B – NEWSPAPER ADVERTISEMENT

## APPENDIX 1C – INITIAL NOTIFICATION LETTERS (AND PROOF)



## APPENDIX 1D – SITE NOTICES / POSTER PLACEMENT

## APPENDIX 1E – INITIAL COMMENTS RECEIVED AND RESPONSES

## APPENDIX 1F – INITIAL COMMENTS AND RESPONSES REPORT



## APPENDIX 1G – BIODIVERSITY IMPACT ASSESSMENT

## APPENDIX 1H – HERITAGE IMPACT ASSESSMENT

## APPENDIX 1I – FRESHWATER REPORT



## APPENDIX 1J: SITE CO-ORDINATES

## APPENDIX 1K: INTERESTED AND AFFECTED PARTIES (I&APs) LIST

## APPENDIX 1L: S24O NOTIFICATION ON DRAFT SCOPING REPORT



## APPENDIX 1M: DRAFT SCOPING REPORT COMMENTS RECEIVED AND RESPONSES

## APPENDIX 1N: DRAFT SCOPING REPORT COMMENTS AND RESPONSES REPORT

15 January 2019

Dear Interested and Affected Party

**NEMA PUBLIC PARTICIPATION PROCESS**

**PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

Notice is hereby given of the intention to submit an application, and the public participation process, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment Regulations, 2014. The proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape, includes activities listed in terms of the NEMA EIA Regulations 2014.

EnviroAfrica cc has been appointed by Kai !Garib Local Municipality, to undertake the NEMA Application for Environmental Authorisation process.

**Application for environmental authorization to undertake the following activities:**

Government Notice R327 (Listing Notice 1): 9; 10; 12; 19; 24; 28

Government Notice R325 (Listing Notice 2): 15

Government Notice R324 (Listing Notice 3): 4; 14

\*Please note that the listed activities above may change during the course of the NEMA Application process. Registered I&APs will be notified of any changes.

**Project Description & Location:**

The proposed development is located in the town of Keimoes. The application proposes the following activities:

- The rezoning and the subdivision of 1500 Erven for low cost houses; Associated infrastructure such as water, electricity, sewage, solid waste removal; and the total residential area to be developed would be approximately 104 ha. The proposed site is located on the western side of the town of Keimoes, and the N14 National Road is approximately 310m south of the proposed site. The site co-ordinates are **28° 41' 52.60" S, 20° 56' 51.34" E**.

**Public Participation:**

Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, **on or before 18 February 2019**. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (*indicating your preferred method of notification*) and an indication of any direct business, financial, personal, or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties.

Please note that only Registered I&APs:

- will be notified of the availability of reports and other written submissions made (or to be made) to the Department by the applicant, and be entitled to comment on these reports and submissions;
- will be notified of the outcome of the application, the reasons for the decision, and that an appeal may be lodged against a decision; and
- will be notified of the applicant's intention to appeal the decision of the competent authority, together with an indication of where and for what period the appeal submission will be available for inspection.

**Consultant:** EnviroAfrica CC. P.O. Box 5367, Helderberg, 7135 / Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za)

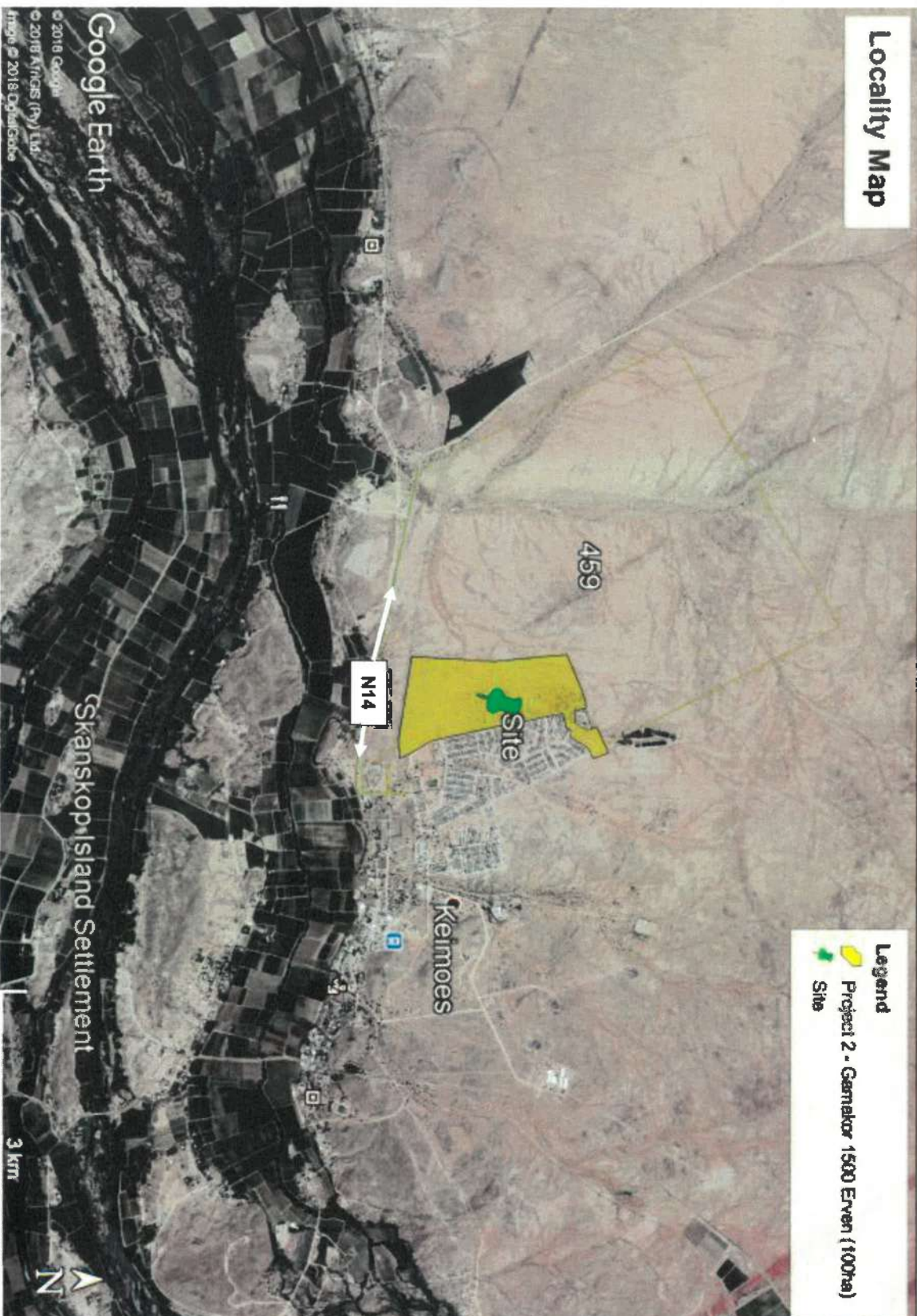
Yours sincerely



Emile Esquire  
Environmental Consultant  
EnviroAfrica cc

**PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI IGARIB LOCAL MUNICIPALITY, ZF MGCWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

## Locality Map



### Legend

- Project 2 - Gamakor 1500 Erven (100ha)
- Site

### SITE CO-ORDINATES

28° 41' 52.60" S,  
20° 56' 51.34" E.



THE SITE

N



ENVIRO AFRICA REF:

0488

JANUARY 2019



EnviroAfrica



## INITIAL INVITATION TO REGISTER

EnviroAfrican Ref: 0488

ISAP List for: **Gamakor Settlement Low Cost Housing**  
Advert Placed: \_\_\_\_\_

DENC Ref: \_\_\_\_\_  
Date: \_\_\_\_\_

No.	Title	Initials/Name	Surname	Affiliation	Postal Address	Town/City	Code	Telephone	Fax	E-mail
<b>1. Applicant</b>										
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>2. Property / Land Owners:</b>										
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>3. Occupiers</b>										
3.1			Malrops done							
<b>4. Municipality</b>										
4.1	Mr	Marius	Louw	Kai IGarb Municipality (Mayor)	Private Bag X6	Kakamas	8870	(054) 461 6700 079 867 0617	(054) 461 6401	<a href="mailto:mayor@kaiigarib.gov.za">mayor@kaiigarib.gov.za</a>
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>5. Municipal Ward Councillor:</b>										
5.1	Mr	Victor	Sacco	Ward Councillor - Ward 6	Private Bag X6	Kakamas	8870	054 461 6700 082 945 4910	054 461 6401	<a href="mailto:saccovictor6@gmail.com">saccovictor6@gmail.com</a>
<b>6. Ratepayers's association</b>										
6.1										
<b>7. State Organisations:</b>										
7.1	Mr	Wonders	Mothibi (HOD)	NC Department of Agriculture & Land Reform	Private Bag X5018	Kimberley	8300	(053)898 9102	(053) 831 3635	
7.2	Ms	Jacoline	Mans	Depr Agriculture, Forestry, Fisheries	P.O.Box 2782	Upington	8800	054 338 5909	054 334 0030	<a href="mailto:jacolineMa@daff.gov.za">jacolineMa@daff.gov.za</a>
7.3	Mr	Abe	Abrahams	Department of Water & Sanitation- Northern Cape	28 Central Road Beaconsfield	Kimberley	8301	053 830 5800 082 883 6741	(053) 831 4534	<a href="mailto:AbrahamsA@dws.gov.za">AbrahamsA@dws.gov.za</a>
7.4	Mr	Steven	Shibambu	Northern Cape Department of Water and Sanitation	Private Bag X5912	Upington	8800	054 338 5819	086 699 2007	<a href="mailto:shibambus@dws.gov.za">shibambus@dws.gov.za</a>
7.5	Ms	Chanel	Schwartz	Department of Water & Sanitation- Northern Cape	Lodisevale Road	Upington	8800	054 338 5836	054 334 0205	<a href="mailto:SchwartzC@dws.gov.za">SchwartzC@dws.gov.za</a>
7.6	Ms.	T.	Tsimakwane	NC Department of Environment and Nature Conservation	Private Bag x 6102	Kimberley	8300	053 807 7300	053 807 7328	<a href="mailto:Tsimakwane@ncog.gov.za">Tsimakwane@ncog.gov.za</a>

SEVENSET MAIL

2024-07-13

12

				Provincial Building (First Floor), Corner of River & Nelson Mandela Road, Uptington, 8800	Uptington	8800	060 991 4817	0538313530	oriba.danc@gmail.com ORiba@ncpe.gov.za
7.7	Mt.	Ordain	Riba	Northern Cape Department of Environment and Nature Conservation					
7.8	Ms.	Sylvia	Moholo	Department of Roads and Public Works	Private Bag X5002	Kimberley	8300	053 838 5202	053 832 7380
7.9	Ms.	Natasha	Hlegiti	South African Heritage Resource Agency (SAHRA)	P.O.Box 4637	Cape Town	8000	021 462 4502	021 462 4509
8. Neighbours/Surrounding Property Owners									
Matl Drops done									
9. Other									
9.1	Ms.	Marina	Jordan	Kakamas Water Users Association	Private Bag X4	Kakamas	8870	054 431 0725	054 431 0348
							marinakw@sat.co.za		

CONDENSED FULL  
P20-01-15

## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Tuesday, 15 January 2019 12:34 PM  
**To:** 'mm@kaigarib.gov.za'; 'mayor@kaigarib.gov.za'; 'saccovictor6@gmail.com'; 'JacolineMa'; 'AbrahamsA@dws.gov.za'; 'shibambus@dws.gov.za'; 'Schwartz Chantel (UPN)'; 'TTshimakwane'; 'ORiba'; 'Ordain Riba'; 'sylvia.moholo@dpw.gov.za'; 'nhiggitt@sahra.org.za'; 'marinakwgv@isat.co.za'  
**Cc:** 'EnviroAfrica :Admin'  
**Subject:** Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcau Di  
**Attachments:** Initial notification letters\_Gamakor Behuising - 15 Jan 2019.pdf

Dear Interested and Affected Parties,

Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before 18 February 2019. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (indicating your preferred method of notification) and an indication of any direct business, financial, personal, or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties.

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- will be notified of the applicant's intention to appeal the decision of the competent authority, together with an indication of where and for what period the appeal submission will be available for inspection.

Consultant: EnviroAfrica CC. P.O. Box 5367, Helderberg, 7135 / Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

In addition, please find attached notification letter dated 15 January 2019.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

p: +27 21 851 1616

f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130  
P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Tuesday, 15 January 2019 2:51 PM  
**To:** 'mm@kaigarib.gov.za'; 'mayor@kaigarib.gov.za'; 'saccovictor6@gmail.com'; 'JacolineMa'; 'AbrahamsA@dws.gov.za'; 'shibambus@dws.gov.za'; 'Schwartz Chantel (UPN)'; 'TTshimakwane'; 'ORiba'; 'Ordain Riba'; 'sylvia.moholo@dpw.gov.za'; 'nhiggitt@sahra.org.za'; 'marinakwgv@isat.co.za'; 'mariuslouw111@gmail.com'; 'minibos@yahoo.com'; 'dewaal@kaigarib.gov.za'  
**Subject:** Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonias Road, Kai !Garib Municipality, ZF Mgcau Di  
**Attachments:** Initial notification letters\_Gamakor Behuising - 15 Jan 2019.pdf

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In addition, please find attached notification letter dated 15 January 2019.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130

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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)



www.kalaharibulletin.co.za

OM TE ADVERTEER SKAKEL

Upington T: 054 331 3482 • Katu T: 053 723 2685 • Kuruman T: 053 712 1472 • E: phidelia.abrahams@volksblad.com

Geklassifiseerd

eksklusief aanlyn by

Waar kopers en verkopers mekaar ontmoet

www.olx.co.za

SEKURITEIT

1865

Elektriese heinings en hekmotors: Profesionele installasie. Francois 072 156 4035

MOTORS TE KOOP

3025

HUIS TE SEODIN, Kuruman: Erf 3331 vk meter groot en woonhuis met sit-, eet- en TV-kamer, kombuis en spens, 4 slk, 2 badk. Toegerus met lugversorgers, diefwering, alarm en kamera. Een 3-kamer-woonstel, dubbelmotorhuis met stoor en afdak asook apartstaande enkelmotorhuis. Boorgat met dompelpomp en een met windpomp en sinkdam. Goed versorgde tuin. Alles vir die prys van R1.8 miljoen o.n.a. Skakel eienaar 083 524 4995.

BOEDELKENNISGEWINGS

4201

BOEDEL: KREDITEURE EN DEBITEURE

X32V2BL-KA190418

BOEDEL WYLE: D S TOTWE

BOEDELNUMMER: 981/2018

BOEDELKENNISGEWING

In die boedel van wyle DEREKE STANLEY TOTWE, identiteitsnommer 440519 5142 085, getroud binne gemeenskap van goedere met NTSHEKISANG EMILY TOTWE, identiteitsnommer 490510 0748 082, in lewe van Huis 27, Mentu Village, distrik Kuruman, boedelnommer 981/2018. Skuldeisers en skuldenaars in bogemelde boedel word versoek om hul skuld te betaal by die kantore van ondergenoemde binne 30 (dertig) dae vanaf 18 Januarie 2019. DUVENHAGE & VAN DER MERWE ING POSBUS 63 KURUMAN 8460.

DR ISIMA AND MAMMA TINA

- Winning big tenders.
- Increasing your salary.
- Gambling, Lotto, casino.
- Manhood enlargement.
- Did someone take your property or money?
- Your financial problems.
- Clears all debts and credits.
- Business and money spell.
- Return your ex or lost lover.
- Get job double salary.
- Recover lost money to other doctors by powerful jinns.
- I can clear your dirty or black money same day no matter how much.

Marriage Problems

All work done is confidential. Pay after job. 060 344 8867 Kuruman

X1V6WDD-KA170119

THE MIRACLE HERBALIST CHIEF SSOSOLYE

100% GAURTEED MUTHI AND WATER FROM THE VOLCANOES WILL WIPE YOUR TEARS AND BRING BACK HAPPINESS IN YOUR LIFE

- LOVE AND HAPPINESS
- COURT CASES
- LOST OF PROPERTIES
- SOLVING YOUR FINANCIAL STRESS
- JOB SEARCH
- MAGIC WALLET
- BRING BACK LOST LOVER
- BOOST YOUT BUSINESS
- TENDERS AND CASINO
- PENIS ENLARGEMENT AND MORE ROUNDS IN BED
- EASY GETTING PREGNANT
- HELPS YOUR ANCESTORS TO BRING GOOD LUCK

CONTACT CHIEF SSOSOLYE ON 066 509 2074

X1V6ZJLH-KA170119

The year to remember for Karen, only good news for me and everyone who will read this paper about this powerful man who helped me to be happy also like me pay nothing your husband if he don't like you, or gone, or your wife, working problems you need or transfer or to raise up your salary, delayed pension money, stop cheating, men or women, unfinished work from other healers, you need to be famous like celebrities, or win tender, you need to buy house or car but no luck. Contact this blessed man and his wife and you will smile at the financial problem, stop divorce or make it happen, teachers, nurses or military officers, police officers and all municipality works, for free and all old people for free too. This humble man puts his hands on you and you smile for 2019. Make it your year to remember, thanks to this man.

COLLINS

074 285 7407

X1V6SUPR-KA170119

Tyre Company in Kuruman have the following two positions available:

- Manager with at least 10 years experience in the tyre trade
- Salesperson with at least 3 years experience in the tyre trade

CV's can be faxed to 086 654 5919

X1V6Q2YH-KA170119

DANKIE PROF MUNNO GORDON

Ek het gedink dis n grap, maar nou is ek n regte miljoener, te danke aan Prof Munno Gordon. Ek is Elsie van die Noord-Kaap. Ek het verskeie kriedokters en geneesheers probeer maar was nooit so gelukkig soos toe my vriendin Tessa my van Prof Munno Gordonv ertel het nie. Prof het al my hoop en drome laat waar word toe ek hom gebel het. Hy't vir my besonderhede gevra wat ek dadelik gestuur het, want my lewe was n gemors, Na slegs 15 minute het hy my lewe verander en ek het R4miljoen in my rekening gekry met baie opgewondenheid het ek my man vertel Ek was oppad huis toe, toe my dogter bel en se haar kamer is vol van geld in n boks. Sedertdien was ek n miljoener. Geen woorde kan verduidelik hoe dankbaar ek is nie

PROF MUNNO GORDON

072 262 1521

X1V6W0XZ-KA170119

PROF GODFREY CHUMA

Ek wil net dankie se aan Prof Godfrey Chuma, vir al sy hulp. My naam is Alexander, ek is van die Noord Kaap en is 'n enkel moeder. Ek het al opgegee in die dokters en ander profete. Vroeg verlede jaar was ek geskok toe ek 'n ou vriend sien en 'n nuwe motor ry, hy het my huis toe gevat en ek het gevra wat sy lewe verander het in so 'n kort tydjie. Hy het my sy geheim vertel , hy't my 'n koerant gegee waarin ek kon lees wat alles Prof Godfrey kan mee help. Ek het hom onmiddelik gebel en vertel van Short Boys wat geld in jou rekening sit, Magic Rings om geld en dubbel te wen en Magic Beursie wat jou geld verdubbel. Hy het ook rotte wat geld in jou huis diesefde dag insit. Ek het Short Boys gekies. Ek het sy instruksies gevolg en toe sien ek 'n groot bedrag geld in my rekening. Hy het gevra ek moet vir hom 10% gee en ek het gesien die geld is regtig in my rekening. Dankie Prof Godfrey Chuma dat jy my lewe verander het. Verlore liefdes, Egskeidings ens

063 194 5379

X1V6W0XZ-KA170119

Tenders are invited for: DANIËLSKUIL: DEVELOPMENT OF HIGH SCHOOL TECHNICAL CLASSROOMS

One complete set of documents will be available from MVD Kalahari at the compulsory site meeting upon payment of an amount of R700 (seven hundred rand), which is non-refundable. Cheques must be made payable to MVD Kalahari.

Tenders must be submitted in sealed envelopes and clearly endorsed: **Tender No: DANIËLSKUIL: DEVELOPMENT OF HIGH SCHOOL TECHNICAL CLASSROOMS** must be addressed to **FINSCH DIAMOND MINE (PTY) LTD** and must be placed in the **Tender Box**, at the Small Business Hub, Barker Street, Daniëlskuil, not later than **12:00 on Friday, 8 February 2019**. Tenders will be opened in public on the same day at the Small Business Hub, Barker Street, Daniëlskuil.

A **compulsory site inspection will be held at 14:00 on Thursday, 24 January 2019**. The Engineer will be present and any questions will then be answered. No further visits to the site will take place. Persons taking interest will gather at the office of the **Small Business Hub, Barker Street, Daniëlskuil at 14:00**. **Tenderers who do not attend the compulsory site inspection, will be disqualified.**

**Tenderers must be bound by their tenders for a period of 90 (ninety) days from the date on which tenders are due. No tenders or copies of tenders received by facsimile machine or e-mail will be considered. Only those tenderers who are registered with the NHBC and the CIDB, or will be capable of registering within 10 working days after the closing date for submission of tenders in a contractor grading designation equal or higher than a contractor grading of 4 GB class for construction work, will be eligible to submit a tender.**

**FINSCH DIAMOND MINE (PTY) LTD reserves the right to accept a part of a tender and does not bind itself to accept the lowest and/or any tender.** Their tenders must bind tenderers for a period of 90 (ninety) days from the date on which tenders are due. Tenderers attempting to influence the client with regard to the awarding of the tender after tender closure, will automatically expose their tenders to rejection.

FINSCH DIAMOND MINE (PTY) LTD

Mr Eric Britz

PO Box 7

LIME ACRES

8410

X1V5UNAH-KA170119

KAI !GARIB LOCAL MUNICIPALITY

ENVIROAFRICA CC

NEMA PUBLIC PARTICIPATION PROCESS

PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459 AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

Notice is hereby given of the intention to submit an application and the public participation process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), Environmental Impact Assessment Regulations, 2014. The proposed formalisation of Gamakor and Noodkamp low cost housing development on portions 0 and 128 of farm Kousas No. 459, and erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape, includes activities listed in terms of the NEMA EIA Regulations 2014.

EnviroAfrica CC has been appointed by Kai !Garib Local Municipality, to undertake the NEMA Application for Environmental Authorisation process.

**Application for environmental authorisation to undertake the following activities:**

Government Notice R327 (Listing Notice 1): 9, 10, 12, 19, 24, 28  
Government Notice R325 (Listing Notice 2): 15  
Government Notice R324 (Listing Notice 3): 4, 14

\*Please note that the listed activities above may change during the course of the NEMA Application process. Registered I&APs will be notified of any changes.

**Project description and location:**  
The proposed development is located in the town of Keimoes. The application proposes the following activities:

- The rezoning and the subdivision of 1 500 erven for low cost houses. Associated infrastructure such as water, electricity, sewage, solid waste removal and the total residential area to be developed would be approximately 104 ha. The proposed site is located on the western side of the town of Keimoes, and the N14 national road is approximately 310 m south of the proposed site. The site co-ordinates are 28° 41' 52.60" S, 20° 56' 51.34" E.

**Public participation:**  
Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before **18 February 2019**. In order to register or submit comment, I&APs should refer to the project name and provide their name, address and contact details (*indicating your preferred method of notification*) and an indication of any direct business, financial, personal or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties. Please note that only Registered I&APs:

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**Consultant:** EnviroAfrica CC, PO Box 5367, Helderberg 7135, fax 086 512 0154, tel. 021 8511616, e-mail: admin@enviroafrica.co.za

X1V5UNGR-KA170119

DISCLAIMER

Kalahari Bulletin and Media 24 have not verified whether any of the services or products advertised will have the desired effect or outcome. Readers will note that some of the promised results in the advertisements are extraordinary and may be impossible to achieve. Beware some of the procedures and claims advertised may be dangerous if not executed by a qualified medical practitioner. Readers are warned that they should carefully consider and verify the advertiser's credentials.

Kalahari Bulletin and Media24 do not accept any liability whatsoever in respect of any of the services or goods advertised.

X1V5UNGR-KA170119

15 January 2019

Dear Interested and Affected Party

**NEMA PUBLIC PARTICIPATION PROCESS**

**PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

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Yours sincerely

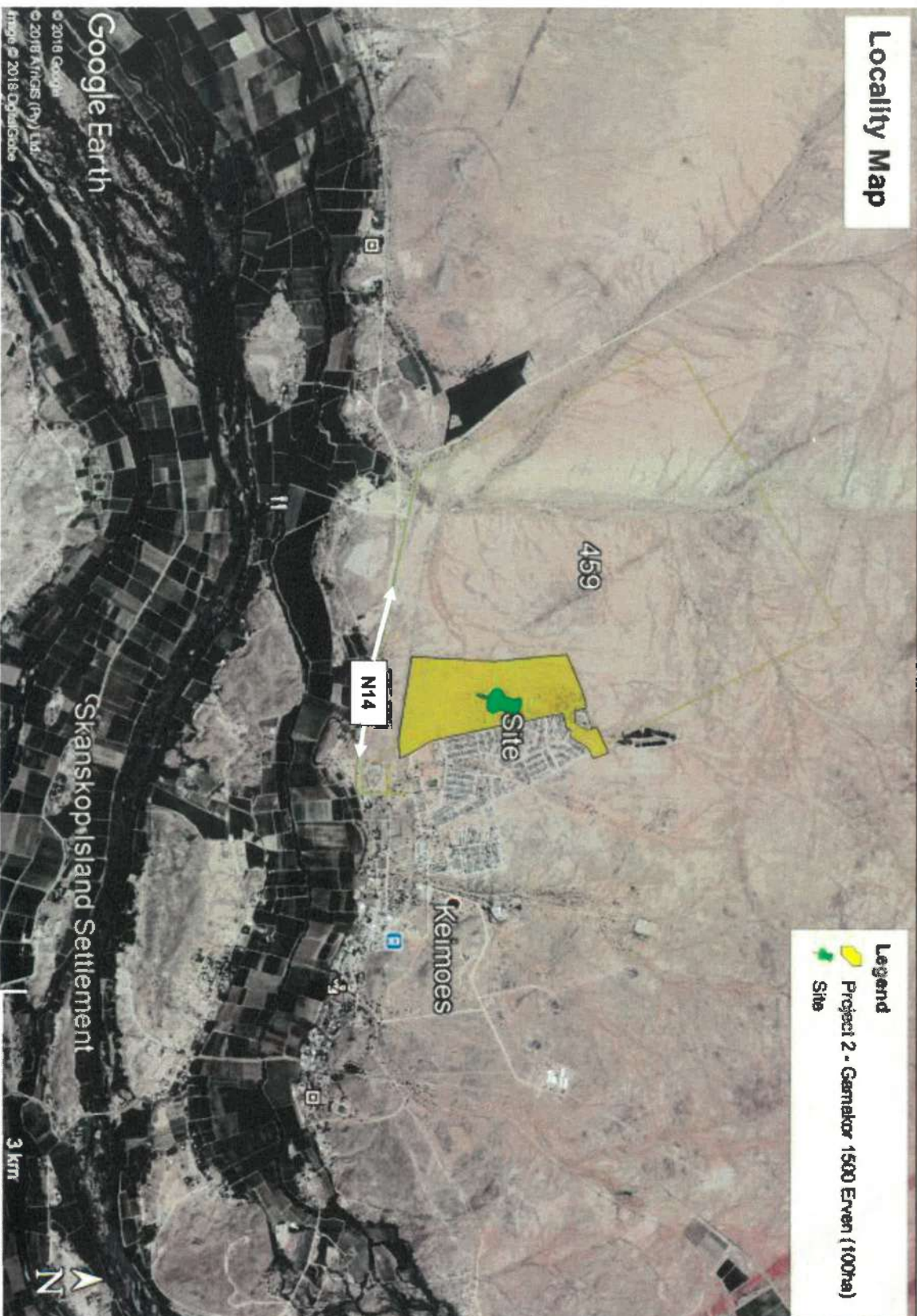


Emile Esquire  
Environmental Consultant  
EnviroAfrica cc



**PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI IGARIB LOCAL MUNICIPALITY, ZF MGCWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

## Locality Map



### Legend

- Project 2 - Gamakor 1500 Erven (100ha)
- Site

### SITE CO-ORDINATES

28° 41' 52.60" S,  
20° 56' 51.34" E.



THE SITE

**N**



**ENVIRO AFRICA REF:**

0488

JANUARY 2019



**EnviroAfrica**

## INITIAL INVITATION TO REGISTER

EnviroAfrican Ref: 0488

ISAP List for: **Gamakor Settlement Low Cost Housing**  
Advert Placed: \_\_\_\_\_

DENC Ref: \_\_\_\_\_  
Date: \_\_\_\_\_

No.	Title	Initials/Name	Surname	Affiliation	Postal Address	Town/City	Code	Telephone	Fax	E-mail
<b>1. Applicant</b>										
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>2. Property / Land Owners:</b>										
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>3. Occupiers</b>										
3.1			Malrops done							
<b>4. Municipality</b>										
4.1	Mr	Marius	Louw	Kai IGarb Municipality (Mayor)	Private Bag X6	Kakamas	8870	(054) 461 6700 079 867 0617	(054) 461 6401	<a href="mailto:mayor@kaiigarib.gov.za">mayor@kaiigarib.gov.za</a>
4.2	Mr	JG	Lategan	Kai IGarb Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mun@kaiigarib.gov.za">mun@kaiigarib.gov.za</a>
<b>5. Municipal Ward Councillor:</b>										
5.1	Mr	Victor	Sacco	Ward Councillor - Ward 6	Private Bag X6	Kakamas	8870	054 461 6700 082 945 4910	054 461 6401	<a href="mailto:saccovictor6@gmail.com">saccovictor6@gmail.com</a>
<b>6. Ratepayers's association</b>										
6.1										
<b>7. State Organisations:</b>										
7.1	Mr	Wonders	Mothibi (HOD)	NC Department of Agriculture & Land Reform	Private Bag X5018	Kimberley	8300	(053)898 9102	(053) 831 3635	
7.2	Ms	Jacoline	Mans	Depr Agriculture, Forestry, Fisheries	P.O.Box 2782	Upington	8800	054 338 5909	054 334 0030	<a href="mailto:jacolineMa@daff.gov.za">jacolineMa@daff.gov.za</a>
7.3	Mr	Abe	Abrahams	Department of Water & Sanitation- Northern Cape	28 Central Road Beaconsfield	Kimberley	8301	053 830 5800 082 883 6741	(053) 831 4534	<a href="mailto:AbrahamsA@dws.gov.za">AbrahamsA@dws.gov.za</a>
7.4	Mr	Steven	Shibambu	Northern Cape Department of Water and Sanitation	Private Bag X5912	Upington	8800	054 338 5819	086 699 2007	<a href="mailto:shibambus@dws.gov.za">shibambus@dws.gov.za</a>
7.5	Ms	Chanel	Schwartz	Department of Water & Sanitation- Northern Cape	Lodisevale Road	Upington	8800	054 338 5836	054 334 0205	<a href="mailto:SchwartzC@dws.gov.za">SchwartzC@dws.gov.za</a>
7.6	Ms.	T.	Tsimakwane	NC Department of Environment and Nature Conservation	Private Bag x 6102	Kimberley	8300	053 807 7300	053 807 7328	<a href="mailto:Tsimakwane@ncpg.gov.za">Tsimakwane@ncpg.gov.za</a>

SEVENSET VILL

2014-01-13

12



				Provincial Building (First Floor, Corner of River & Nelson Mandela Road, Uptington, 8800	Uptington	8800	060 991 4817	0538313530	oriba.danc@gmail.com ORiba@ncpe.gov.za
7.7	Mt. Ordain	Riba	Northern Cape Department of Environment and Nature Conservation						
7.8	Ms. Sylvia	Moholo	Department of Roads and Public Works	Private Bag X5002	Kimberley	8300	053 838 5202	053 832 7380	<a href="mailto:sylvia.moholo@dpw.gov.za">sylvia.moholo@dpw.gov.za</a>
7.9	Ms. Natasha	Higgit	South African Heritage Resource Agency (SAHRA)	P.O.Box 4637	Cape Town	8000	021 462 4502	021 462 4509	<a href="mailto:nhiggit@sahra.org.za">nhiggit@sahra.org.za</a>
8. Neighbours/Surrounding Property Owners									
	Matl Drops done								
9. Other									
9.1	Ms. Marina	Jordan	Kakamas Water Users Association	Private Bag X4	Kakamas	8870	054 431 0725	054 431 0348	<a href="mailto:marinakwrv@sat.co.za">marinakwrv@sat.co.za</a>

CONDENSED FULL  
P20-01-15

## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Tuesday, 15 January 2019 12:34 PM  
**To:** 'mm@kaigarib.gov.za'; 'mayor@kaigarib.gov.za'; 'saccovictor6@gmail.com'; 'JacolineMa'; 'AbrahamsA@dws.gov.za'; 'shibambus@dws.gov.za'; 'Schwartz Chantel (UPN)'; 'TTshimakwane'; 'ORiba'; 'Ordain Riba'; 'sylvia.moholo@dpw.gov.za'; 'nhiggitt@sahra.org.za'; 'marinakwgv@isat.co.za'  
**Cc:** 'EnviroAfrica :Admin'  
**Subject:** Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcau Di  
**Attachments:** Initial notification letters\_Gamakor Behuising - 15 Jan 2019.pdf

Dear Interested and Affected Parties,

Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before 18 February 2019. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (indicating your preferred method of notification) and an indication of any direct business, financial, personal, or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties.

Please note that only Registered I&APs:

- will be notified of the availability of reports and other written submissions made (or to be made) to the Department by the applicant, and be entitled to comment on these reports and submissions;
- will be notified of the outcome of the application, the reasons for the decision, and that an appeal may be lodged against a decision; and
- will be notified of the applicant's intention to appeal the decision of the competent authority, together with an indication of where and for what period the appeal submission will be available for inspection.

Consultant: EnviroAfrica CC. P.O. Box 5367, Helderberg, 7135 / Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

In addition, please find attached notification letter dated 15 January 2019.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

p: +27 21 851 1616

f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130  
P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Tuesday, 15 January 2019 2:51 PM  
**To:** 'mm@kaigarib.gov.za'; 'mayor@kaigarib.gov.za'; 'saccovictor6@gmail.com'; 'JacolineMa'; 'AbrahamsA@dws.gov.za'; 'shibambus@dws.gov.za'; 'Schwartz Chantel (UPN)'; 'TTshimakwane'; 'ORiba'; 'Ordain Riba'; 'sylvia.moholo@dpw.gov.za'; 'nhiggitt@sahra.org.za'; 'marinakwgv@isat.co.za'; 'mariuslouw111@gmail.com'; 'minibos@yahoo.com'; 'dewaal@kaigarib.gov.za'  
**Subject:** Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonias Road, Kai !Garib Municipality, ZF Mgcau Di  
**Attachments:** Initial notification letters\_Gamakor Behuising - 15 Jan 2019.pdf

Dear Interested and Affected Parties,

Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before 18 February 2019. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (indicating your preferred method of notification) and an indication of any direct business, financial, personal, or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties.

Please note that only Registered I&APs:

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- will be notified of the outcome of the application, the reasons for the decision, and that an appeal may be lodged against a decision; and
- will be notified of the applicant's intention to appeal the decision of the competent authority, together with an indication of where and for what period the appeal submission will be available for inspection.

Consultant: EnviroAfrica CC. P.O. Box 5367, Helderberg, 7135 / Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

In addition, please find attached notification letter dated 15 January 2019.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

p: +27 21 851 1616

f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130  
P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

**MAILDROPS AND POSTER PLACEMENT: PROPOSED GAMAKOR AND NOODKAMP LOW COST HOUSING PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOOES, GORDONIA RD, KAI !GARIB MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE – 27 NOVEMBER 2018**



Figure 1: A3 Poster placed against the door at Kai !Garib Municipality in Keimoes.



Figure 2: A3 Poster placed against the door at Kai !Garib Municipality in Keimoes.



Figure 3: A2 poster placed against fence at the site; looking in a western direction. A2 poster placed adjacent to a Tuck Shop along Alwyn Street.



Figure 4: A2 poster placed against fence at the site; looking in a north-western direction. Poster placed adjacent to a Tuck Shop along Alwyn Street.





Figure 5: A2 poster placed against the fence at the site, looking in a western direction. A2 poster placed adjacent to a Tuck Shop along Alwyn Street.



Figure 6: A2 poster placed against the fence at 7de Laan Tuck Shop. Looking in a north-western direction.



Figure 7: A2 poster placed against the fence at 7de Laan Tuck Shop. Looking in a western direction.

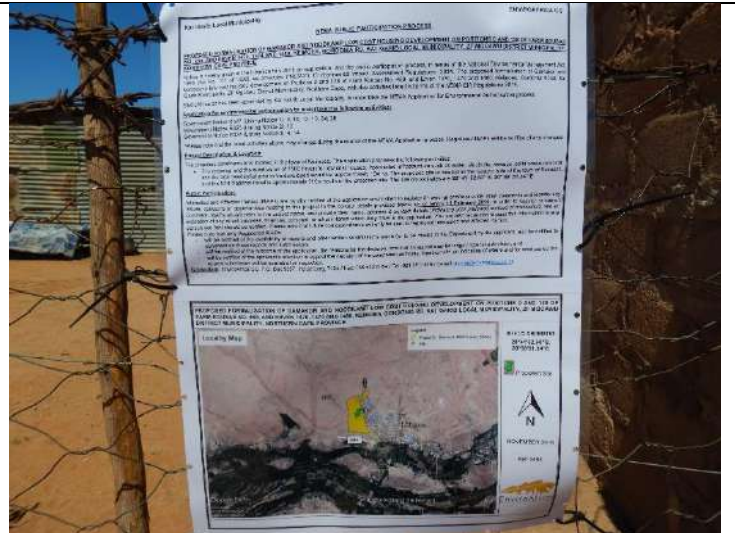


Figure 8: A2 poster placed against the fence at 7de Laan Tuck Shop. Looking in a western direction.



Figure 9: A2 poster placed against the fence at 7de Laan Tuck Shop. Looking in a northern direction.



Figure 10: Maildrops done at informal dwellings on site.





Figure 11: Maildrops done at informal dwellings on site.



Figure 12: Maildrops done at informal dwellings on site.



Figure 13: Maildrops done at informal dwellings on site.



Figure 14: Maildrops done at informal dwellings on site.



Figure 15: Maildrops done at informal dwellings on site.



Figure 16: Maildrops done at informal dwellings on site.





Figure 17: Maildrops done at informal dwellings on site. Looking in a southern direction.



Figure 18: Maildrops done at informal dwellings on site. Looking in a southern direction.



Figure 19: A3 Poster placed against the gate at Star Tuck Shop. Looking in a north-eastern direction.



Figure 19: A3 Poster placed against the gate at Star Tuck Shop. Looking in a north-eastern direction.



Figure 19: A3 Poster placed against the gate at Star Tuck Shop.



Figure 19: The area to the south of Star Tuck Shop, looking in a northern direction.



Figure 19: Maildrops done along Alwyn Street, looking in a northern direction. The site is to the left, some informal structures present.



Figure 23: Maildrops done along Alwyn Street, looking in a northern direction.



## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Tuesday, 10 March 2020 3:55 PM  
**To:** 'Natasha Higgitt'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** RE: Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcaw

<b>Tracking:</b>	<b>Recipient</b>	<b>Read</b>
	'Natasha Higgitt'	
	'Jackie   Enviro Africa'	
	Jackie   Enviro Africa	Read: 2020/03/11 10:18 AM

Dear Natasha,

Your e-mail correspondence dated 16 January 2019, refers.

Please note that EnviroAfrica has appointed UBIQUE Heritage Consultants to undertake the required Heritage Impact Assessment (HIA) report.

The HIA is completed and will be attached the Draft Scoping Report that will go out for public comment in due course.

UBIQUE Heritage Consultants will create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130

P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

**From:** Natasha Higgitt <nhiggitt@sahra.org.za>

**Sent:** Wednesday, 16 January 2019 10:26 AM

**To:** Emile Esquire <emile@enviroafrica.co.za>

**Subject:** RE: Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcaw

Good morning,

Thank you for notifying SAHRA of the proposed development. Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: <http://sahra.org.za/sahris/>. We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions.

Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.

Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application, and are submitted to SAHRA at the beginning of the Public Review periods. Once all these documents have been uploaded, I will be able to issue an informed comment as per section 38(4) and 38(8) of the NHRA.

Kind regards,

**From:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>

**Sent:** Tuesday, January 15, 2019 12:34 PM

**To:** [mm@kaigarib.gov.za](mailto:mm@kaigarib.gov.za); [mayor@kaigarib.gov.za](mailto:mayor@kaigarib.gov.za); [saccovictor6@gmail.com](mailto:saccovictor6@gmail.com); 'JacolineMa' <[JacolineMa@daff.gov.za](mailto:JacolineMa@daff.gov.za)>; [AbrahamsA@dws.gov.za](mailto:AbrahamsA@dws.gov.za); [shibambus@dws.gov.za](mailto:shibambus@dws.gov.za); 'Schwartz Chantel (UPN)' <[SchwartzC@dws.gov.za](mailto:SchwartzC@dws.gov.za)>; 'Ttshimakwane' <[Ttsimakwane@ncpg.gov.za](mailto:Ttsimakwane@ncpg.gov.za)>; 'ORiba' <[ORiba@ncpg.gov.za](mailto:ORiba@ncpg.gov.za)>; 'Ordain Riba' <[oriba.denc@gmail.com](mailto:oriba.denc@gmail.com)>; [sylvia.moholo@dpw.gov.za](mailto:sylvia.moholo@dpw.gov.za); Natasha Higgitt <[nhiggitt@sahra.org.za](mailto:nhiggitt@sahra.org.za)>; [marinakwgv@isat.co.za](mailto:marinakwgv@isat.co.za)

**Cc:** 'EnviroAfrica :Admin' <[admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za)>

**Subject:** Initial Invitation to Register as I&APs: Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordonia Road, Kai !Garib Municipality, ZF Mgcawu Di

Dear Interested and Affected Parties,

Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before 18 February 2019. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (indicating your preferred method of notification) and an indication of any direct business, financial, personal, or other interest which they have in the application. You are also requested to pass this information to any person you feel should be notified. Please note that future correspondence will only be sent to registered Interested and Affected Parties.

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- will be notified of the outcome of the application, the reasons for the decision, and that an appeal may be lodged against a decision; and
- will be notified of the applicant's intention to appeal the decision of the competent authority, together with an indication of where and for what period the appeal submission will be available for inspection.

Consultant: EnviroAfrica CC. P.O. Box 5367, Helderberg, 7135 / Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

In addition, please find attached notification letter dated 15 January 2019.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130

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**Natasha Higgitt**

Heritage Officer: Archaeology, Palaeontology and Meteorites Unit

South African Heritage Resources Agency

*- A nation united through heritage -*

T: +27 21 462 4502/ 8660 | C: +27 82 507 0378 | F: +27 21 462 4509

E: [nhiggitt@sahra.org.za](mailto:nhiggitt@sahra.org.za) | 111 Harrington Street | Cape Town |

[www.sahra.org.za](http://www.sahra.org.za)



The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The second part of the paper describes the methodology used in the study, including the data collection and analysis techniques. The third part of the paper presents the results of the study, and the fourth part discusses the conclusions and implications of the findings.

The study was conducted using a quantitative research design. Data was collected from a sample of 100 participants using a survey questionnaire. The data was then analyzed using statistical software to determine the relationships between the variables.

The results of the study show that there is a significant positive relationship between the variables. This finding is consistent with the previous research on the topic. The implications of the findings suggest that the variables are important factors in the study of the topic.

In conclusion, the study has shown that the variables are important factors in the study of the topic. The findings have implications for the understanding of the topic and for the development of future research.



## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Thursday, 28 March 2019 10:40 AM  
**To:** 'SonetD@l2b.co.za'  
**Subject:** RE: Gamakor and Noodkamp low cost housing  
**Attachments:** Initial notification letters\_Gamakor Behuising - 15 Jan 2019.pdf

Dear Sonet,

Your email correspondence dated 27 March 2019, refers.

Your name will be placed on the list of registered Interested and Affected Parties (I&APs) for the aforementioned project.

However, please note that the initial Public Participation Process (PPP) closed on 18 February 2019.

Please find attached BID for the aforementioned project.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

p: +27 21 851 1616

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130  
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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

**From:** Sonet Du Plooy <[SonetD@l2b.co.za](mailto:SonetD@l2b.co.za)>  
**Sent:** March 27, 2019 9:47 AM  
**To:** [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za)  
**Subject:** Gamakor and Noodkamp low cost housing

Good morning,

Your company is currently conducting a Basic Impact Assessment for the establishment of a proposed Development of portions 0 and 128 of farm Kousas to be known as Gamakor and Noodkamp low cost housing. Please could you forward me the BID for this application and register me as a Interested & Affected party?

Thanking you in anticipation of a favourable response.

--

Kind Regards

Sonet Du Plooy

Daily Tenders Department

Leads 2 Business ([www.L2B.co.za](http://www.L2B.co.za))

Tel: 0860 836337

0860 TENDER

Fax: 033 3435882

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Please note that any views expressed in this email may be those of the originator and do not necessarily reflect those of Cedrus Internet Solutions (Pty) Ltd.



## Emile Esquire

---

**From:** Sherina Shawe <SherinaS@l2b.co.za>  
**Sent:** Wednesday, 11 March 2020 8:32 AM  
**To:** Emile Esquire (emile@enviroafrica.co.za)  
**Subject:** Re: Gamakor and Noodkamp Low Cost Housing

Thank you :)

Kind Regards

Sherina Shawe  
Regional Content Researcher  
Private Projects

Leads 2 Business ([www.L2B.co.za](http://www.L2B.co.za))

Tel: 0860 836337  
0860 TENDER  
Fax: 033 3435882

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Please note that any views expressed in this email may be those of the originator and do not necessarily reflect those of Cedrus Internet Solutions (Pty) Ltd. --

On 2020/03/11 08:27, Emile Esquire ([emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)) wrote:

Dear Sherina,

Your email of earlier today, refers.

Thank you for confirming that Karen is no longer involved in the project.

Please note that I have added your name to the list of I&APs for the aforementioned project.

Kind regards,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130



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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

**From:** Sherina Shawe <[SherinaS@l2b.co.za](mailto:SherinaS@l2b.co.za)>  
**Sent:** Wednesday, 11 March 2020 7:48 AM  
**To:** Emile Esquire ([emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)) <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>; [KarenC@l2b.co.za](mailto:KarenC@l2b.co.za)  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>  
**Subject:** Re: Gamakor and Noodkamp Low Cost Housing

Good Morning Emile

Please may I ask that you add myself as Karen has left and I have taken over her projects :)

Much appreciated.

Kind Regards

Sherina Shawe  
Regional Content Researcher  
Private Projects

Leads 2 Business ([www.L2B.co.za](http://www.L2B.co.za))

Tel: 0860 836337  
0860 TENDER  
Fax: 033 3435882

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Please note that any views expressed in this email may be those of the originator and do not necessarily reflect those of Cedrus Internet Solutions (Pty) Ltd. --

On 2020/03/10 15:49, Emile Esquire ([emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)) wrote:

Dear Karen Clark,

Your email correspondence dated 19 February 2019, refers.

Please note that your name are now placed on the list of registered Interested and Affected Parties (I&APs) and you will receive an electronic copy of the Draft Scoping Report that will go out for public comment in due course.

Kind regards,

Emile Esquire



## EnviroAfrica

*Environmental Consultant*

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**From:** Karen Clark <[KarenC@l2b.co.za](mailto:KarenC@l2b.co.za)>

**Sent:** February 19, 2019 4:39 PM

**To:** [admin@enviroafrica.co.za](mailto:admin@enviroafrica.co.za)

**Subject:** Gamakor and Noodkamp Low Cost Housing

Good afternoon,

I trust you are well.

I see that I am late in my request to be added as an I&AP, however, I do not have any queries or comments. I would just like to receive notifications of future correspondence.

Please kindly send me the BID for this housing development.

Thank you in advance and have a good evening.

--

Kind Regards,

Karen Clark

Regional Content Researcher

Leads 2 Business ([www.L2B.co.za](http://www.L2B.co.za))

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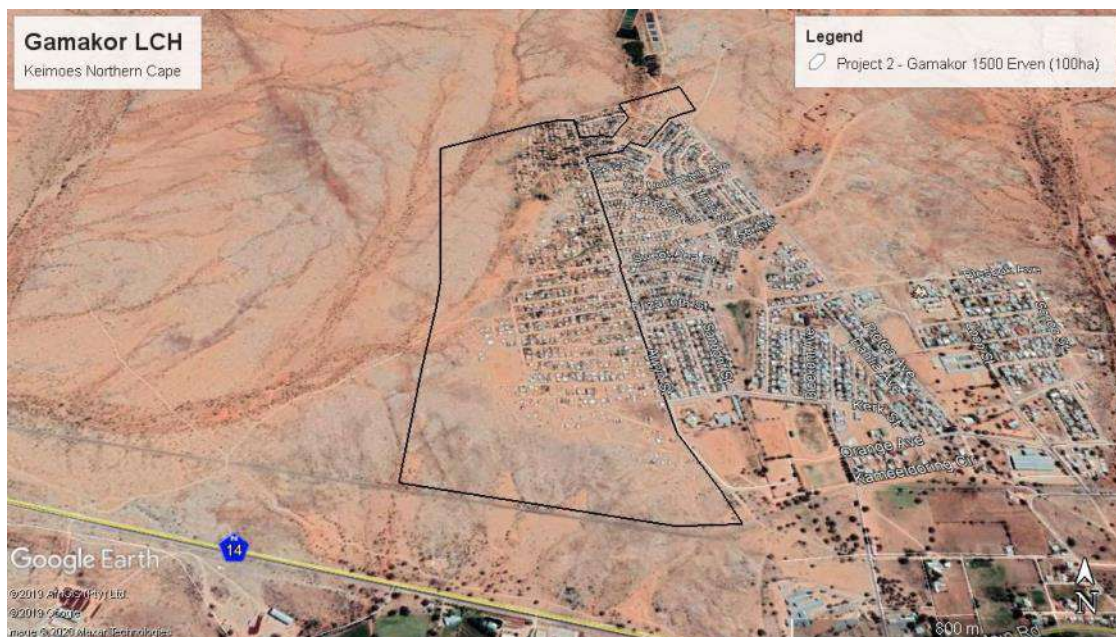
INITIAL PPP: PUBLIC PARTICIPATION COMMENTS RECEIVED - PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI IGARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE					
Date	Comment	I&AP	Project	Response	Respondent
15/01/2019	<p>Good morning,</p> <p>Thank you for notifying SAHRA of the proposed development. Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: <a href="http://sahra.org.za/sahris/">http://sahra.org.za/sahris/</a>. We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions.</p> <p>Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.</p> <p>Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application, and are submitted to SAHRA at the beginning of the Public Review periods. Once all these documents have been uploaded, I will be able to issue an informed comment as per section 38(4) and 38(8) of the NHRA.</p> <p>Kind regards,</p>	SAHRA	Gamakor Housing Development	<p>Dear Natasha,</p> <p>Your e-mail correspondence dated 16 January 2019, refers.</p> <p>Please note that EnviroAfrica has appointed UBIQUE Heritage Consultants to undertake the required Heritage Impact Assessment (HIA) report.</p> <p>The HIA is completed and will be attached the Draft Scoping Report that will go out for public comment in due course.</p> <p>UBIQUE Heritage Consultants will create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process.</p> <p>Kind regards,</p>	EnviroAfrica
19/02/2019	<p>Good afternoon,</p> <p>I trust you are well.</p> <p>I see that I am late in my request to be added as an I&amp;AP, however, I do not have any queries or comments. I would just like to receive notifications of future correspondence.</p> <p>Please kindly send me the BID for this housing development.</p> <p>Thank you in advance and have a good evening.</p> <p>--</p> <p>Kind Regards,</p> <p>Karen Clark</p>	Karen Clark	Gamakor Housing Development	<p>Dear Karen Clark,</p> <p>Your email correspondence dated 19 February 2019, refers.</p> <p>Please note that your name are now placed on the list of registered Interested and Affected Parties (I&amp;APs) and you will receive an electronic copy of the Draft Scoping Report that will go out for public comment in due course.</p> <p>Kind regards,</p>	EnviroAfrica
11/03/2020	<p>Good Morning Emile</p> <p>Please may I ask that you add myself as Karen has leaft and I have taken over her projects :)</p> <p>Much appreciated.</p> <p>Kind Regards</p>	Sherina Shawe	Gamakor Housing Development	<p>Dear Sherina,</p> <p>Your email of earlier today, refers.</p> <p>Thank you for confirming that Karen is no longer involved in the project.</p> <p>Please note that I have added your name to the list of I&amp;APs for the aforementioned project.</p> <p>Kind regards,</p>	EnviroAfrica
27/03/2019	<p>Good morning,</p> <p>Your company is currently conducting a Basic Impact Assessment for the establishment of a proposed Development of portions 0 and 128 of farm Kousas to be known as Gamakor and Noodkamp low cost housing. Please could you forward me the BID for this application and register me as a Interested &amp; Affected party?</p> <p>Thanking you in anticipation of a favourable response.</p> <p>Kind Regards</p> <p>Sonet Du Plooy</p>	Sonet Du Plooy	Gamakor Housing Development	<p>Dear Sonet,</p> <p>Your email correspondence dated 27 March 2019, refers.</p> <p>Your name will be placed on the list of registered Interested and Affected Parties (I&amp;APs) for the aforementioned project.</p> <p>However, please note that the initial Public Participation Process (PPP) closed on 18 February 2019.</p> <p>Please find attached BID for the aforementioned project.</p> <p>Kind regards,</p>	EnviroAfrica



# BOTANICAL ASSESSMENT

## GAMAKOR & NOODKAMP LOW COST HOUSING

Proposed formalisation of the Gamakor and Noodkamp housing development on the Remainder and Portion 128 of the Farm Kousas No. 459 and Erven 1470, 1474 and 1480, Gordonia road, Keimoes. Kai !Garib Local Municipality, Northern Cape Province.



6 February 2020

**P.J.J. Botes (Pr.Sci.Nat: 400184/05)**

*Registered Professional Botanical, Environmental and Ecological Scientist*

©

## SUMMARY - MAIN CONCLUSIONS

<b>VEGETATION TYPE</b>	<p><b>Bushmanland Arid Grassland:</b></p> <p>Bushmanland Arid Grassland is not considered a threatened vegetation type, with more than 99% remaining. However only 4% is formally conserved (Augrabies Falls National Park). Further conservation options must thus be investigated. The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness &amp; Oosthuysen, 2016). The NCCBA maps were used to guide the identification of potential significant sites.</p>
<b>VEGETATION ENCOUNTERED</b>	<p>Bushmanland Arid Grassland is generally described as a sparsely vegetated (semi-desert) low shrubland dominated by white grasses (<i>Stipagrostis</i> species) on gently sloping or irregular plains, which can, in years of abundant rainfall, have rich displays of annual herbs. However, the white grasses are usually prominent after recent rains.</p> <p>In this case the absence of recent rains, as well as grazing by domestic livestock meant that the white grassy layer was mostly absent, and only a sparse low shrubland remained. Because of the arid nature of the region (and the unpredictability of rainfall) the carrying capacity of the veld is very low and overgrazing had an extremely negative effect on many vegetation types (with destruction of natural vegetation quite common near settlements). In addition, a large portion (mostly the eastern section) of the footprint was already transformed as a result of informal settlement and housing (Figure 5).</p> <p>Within the remainder of the natural veld two plant communities were observed, closely associated with variations in soil type and depth. They were:</p> <ul style="list-style-type: none"> <li>• On the shallow quartz rich rocky soils a very sparse (semi-desert) low shrubland were observed, dominated by <i>Salsola tuberculata</i> and <i>Justicia australis</i>, with <i>Aloe claviflora</i> also very common.</li> <li>• On the deeper sandy soils in the slight depressions associated with the seasonal watercourses a denser and larger shrub and tree layer was encountered, dominated by <i>Parkinsonia africana</i> and <i>Senegalia mellifera</i>.</li> </ul>
<b>CONSERVATION PRIORITY AREAS</b>	<p>According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located <u>within a terrestrial CBA</u>. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA.</p> <p>The site will not impact on any centre of endemism.</p>
<b>CONNECTIVITY</b>	<p>The proposed activity will result in a permanent footprint enlargement of the existing housing scheme by approximately 100 ha. However, the proposed footprint joins up with the existing urban edge and should not have any significant additional impact on connectivity.</p>
<b>LAND-USE</b>	<p>The footprint is located on municipal land adjacent to an existing urban area. Portions of the footprint is still in relative good conditions (although heavily grazed), but half had already been transformed by illegal structures (settlement). Remaining natural veld is utilised for livestock grazing by the local community.</p>
<b>PROTECTED PLANT SPECIES</b>	<p>Three <i>Vachellia erioloba</i> (Camel Thorn) trees (NFA protected) and five NCNCA protected plant was observed. It is recommended that the Camel thorn trees are protected and that <i>Aloe</i> and <i>Boscia</i> plants are search &amp; rescued.</p>
<b>WATER COURSES AND WETLANDS</b>	<p>The most significant feature of the study area, influencing topography is the seasonal drainage line that runs from northeast to southwest through the northern part of the property, draining towards the Friesdale Spruit, which drains into the Orange River. Please refer to the freshwater specialist report for recommendations (Watsan Africa, 2020).</p>

**MAIN  
CONCLUSION**

The terrestrial habitat associated with the project footprint is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type is classified as least threatened;
- However, the project footprint overlaps a CBA;
- The floral habitat and natural systems have been impacted, by grazing and urban related activities, but portions still functions relatively well;
- The floral diversity is very low;
- No special habitats or features were observed within the footprint;
- No red-list species were encountered, but one nationally protected tree and five provincially protected plant species was encountered.

The proposed development will result in the permanent transformation of approximately 100ha of natural veld for human settlement. According to the impact assessment given in Table 7, with good environmental control, the development is likely to result in a **MEDIUM** impact on the environment.

However, with the correct mitigation it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

**WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED, WITH THE PROPOSED MITIGATION ACTIONS.**

**NO-GO OPTION**

The development will result in significant socio-economic gain, while the no-go option will not contribute significantly to national or provincial conservation targets.

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## **INDEPENDENCE & CONDITIONS**

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PB Consult is an independent entity with no interest in the activity other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and PB Consult have no interest in secondary or downstream development as a result of the authorization of this proposed project. There are no circumstances that compromise the objectivity of this report. The findings, results, observations and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. PB Consult reserve the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

---

## **RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR**

---

Mr. Peet Botes holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he had worked for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTR and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve).

In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and was also responsible for helping develop the biodiversity part of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits.

During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, environmental management plans for various industries, environmental compliance audits, environmental control work as well as more than 70 biodiversity & botanical specialist studies.

Towards the end of 2017, Mr Botes started his own small environmental consulting business focusing on biodiversity & botanical assessments, biodiversity management plans and environmental compliance audits.

Mr. Botes is a registered Professional Botanical, Environmental and Ecological Scientists at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.



## DECLARATION OF INDEPENDENCE

### THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Petrus, Jacobus, Johannes Botes, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 13 of GN No. R. 326.

**Note:** The terms of reference must be attached.



Signature of the specialist:

PB Consult (Sole Proprietor)

Name of company:

4 February 2020

Date:

## CONTENTS

<b>SUMMARY - MAIN CONCLUSIONS .....</b>	<b>I</b>
<b>INDEPENDENCE &amp; CONDITIONS.....</b>	<b>III</b>
<b>RELEVANT QUALIFICATIONS &amp; EXPERIENCE OF THE AUTHOR .....</b>	<b>III</b>
<b>DECLARATION OF INDEPENDENCE .....</b>	<b>IV</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1. Terms of reference .....	1
<b>2. STUDY AREA .....</b>	<b>1</b>
2.1. Location & Layout .....	1
2.2. Climate .....	2
2.3. Topography.....	3
2.4. Geology and soils .....	3
<b>3. EVALUATION METHOD.....</b>	<b>3</b>
<b>4. THE VEGETATION .....</b>	<b>5</b>
4.1. The Vegetation in context.....	6
4.2. Vegetation encountered .....	6
4.2.1. Vegetation associated with the shallow rocky soils.....	7
4.2.2. Vegetation associated with the deeper sandy soils.....	9
4.2.3. Transformed area.....	10
4.3. Flora encountered .....	11
4.4. Northern Cape critical biodiversity areas.....	12
4.5. Potential impact on centres of endemism .....	13
4.6. Threatened and protected plant species .....	13
4.6.1. Red list of South African plant species .....	14
4.6.2. NEM: BA protected plant species .....	14
4.6.3. NFA Protected plant species.....	14
4.6.4. NCNCA protected plant species.....	14
<b>5. IMPACT ASSESSMENT METHOD .....</b>	<b>16</b>
5.1. Determining significance .....	16
5.2. Significance categories .....	18
<b>6. DISCUSSING BOTANICAL SENSITIVITY.....</b>	<b>19</b>
6.1. Impact assessment .....	20
<b>7. IMPACT MINIMISATION RECOMMENDATIONS.....</b>	<b>22</b>
7.1. Mitigation actions .....	22
<b>8. REFERENCES.....</b>	<b>23</b>

## LIST OF FIGURES

Figure 1: Map showing the location of Keimoes in the Northern Cape Province .....	2
Figure 2: Location of the proposed Gamakor LCH, to the northwest of Keimoes.....	2
Figure 3: The proposed footprint (black) and the routes followed during the survey (yellow) .....	4
Figure 4: Vegetation map of South Africa (2012 beta 2 version), showing the Keimoes area. ....	5
Figure 5: Google image of the footprint, showing the transformed area (purple) and deeper sandy areas (orange) .....	7
Figure 10: The Northern Cape CBA map showing the location of the proposed development .....	13

## LIST OF TABLES:

Table 1: Average rainfall and temperatures for Keimoes ( <a href="http://www.saexplorer.co.za">www.saexplorer.co.za</a> ).....	3
Table 2: List of indigenous species encountered within or near the proposed footprint .....	11
Table 3: List and location of protected tree species encountered near the proposed site 2, 3 & 9 locations .....	14
Table 4: Plant species protected in terms of the NCNCA encountered within the study area.....	15
Table 5: Categories and criteria used for the evaluation of the significance of a potential impact .....	17
Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002) .....	18
Table 7: Impact assessment associated with the proposed development .....	20

## 1. INTRODUCTION

The Kai !Garib Local Municipality are in the process of formalizing the Gamakor and Noodkamp low cost housing (LCH) project, which is located to the north-west of Keimoes. The aim is to rezone and subdivide about 1 500 new erven for low cost housing, which will include associated infrastructure such as water, electricity, sewage and solid waste removal. The footprint for this development will be approximately 104 ha. However, it must be noted that many of this area has already been settled by local inhabitants.

The study areas includes (Please refer to Figure 1 – 2):

- The remainder of Farm Kousas No. 459, Keimoes;
- Portion 128 of Farm Kousas No. 459, Keimoes;
- Erven 1470, 1474 & 1480, Keimoes

The proposed development will result in the transformation of a further 50-60 ha of remaining natural veld, which triggers NEMA EIA activities. EnviroAfrica was appointed to perform the NEMA EIA application and PB Consult was appointed to conduct a botanical assessment of the proposed development.

Only one vegetation type is expected to be impacted by the proposed development, namely Bushmanland Arid Grassland (considered “Least Threatened” in terms of the National list of ecosystems that are threatened and in need of protection). Desktop studies indicated that the site is still likely to support natural vegetation including potentially protected tree species.

However, the site also shows signs of being partially transformed already (due to existing housing development), while its proximity to the urban edge would certainly have resulted in some impacts associated with urban development, which were supported by the findings of the site visit.

### 1.1. TERMS OF REFERENCE

The terms of reference for this appointment were to:

- Evaluate the proposed site(s) in order to determine whether any significant botanical features will be impacted as a result of the proposed development.
- Determine and record the position of any plant species of special significance (e.g. protected tree species, or rare or endangered plant species) that should be avoided or that may require “search & rescue” intervention.
- Make recommendations on impact minimization should it be required
- Consider short- to long-term implications of impacts on biodiversity and highlight irreversible impacts or irreplaceable loss of species.

## 2. STUDY AREA

### 2.1. LOCATION & LAYOUT

Keimoes is located in the Northern Cape Province where the R26 (Brandvlei road) meets the N14 (Springbok-Upington road), Refer to Figure 1). The proposed development is located to the northwest outskirts of Keimoes and overlaps portions of the Remainder and Portion 128 of the Farm Kousas No. 459 as well as Erven 1470, 1474 and 1480 (Keimoes) (Refer to Figure 1 and Figure 2).



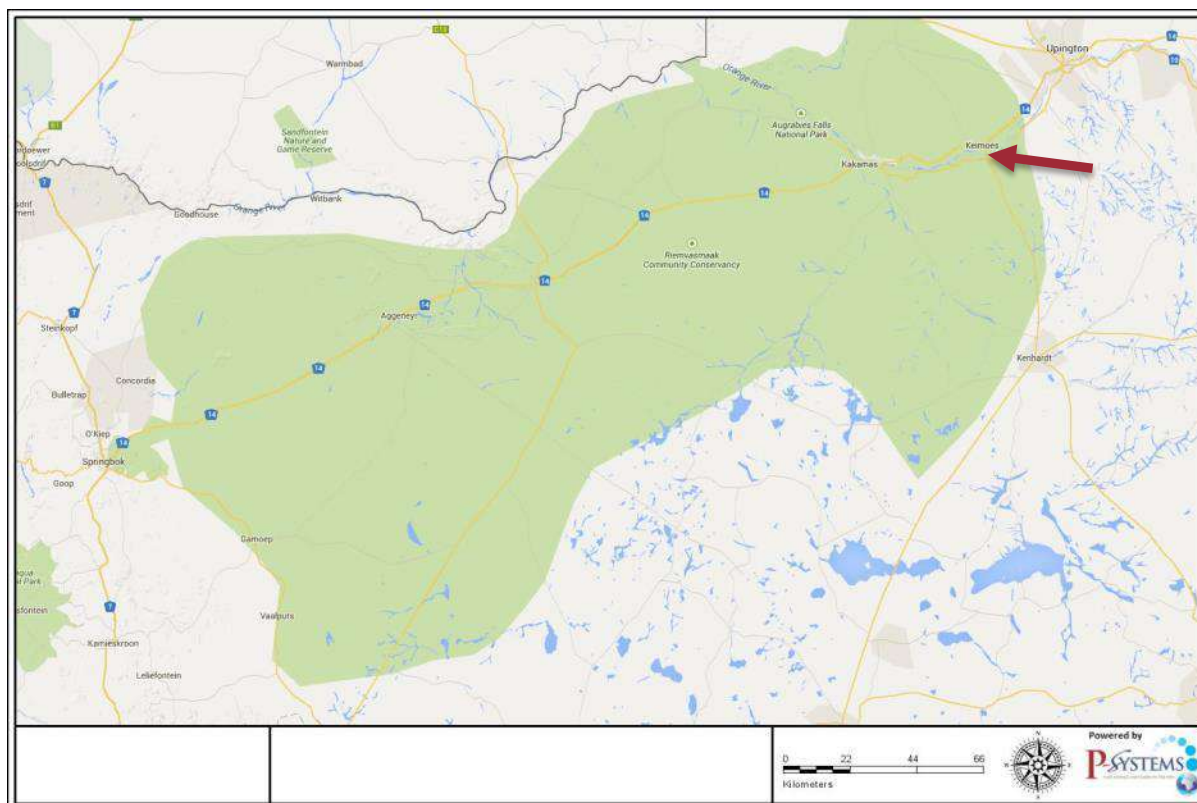


Figure 1: Map showing the location of Keimoes in the Northern Cape Province

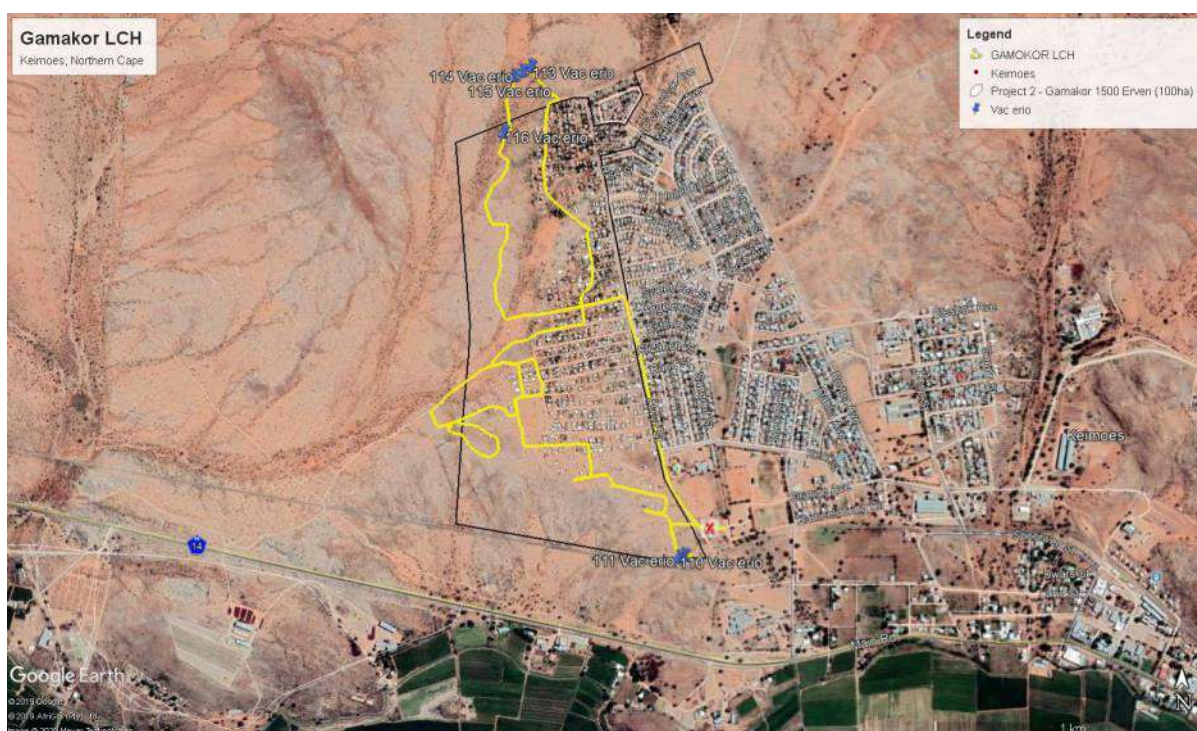


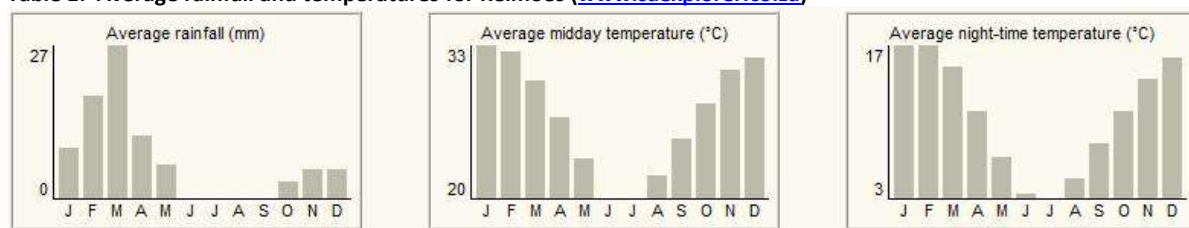
Figure 2: Location of the proposed Gamakor LCH, to the northwest of Keimoes

## 2.2. CLIMATE

All regions with a rainfall of less than 400 mm per year are regarded as arid. Keimoes receives on average approximately 84 mm of rain per year (mainly during autumn). Table 1 below gives the average rainfall values

(left) and average temperatures (centre and right) for Keimoes per month. It receives the lowest rainfall (0 mm) in June and the highest (27 mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Keimoes range from 19.8°C in June to 33°C in January. On average, the coldest nights can be expected during July with night-time temperatures averaging 3°C ([www.saexplorer.co.za](http://www.saexplorer.co.za)).

**Table 1: Average rainfall and temperatures for Keimoes ([www.saexplorer.co.za](http://www.saexplorer.co.za))**



### 2.3. TOPOGRAPHY

The most significant feature of the study area, influencing topography is the seasonal drainage line that runs from northeast to southwest through the northern part of the property, draining towards the Friesdale Spruit, which drains into the Orange River. The study area can be described as flat to slightly undulating (especially the southern portion of the site). However, the site has a slight slope from northeast to southwest (and north to south) as the landscape drains towards the Orange River. Elevation drops from approximately 758 m (northern boundary) to about 738 m (at the southern boundary) over a distance of just more than 1.72 km, with a maximum slope of 1.6% and an average slope of only 0.4%.

In general aspect is not expected to have any significant influence on the vegetation. The main environmental feature that is likely to influence vegetation will be geographical features such as drainage lines and variations in soils. As is typical of this part of the Northern Cape, small seasonal drainage lines were present on the site. In terms of vegetation, most of these drainage lines are probably not significant, apart from the larger indigenous trees that is often associated with such drainage lines and which in turns can support its own localized ecological habitat.

### 2.4. GEOLOGY AND SOILS

According to Mucina & Rutherford (2006), the geology is dominated by mudstones and shales of the Ecca Group (Prince Albert and Volksrust Formations) and Dwyka tillites, both of the early Karoo age. About 20% of rock outcrops are formed by Jurassic intrusive dolerite sheets and dykes. The soils are described as soils with minimal development, usually shallow on hard or weathering rock, Glenrosa and Mispah forms, with lime generally present in the entire landscape (Fc land type) and, to a lesser extent, red-yellow apedal, freely drained soils with a high base status and usually <15% clay (Ah and Ai land types) are also found. The salt content in these soils is very high. Lime is generally present in part or most of the landscape.

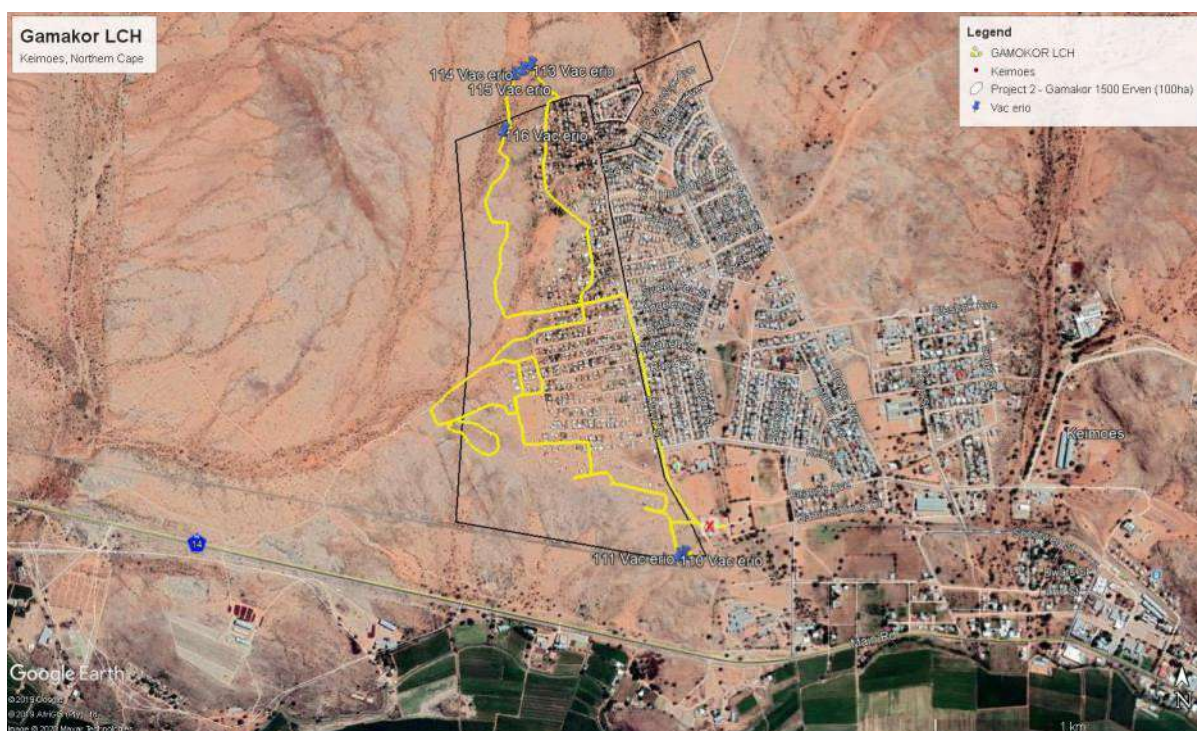
## 3. EVALUATION METHOD

Desktop studies coupled with a site visit were performed. The survey was conducted by walking and driving the site and examining, marking and photographing any area of interest. The yellow line in Figure 3 shows the route that was walked and drive during the site visit. The site visit was conducted during February 2019. The



timing of the site visit was reasonable in that, all perennial plants were identifiable, but the site was clearly very dry at the time of the visit. The author is confident that a fairly good understanding of the biodiversity status of the site was obtained (having done a number of studies in the Keimoes / Kakamas areas). Confidence in the findings is high.

The site visit started by driving slowly through the site in order to get an overall “feel” of the landscape and vegetation within the footprint. It also serves to identify differences in the landscape that may result in differences in plant community or species composition. The actual survey was then done, by walking through the sites. A hand-held Garmin GPSMAP 62s was used to track the sampling route and for recording waypoints of locations of specific importance, like protected trees (Figure 3). During the survey notes, together with a photographic record, were compiled for the vegetation and landscape.



**Figure 3:** The proposed footprint (black) and the routes followed during the survey (yellow)

During the site visit the author endeavoured to identify and record all significant biodiversity features, including rivers, streams or wetlands, special plant species and or specific soil conditions which might indicate special botanical features (e.g. rocky outcrops or silcrete patches).

The following general observations were made from the desktop studies and the site visit or evaluation:

- The western portion of the proposed footprint still include areas covered in natural land, but most of the eastern half of the proposed footprint are already settled or occupied by informal housing;
- The vegetation type conforms to the expected Bushmanland Arid Grassland, but shows two community variations, as a result of variations in soils;
- According to Van Wyk & Smith (2001) the footprint is not located within centre of endemism.

## 4. THE VEGETATION

The Northern Cape contains about 3500 plant species in 135 families and 724 genera, with about 25% of this flora endemic to the region. It is also home to an exceptionally high level of insect and reptile endemism, with new species still being discovered. However, it must be noted that this remarkable diversity is not distributed evenly throughout the region, but is concentrated in many local centres of endemism (NDBSP, 2008).

The Keimoes area would be classified as a desert region. In accordance with the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version) only one broad vegetation type is expected in the proposed area and its immediate vicinity, namely **Bushmanland Arid Grassland** (Figure 4). More than 99% of this vegetation still remains, but only 4% is formally conserved (Augrabies Falls National Park). According to the National list of ecosystems that are threatened and in need of protection (GN 1002, December 2011), Bushmanland Arid Grassland, is classified as *Least Threatened*.

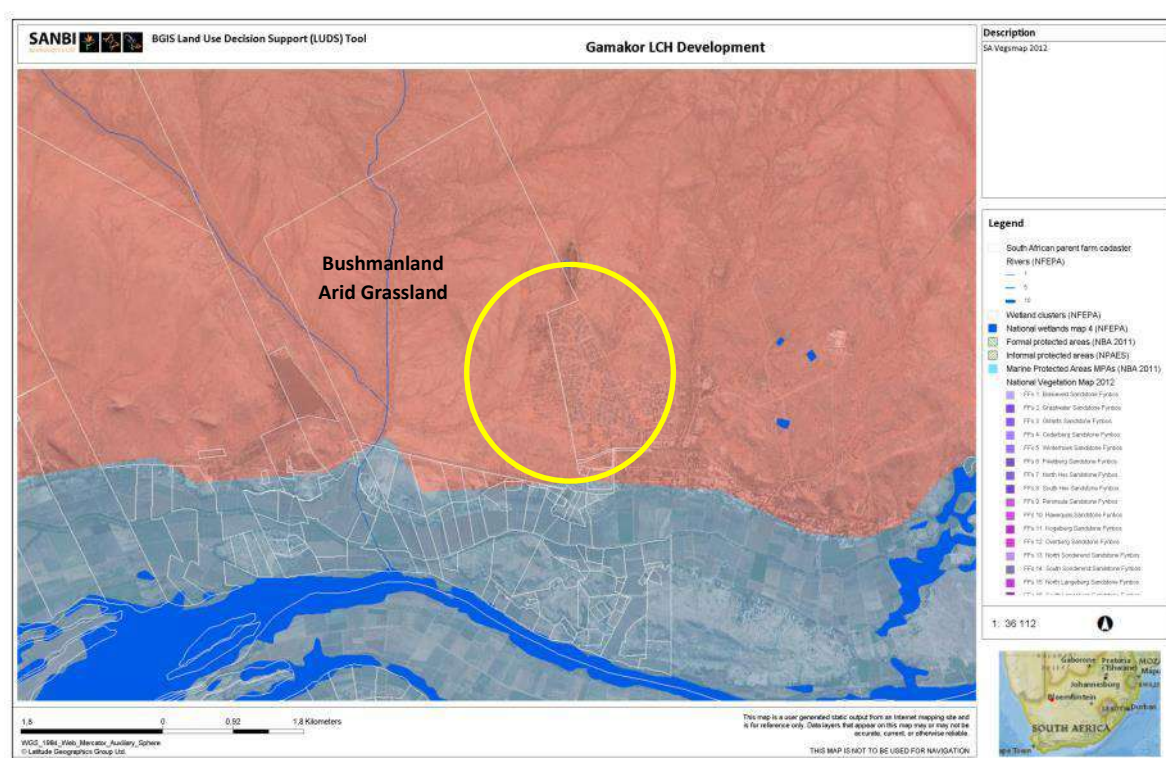


Figure 4: Vegetation map of South Africa (2012 beta 2 version), showing the Keimoes area.

According to Mucina and Rutherford (20016), Bushmanland Arid Grassland is found in the Northern Cape Province spanning about one degree of latitude from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the north-west this vegetation unit borders on desert vegetation (north-west of Aggeneys and Pofadder). The northern border (in the vicinity of Upington) and the eastern border (between Upington and Prieska) are formed with often intermingling units of Lower Gariep Broken Veld, Kalahari Karroid Shrubland and Gordonia Duneveld. Most of the western border is formed by the edge of the Namaqualand hills. Altitude varies from 600 – 1 200 m.



#### 4.1. THE VEGETATION IN CONTEXT

Bushmanland Arid Grassland is part of the Nama-Karoo Biome, which is a large arid landlocked region on the central plateau of the western half of South Africa, extending into Namibia. It is flanked by the Succulent Karoo to the west and south, desert to the northwest, arid Kalahari Savanna to the north, Grassland to the northeast, Albany Thicket to the southeast and small parts of Fynbos to the south. In South Africa, only the Desert Biome has a higher variability in annual rainfall and only the Kalahari Savanna greater extremes in temperature. The Nama-Karoo receives most of its rainfall in summer, especially in late summer (Mucina *et. al.*, 2006).

Climate is essentially continental and with almost no effect of the ameliorating influences of the oceans. Rainfall is low and unreliable, peaking in March. Droughts are unpredictable and often prolonged. Summers are hot and winters cold with temperature extremes ranging from -5°C in winter to 43°C in summer. However, rainfall intensity can be high (e.g. episodic thunderstorm and hail storm events). This coupled with the generally low vegetation cover associated with aridity and grazing pressure by domestic stock over the last two centuries, raises the potential for soil erosion. In semi-arid environments such as the Nama-Karoo, nutrients are generally located near the soil surface, making it vulnerable to sheet erosion (Mucina *et. al.*, 2006).

In contrast with the Succulent Karoo, the Nama-Karoo is not particularly rich in plant species and does not contain any centre of endemism. Local endemism is very low, which might indicate a relative youthful biome linked to the remarkable geological and environmental homogeneity of the Nama-Karoo. Rainfall seasonality and frequency are too unpredictable and winter temperatures too low to enable leaf succulent dominance (as in the Succulent Karoo). It is also too dry in summer for dominance by perennial grasses alone and the soils generally too shallow and rainfall too low for dominance by trees. But soil type, soil depth and local differences in moisture availability can cause abrupt changes in vegetation structure and composition (e.g. small drainage lines support more plant species than surrounding plains) (Mucina *et. al.*, 2006).

#### 4.2. VEGETATION ENCOUNTERED

Bushmanland Arid Grassland is generally described as a sparsely vegetated (semi-desert) low shrubland dominated by white grasses (*Stipagrostis* species) on gently sloping or irregular plains, which can, in years of abundant rainfall, have rich displays of annual herbs. However, the white grasses are usually also only prominent after recent rains.

In this case the absence of recent rains, as well as grazing by domestic livestock meant that the white grassy layer was mostly absent, and only a sparse low shrubland remained. Because of the arid nature of the region (and the unpredictability of rainfall) the carrying capacity of the veld is very low and overgrazing had an extremely negative effect on many vegetation types (with destruction of natural vegetation quite common near settlements). In addition, a large portion (mostly the eastern section) of the footprint was already transformed as a result of informal settlement and housing (Figure 5).

Within the remainder of the natural veld two plant communities were observed, closely associated with variations in soil type and depth. They were:

- On the shallow quartz rich rocky soils a very sparse (semi-desert) low shrubland were observed, dominated by *Salsola tuberculata* and *Justicia australis*, with *Aloe claviflora* also very common.
- On the deeper sandy soils in the slight depressions associated with the seasonal watercourses a denser and larger shrub and tree layer was encountered, dominated by *Parkinsonia africana* and *Senegalia mellifera*.

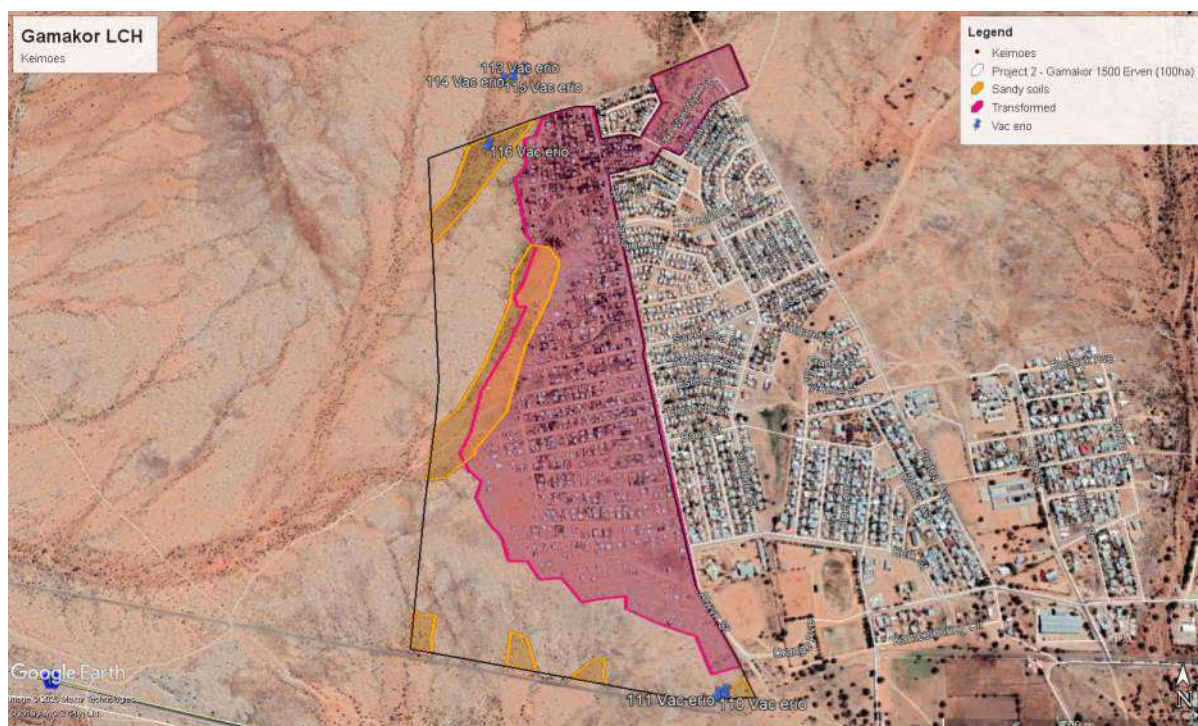


Figure 5: Google image of the footprint, showing the transformed area (purple) and deeper sandy areas (orange)

#### 4.2.1. Vegetation associated with the shallow rocky soils

Most of the remaining natural veld is associated with shallow quartz rich rocky soils. Please note that because of the unpredictability and infrequency of the rainfall the vegetation associated with true quartz fields (e.g. Knersvlakte) will never be able to develop in this area.

The vegetation can be described as a low (<50 cm in height) sparse to very sparse shrubland, low in species composition (not a great variety of species encountered). The shrubland was dominated *Salsola tuberculata* and *Justicia australis* (= *Monechma genistifolium*), with *Aloe claviflora* (Kraalaalwyn), *Mesembryanthemum subnodosum* (often a disturbance indicator) also relatively common.



**Photo 1:** Typical veld associated with the shallow rocky soils. Note the dominance by *Salsola tuberculata* in this photo. However, this was not always the case and mostly *Justicia australis* or *Mesembryanthemum subnodosum* were also present or common.

Other species in the upper layer included: *Barleria lichtensteiniana*, *Cynanchum viminale*, *Kleinia longiflora*, *Parkinsonia africana*, *Rhigozum trichotomum*, *Senegalia mellifera* and the aerial hemiparasite *Tapinanthus oleifolius*. In the lower layer (<20 cm) species like *Acanthopsis disperma* (Halfmensie), *Aptosimum spinescens*



(Doringviooltjie), *Blepharis mitrata* and *Tetraena simplex* were observed. Disturbance indicators like *Galenia africana* (Kraalbos) and *Salsola kali* (tumble weed) were also observed in the disturbed or transformed areas.



**Photo 2:** Looking from west to east over the southern portion of the footprint. Note the dominance by the disturbance indicator, *Mesembryanthemum subnodosum* near the disturbance footprint of the existing houses.



**Photo 3:** Looking from the middle of the site in a south-westerly direction. Note the dominance by *Justicia australis* in middle of the picture.



**Photo 4:** One of the rocky outcrops in the south western portion of the footprint. Note the Kraalaalwyn (*Aloe claviflora*) in the foreground and the larger Blackthorn (*Senegalia mellifera*) and *Parkinsonia africana* in the background.

#### 4.2.2. Vegetation associated with the deeper sandy soils

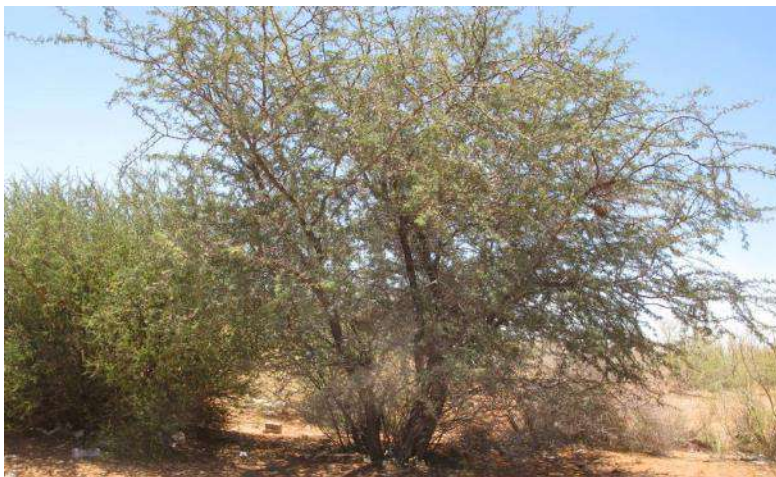
Within the slightly lower lying depressions associated with seasonal drainage lines, deeper sandy soils were encountered, which also supported a denser and larger shrub / small tree layer dominated by *Parkinsonia africana* and *Senegalia mellifera*. Unfortunately, the alien invasive *Prosopis* tree was also common in some of these areas. The following species were observed: *Asparagus cf. cooperi*, *B. foetida* (occasionally), *Euphorbia braunsii*, *Justicia australis*, *Kleinia longifolia*, *Lycium bosciifolium*, *Rhigozum trichotomum* and *Vachellia erioloba* (3 individuals within the proposed footprint).



**Photo 5:** A view over the northern portion of the footprint, overlooking the deeper sandy area in the background.



**Photo 6:** Note the dominance by *Parkinsonia africana* in the deeper sandy area, with the occasional *Senegalia mellifera* also visible.



**Photo 7:** One of the three *Vachellia erioloba* trees within the footprint. This one to the north of the site. Note the large *Senegalia mellifera* next to the Camel Thorn tree.





**Photo 8:** One of the two *Vachellia erioloba* encountered in a sandy spot to the south of the footprint.

#### 4.2.3. Transformed area

Most of the eastern portion of the footprint is already transformed as a result of informal settlement. The purpose of this application is to formalise this area into a formal urban development. The following pictures shows portions of this area.



**Photo 9:** Some of the housing in the north eastern section of the footprint



**Photo 10:** Some of the housing in the south eastern section of the footprint.

### 4.3. FLORA ENCOUNTERED

Table 2 gives a list of the plant species encountered during this study and their status in terms of the Red List of South African plants, National Environmental Management: Biodiversity Act, Act 10 of 2004 (NEM:BA), National Forest Act, Act 84 of 1998 (NFA), the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA) and Conservation of Agricultural Resources Act, Act 43 of 1983 (CARA).

**Table 2: List of indigenous species encountered within or near the proposed footprint**

No.	Species name	FAMILY	Status	Alien & invader species (AIS)
1.	<i>Acanthopsis disperma</i>	ACANTHACEAE	LC	
2.	<i>Aloe claviflora</i>	ASPHODELACEAE	LC NCNCA, Schedule 2 Protected (all species in this Family)	Apply for a NCNCA Flora permit (DENC)
3.	<i>Aptosimum spinescens</i>	SCROPHULARIACEAE	LC	
4.	<i>Asparagus cf. cooperi</i>	ASPARAGACEAE	LC	
5.	<i>Barleria lichtensteiniana</i>	ACANTHACEAE	LC	
6.	<i>Blepharis mitrata</i>	ACANTHACEAE	LC	
7.	<i>Boscia foetida</i>	BRASSICACEAE (CAPPARACEAE)	LC NCNCA, Schedule 2 Protected (all species in this Genus)	Apply for a NCNCA Flora permit (DENC)
8.	<i>Cynanchum viminale</i> (=Sarcostemma viminale)	APOCYNACEAE	NCNCA, Schedule 2 Protected (all species in this Family)	Apply for a NCNCA Flora permit (DENC)
9.	<i>Datura innoxia</i>	BRASSICACEAE	Alien weed	CARA Cat 1; NEMBA Cat 1b
10.	<i>Euphorbia braunsii</i>	EUPHORBIACEAE		
11.	<i>Galenia africana</i>	AIZOACEAE	LC Protected in terms of schedule 2 of the NCNCA	Apply for a NCNCA Flora permit (DENC)
12.	<i>Justicia australis</i> (=Monechma genistifolium)	ACANTHACEAE	LC	
13.	<i>Kleinia longiflora</i>	ASTERACEAE	LC	
14.	<i>Lycium bosciifolium</i>	SOLANACEAE	LC	
15.	<i>Mesembryanthemum subnodosum</i> (=Psilocaulon subnodosum)	AIZOACEAE	LC Protected in terms of schedule 2 of the NCNCA	Apply for a NCNCA Flora permit (DENC)
16.	<i>Parkinsonia africana</i>	FABACEAE	LC	
17.	<i>Prosopis</i> species	FABACEAE	Alien invasive plant species	CARA Cat 2; NEMBA Cat 3
18.	<i>Rhigozum trichotomum</i>	BIGONACEAE	LC	
19.	<i>Salsola kali</i>	AMARANTHACEAE	Naturalised invader	NEMBA Cat 1b
20.	<i>Salsola tuberculata</i>	AMARANTHACEAE		
21.	<i>Senegalia mellifera</i> (=Acacia mellifera)	FABACEAE	LC	
22.	<i>Tapinanthus oleifolius</i>	LORANTHACEAE	LC	
23.	<i>Tetraena simplex</i> (=Zygophyllum simplex)	ZYGOPHYLLACEAE	LC	
24.	<i>Vachellia erioloba</i>	FABACEAE	LC NFA protected species	Apply for a NFA Tree permit (DAFF)

#### 4.4. NORTHERN CAPE CRITICAL BIODIVERSITY AREAS

The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness & Oosthuysen, 2016). The 2016 Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province (including the Namakwa District Biodiversity Sector Plan, 2008). Priorities from existing plans such as the Namakwa District Biodiversity Plan, the Succulent Karoo Ecosystem Plan, National Estuary Priorities, and the National Freshwater Ecosystem Priority Areas were incorporated. Targets for terrestrial ecosystems were based on established national targets, while targets used for other features were aligned with those used in other provincial planning processes.

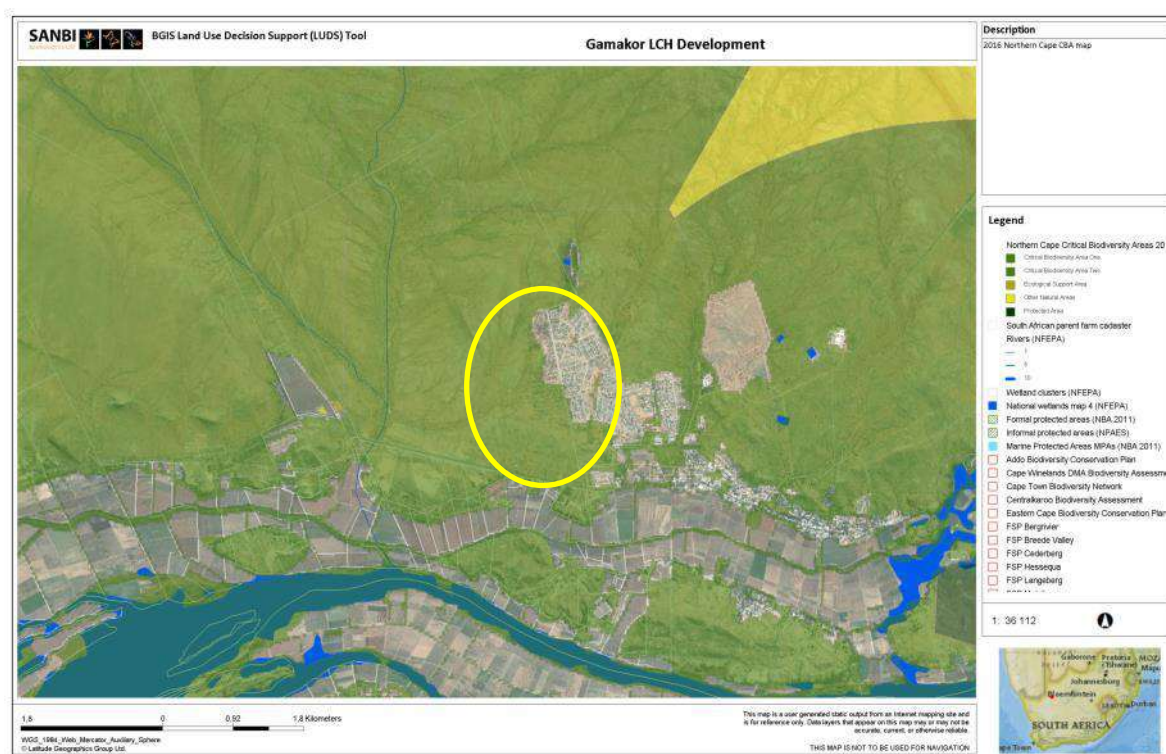
Critical biodiversity areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI 2007). The primary purpose of CBA's is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. CBA's can also be used to inform protected area expansion and development plans.

- **Critical biodiversity areas (CBA's)** are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.
- **Ecological support areas (ESA's)** are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas.

From a land-use planning perspective it is useful to think of the difference between CBA's and ESA's in terms of where in the landscape the biodiversity impact of any land-use activity action is most significant:

- For CBA's the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat).
- For ESA's a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity).

According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located **within a terrestrial CBA**. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA.



**Figure 6:** The Northern Cape CBA map showing the location of the proposed development

#### **4.5. POTENTIAL IMPACT ON CENTRES OF ENDEMISM**

According to Van Wyk en Smith (2001), the proposed development will not impact on any recognised centre of endemism. The nearest centre of endemism is the Griqualand West Centre which starts west of Delportshoop (approximately 50 km west of the proposed site).

**The proposed site does not fall within any recognised centre of endemism.**

#### **4.6. THREATENED AND PROTECTED PLANT SPECIES**

South Africa has become the first country to fully assess the status of its entire flora. Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban expansion, crop cultivation and mines), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods). South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction, but may nonetheless be of high conservation importance. As a result a SANBI uses an amended system of categories in order to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).



In the Northern Cape, species of conservation concern are also protected in terms of national and provincial legislation, namely:

- The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007).
- National Forest Act, Act 84 of 1998, provides for the protection of forests as well as specific tree species through the “*List of protected tree species*” (GN 908 of 21 November 2014).
- Northern Cape Nature Conservation Act, Act of 2009, provides for the protection of “*specially protected species*” (Schedule 1), “*protected species*” (Schedule 2) and “*common indigenous species*” (Schedule 3).

#### 4.6.1. Red list of South African plant species

The Red List of South African Plants online provides up to date information on the national conservation status of South Africa’s indigenous plants (SANBI, 2015). **No red-listed species** was observed.

#### 4.6.2. NEM: BA protected plant species

The National Environmental Management: Biodiversity Act, Act 10 of 2004, provides for the protection of species through the “*Lists of critically endangered, endangered, vulnerable and protected species*” (GN. R. 152 of 23 February 2007). **No NEM: BA protected species was observed.**

#### 4.6.3. NFA Protected plant species

The National Forests Act (NFA) of 1998 (Act 84 of 1998) provides for the protection of forests as well as specific tree species (as updated).

- **Three *Vachellia erioloba* trees were encountered** within the footprint (Refer to Table 3). There should be no reason to remove these trees.

**Table 3: List and location of protected tree species encountered near the proposed site 2, 3 & 9 locations**

Waypoint No.	Species name	Coordinates	Comments	Recommendations
110 Vac erio	<i>Vachellia erioloba</i>	S28° 42' 14.9" E20° 57' 08.4"	Young tree (4m). Picture 8	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).
111 Vac erio	<i>Vachellia erioloba</i>	S28° 42' 14.6" E20° 57' 09.1"	Young tree (4m).	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).
116 Vac erio	<i>Vachellia erioloba</i>	S28° 41' 25.3" E20° 56' 44.9"	Mature tree (5m) Picture 7	<b>Do not disturb:</b> Avoid coming nearer than 1 m of the canopy (or drip line).

#### 4.6.4. NCNCA protected plant species

The Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect on the 12<sup>th</sup> of December 2011, and also provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. NB. Please note that all indigenous plant species are protected in terms of Schedule 3 of this act (e.g. any work within a road reserve).

- The following plant protected in terms of the NCNCA was encountered. Recommendations on impact minimisation also included.

**Table 4: Plant species protected in terms of the NCNCA encountered within the study area**

NO.	SPECIES NAME	COMMENTS	RECOMMENDATIONS
1.	<i>Aloe claviflora</i> <b>Schedule 2 protected</b>	All species in the genus protected by default. Locally abundant.	<b>Search &amp; rescue:</b> Individuals within footprint to be transplanted to surrounding area.
2.	<i>Boscia foetida</i> <b>Schedule 2 protected</b>	Occasionally observe, usually in poor condition and subject to grazing	<b>Search &amp; rescue:</b> Individuals within footprint to be transplanted to surrounding area.
3.	<i>Cynanchum viminalis</i> <b>Schedule 2 protected</b>	Occasionally observed.	Larger <i>Cynanchum</i> plants are expected to transplant poorly. Species protection through topsoil conservation.
4.	<i>Galenia africana</i> <b>Schedule 2 protected</b>	This plant is weedy a disturbance indicator and commonly found in the Northern Cape.	No special measures needed, this is a weedy pioneer species.
5.	<i>Mesembryanthemum subnodosum</i> <b>Schedule 2 protected</b>	This plant is weedy a disturbance indicator and commonly found throughout.	No special measures needed, this is a weedy pioneer species.

## 5. IMPACT ASSESSMENT METHOD

The objective of this study was to evaluate the botanical diversity of the property area in order to identify significant environmental features which might have been impacted as a result of the development. The Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al.*, 2005), were used to evaluate the botanical significance of the property with emphasis on:

- Significant ecosystems
  - Threatened or protected ecosystems
  - Special habitats
  - Corridors and or conservancy networks
- Significant species
  - Threatened or endangered species
  - Protected species

### 5.1. DETERMINING SIGNIFICANCE

Determining impact significance from predictions of the nature of the impact has been a source of debate and will remain a source of debate. The author used a combination of scaling and weighting methods to determine significance based on a simple formula. The formula used is based on the method proposed by Edwards (2011). However, the criteria used were adjusted to suite its use for botanical assessment. In this document significance rating was evaluated using the following criteria (Refer to Table 5).

Significance = Conservation Value x (Likelihood + Duration + Extent + Severity) (Edwards 2011)
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**Table 5: Categories and criteria used for the evaluation of the significance of a potential impact**

ASPECT / CRITERIA	LOW (1)	MEDIUM/LOW (2)	MEDIUM (3)	MEDIUM/HIGH (4)	HIGH (5)
<b>CONSERVATION VALUE</b> Refers to the intrinsic value of an attribute or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species	The attribute is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.	The attribute is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.	The attribute is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.	The attribute is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.	The attribute is considered critically endangered or is part of a proclaimed provincial or national protected area.
<b>LIKELIHOOD</b> Refers to the probability of the specific impact occurring as a result of the proposed activity	Under normal circumstances it is almost certain that the impact will not occur.	The possibility of the impact occurring is very low, but there is a small likelihood under normal circumstances.	The likelihood of the impact occurring, under normal circumstances is 50/50, it may or it may not occur.	It is very likely that the impact will occur under normal circumstances.	The proposed activity is of such a nature that it is certain that the impact will occur under normal circumstances.
<b>DURATION</b> Refers to the length in time during which the activity is expected to impact on the environment.	Impact is temporary and easily reversible through natural process or with mitigation. Rehabilitation time is expected to be short (1-2 years).	Impact is temporary and reversible through natural process or with mitigation. Rehabilitation time is expected to be relative short (2-5 years).	Impact is medium-term and reversible with mitigation, but will last for some time after construction and may require on-going mitigation. Rehabilitation time is expected to be longer (5-15 years).	Impact is long-term and reversible but only with long term mitigation. It will last for a long time after construction and is likely to require on-going mitigation. Rehabilitation time is expected to be longer (15-50 years).	The impact is expected to be permanent.
<b>EXTENT</b> Refers to the spatial area that is likely to be impacted or over which the impact will have influence, should it occur.	Under normal circumstances the impact will be contained within the construction footprint.	Under normal circumstances the impact might extent outside of the construction site (e.g. within a 2 km radius), but will not affect surrounding properties.	Under normal circumstances the impact might extent outside of the property boundaries and will affect surrounding land owners or – users, but still within the local area (e.g. within a 50 km radius).	Under normal circumstances the impact might extent to the surrounding region (e.g. within a 200 km radius), and will regional land owners or –users.	Under normal circumstances the effects of the impact might extent to a large geographical area (>200 km radius).
<b>SEVERITY</b> Refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur.	It is expected that the impact will have little or no affect (barely perceptible) on the integrity of the surrounding environment. Rehabilitation not needed or easily achieved.	It is expected that the impact will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved.	It is expected that the impact will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved.	It is expected that the impact will have a severe impact on the surrounding environment. Functioning may be severely impaired and may temporarily cease. Rehabilitation will be needed to restore system integrity.	It is expected that the impact will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible due to cost.



## 5.2. SIGNIFICANCE CATEGORIES

The formal NEMA EIA application process was developed to assess the significance of impacts on the surrounding environment (including socio-economic factors), associated with any specific development proposal in order to allow the competent authority to make informed decisions. Specialist studies must advise the environmental assessment practitioner (EAP) on the significance of impacts in his field of specialty. In order to do this, the specialist must identify all potentially significant environmental impacts, predict the nature of the impact and evaluate the significance of that impact should it occur. Potential significant impacts are evaluated, using the method described above, in order to determine its potential significance. The potential significance is then described in terms of the categories given in Table 5.

**Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002)**

SIGNIFICANCE	DESCRIPTION
Insignificant or Positive (4-22)	There is no impact or the impact is insignificant in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or the impact may be positive.
Low (23-36)	An impact barely noticeable in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium Low (37-45)	Impact is of a low order and therefore likely to have little real effect. Mitigation is either easily achieved. Social, cultural and economic activities can continue unchanged, or impacts may have medium to short term effects on the social and/or natural environment within site boundaries.
Medium (46-55)	Impact is real, but not substantial. Mitigation is both feasible and fairly easily possible, but may require modification of the project design or layout. Social, cultural and economic activities of communities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long term effect on the social and/or natural environment, within site boundary.
Medium high (56-63)	Impact is real, substantial and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. Social, cultural and economic activities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long-term effect on the social and/or natural environment, beyond site boundary within local area.
High (64-79)	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted and may come to a halt. These impacts will usually result in long-term change to the social and/or natural environment, beyond site boundaries, regional or widespread.
Unacceptable (80-100)	An impact of the highest order possible. There is no possible mitigation that could offset the impact. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. The impact will result in permanent change. Very often these impacts cannot be mitigated and usually result in very severe effects, beyond site boundaries, national or international.

## 6. DISCUSSING BOTANICAL SENSITIVITY

The aim of impact assessment is to determine the vulnerability of a habitat to a specific impact. In order to do so, the sensitivity of the habitat should be determined by identifying and assessing the most significant environmental aspects of the site against the potential impact(s). For this development the following biodiversity aspects was considered:

- **Location:** The proposed development footprint is located on Municipal property, adjacent to existing housing infrastructure on natural veld that shows varying degrees of disturbance as a result of historical land use and more recent urban settlement and current land use (livestock grazing).
- **Activity:** The proposed activity is expected to result in a permanent footprint of approximately 100 ha of veld (showing varying degrees of disturbance), of which almost half had already been transformed.
- **Geology & Soils:** No special features such as true quartz patches or heuweltjies were observed in or near to the larger footprint area that may result in specialised plant habitat.
- **Land use and cover:** The footprint is located on municipal land adjacent to an existing urban area. Portions of the footprint is still in relative good conditions (although heavily grazed), but half had already been transformed by illegal structures (settlement). Remaining natural veld is utilised for livestock grazing by the local community.
- **Vegetation status:** Bushmanland Arid Grassland is not considered to be of conservation concern, but conservation targets have not yet been met. In general the natural systems associated with the proposed footprint have been impacted, but the western portion of the proposed footprint is still largely natural, although it is under constant urban related pressures.
- **Conservation priority areas:** According to the 2016 Northern Cape CBA map (Figure 6), the proposed development footprint is located within a terrestrial CBA. Unfortunately, there are no logical alternative sites available to the Keimoes Municipality, which will not impact on the CBA. The site will not impact on any centre of endemism.
- **Connectivity:** The proposed activity will result in a permanent footprint enlargement of the existing housing scheme by approximately 100 ha. However, the proposed footprint joins up with the existing urban edge and should not have any significant additional impact on connectivity.
- **Watercourses and wetlands:** A number of small seasonal drainage lines run through the property.
- **Protected or endangered plant species:** Three Camel Thorn trees (NFA protected) and five NCNCA protected plant was observed.
- **Alien and Invasive Plant species:** A number of alien and invasive plant species were observed of which the densities and spread of the alien *Prosopis glandulosa* tree is probably the most concerning.

Conservation value or habitat sensitivity is based on the irreplaceability of the habitat unit, on observations of the abundance and diversity of floral and faunal species present at the time of the assessment, on the presence of endangered or protected species within the habitat units, on the presence of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) and on the degree of disturbance encountered as a result of historical and current activities.

The terrestrial habitat associated with the project footprint is considered to be of a moderate sensitivity based on the following factors:

- The vegetation type is classified as least threatened;
- However, the project footprint overlaps a CBA;

- The floral habitat and natural systems have been impacted, by grazing and urban related activities, but portions still functions relatively well;
- The floral diversity is very low;
- No special habitats or features were observed within the footprint;
- No red-list species were encountered, but one nationally protected tree and five provincially protected plant species was encountered.

## 6.1. IMPACT ASSESSMENT

The following table rates the significance of environmental impacts associated with the proposed development. It also evaluates the expected accumulative effect of the proposed development as well as the No-Go option.

**Table 7: Impact assessment associated with the proposed development**

Impact assessment								
Aspect	Mitigation	CV	Lik	Dur	Ext	Sev	Significance	Short discussion
<b>Geology &amp; soils:</b> Potential impact on special habitats (e.g. true quartz or "heuweltjies")	Without mitigation	3	1	2	3	2	24	No special habitats observed.
	With mitigation	3	1	2	2	1	18	Ensure good environmental control during the construction phase.
<b>Landuse and cover:</b> Potential impact on socio-economic activities.	Without mitigation	3	3	4	3	2	36	Permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants).
	With mitigation	3	2	4	2	1	27	Potential beneficial socio-economic impact (job opportunities).
<b>Vegetation status:</b> Loss of vulnerable or endangered vegetation and associated habitat.	Without mitigation	3	3	4	3	2	36	Permanent transformation of 100ha of partially disturbed Bushmanland Arid Grassland (Least Threatened)
	With mitigation	3	2	4	2	1	27	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint
<b>Conservation priority:</b> Potential impact on protected areas, CBA's, ESA's or Centre's of Endemism.	Without mitigation	3	5	5	3	3	48	The development will impact on a proposed CBA. However, there is no alternative that will not impact on the CBA, and this area is probably the most logical choice.
	With mitigation	3	3	4	2	2	33	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint
<b>Connectivity:</b> Potential loss of ecological migration corridors.	Without mitigation	3	3	4	3	3	39	The additional footprint joins the existing urban edge and should not add have any significant additional impact on connectivity.
	With mitigation	3	2	2	2	2	24	Incorporate larger trees within the settlement layout where possible and protect all Camel Thorn trees within the development footprint

Impact assessment								
Aspect	Mitigation	CV	Lik	Dur	Ext	Sev	Significance	Short discussion
<b>Watercourses and wetlands:</b> Potential impact on natural water courses and its ecological support areas.	Without mitigation	3	3	4	3	2	36	The proposed development will impact on small ephemeral drainage lines and potentially larger water courses with well-established riparian vegetation.
	With mitigation	3	2	3	2	2	27	Refer to the freshwater specialist report.
<b>Protected &amp; endangered plant species:</b> Potential impact on threatened or protected plant species.	Without mitigation	3	4	4	3	4	45	A number of protected species were observed, most notably a number of nationally protected tree species.
	With mitigation	3	2	3	1	2	24	Protect all significant indigenous tree species and search & rescue other potentially significant protected plant species.
<b>Invasive alien plant species:</b> Potential invasive plant infestation as a result of the activities.	Without mitigation	3	3	4	3	2	36	Stands of Prosopis trees were observed in certain areas.
	With mitigation	3	1	2	1	1	15	Special care must be taken during their removal (in order to avoid re-sprouting).
<b>Veld fire risk:</b> Potential risk of veld fires as a result of the activities.	Without mitigation	3	2	3	2	2	27	Veld fire risk low.
	With mitigation	3	1	3	1	1	18	Address fire danger throughout construction.
<b>Cumulative impacts:</b> Cumulative impact associated with proposed activity.	Without mitigation	3	5	5	3	4	51	Permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants).
	With mitigation	3	3	4	2	2	33	Refer to all the mitigation recommendations above.
<b>The "No-Go" option:</b> Potential impact associated with the No-Go alternative.	Without mitigation	3	3	3	2	3	33	No direct impact on natural veld or protected plant species, but slow deterioration through constant grazing and urban creep.
	With mitigation						0	

According Table 7, the main impacts associated with the proposed development will be on:

- The permanent transformation of approximately 100ha of natural veld for human settlement (in an area used for livestock grazing by the local inhabitants);
- The potential impact on critical biodiversity areas;
- The potential impact on protected plant species;

Because of the location and the degraded status of the site, the cumulative impact is expected to be **Medium**, but this can be reduced to **Low** by mitigation.



## 7. IMPACT MINIMISATION RECOMMENDATIONS

The proposed development will result in the permanent transformation of approximately 100ha of natural veld for human settlement. According to the impact assessment given in Table 7, with good environmental control, the development is likely to result in a **MEDIUM** impact on the environment.

However, with the correct mitigation it is unlikely that the development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity.

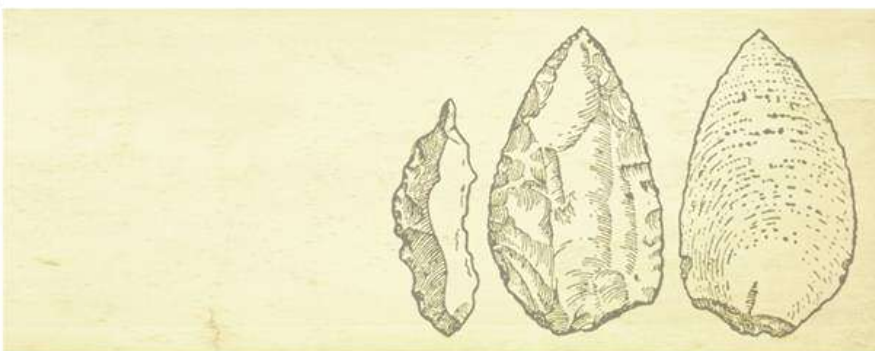
### 7.1. MITIGATION ACTIONS

The following mitigation actions are recommended:

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must include the recommendations made in this report.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EA and the construction phase EMP and any other conditions pertaining to specialist studies.
- **Before any work is done** the development footprint and access routes must be clearly demarcated and approved by the ECO. The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- No *Vachellia erioloba* (Camel Thorn) trees may be removed or damaged (the three trees within the footprint must be protected).
- An effort should be made to transplant some of the *Aloe claviflora* plants as well as all viable (transplantable) *Boscia foetida* shrubs/trees.
- Indiscriminate clearing of any area outside of the construction footprint must be avoided.
- An integrated waste management approach must be implemented during construction.
  - Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
  - All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.
- Special attention must be given to alien and invasive control within the construction footprint. All alien invasive species within the footprint and at least 5 m to the side of the footprint must be removed responsibly.
  - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the AIP due to incorrect eradication methods);
  - Care must be taken to dispose of alien plant material responsibly.

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## PHASE 1 HIA REPORT, GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT, KEIMOE, NORTHERN CAPE

PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING  
DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459,  
AND ERVEN 1470, 1474 AND 1480, KEIMOE, GORDONIA RD,  
KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY,  
NORTHERN CAPE PROVINCE.

**PREPARED FOR:**  
ENVIROAFRICA

**PREPARED BY:**  
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12 MARCH 2019

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For this project, Mr Engelbrecht was responsible for the field survey of the development footprint, identification of heritage resources, and recommendations. Ms Fivaz was responsible for research and report compilation. Desktop research completed by Sky-Lee Fairhurst.

**Declaration of independence:**

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



**Signed:**  
J.A.C. Engelbrecht & H. Fivaz  
UBIQUE Heritage Consultants

**Date:** 2019-03-12

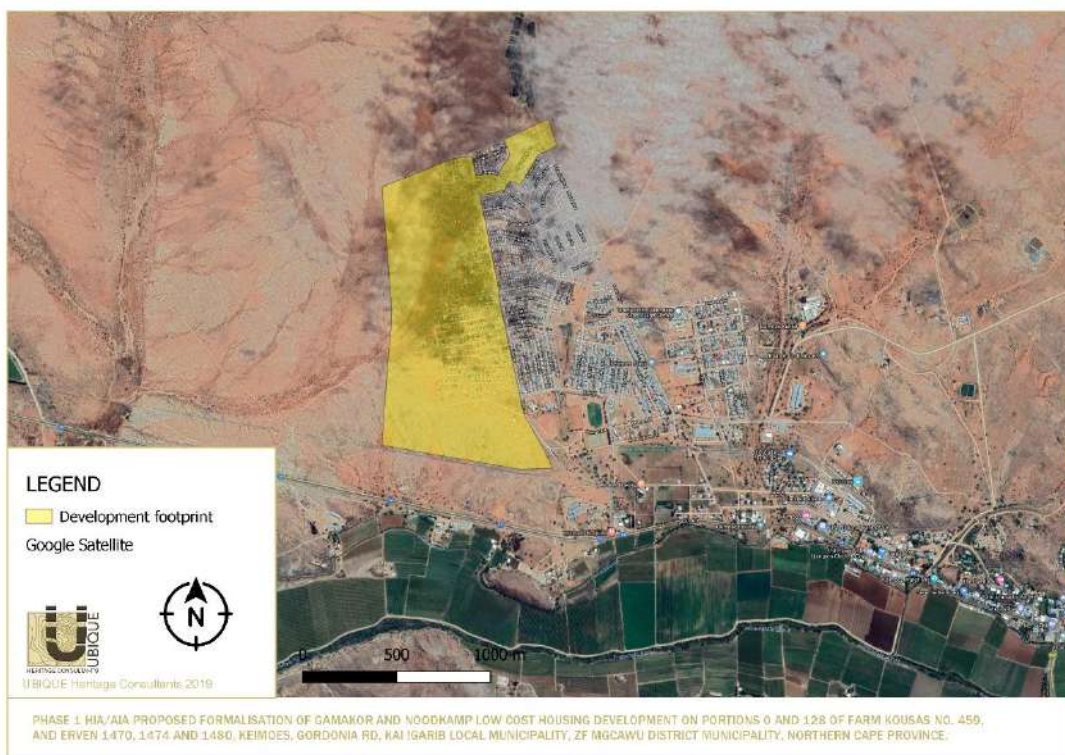
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## EXECUTIVE SUMMARY

### Technical summary

Project description	
Project name	Gamakor and Noodkamp low cost housing development, Keimoes, Northern Cape.
Description	Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes.
Developer	
Kai !Garib Municipality	
Consultants	
Environmental	EnviroAfrica cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu
Local municipality	Kai !Garib
Topo-cadastral map	2820DB 1:50 000
Farm name	Kousas No. 459 Portion 0 and 128 Erven 1470, 1474 and 1480
Closest town	Keimoes
GPS Co-ordinates	28° 41' 52.60" S; 20° 56' 51.34" E.
Development footprint size	104 ha



**Figure 1** Project footprint, represented by yellow polygon, indicated on Google Earth Satellite Image.

## Project description

UBIQUE Heritage Consultants were appointed by EnviroAfrica cc. as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA), to conduct a cultural heritage assessment to determine the impact of the proposed formalisation and low cost housing development of Gamakor and Noodkamp on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, on any sites, features, or objects of cultural heritage significance. The site is located approximately 310 m north of the N14 Main Road, and on the western side of the town of Keimoes in the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape.

## Findings and Impact on Heritage Resources

Description	Development Impact		Mitigation	Field rating/ Significance
Archaeological				
1. One incidence of lithics was recorded within the development footprint. This included four pieces of MSA/Early LSA debitage/flakes scattered ex situ in a heavily disturbed area. made from the highly utilised banded ironstone formation (BIF).	Nature	Neutral	No mitigation required.	Field Rating IV C Low significance
	Extent	Low		
	Duration	Low		
	Intensity	Low		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		
2. An isolated chunk was recorded outside the development footprint.	Nature	Neutral	No mitigation required.	Field Rating IV C Low significance
	Extent	Low		
	Duration	Low		
	Intensity	Low		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		
Graves				
3. No formal or informal graves were identified.	Nature	N/A	No mitigation required.	N/A
	Extent	N/A		
	Duration	N/A		
	Intensity	N/A		
	Potential of impact on irreplaceable resource	N/A		
	Consequence	N/A		
	Probability of impact	N/A		
	Significance	N/A		
Paleontological				
4. Area has zero palaeontological significance.	Nature	N/A	No mitigation required.	N/A
	Extent	N/A		
	Duration	N/A		
	Intensity	N/A		
	Potential of impact on irreplaceable resource	N/A		
	Consequence	N/A		
	Probability of impact	N/A		
	Significance	N/A		

## Recommendations

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue.
2. Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).
3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	i
Technical summary.....	i
Project description .....	ii
Findings and Impact on Heritage Resources .....	ii
Recommendations.....	iii
TABLE OF FIGURES .....	v
ABBREVIATIONS .....	vi
GLOSSARY .....	vi
1. INTRODUCTION.....	1
1.1 Scope of study.....	1
1.2 Assumptions and limitations.....	2
2. TERMS OF REFERENCE .....	2
2.1. Statutory Requirements.....	3
2.1.1 General .....	3
2.1.2 National Heritage Resources Act 25 of 1999 .....	3
2.1.3 Heritage Impact Assessments/Archaeological Impact Assessments.....	3
2.1.4 Definitions of heritage resources.....	4
2.1.5 Management of Graves and Burial Grounds.....	4
3. STUDY APPROACH AND METHODOLOGY.....	6
3.1 Desktop study.....	6
3.1.1 Literature review .....	6
3.2 Field study .....	6
3.2.1 Systematic survey .....	6
3.2.2 Recording significant areas.....	7
3.2.3 Determining significance.....	7
3.2.4 Assessment of development impacts.....	8
3.3 Oral history .....	10
3.4 Report .....	10
4. PROJECT OVERVIEW.....	11
4.1 Technical information .....	11
4.2 Description of affected environment.....	14
5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND.....	16
5.1 Region.....	16
5.1.1 Stone Age.....	16
5.1.2 Historical period .....	17
5.2 Local.....	18
5.2.1 Stone Age.....	18



5.2.2	Historical period .....	20
5.2.3	Oral history .....	23
6.	IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT.....	23
6.1	Surveyed area .....	23
6.2	Identified heritage resources .....	24
6.3	Discussion .....	24
6.3.1	Archaeological features .....	24
6.3.2	Historical features.....	25
6.3.3	Graves.....	26
6.3.4	Palaeontological resources .....	26
7.	RECOMMENDATIONS.....	26
8.	CONCLUSION .....	27
9.	BIBLIOGRAPHY .....	28
	APPENDIX A .....	34
	RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES FOR PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT, KEIMOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE. ....	34
	BACKGROUND.....	36
	OUTLINE OF PROPOSED DEVELOPMENT.....	36
	GEOGRAPHICAL LOCATION OF THE SITE .....	36
	GEOLOGICAL AND PALAEONTOLOGICAL HERITAGE.....	40

## TABLE OF FIGURES

<b>Figure 1</b>	Project footprint, represented by yellow polygon, indicated on Google Earth Satellite Image. ....	i
<b>Figure 2</b>	Project footprint, represented by yellow polygon, indicated on Chief Surveyor General Property Search ArcGIS Web Map.....	12
<b>Figure 3</b>	Locality of proposed low-cost housing development on Farm Kousas No. 459, Portion 0 and 128, and Erven 1470, 1474, and 1480, Keimoes. 1:50 000 Topo-cadastral map WGS2820DB, Chief Surveyor General. ....	13
<b>Figure 4</b>	Locality of proposed low-cost housing development on Farm Kousas No. 459, Portion 0 and 128, and Erven 1470, 1474, and 1480, Keimoes. Google Earth Satellite image. ....	13
<b>Figure 5</b>	Views of the affected development area. ....	15
<b>Figure 6</b>	Historic water wheel, a declared provincial heritage site in Keimoes. ....	21
<b>Figure 7</b>	Dutch Reformed Missionary Church, provincial heritage site in Keimoes. ....	22
<b>Figure 8</b>	Google Earth image showing survey track for housing development project, Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474, and 1480, Keimoes.....	23
<b>Figure 9</b>	Lithic occurrences within, and in close proximity to study area.....	25
<b>Figure 10</b>	Lithics found within the development footprint and outside. ....	25
<b>Figure 11</b>	Local municipal cemetery. ....	26

## ABBREVIATIONS

AIA:	Archaeological Impact Assessment
ASAPA:	Association of South African Professional Archaeologists
BIA:	Basic Impact Assessment
CRM:	Cultural Resource Management
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment*
EIA:	Early Iron Age*
EMP:	Environmental Management Plan
ESA:	Earlier Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
LIA:	Late Iron Age
LSA:	Later Stone Age
MEC:	Member of the Executive Council
MIA:	Middle Iron Age
MPRDA:	Mineral and Petroleum Resources Development Act
MSA:	Middle Stone Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
OWC:	Orange River Wine Cellars
PRHA:	Provincial Heritage Resource Agency
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency

*\*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

## GLOSSARY

- Archaeological: material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years (as defined and protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation;
  - wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
  - features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found.

Stone Age:	The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.
Earlier Stone Age:	>2 000 000 - >200 000 years ago
Middle Stone Age:	<300 000 - >20 000 years ago
Later Stone Age:	<40 000 - until the historical period
Iron Age:	(Early Farming Communities). Period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age. Early Iron Age: AD 200 - AD 900 Middle Iron Age: AD 900 - AD 1300 Later Iron Age: AD 1300 - AD 1850
Historic:	Period of arrival of white settlers and colonial contact. AD 1500 to 1950
Historic building:	Structures 60 years and older.
Fossil:	Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.
Heritage:	That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).
Heritage resources:	These mean any place or object of cultural significance, tangible or intangible.
Holocene:	The most recent geological period that commenced 10 000 years ago.
Palaeontology:	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site that contains such fossilised remains or traces
Cumulative impacts:	“Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.
Mitigation:	Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.
A ‘place’:	a site, area or region;

- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

‘Public monuments and memorials’: mean all monuments and memorials—

- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
- which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;

‘Structures’: any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.



## 1. INTRODUCTION

### 1.1 Scope of study

The project involves the proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Gordon Road, Kai !Garib Municipality, ZF Mgcawu District Municipality, Northern Cape. It includes activities listed in terms of the NEMA EIA Regulations 2014, and UBIQUE Heritage Consultants were appointed by EnviroAfrica cc as independent heritage specialists in accordance with the National Environmental Management Act 107 of 1998 (NEMA), and in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (NHRA), to conduct a cultural heritage assessment (AIA/HIA) of the development area.

The aim of the assessment is to identify and report any heritage resources that may fall within the development footprint; to determine the impact of the proposed development on any sites, features, or objects of cultural heritage significance; to assess the significance of any identified resources; and to assist the developer in managing the documented heritage resources in an accountable manner, within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

South Africa's heritage resources are both rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representation of a time or group; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardized by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timeous and accurate identification and effective management of heritage resources for present and future generations.

The result of this investigation is presented within this heritage impact assessment report. It comprises the recording of heritage resources present/ absent and offers recommendations for the management of these resources within the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, taking in account any proposed mitigation measures.

## 1.2 Assumptions and limitations

It is assumed that the description of the proposed project, as provided by the client, is accurate. Furthermore, it is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is comprehensive and does not have to be repeated as part of the heritage impact assessment.

The significance of the sites, structures and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

Although all possible care has been taken during the comprehensive field survey and intensive desktop study to identify sites of cultural importance within the development areas, it is important to note that some heritage sites may have been missed due to their subterranean nature, or due to dense vegetation cover. No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities. Therefore, should any heritage features and/or objects such as architectural features, stone tool scatters, artefacts, human remains, or fossils be uncovered or observed during construction, operations must be stopped, and a qualified archaeologist contacted for an assessment of the find. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question.

## 2. TERMS OF REFERENCE

An HIA/ AIA must address the following key aspects:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

In addition, the HIA/AIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency.

## 2.1. Statutory Requirements

### 2.1.1 General

The Constitution of the Republic of South Africa Act 108 of 1996 is the source of all legislation. Within the Constitution the Bill of Rights is fundamental, with the principle that the environment should be protected for present and future generations by preventing pollution, promoting conservation and practising ecologically sustainable development. With regard to spatial planning and related legislation at national and provincial levels the following legislation may be relevant:

- Physical Planning Act 125 of 1991
- Municipal Structures Act 117 of 1998
- Municipal Systems Act 32 of 2000
- Development Facilitation Act 67 of 1995 (DFA)

The identification, evaluation and management of heritage resources in South Africa are required and governed by the following legislation:

- National Environmental Management Act 107 of 1998 (NEMA)
- KwaZulu-Natal Heritage Act 4 of 2008 (KZNHA)
- National Heritage Resources Act 25 of 1999 (NHRA)
- Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA)

### 2.1.2 National Heritage Resources Act 25 of 1999

The NHRA established the South African Heritage Resources Agency (SAHRA) together with its Council to fulfil the following functions:

- co-ordinate and promote the management of heritage resources at national level;
- set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- provide for the protection and management of conservation-worthy places and areas by local authorities.

### 2.1.3 Heritage Impact Assessments/Archaeological Impact Assessments

Section 38(1) of the NHRA of 1999 requires **the responsible heritage resources authority to notify the person who intends to undertake a development that fulfils the following criteria to submit an impact assessment report if there is reason to believe that heritage resources will be affected by such development:**

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity that will change the character of a site—
  - exceeding 5000m<sup>2</sup> in extent; or
  - involving three or more existing erven or subdivisions thereof; or
  - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or

- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

#### 2.1.4 Definitions of heritage resources

The NHRA defines a heritage resource as any place or object of cultural significance, i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. These include, but are not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- Ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- public monuments and memorials;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person; and
- battlefields.

Furthermore, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.

#### 2.1.5 Management of Graves and Burial Grounds

- **Graves younger than 60 years** are protected in terms of Section 2(1) of the Removal of Graves and Dead Bodies Ordinance 7 of 1925 as well as the Human Tissues Act 65 of 1983.
- **Graves older than 60 years, situated outside a formal cemetery administered by a local**



**Authority** are protected in terms of Section 36 of the NHRA as well as the Human Tissues Act of 1983. Accordingly, such graves are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of NHRA) is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in the category located inside a formal cemetery administered by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

**The protocol for the management of graves older than 60 years situated outside a formal cemetery administered by a local authority** is detailed in Section 36 of the NHRA:

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

### 3. STUDY APPROACH AND METHODOLOGY

#### 3.1 Desktop study

The first step in the methodology was to conduct a desktop study of the heritage background of the area and the site of the proposed development. This entailed the scoping and scanning of historical texts/records as well as previous heritage studies and research around the study area.

By incorporating data from previous CRM reports done in the area and an archival search, the study area is contextualised. The objective of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

No archaeological site data was available for the project area. A concise account of the archaeology and history of the broader study area was compiled from sources including those listed in the bibliography.

##### 3.1.1 Literature review

A survey of literature was undertaken to obtain background information regarding the area. Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined that several other archaeological or historical studies have been performed within the wider vicinity of the study area. Sources consulted in this regard are indicated in the bibliography.

#### 3.2 Field study

The Phase 1 (AIA/HIA) requires the completion of a field study to establish and ensure the following:

##### 3.2.1 Systematic survey

A systematic survey of the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest, was completed.

UBIQUE Heritage Consultants inspected the proposed development and surrounding areas on 5<sup>th</sup> and 6<sup>th</sup> of February 2019 and completed a controlled-exclusive, pre-planned, pedestrian survey. We conducted an inspection of the surface of the ground, wherever the surface was visible. This was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

The survey was tracked with a handheld Garmin global positioning unit (Garmin eTrex 10), and Android Locus Maps application on Samsung Galaxy S9.

### 3.2.2 Recording significant areas

GPS points of identified significant areas were recorded with a handheld Garmin global positioning unit (Garmin eTrex 10) and Android Locus Maps application on Samsung Galaxy S9. Photographs were taken with a Nikon Coolpix 10-megapixel camera. Detailed fieldnotes were taken to describe observations. The layout of the area and plotted by GPS points, tracks and coordinates, were transferred to Google Earth and QGIS, and maps were created.

### 3.2.3 Determining significance

Levels of significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

#### *Cultural significance:*

- Low                      A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium                Any site, structure or feature being regarded less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High                    Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Likewise, any important object found within a specific context.

#### *Heritage significance:*

- Grade I                Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II                Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III                Other heritage resources of local importance and therefore worthy of Conservation

#### *Field ratings:*

- i.            National Grade I                      significance should be managed as part of the national estate
- ii.           Provincial Grade II                significance should be managed as part of the provincial estate
- iii.           Local Grade IIIA                      should be included in the heritage register and not be mitigated (high significance)
- iv.           Local Grade IIIB                        should be included in the heritage register and may be mitigated (high/ medium significance)

- |      |                             |   |
|------|-----------------------------|---|
| v.   | General protection A (IV A) | site should be mitigated before destruction (high/ medium significance)             |
| vi.  | General protection B (IV B) | site should be recorded before destruction (medium significance)                    |
| vii. | General protection C (IV C) | phase 1 is seen as sufficient recording and it may be demolished (low significance) |

*Heritage value, statement of significance:*

- a. its importance in the community, or pattern of South Africa's history;
- b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d. its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i. sites of significance relating to the history of slavery in South Africa.

### 3.2.4 Assessment of development impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are of an adverse nature and can include:

- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and / or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they



must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on possible identified heritage resources:

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource.
	Negative	
	Neutral	
Extent	Low	Site-specific, affects only the development footprint.
	Medium	Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
	High	Regional (beyond a 10 km radius) to national.
Duration	Low	0-4 years (i.e. duration of construction phase).
	Medium	5-10 years.
	High	More than 10 years to permanent.
Intensity	Low	Where the impact affects the heritage resource in such a way that its significance and value are minimally affected.
	Medium	Where the heritage resource is altered, and its significance and value are measurably reduced.
	High	Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particular vulnerable resource that will be impacted.
Consequence, (a combination of extent, duration, intensity, and the potential for impact on irreplaceable resources).	Low	A combination of any of the following:  - Intensity, duration, extent and impact on irreplaceable resources are all rated low.  - Intensity is low and up to two of the other criteria are rated medium.  - Intensity is medium and all three other criteria are rated low.
	Medium	Intensity is medium and at least two of the other criteria are rated medium.
	High	Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration.  Intensity is rated high, with all the other criteria being rated medium or higher.

Criteria	Rating Scales	Notes
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.
	High	It is more than 75 % certain that the impact will occur, or it is definite that the impact will occur.
Significance (all impacts including potential cumulative impacts)	Low	Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.
	Medium	Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.
	High	High consequence and medium probability. High consequence and high probability.

### 3.3 Oral history

Where possible, people from local communities were interviewed to obtain information relating to the surveyed area.

### 3.4 Report

The results of the desktop research and field survey are compiled in this report. The identified heritage resources and anticipated and cumulative impacts that the development of the proposed project may have on the identified heritage resources will be presented objectively. Alternatives, should any significant sites be impacted adversely by the proposed project, are offered. All effort will be made to ensure that all studies, assessments and results comply with the relevant legislation and the code of ethics and guidelines of the Association of South African Professional Archaeologists (ASAPA). The report aims to assist the developer in managing the documented heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

## 4. PROJECT OVERVIEW

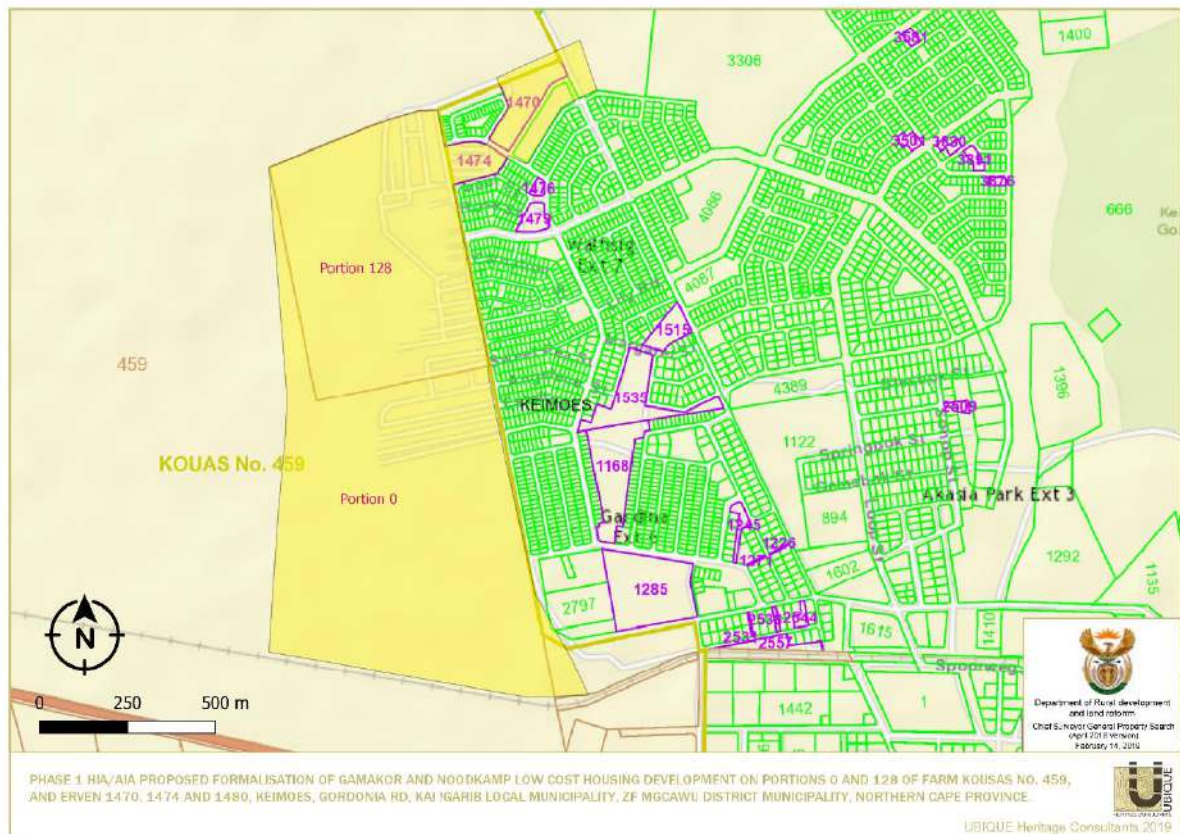
UBIQUE Heritage Consultants were appointed by EnviroAfrica cc. as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA), to conduct a cultural heritage assessment to determine the impact of the proposed formalisation and low cost housing development of Gamakor and Noodkamp on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, on any sites, features, or objects of cultural heritage significance. The site is located approximately 310 m north of the N14 Main Road, and on the western side of the town of Keimoes in the Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape.

The proposed project will entail the rezoning and the subdivision of 1500 Erven for low cost housing. The project includes the associated infrastructure such as water, electricity, sewage, and solid waste removal. The total residential area to be developed would be approximately 104 ha.

### 4.1 Technical information

Project description	
Project name	Gamakor and Noodkamp low cost housing development, Keimoes, Northern Cape.
Description	Proposed formalisation of Gamakor and Noodkamp low cost housing development on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes.
Developer	
Kai !Garib Municipality	
Contact information	Kai !Garib Municipality Tel: (+27)54 461 6700 Fax: (+27)54 467 6401
Development type	Civil: Housing Development (Low cost)
Land owner	
Contact information	See developer
Consultants	
Environmental	EnviroAfrica cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu
Local municipality	Kai !Garib
Topo-cadastral map	2820DB 1:50 000
Farm name	Kousas No. 459 Portion 0 and 128 Erven 1470, 1474 and 1480
Closest town	Keimoes
GPS Co-ordinates	28° 41' 52.60" S; 20° 56' 51.34" E.
Property size	104 ha
Development footprint size	104 ha

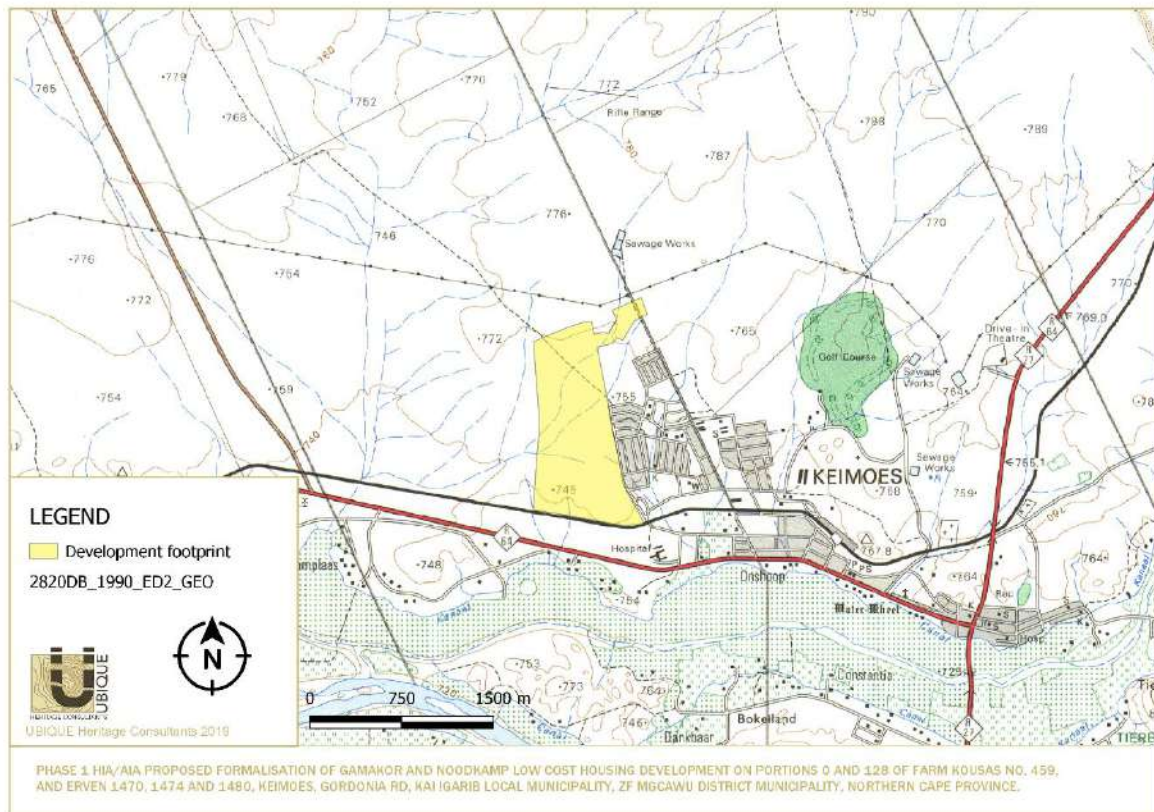
Land use	
Previous	Unknown
Current	Informal settlement
Re- zoning required	Yes
Sub-division of land	Yes
Development criteria in terms of Section 38(1) NHRA	
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	Yes
Construction of bridge or similar structure exceeding 50m in length.	No
Construction exceeding 5000m <sup>2</sup> .	Yes
Development involving three or more existing erven or subdivisions.	Yes
Development involving three or more erven or divisions that have been consolidated within the past five years.	Yes
Rezoning of site exceeding 10 000m <sup>2</sup> .	Yes
Any other development category, public open space, squares, parks, recreation grounds.	Yes



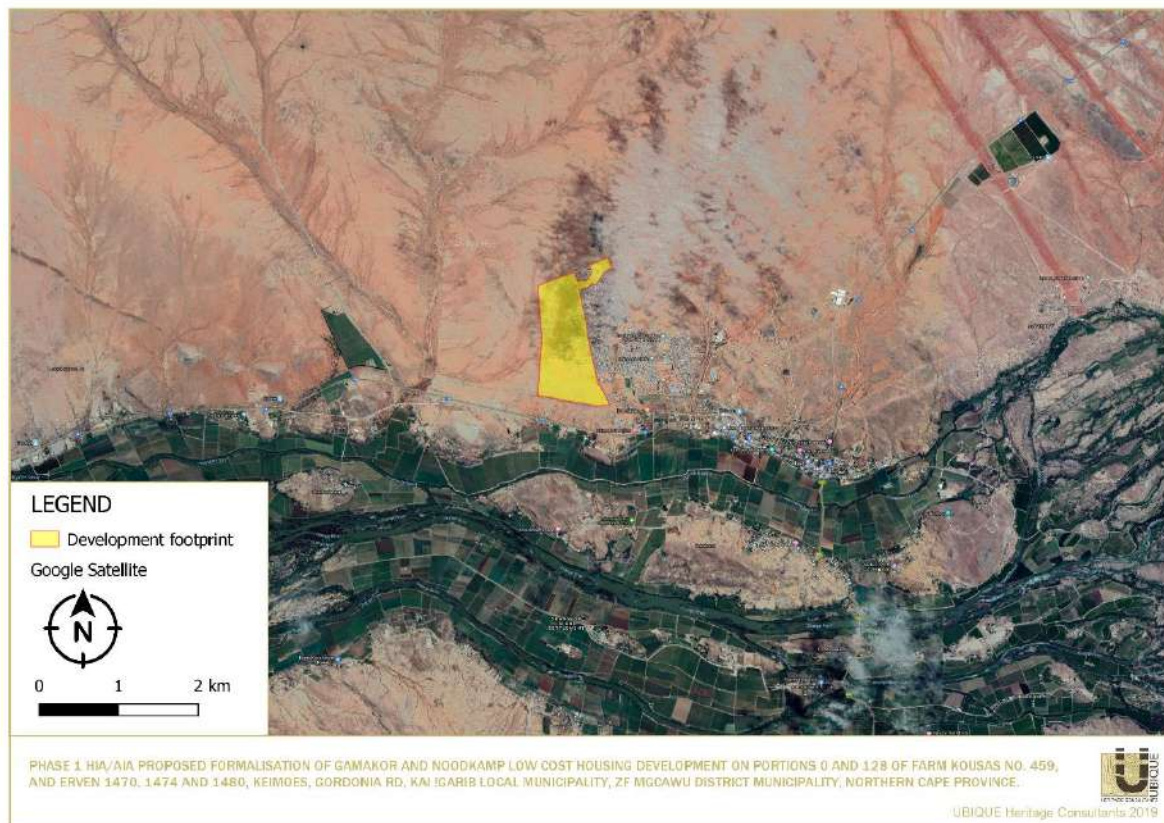
**Figure 2** Project footprint, represented by yellow polygon, indicated on Chief Surveyor General Property Search ArcGIS Web Map.

(<https://csg.esri-southafrica.com/portal/apps/webappviewer/index.html?id=34ec3dcf8d8642bb9ed7f795cbfe8faf>)





**Figure 3** Locality of proposed low-cost housing development on Farm Kousas No. 459, Portion 0 and 128, and Erven 1470, 1474, and 1480, Keimoes. 1:50 000 Topo-cadastral map WGS2820DB, Chief Surveyor General.



**Figure 4** Locality of proposed low-cost housing development on Farm Kousas No. 459, Portion 0 and 128, and Erven 1470, 1474, and 1480, Keimoes. Google Earth Satellite image.

## 4.2 Description of affected environment

The Kai !Garib Local Municipality falls predominantly within the Nama-Karoo biome (Mucina & Rutherford 2006), and most of the vegetation type in the study area is typical Bushmanland Arid Grassland. The landscape is characterised by extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) characteristic of a semidesert 'steppe'. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected (Mucina & Rutherford 2006). Vegetation observed in the study area include Basterskaapvygie (*Aizoon fruticosum*), Swarthaak (*Acacia mellifera*), Borseltjiegras (*Antheophora pubescens*), Soetpeulboom (*Prosopis glandulosa*), Driedoring (*Rhigozum trichotomum*), Aloes (*Aloe argentea*), Kameeldoring (*Acacia erioloba*), and Lemoendoring (*Parkinsonia africana*). The soils of most of the area are freely drained red-yellow apedal soils (Mucina & Rutherford 2006). The study area consists of rocky *klipveld* with surface scatters of Quartz, Quartzite, Banded Ironstone Formation (BIF), and Sandstone and Calcrete deposits with visible Quartzite outcrops to the north of the site. Minor sand patches to the north and east of the site footprint. There is a slight slope across the site towards the south-west.

The town of Keimoes is situated to the north of the Gariep/Orange River, which is characterised by Lower Gariep Alluvial vegetation. The study area is situated north of an agricultural area that is part of intensive Irrigation Farming Community stretching from Groblershoop in the east up to Blouputs in the west. The Gariep/Orange River cuts through a great variety of Precambrian metamorphic rocks and is subjected to floods, especially in summer, as a result of high precipitation on the highveld. The soil of these areas is very fertile resulting in various grapes and other crops such as pecan nut- and citrus plantations being planted along the Gariep/Orange River (Mucina & Rutherford 2006).

The development site is located north of the N14, on the western side of the town of Keimoes. Towards the south, south-west, the site is bounded by a railway line, while to the north and east the informal settlement is located. At least two dry riverine are present on the project footprint, running from north-east to south-west. Moderate natural erosion occurs along the dry riverine. Approximately 80% of the entire footprint is disturbed by anthropogenic causes. The site has been greatly impacted upon by construction machinery and building activities associated with the informal settlement already present, and upcoming housing developments. There are at least three unlicensed and informal landfill sites/dumping areas.







**Figure 5** Views of the affected development area.

## 5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

### 5.1 Region

The Northern Cape is rich in archaeological sites and landscapes that reflect the complex South African heritage from the Stone Age to Colonial history.

#### 5.1.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division of the Stone Age according to Lombard et al. (2012) is as follows:

Earlier Stone Age:	>2 000 000 - >200 000 years ago
Middle Stone Age:	<300 000 - >20 000 years ago
Later Stone Age:	<40 000 - until the historical period.

Each of the sub-divisions is formed by a group of industries where the assemblages share attributes or common traditions (Lombard et al. 2012). Prominent sites that exemplify these periods in the Nama-Karoo Biome are Rooidam and Bundu Farm (Earlier Stone Age and Middle Stone Age), and Biesje Poort 2, Bokvasmaak 3, Melkboom 1, Vlermuisgat, and Jagtpan 7 (Later Stone Age) (Lombard et al. 2012).

Within the region, Stone Age sites and complexes have been, and are still being investigated in some detail. This includes, but are not limited to, the landscape near Kathu, where numerous Stone Age sites have been documented and excavated, representing the longest preserved lithostratigraphic and archaeological sequence of human occupation at the pan through the ESA, MSA, and LSA and with evidence for 500 000-year-old hafted stone points; ancient specularite working (and mining) on the eastern side of Postmasburg, Doornfontein; and associated Ceramic Later Stone Age material, and also the older transitional ESA/MSA Fauresmith sites at Lyly Feld, Demaneng, Mashwening, King, Rust & Vrede, Paling, Gloucester and Mount Huxley (Beaumont 2004; Beaumont 2013; Beaumont & Morris 1990; Beaumont & Vogel 2006; Morris 2005; Morris & Beaumont 2004; Porat et al. 2010; Thackeray et al. 1983; Walker et al. 2014; Wilkins et al. 2012).

Beaumont et al. (1995) commented that thousands of square kilometres of Bushmanland are covered by low-density lithic scatters. It is therefore not surprising that Stone Age sites and lithic scatters were identified by CRM practitioners between the Garona substation and the Gariep/Orange River in numerous surveys conducted during the recent years. Scatters of MSA material have been recorded close to Griekwastad, Hotazel. Postmasburg and Kenhardt, Pofadder, Marydale, and in the Upington district (Dreyer 2006, 2012, 2014; Pelsner & Lombard 2013; PGS Heritage 2009, 2010; Webley 2013). MSA and LSA tools as well as rock engravings were also found at Putsonderwater, Beeshoek and Bruce (Morris 2005; Snyman 2000; Van Vollenhoven 2012b; Van Vollenhoven 2014).



Archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks and confluences to be prime localities for archaeological finds and specifically Stone Age sites since these areas were utilized for base camps close to water and hunting ranges. If any such features occur in the study area, Stone Age manifestations can be anticipated (Lombard 2011).

### 5.1.2 Historical period

The historical period within the region coincides with the incursion of white traders, hunters, explorers, and missionaries into the interior of South Africa. Buildings and structures associated with the early missionaries, travellers, and traders such as PJ Truter's and William Somerville (arriving in 1801), Donovan, Burchell and Campbell, James Read (arriving around 1870) William Sanderson, John Ryan and John Ludwig's (De Jong 2010; Snyman 2000) arrival during the 19th century, and the settlement of the first white farmers and towns, are still evident in the Northern Cape. Numerous heritage reports that provide a synthesis of the incursions of travellers, missionaries and the early European settlers have been captured on the SAHRIS database.

San hunter-gatherer groups utilised the landscape for thousands of years and Khoi herders moved into South Africa with their cattle and sheep approximately 2000 years ago. With the arrival of the Dutch settlers in the Cape in the mid-17<sup>th</sup> century, clashes between the Europeans and Khoi tribes in the Cape Peninsula resulted in the Goringhaiqua and Goraxouqua migrating north towards the Gariep/Orange River in 1680. These tribes became collectively known as the Korannas, living as small tribal entities in their own separate areas (Penn 2005).

According to Breutz (1953, 1954), and Van Warmelo (1935), several Batswana tribes, including the different Thlaping and Thlaro sections as well as other smaller groups, take their 18<sup>th</sup> and 19<sup>th</sup> century roots back to the area around Groblershoop, Olifantshoek, the Langeberg (Majeng) and Korannaberg ranges in the western part of the region. After Britain annexed Bechuanaland in 1885, the land of the indigenous inhabitants was limited to a few reserves. In 1895, when British Bechuanaland was incorporated into the Cape Colony, the land inside the reserves remained the property of the Tswana and could only be alienated with the consent of the British Secretary of State.

Because of its distance from the Cape Colony, this arid part of South Africa's interior was generally not colonised until relatively recent. According to history, the remote northern reaches of the Cape Colony were home to cattle rushers, gun-runners, river pirates and various manner of outlaws. Distribution of land to colonial farmers only occurred from the 1880s onwards when Government-owned land was surveyed, divided into farms, and transferred to farmers. More permanent large-scale settlement however only started in the late 1920s and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20<sup>th</sup> century (De Jong 2010, Penn 2005).

The region has been the backdrop to various incidents of conflict. The arrival of large numbers of Great Trek Boers from the Cape Colony to the borders of Bechuanaland and Griqualand West in 1836 caused conflict with many Tswana groups and the missionaries of the London Mission Society. The conflict between Boer and Tswana communities escalated in the 1860s and 1870s when the Korana and Griqua communities and the British government became involved. The

Northern Cape was very important in the South African War (Anglo-Boer War) (1899-1902) and major battles took place within 120 km of Kimberley, including the battle of Magersfontein. Boer guerrilla forces roamed the entire Northern Cape region and skirmishes between Boer and Brits were regular occurrences. Furthermore, many graves in the region tell the story of battles fought during the 1914 Rebellion (Hopkins 1978).

## 5.2 Local

During 1778, Swedish-born traveller and explorer Hendrik Wikar, reached the middle and lower reaches of the Orange River after a long land journey that started in Cape Town. As a deserter from the service of the Dutch East India Company, Wikar spent several years within the area, and compiled a report of his experiences in exchange for a pardon (Ross 1975). He documented his encounters with Khoisan communities who called themselves the *Einiqua*, or *River People*. The *Einiqua* were divided into three “kraals”: the *Namnykoa* near the Augrabies Falls, the *Kaukoa* on islands west of Keimoes, and the *Aukokoa* of Kanoneiland and other islands to the east. Their kraals consisted of considerable amount of sheep and cattle, they collected plants, hunted game, and cultivated dagga but no other crops according to Wikar (Ross 1975). Amongst the pastoralist communities living on the islands were the *Anoe eis* people who Wikar characterised as “Bushman”. They possessed no domesticated stock, subsisted by fishing, game-trapping, hunting and the gathering of plant foods (Morris & Beaumont 1991). Colonel Robert Jacob Gordon who visited the area in 1779, however remarked that they were actually *Einiqua* (i.e. Khoi) who had “lost their cattle as a result of an argument with the *Namneiqua* village (Morris & Beaumont 1991).

Numerous HIA and AIA reports have been conducted between the Kakamas and Upington landscape. These reports include, but are not limited to, studies involving agricultural developments such as the construction of solar thermal plants and solar parks on/near farms at Olyvenhouts drift, Upington, and Keimoes (Dreyer 2006; Morris 2011), the construction of raisin drier facilities near Kanoneiland (Engelbrecht 2015), sand mining activities in the bed of the Donkerhoekspruit on Jannelsepan near Louisvale (Morris 2018), and road developments at Blaauwskop (Rossouw 2013).

Van Schalkwyk (2013) reported that the cultural landscape qualities of the larger region essentially consist of two components. First is a rural area in which human occupation is made up of a pre-colonial element (Stone Age), as well as a much later historical/colonial (farmer and industrial/mining) component. The second component is an urban landscape dating to the colonial period which is linked to the rural colonial landscape.

### 5.2.1 Stone Age

According to Kruger (2015) the landscape of this section of the Northern Cape seems to have been relatively sparsely populated by humans in the past, MSA and LSA scatters and quarries occur frequently in low lying areas on plains between dune straights and outcrops along the Orange River. Scatters of stone artefacts in and around the area between Kakamas and Upington have been recorded by, ACRM (2013; 2016(b)), Beaumont (2006; 2008), Dreyer (2006; 2013), Engelbrecht (2015), Kaplan (2008; 2012; 2013), Kruger (2015), Morris (2011; 2013; 2018), Orton et al

(2013), Rossouw (2013), Van Ryneveld (2007), Van Schalkwyk (2013; 2014), and Webley & Halkett (2014), amongst others. The majority of the documented lithics are predominately associated with the MSA, with a few attributed to the ESA and LSA. Most of the documented lithics have low archaeological significance as some of these lithic assemblages are of mixed age, occur on eroded surfaces, and lack in spatial context and integrity (ACRM 2012). Several stone artefacts were also affected by weathering such as gloss patina and riverine cortex gloss patina (Orton et al 2013).

Banded ironstone occurs on several sites throughout the Northern Cape and was a favoured raw material for making stone tools due to its superior flaking qualities (Morris 2012). ACRM (2013) stated that over 95% of the tools recorded, at Site 1 on Erf 666 (Site B), Keimoes, were made with banded ironstone, while the remainder is in indurated shale, quartzite, opaline and quartz. In the landscape surrounding the Keimoes Solar farm on Erf 666, Kaplan (2012) recorded a low-density surface scatter of MSA and LSA material, including several chunks, a weathered broken limestone flake, several burnished retouched and utilized flakes, a burnished core, and an unworked quartzite cobble/manuport on a large patch of stony ground. Stone artefact scatters were present on Site 1 on the farm Olyvenhouts Drift (Dreyer 2006) in the district of Upington. These included MSA points with convergent ends and flakes with faceted platforms made of quartzite, chalcedony and banded ironstone (Dreyer 2006).

Rossouw (2013) found occasional occurrences of lithics made from brown jasper present as isolated surface occurrences in Section A-B on the farm Blaauwskop 36. Rossouw (2013) speculated that these lithics can be attributed to the LSA. The lithics are represented by irregular flakes and chips, they also appear to be fresh with little sign of intentional faceting or formal preparation. Kruger (2015) identified and recorded scatters of MSA stone tools, such as blades, points, scrapers and one adze at Eenduin farm near Keimoes. Similar stone tools were also recorded by Engelbrecht (2015) at the Blaauwskop settlement, approximately 15 km north-east of Keimoes.

Near Lennertsville, approximately 10 km from the farm Kousas, and 18-20 km from Blaauwskop, Kaplan (2018) documented a large silcrete core, an LSA silcrete retouched flake and one quartzite flake was documented along with a number of flaked stone tools. Kaplan (2008) noted that certain flake tools have been utilized or retouched. Some of the other finds include flakes of various sizes, bladelets and blade tools (e.g. backed pieces and points), and fine punch struck flakes as well as small round cores. Kaplan (2008) also documented four convex scrapers, three side scrapers, an adze, a large ESA core and weathered, retouched MSA flakes. He stated most of the tools are LSA in character, possibly from the 'Wilton Complex' (Kaplan 2008).

Other traces left on the landscape by prehistoric people include grinding grooves in the bedrock exposures at Dyason's Klip, 16.1 km north-east of Keimoes (Morris 2013). There are about five grinding surfaces along with a small number of stone tools in the locale. Morris (2013) also recorded lower grindstones adjacent to localized bedrock exposure, with a surface scatter of LSA flakes.

To the west of the study area on agricultural lot 2371 Kakamas South Settlement, Morris (2017b) reports the unexpected occurrence of a rock gong on a rocky granite-gneiss outcrop. Rock gongs (or lithophones) are rocks that ring when struck and are characterised by beating marks that reflect ancient use (Morris 2017b). According to Morris (2017b), the find is significant as it is the first rock gong to be identified from this part of the Northern Cape and on granite-gneiss. Often found in association with rock art, they are a feature of the LSA, with alleged ritual connotations (Morris 2017b).

Another interesting prehistoric find in the greater vicinity is the discovery of two kite-like features 22km north of Keimoes (Van der Walt & Lombard 2018). The large funnel-shaped features of undetermined age were constructed and shaped by organising local dolerite stones, sometimes incorporating in-situ dolerite outcrops/boulders. Kites are widely accepted as being utilised as hunting traps (Holzer *et al.* 2010 in Van der Walt & Lombard 2018). The ethno-historical records documented various kinds of hunting traps used by San hunter-gatherers, but the use of these funnel-shaped stone features by Stone Age herding communities (who also hunted) cannot be conclusively discounted (Van der Walt & Lombard 2018).

Furthermore, Morris (2014; Morris & Beaumont 1991) hypothesizes that the archaeological footprint of substantial herder and short-term hunter-gatherer encampments along the floodplain of the Orange River, may have been disrupted and destroyed by intensive farming alongside the river since colonial settlement.

### 5.2.2 Historical period

Before the European influx, the region of interest was predominantly settled by the Khoi-San and Koranna people. The subsequent settlement of European farmers and *trekboers* took place during the 18<sup>th</sup> and 19<sup>th</sup> centuries up until the 20<sup>th</sup> century. Khoikhoi farmers/hunter gatherers, Bushmen, Nama and Griqua had also resided in this region (Engelbrecht 2015).

Keimoes translates from the Khoekhoe language as "large eye" or "big eye". This might refer to either the natural water fountain called Big Eye or Keimoes situated at the Roman Catholic Mission Station in the town, or to the vast views that can be seen from the Tierberg, a small mountain outside the town. A second account for the town's name, is said to originate from the Khoemana leader, Klaas Lucas, who in the 1860s named the place Keimoes or "mouse nest" in the Khoemana language, denoting to the colonies of mice living there (Raper *et al* 2014).

In 1882, the first 81 farms north of the Gariep/Orange River between Groblershoop and the Augrabies Falls were allocated almost exclusively to *Basters* (a term referring to a group of people with mixed parentage, particularly white and Khoikhoi or slave and Khoikhoi, who were culturally European and who chose to move out of the Cape Colony to avoid social oppression) (Morris, 1992). During the late 19<sup>th</sup> century, more white people started moving to the Gordonia area and by the turn of the century, some 13 Afrikaner families had settled at Keimoes (De Beer 1992; Van der Walt 2015). The aftermath of the scorched earth policy of the South African War (Anglo-Boer War), resulted in many farmers moving to new areas, in search of greener pastures, and settlement next to the Gariep/Orange River provided ample irrigation for one's crops. Farmers who could



afford it, bought land in Keimoes, while others who could not afford properties of their own became *bywoners* to other landowners, paying rent to live and work on the land, or they settled in Kakamas, a labour colony established to help uplift poor whites in the Gordonia area (Engelbrecht & Fivaz 2018; Van der Walt 2015). By 1910, Keimoes had its own hotel, prison, court and police service (De Beer, 1992). It attained municipal status in 1949, and in 1951, Keimoes opened its own power station and electricity replaced candlelight (De Beer 1992; Van der Walt 2015). In 1995 there were only three *Baster* landowner families remaining in the Keimoes area, namely the Jansen family, the Loxtons and the Spangenberg. The commercialisation of agricultural farming during the 20<sup>th</sup> century and the state's support for the capitalisation of white farmers in the area, probably contributed to many of the *Basters*' decision to sell their farms to emerging white farmers (Legassick 1996; Van der Walt 2015).

The development of canal systems played an important role in irrigating extensive vineyards and orchards within the region and the development of substantial agricultural initiatives within the area (Engelbrecht & Fivaz 2018). It has been central to the economic existence and development of Keimoes and surrounds since the 1880s. Dutch Reformed Church missionary Reverend C.H.W. Schröder and Special Magistrate for the Northern Border John H. Scott, are credited with formalising and extending the irrigation system. However, when Schröder first came to Upington in July 1883, there were already people in the area of Keimoes that used irrigation and planted fields. Moolman (1946) and Legassick (1996) mentions how the *Baster* farmers diverted river water to their gardens, albeit crudely. The historic water wheel at Keimoes, Main Street, was declared a provincial heritage site in 1978. The four historic water wheels situated along the Noordvoor, or northern furrow on Erven 103, 1057, 268 and 1467 Kakamas South Settlement, have also been designated as provincial heritage sites (<https://sahris.sahra.org.za/declaredsites>).



**Figure 6** Historic water wheel, a declared provincial heritage site in Keimoes.

The old Dutch Reformed Missionary churches at Keimoes and Upington also received provincial heritage site status in 1982 and 1990 (<https://sahris.sahra.org.za/declaredsites>).



Figure 7 Dutch Reformed Missionary Church, provincial heritage site in Keimoes.

De Jong (2010) classifies the cultural landscape along the Gariep/Orange River as predominantly historic farmland. The affected area consists of working (operating) irrigation and grazing farms located in a typical Lower Orange River environment. These farms display heritage features that typically occur in the district, such as their large size, irrigation furrows and pipelines, fences, tracks, farmsteads, and irrigated fields. Farmsteads are clustered close to rivers and main roads (De Jong 2010). According to De Jong (2010) this class of landscape is of relatively low heritage sensitivity because it can absorb adverse effects of new development through some mitigation. Very little artefacts and/or structures dating to the historical/colonial period have been recorded on sites in the vicinity of the study area.

On Webley and Halkett's (2014) survey for the proposed construction of a PV (Photovoltaic) facility on the remainder of the farm Dyason's Klip 454, they recorded the mud-brick ruins of a small possible shepherd's hut, along with the trenches and abandoned equipment from the 20<sup>th</sup> century mining for tungsten on the property. They concluded that these remains are of low significance (Webley & Halkett 2014). Furthermore, Morris (2013) recorded a collapsed structure, a kraal and a nearby ash-heap close to Dyason's Klip, which he suggests could have been a farm-workers' dwelling. He also noted that there was another collapsed structure, with a possible porch. This structure was more substantial than the first structure and yielded small quantities of glass, porcelain and metal, which most likely can be dated to the mid-20<sup>th</sup> century (Morris 2013).

It is important to note that the region was caught up in the Koranna War of 1879-1880 along with other military activity such as the rising of 'rebels' in the aftermath of the South African War (Anglo-Boer War) and an incursion of German troops in January - February 1915 (Morris 2018). It is believed that any military settlement, specifically those related to the Koranna Wars, would have been located closer to the Gariep/Orange River (Webley & Halkett 2014). A *voortrekker* memorial monument was recorded approximately 1 km from the Orange River Wine Cellars, Kanoneiland (Engelbrecht 2015). Dreyer (2006) recorded, at Olyvenhouts Drift, a heavily soldered food tin that resembled British rations from the South African War (Anglo-Boer War) (1899-1902), he states that this could suggest that a British camp was in the vicinity during the war, however, its context is unconfirmed and thus mere speculation (Dreyer 2006). Van der Walt (2015) noted the position of a historical monument located on the farm Geelkop, north-west of Keimoes, called the "Rebellion

Tree”, associated with the activities of the 1914 rebellion against the South African participation in the First World War.

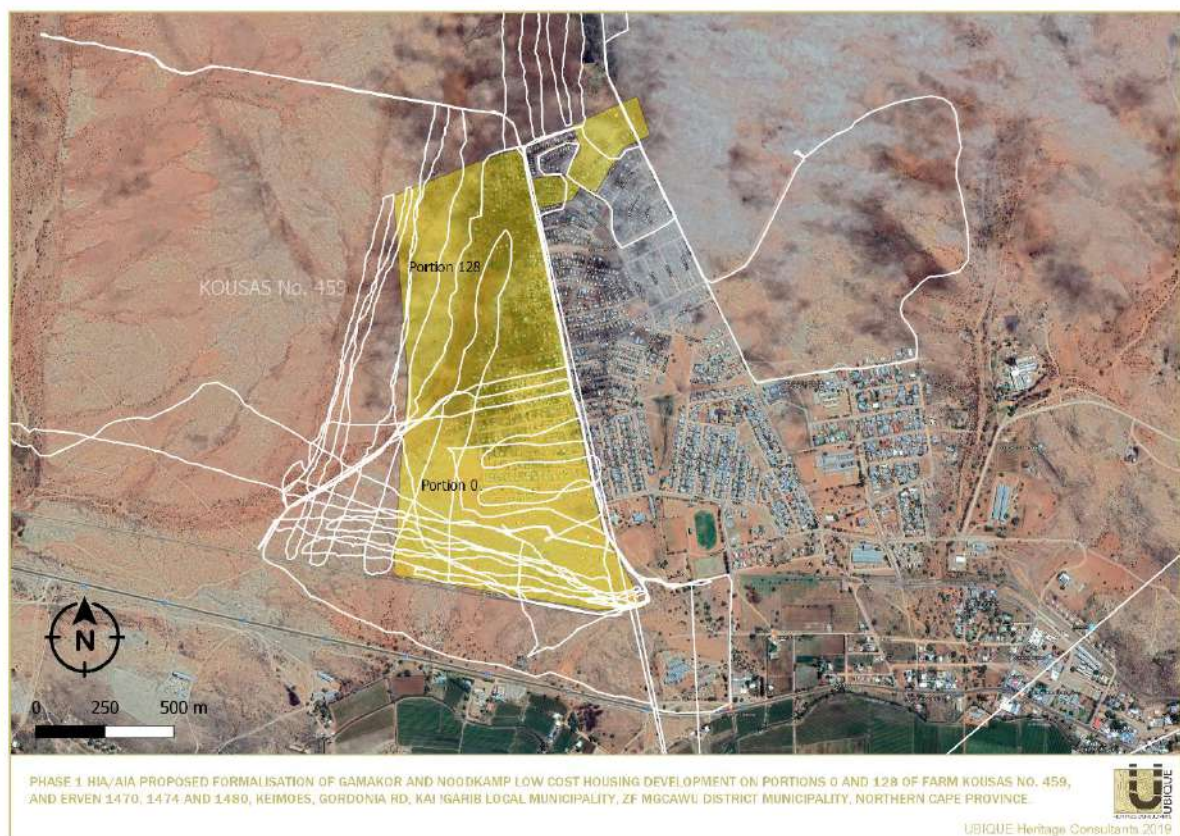
### 5.2.3 Oral history

No interviews with locals were conducted regarding the history of the area.

## 6. IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT

### 6.1 Surveyed area

The area surveyed for the impact assessment was dictated by the Google Earth map of the development footprint provided by the client. The site was approached from the south-west and a pedestrian survey was conducted in transects of approximately 30 m. Developed areas were only scoped due to disturbances. Surrounding areas were surveyed via vehicle.



**Figure 8** Google Earth image showing survey track for housing development project, Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474, and 1480, Keimoes.



## 6.2 Identified heritage resources

Description			Period	Location	Field rating/ Significance
Stone Age					
1	Type lithic/s	Debris: Flakes and Chunks	MSA/ Early LSA	28° 42.234' S 20° 57.079' E	Field Rating IV C  Low significance
	Raw material	Banded ironstone formation			
	N in m².	4 per m² in 20 m² area			
	Context	Surface scatter, out of context			
	Additional	4 pieces scattered close to disturbed area			
2	Type lithic/s	Debris: Chunk	MSA/ Early LSA	28° 42. 125' S 20° 56. 552' E	Field Rating IV C  Low significance
	Raw material	Banded ironstone formation			
	N in m².	1 per m² in 20 m² area			
	Context	Surface scatter, out of context			
	Additional	1 piece, excluded from development footprint			
Historical					
	No historical features were identified.				N/A
Graves					
	Grave markers	No graves were recorded.			N/A
	Inscription				
	Orientation				
	Inscription				
	Orientation				

## 6.3 Discussion

### 6.3.1 Archaeological features

Two occurrences of lithics were recorded during the survey of the study area (Fig. 9 & Fig. 10). The first occurrence is in the south of the development footprint on Farm Kousas No. 459 Portion 0 and consist of four pieces of MSA/Early LSA debitage/flakes scattered ex situ in a heavily disturbed area. The second recorded find is an isolated chunk situated outside the development footprint. All the recorded lithics were made from the highly utilised banded ironstone formation, popular throughout the area (Morris 2012). The cultural material shows various degrees of weathering and may either be representative of the Early Later Stone Age, or a mere mixture of LSA and MSA artefacts (Lombard 2011). The identified archaeological materials are of low significance, as the archaeological sample is small and without context, and therefore of little scientific value.

These Stone Age heritage finds are given a 'General' Protection C (Field Rating IV C). This means these sites have been sufficiently recorded (in the Phase 1). It requires no further action.



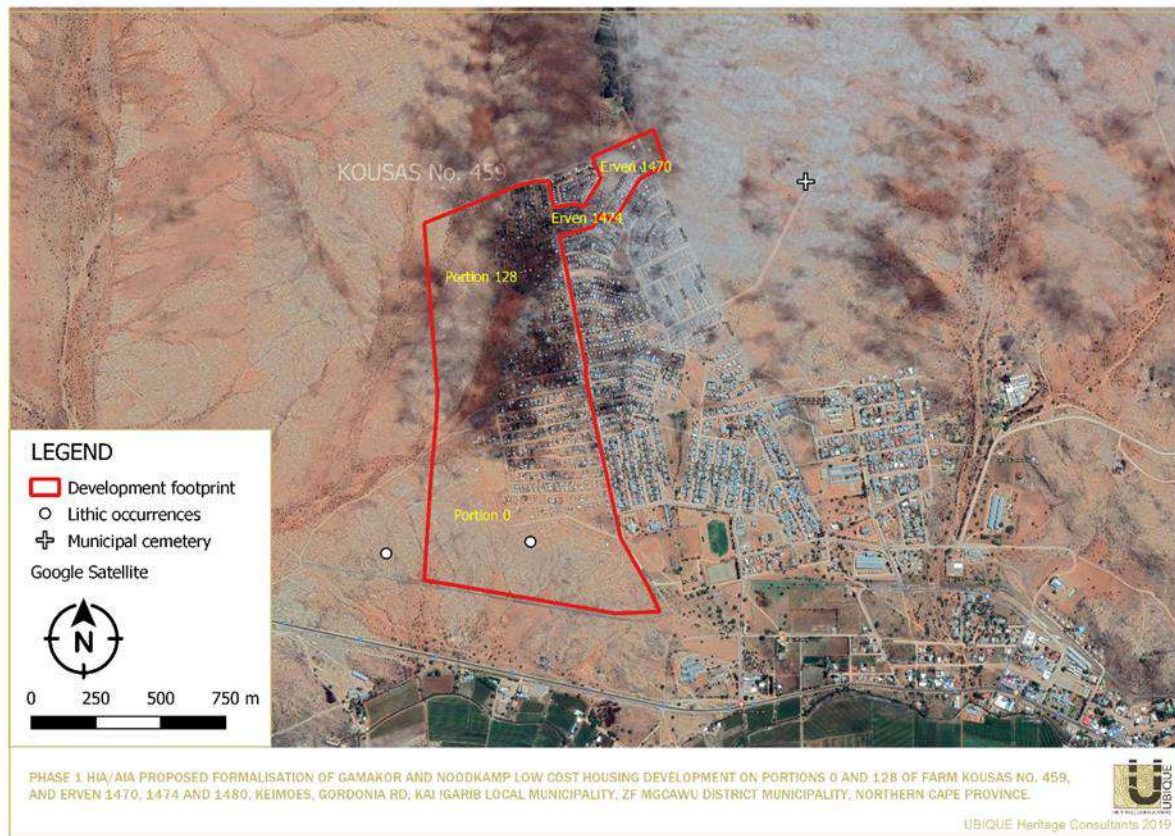


Figure 9 Lithic occurrences within, and near study area.

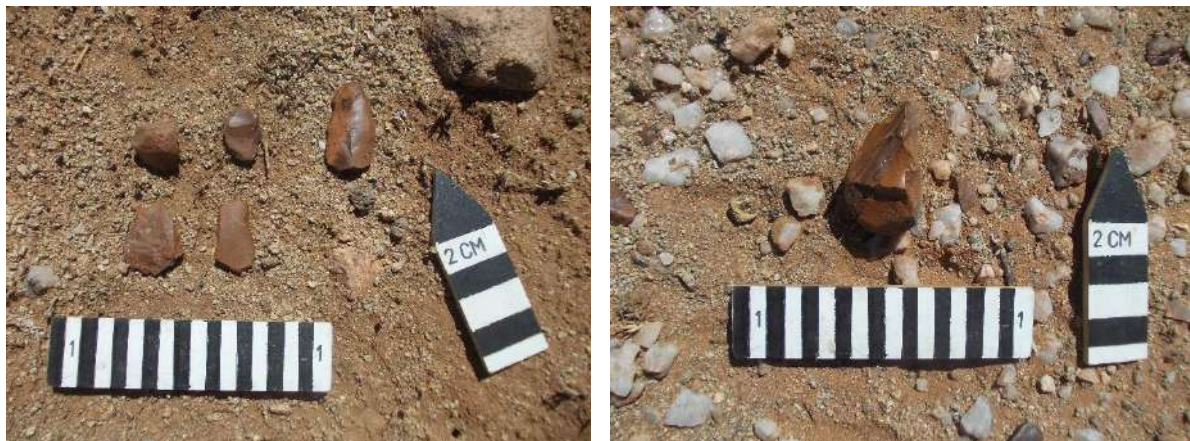


Figure 10 Lithics found within the development footprint and outside.

### 6.3.2 Historical features

No significant historical features were identified within the study area.

### 6.3.3 Graves

No formal or informal graves were identified in the study area. The local municipal cemetery lies well outside the development impact zone, to the north-east (Fig. 11).



**Figure 11** Local municipal cemetery.

### 6.3.4 Palaeontological resources

The proposed Gamakor and Noodkamp low-cost housing development is underlain by Precambrian metamorphic and igneous basement rocks of the Namaqua-Natal Metamorphic Province (not fossiliferous) and superficial Late Cenozoic deposits and (largely not fossiliferous), both of which has a low to very low palaeontological sensitivity. And thus, the impact of the development on the Fossil heritage is considered to be low (Butler 2019; Almond & Pether 2008). Elize Butler from Banzai Environmental proposes exemption from doing a full paleontological study for this project (see Appendix 1).

## 7. RECOMMENDATIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No other heritage was identified. Therefore, no further mitigation is required, and from a heritage point of view we recommend that the proposed development can continue.
2. Due to the zero palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required. It is

considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area as the igneous rocks underlying the site are not fossiliferous. It is therefore recommended that the project be exempt from a full Paleontological Impact Assessment (Butler 2019).

3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

## 8. CONCLUSION

This HIA has identified no significant heritage resources on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480, Keimoes, Kai !Garib Municipality, Mgcawu District Municipality, Northern Cape as set out in the report. In the development footprint are no archaeological, historical or cultural sites, or paleontological resources that will be impacted on negatively by the proposed development.



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**WEB**

<http://www.sahra.org.za/sahris>

# APPENDIX A

RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES FOR PROPOSED FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT, KEIMOGES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE.

**RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES FOR PROPOSED  
FORMALISATION OF GAMAKOR AND NOODKAMP LOW COST HOUSING DEVELOPMENT, KEIMOE, GORDONIA  
RD, KAI IGARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

Prepared by  
**BANZAI ENVIRONMENTAL (PTY) LTD**

**24 February 2019**

## BACKGROUND

EnviroAfrica CC has been employed by Kai !Garib Municipality, ZF Mgcawu District Municipality, to undertake the NEMA [National Environmental Management Act, 1998 (Act no 107 of 1998 as amended in 2014)] for the Application for the Environmental Authorization Process for the proposed formalisation of Gamakor and Noodkamp low cost housing development. The proposed development is located on Portions 0 and 128 of Farm Kousas No. 459, and Erven 1470, 1474 and 1480 in Keimoes (Figure 1 -3)

This report is a **recommended exemption** from further Palaeontological studies as the proposed development site is underlain by Precambrian metamorphic and igneous basement rocks of the Namaqua-Natal Metamorphic Province as well as superficial Late Cenozoic deposits, both of which has a low to very low palaeontological sensitivity. And thus the impact of the development on the Fossil heritage is considered to be LOW.

## OUTLINE OF PROPOSED DEVELOPMENT

The application process consists of the following activities:

- The rezoning and subdivisions of 1500 Erven for low cost houses.
- The associated infrastructure include water, electricity, sewage, solid waste removal

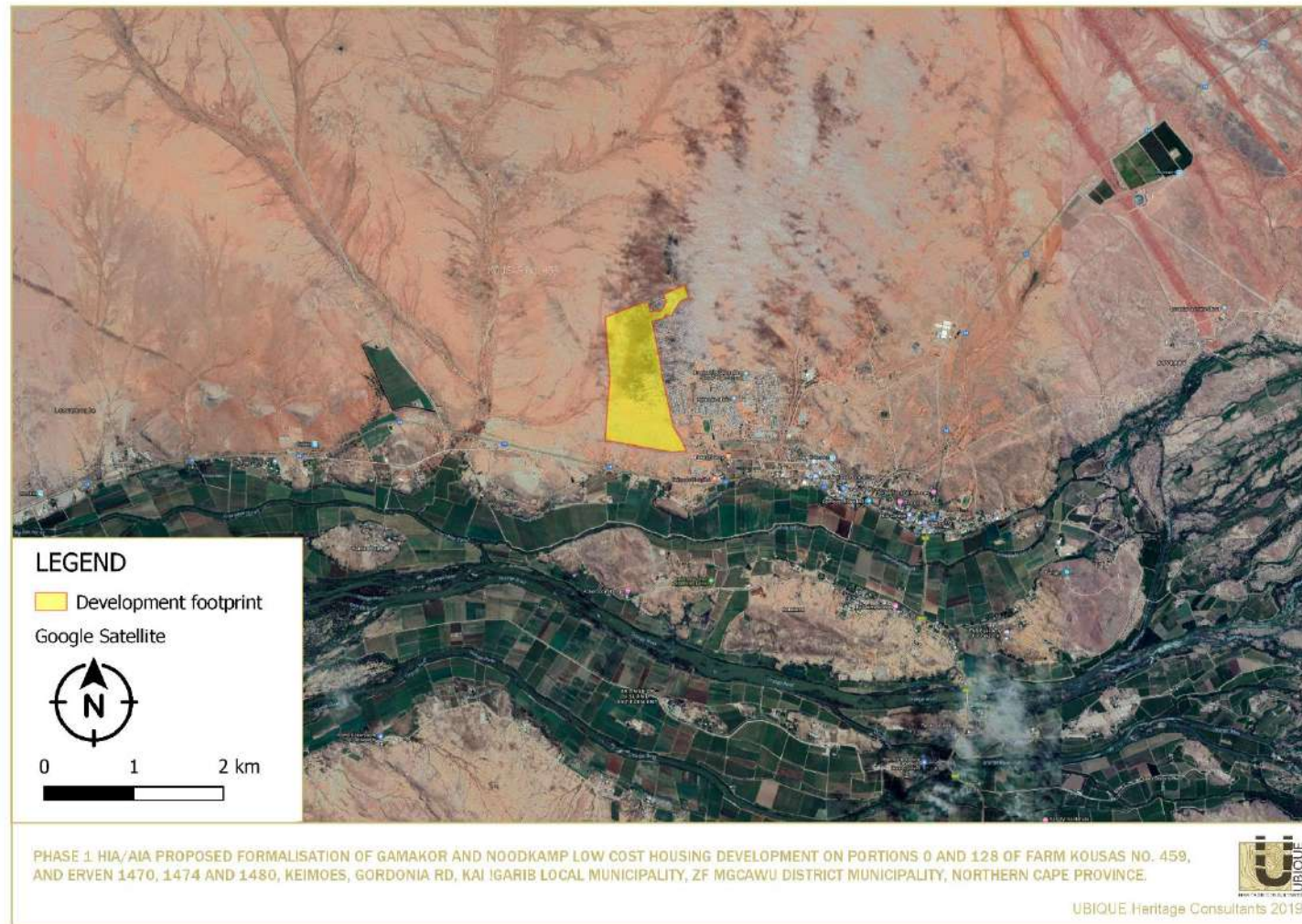
## GEOGRAPHICAL LOCATION OF THE SITE

The proposed development will be 104 ha in extent and is situated on the western side of Keimoes.

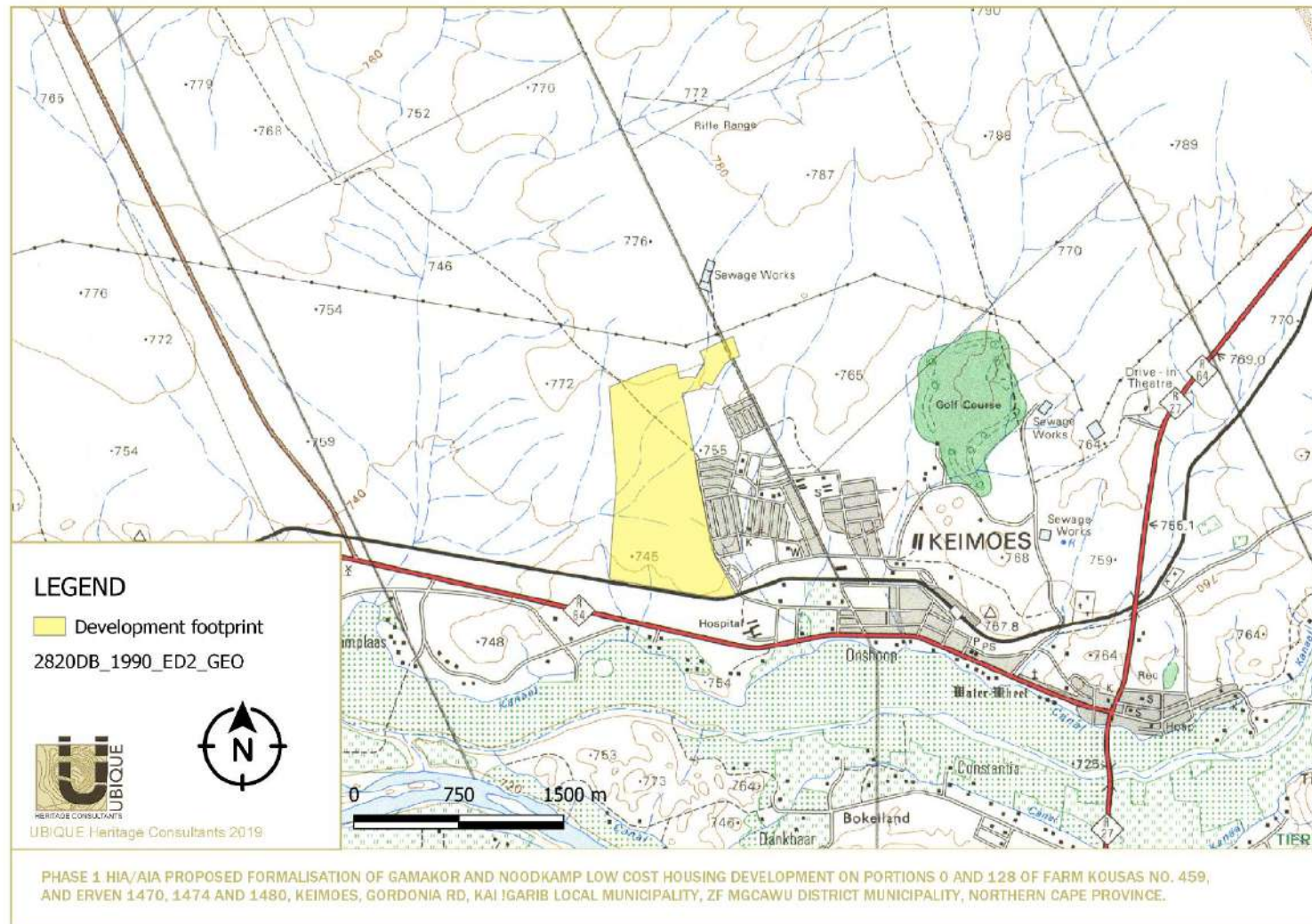
The N14 National Road is approximately 310 m south of the proposed site.

- The development is located on topographical Map 2820 DB



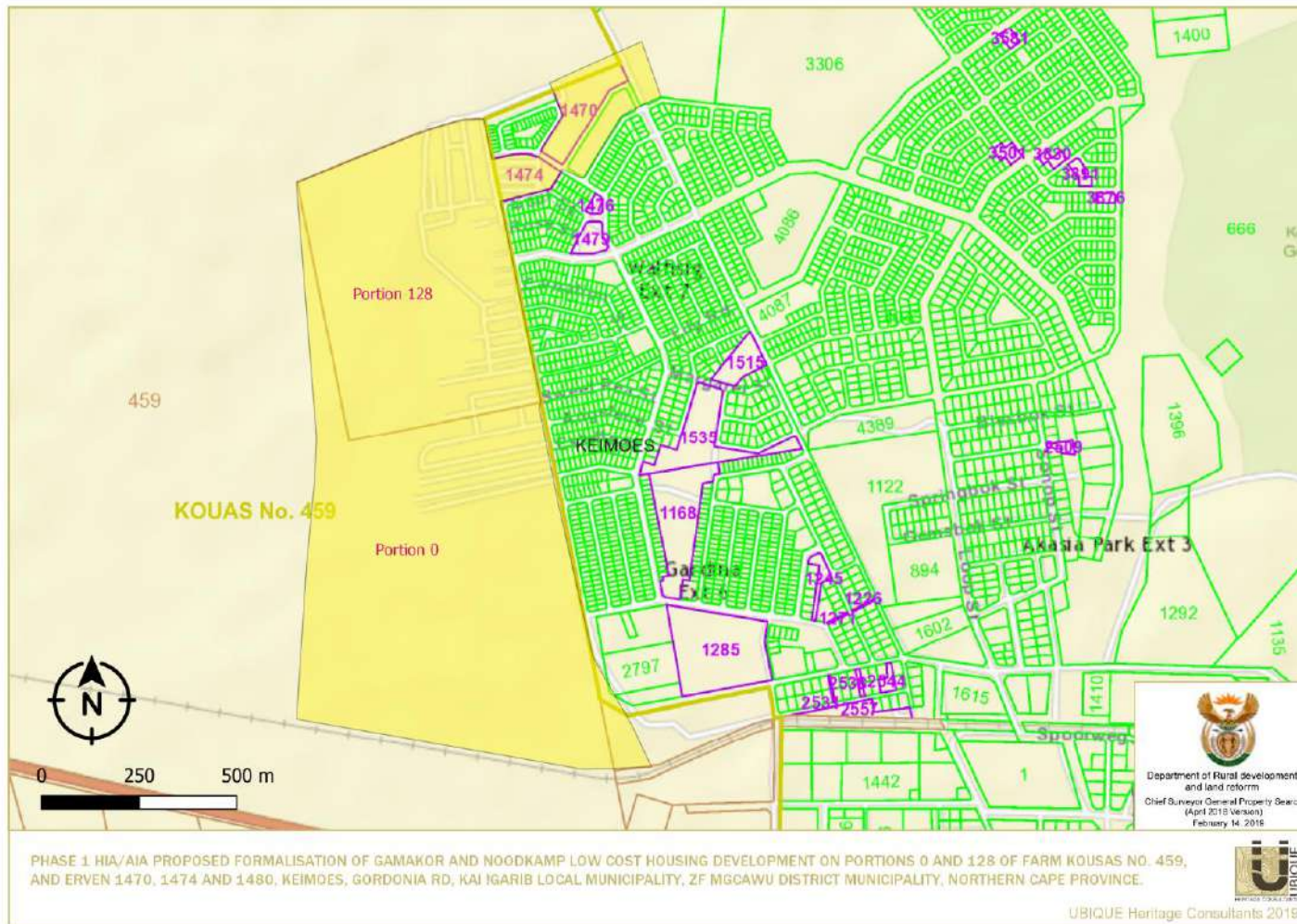


**Figure 1:** Google Earth Image of the proposed formalisation of Gamakor and Noodkamp low cost housing development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. The map provided by Ubique Heritage Consultants.



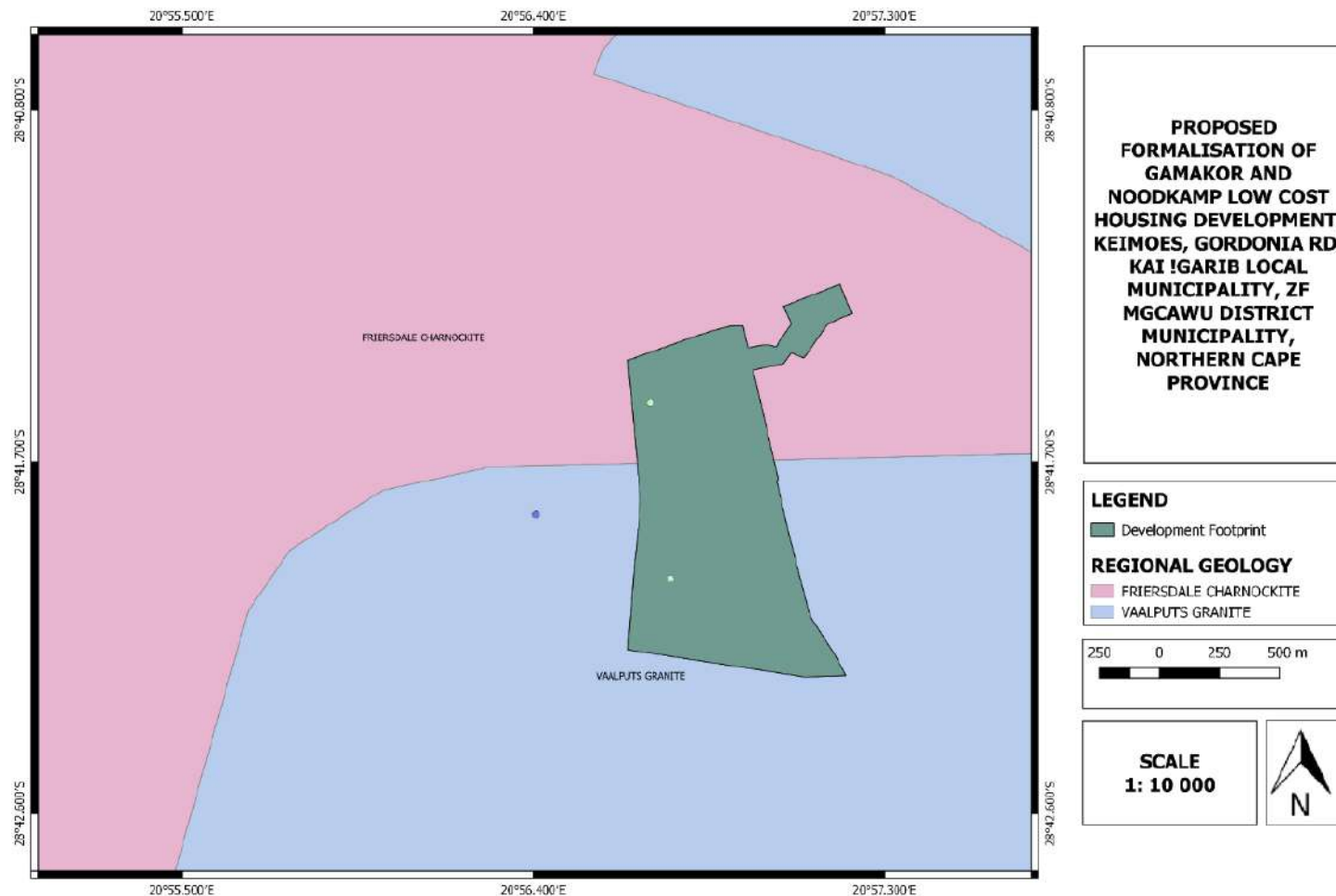
**Figure 2:** Topographical map of the proposed development footprint of Gamakor and Noodkamp low cost housing development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. The map provided by Ubique Heritage Consultants.





**Figure 3:** Detailed layout of Gamakor and Noodkamp low cost housing development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. The map provided by Ubiqum Heritage Consultants.

## GEOLOGICAL AND PALAEOONTOLOGICAL HERITAGE



**Figure 4:** The surface geology of the proposed Gamakor and Noodkamp low cost housing development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province is underlain by the Vaalputs granite and Friersdale Charnockite of the Keimoes Suite as well as late Cenozoic superficial deposits . The map was drawn by QGIS Desktop 2.18.18.



The proposed Gamakor and Noodkamp low cost housing development is located west of Keimoes and just north of the Orange River. The area consists mostly of arid, hilly terrain north of the Orange River with small sporadic flowing streams, and alluvial islands, banks and basement rock outcrops associated with the Orange River. Bedrock exposure away from the river are typically high, while coarse, poorly-sorted alluvial and colluvial gravels are probably mantling the hill slopes and stream valleys.

The proposed low-cost housing development is underlain by Vaalputs Granite and Friersdale Charnockite of the Keimoes Suite (Figure 4), which is Precambrian metamorphic and igneous basement rocks of the Namaqua-Natal Metamorphic Province. Vaalputs granite consists of grey, well-foliated, medium-grained, locally porphyritic adamellite granite with abundant xenoliths. The Friersdale Charnockite contain dark-weathering, fine-to medium-grained, inequigranular (locally porphyritic) charnockitic adamellite.

The Precambrian basement rocks within the study area are covered with a various other coarse to fine-grained **superficial deposits** namely.

- alluvium and calcrete hardpans of intermittently flowing streams.
- colluvium (slope deposits),
- rocky soils, down washed surface gravels,
- sheet wash.

These younger deposits may include patches of aeolian sands of the **Gordonia Formation (Kalahari Group;** and Quaternary to Recent in age).

#### 4. CONCLUSIONS & RECOMMENDATIONS

The proposed Gamakor and Noodkamp low cost housing development is underlain by Precambrian metamorphic and igneous basement rocks of the Namaqua-Natal Metamorphic Province (unfossiliferous) and superficial Late Cenozoic deposits and (largely unfossiliferous), both of which has a low to very low palaeontological sensitivity. And thus, the impact of the development on the Fossil heritage is considered to be LOW.

**It is therefore recommended that exemption from further specialist palaeontological studies and mitigation be granted for this development.**

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**FRESH WATER REPORT**  
**Housing on Portion 128 and the Remainder of Farm Kousas 459 Gordonia RD**  
**KEIMOE**  
**NORTHERN CAPE**

**A requirement in terms of Section 21 (c) and (i) of the  
National Water Act (36 of 1998)**

January 2020



## Index

	Abbreviations	3
	List of Figures	4
	List of Tables	4
1	Introduction	5
2	Legal Framework	6
3	Climate Keimoes	6
4	Quaternary Catchment	7
5	Vegetation	8
6	Housing Scheme	9
7	Sub-Catchments and Drainage Lines	10
8	Runoff	15
9	Wastewater Treatment Works	16
10	Existing Housing	18
11	Biomonitoring the Lower Orange River	20
12	Impacts on the Lower Orange River	20
13	Lower Orange River Biomonitoring Results	21
14	Keimoes Biomonitoring	23
15	Present Ecological State	27
16	Ecological Importance	30
17	Ecological Sensitivity	30
18	Possible Impacts	31
19	Mitigation Measures	31
20	Impact Assessment	31
21	Risk Matrix	32
22	Resource Economics	35
23	Conclusions	38
24	References	39
25	Declaration	40
26	Résumé	41
27	Appendix	44
27.1	Biomonitoring Score Sheet	44
27.2	Methodology used in determining significance of impacts	45
27.3	Risk Matrix Methodology	49

## Abbreviations

Critical Biodiversity Area	CBA
Department of Water and Sanitation	DWA
Ecological Importance	EI
Ecological Sensitivity	ES
Ecological Support Area	ESA
Environmental Impact Assessment	EIA
Electronic Water Use License Application (on-line)	eWULAA
Government Notice	GN
Hectares	ha
Metres Above Sea Level	masl
National Environmental Management Act (107 of 1998)	NEMA
National Freshwater Environment Priority Area	NFEPA
National Water Act (36 of 1998)	NWA
Present Ecological State	PES
South Africa National Biodiversity Institute	SANBI
Section of an Act of Parliament	S
Water Use License Application	WULA

## List of Figures

Figure 1	Kiemoes Climate	7
Figure 2	<i>Aloe claviflora</i>	8
Figure 3	Housing Scheme	9
Figure 4	Sub-Catchment	10
Figure 5	Sandy Drainage Line	11
Figure 6	Confluence	12
Figure 7	Adjacent Catchment	13
Figure 8	Keimoos Drainage Lines	14
Figure 9	Railway Bridge	15
Figure 10	N14 Road Bridge	16
Figure 11	Wastewater Treatment Works	16
Figure 12	Wastewater Treatment Works Drainage	17
Figure 13	Existing Housing	18
Figure 14	Existing Housing Continued	19
Figure 15	New Dwellings	19
Figure 16	Lower Orange River Biomonitoring Results	22
Figure 17	Sampling Point	23
Figure 18	Bridge	24
Figure 19	Vegetation at the Sampling Point	24
Figure 20	Irrigation Pipes	25
Figure 21	Resource Economic Footprint of the Larger Drainage Lines	36
Figure 22	Resource Economic Footprint of the Adjacent Drainage Lines	37
Figure 23	Minimum Requirements for a S21(c) and (i) Application	38

## List of Tables

Table 1	Biomonitoring in the Lower Orange River	21
Table 2	Water Quality	25
Table 3	Biomonitoring Score	25
Table 4	Habitat Integrity	27
Table 5	Present Ecological State of the Larger Drainage Lines	28
Table 6	Present Ecological State of the Adjacent Drainage Lines	29
Table 7	Ecological Importance	30
Table 8	Impact Assessment	32
Table 9	Risk Matrix	33
Table 10	Goods and Services	34



## **1 Introduction**

The Kai !Garib Municipality encompasses several towns in the Northern Cape. Keimoes on the banks of the Orange River is among these towns, where the expansion of a human settlement on 100ha of land is now necessary. This is on the farm Kousas 459 in the Gordonia registration district. In fact, this land has long been under discussion. Approximately half of it is already under informal housing and new residents arrive regularly. It has become urgent that the necessary administrative processes are now being concluded in order to officially establish the settlement.

The municipality appointed the town and regional planners Macroplan of Upington to deal with this administrative process. Macroplan, in turn, has appointed Enviro Africa of Somerset West to deal with the legally required EIA in terms of NEMA.

The proposed housing scheme at Keimoes stretches over mostly dry drainage lines, which are tributaries of the Orange River. These are, in terms of the NWA, deemed as legitimate water resources. In conjunction to the EIA, a WULA is required as well. Consequently, Dr Dirk van Driel of WATSAN Africa has been appointed to carry out the WULA, along with the Fresh Water Report and the Risk Matrix, as is prescribed on the DWS webpage.

The Fresh Water Report has been developed over a number of years to include aspects that now have officially been specified. Apart from answering to WULA requirements, an impact assessment is included to specifically satisfy the requirements of the EIA as well.

It is concluded that the drainage lines have only limited value as water resources and environmental assets. Hence it was advised that the development should go ahead and that a General Authorization is the correct level of authorization.

## 2 Legal Framework

The proposed development “triggers” sections of the National Water Act. These are the following:

### *S21 I Impeding or diverting the flow of a water course*

The proposed housing scheme transverses a number of drainage lines. The drainage lines could possibly be altered, should the development go ahead.

### *S21 (i) Altering the bed, bank, course of characteristics of a water course.*

The proposed housing scheme may alter the characteristics of the drainage lines.

Government Notice 267 of 24 March 2017

Government Notice 1180 of 2002. *Risk Matrix.*

The Risk Matrix as published on the DWS official webpage must be completed and submitted along with the Water Use Licence Application (WULA). The outcome of this risk assessment determines if a letter of consent, a General Authorization or a License is required.

Government Notice 509 of 26 August 2016

An extensive set of regulations that apply to any development in a water course is listed in this government notice in terms of Section 24 of the NWA. No development take place within the 1:100 year-flood line without the consent of the DWS. If the 1:100-year flood line flood line is not known, no development may take place within a 100m from a water course without the consent of the DWS. Likewise, no development may take place within 500m of a wetland without the consent of the DWS.

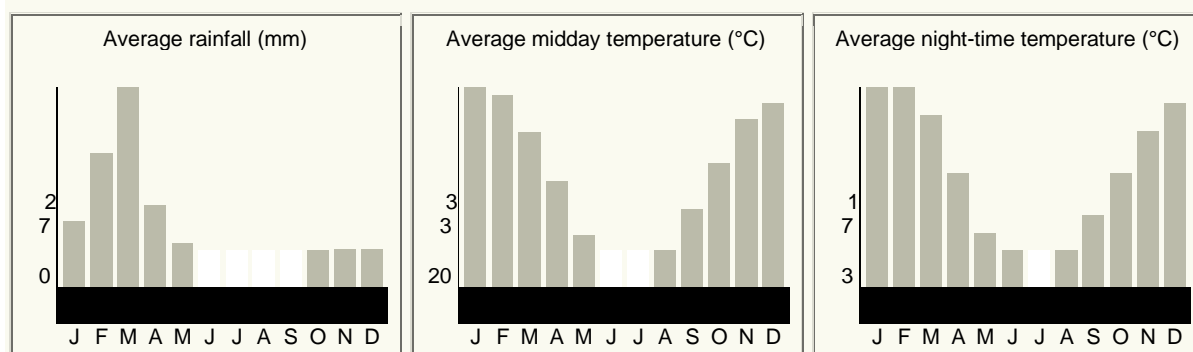
This report deals with S21 I and I of the NWA.

National Environmental Management Act (107 of 1998)

NEMA and regulations promulgated in terms of NEMA determines that no development without the consent and permission of the DEA and its regional agencies, in this case the DENC of the Northern Cape Provincial Government, may take place within 32m of a water course. The mostly dry drainage lines are perceived to be legitimate water courses.

## 2 Climate Keimoes

Keimoes normally receives about 84mm of rain per year, with most rainfall occurring mainly during autumn. The chart below (Figure 1, lower left) shows the average rainfall values for Keimoes per month. It receives the lowest rainfall (0mm) in June and the highest (27mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Keimoes range from 19.8°C in June to 33°C in January. The region is the coldest during July when the mercury drops to 3°C on average during the night.



**Figure 1** Climate Keimoes

The rainfall is really low, tantamount to desert conditions. Keimoes is located on the southern edge of the Kalahari Desert. The larger part of the economy and agriculture entirely depends on irrigation out of the Orange river.

Nevertheless, violent thunderstorms occur from time to time, with rainfall of 40mm and more over a period of 24 hours. This may cause flow in the drainage lines.

## 3 Quaternary Catchment

Keimoes is in the D42E quaternary catchment

#### 4 Vegetation

The veld type where the proposed housing scheme is going to be is listed as Bushmanland Arid Grassland, which is least threatened, according to the SANBI webpage.

The vegetation type on the banks of the Orange River is listed as Lower Gariep Alluvial Vegetation, which is critically endangered. But then the housing development is not going to be anywhere near the banks of the river.

The kraal aalwyn *Aloe claviflora* (Figure 2) grows on the higher quartzites. These are valuable and should be transplanted and conserved prior to the area being developed into housing. The swarthaak *Senegalia mellifera* is the common in the lower drainage lines, but there are a number of other thorn tree species as well. The Kalahari, especially along the drainage lines, is dotted with the protected camel thorn tree *Vachellia erioloba*, but none were observed on the farm Kousas.

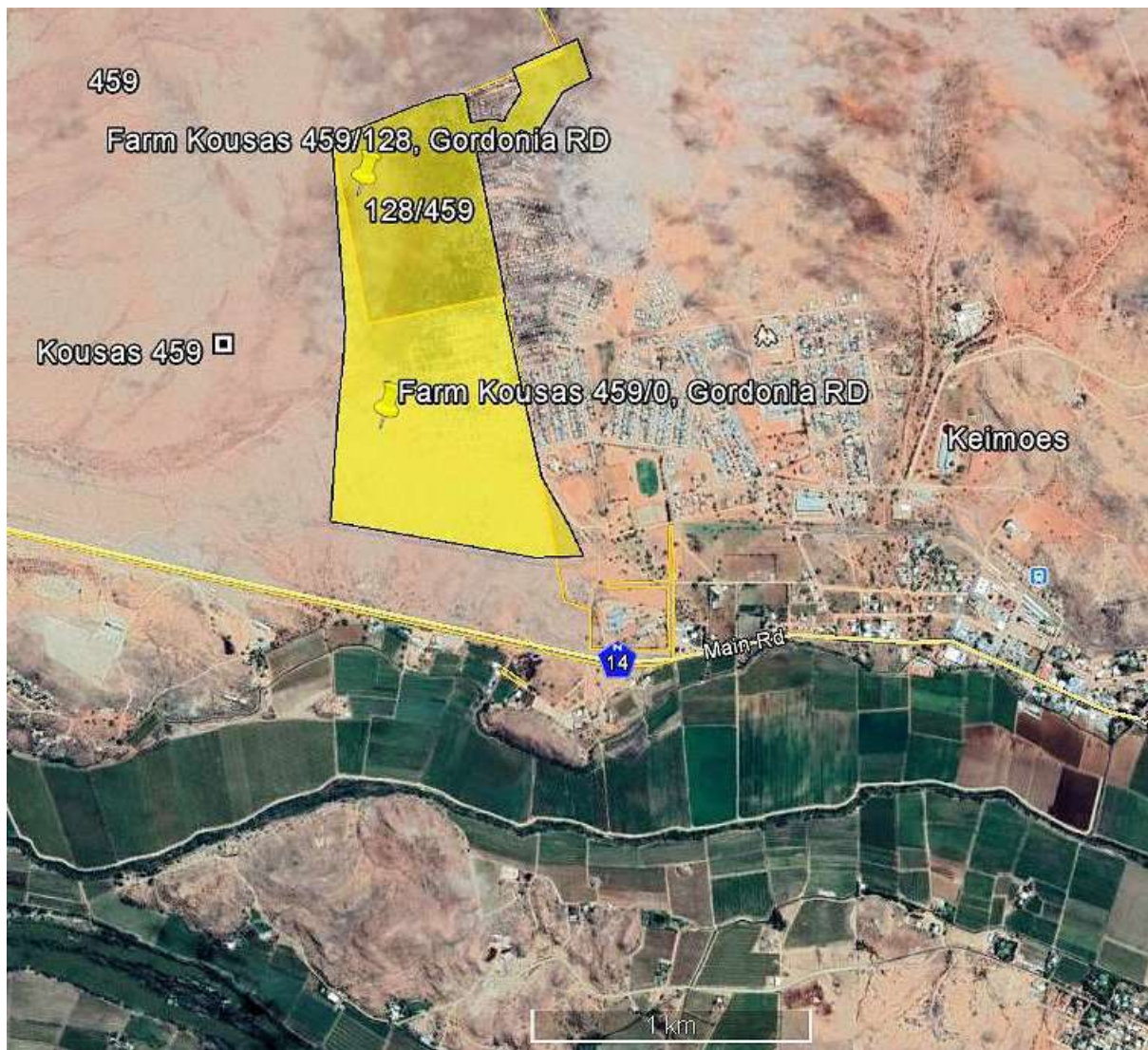
The vegetation was green on the day of the site visit (8 February 2019) following the recent rains.



**Figure 23** *Aloe claviflora*



## 5 The Housing Scheme

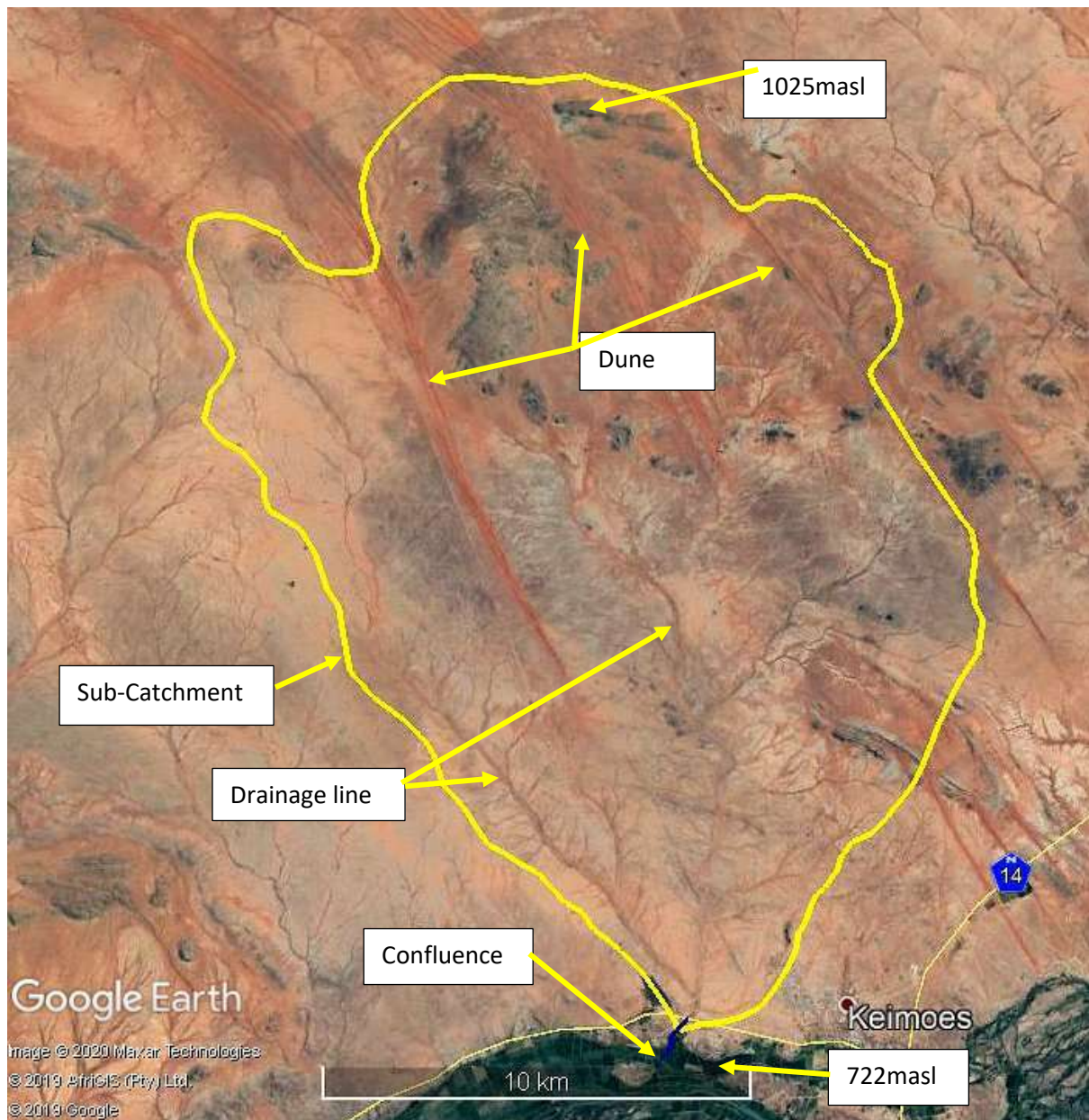


**Figure 3** Housing Scheme (Macroplan)

The proposed housing scheme is demarcated in Figure 3. It is planned on Portion 128 of Farm Kousas 459 Gordonia and on the Remainder of the same farm. It covers a surface area of approximately 100 ha, with a circumference of 6km.

According to plan, there will be 1500 plots. A large part of the assigned land, perhaps half of it, has already been built up, just about all of it with informal housing.

## 6 Sub-Catchments and Drainage Lines



**Figure 4** Sub-Catchment

The sub-catchment (Figure 4) is one of the larger ones along the banks of the lower Orange River. It covers an area of approximately 31 000 ha. It is approximately 26km long and it is 16.8km wide at its widest.

It was demarcated by connecting the highest points around the drainage line system with the polygon function of Google Earth. This is made possible by the coloration of the drainage lines, visible on Google Earth, as iron oxide accumulates in the sandy drainage lines (Figure 5), left there by the occasional storm water.

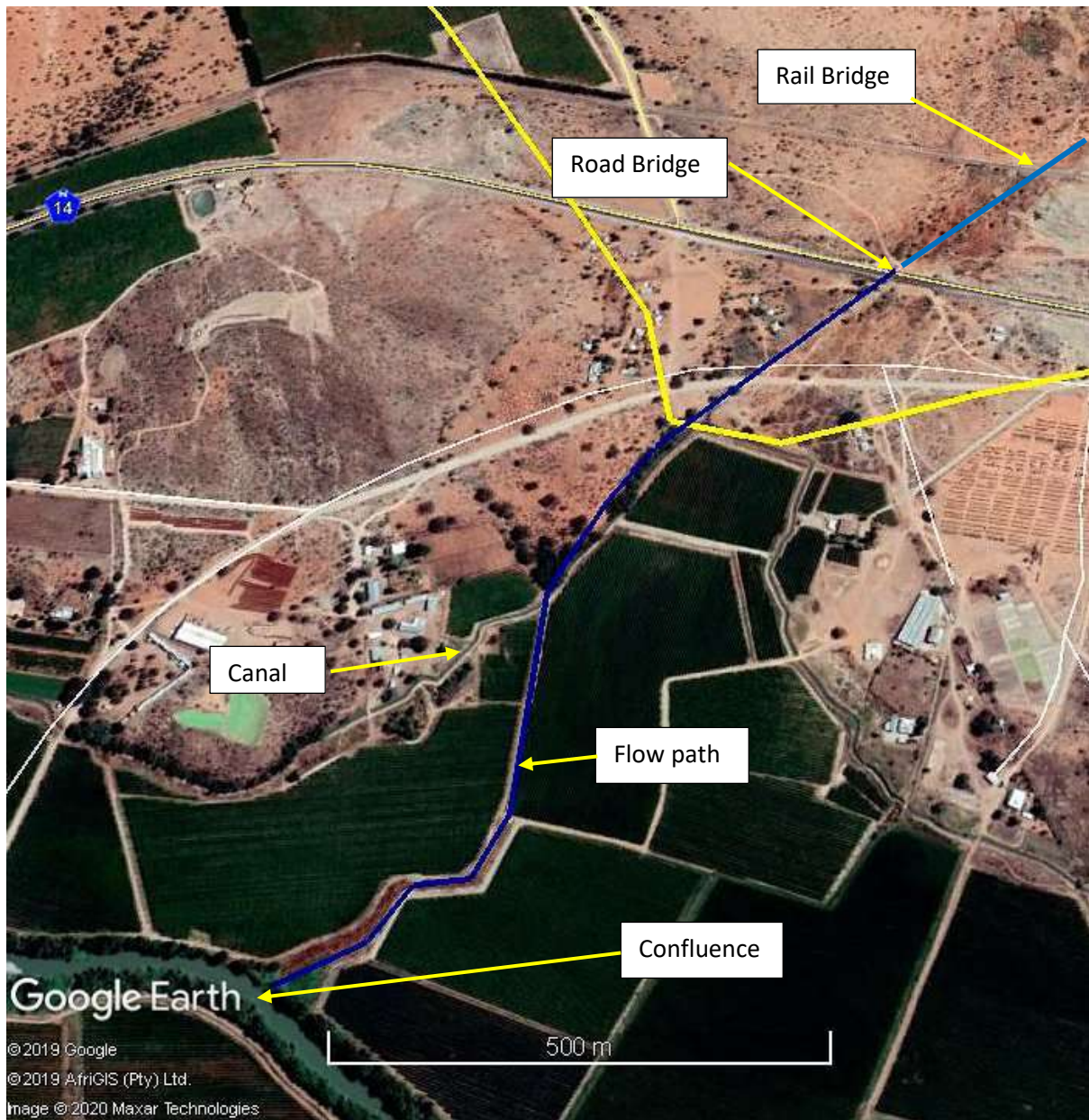




**Figure 5** Sandy drainage line

Its highest point is a rocky outcrop in the very north. It is 1025masl. The lowest point at the confluence with the Orange River is 722masl. This is just less than a horizontal meter drop over a distance of 1km. This is a very gentle slope that does not make for fast flowing water downhill or a strong erosion potential.

The sub-catchment is intersected by typical red Kalahari sand dunes (Figure 4).



**Figure 6 Confluence**

The drainage line passes underneath the railway and the N14 trunk road through bridges. It has been interrupted by the vineyards and the irrigation canal. The final reach is flanked by vineyards (Figure 6).





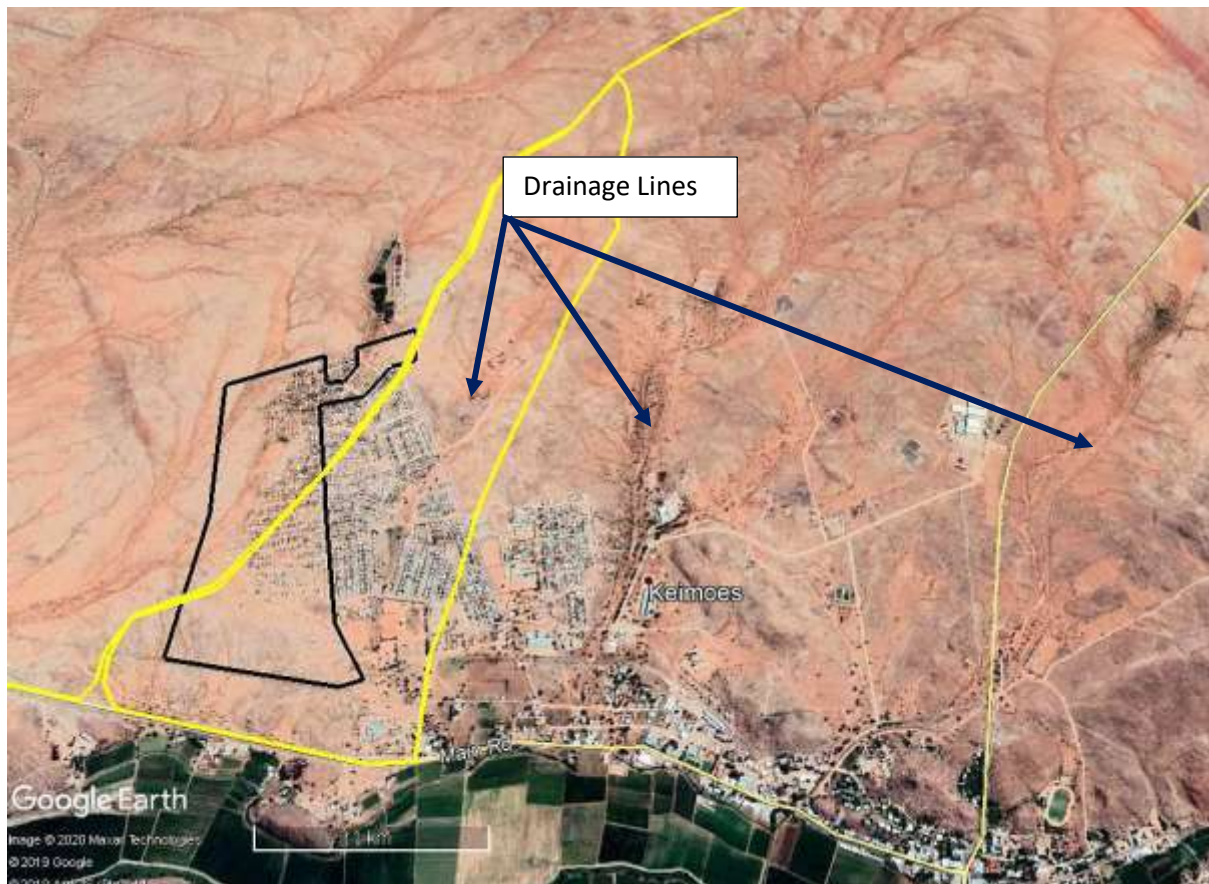
**Figure 7 Adjacent Sub-Catchment**

However, approximately only half of the proposed housing development is in this very large sub-catchment. The other half is located in the adjacent sub-catchment (Figure 7).

This is a much smaller sub-catchment.

In the past, prior to the development of Keimoes and the vineyards along the Orange River, the 3 drainage lines that run through the town of Keimoes (Figure 8) were probably all part of the same catchment, with a single confluence to the river. The locality where these drainage lines came together now has been replaced with vineyards and constructed drainage canals in among the blocks of vineyard. This is

only guessing, we do not really know, because of the lost evidence. We do not really know where the original flow paths were.



**Figure 8** Keimoes drainage lines

The only part of this original sub-catchment of concern is the land around the eastern tributary of the original drainage line system. It is only 314ha in size. For the sake of this discussion it is named the adjacent sub-catchment.

Approximately half of the proposed housing development is located in this adjacent part of the sub-catchment (Figure1).

The drainage line of the adjacent sub-catchment, still faintly visible on the Google Earth Image, where it passes through the urban area, has been impacted, obliterated. It just misses the south eastern corner of the new housing development.

Downstream from the proposed housing development, towards the N14 trunk road, all that remained of the original system are a number of faint drainage lines out of a broad area of sand deposition that each disappear where the vineyards start.



## 7 Runoff

If the very scarce, but quite possible heavy rainfall event occurs of 40mm in 24 hours, this very large sub-catchment of 31 000ha theoretically generates a runoff of 12.4 million m<sup>3</sup>. If only a fraction of this reaches the point of discharge at the Orange River, it would be a significant flow capable of doing damage to infrastructure.

This explains the very long railway bridge with plenty of room underneath to accommodate these occasional large floods (Figure 9). Likewise, the N14 road bridge just downstream from the railway bridge is an equally sturdy structure (Figure 10).

These large floods are responsible for maintaining the integrity of the drainage lines. If it were not for these flows, the drainage lines would probably fill in with wind-driven sand.

Sand mobilized by flood water is deposited downstream that typically creates these wide floodplains lower down the catchment. Mobilized and deposited sand often makes it difficult to “read” the boundary between sub-catchments and in which direction the next flood will head, also because the land is very flat, with the elevation staying the same over a large swat of land.

The size of that part of the sub-catchment directly upstream of the housing development is small and the possibility of floods is remote.

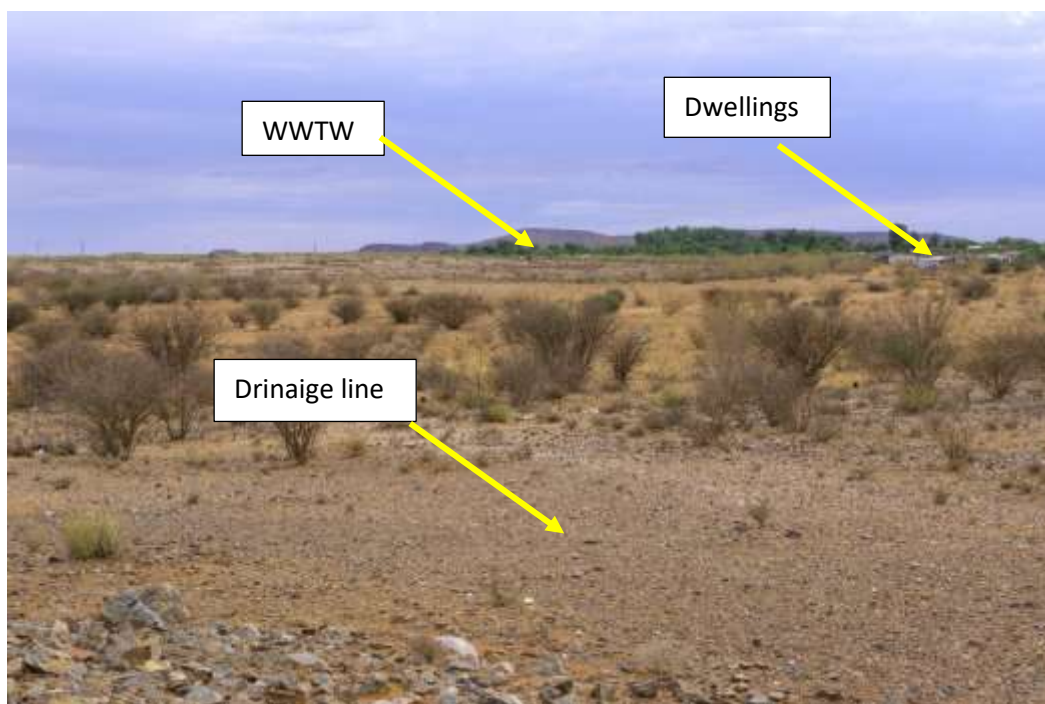


**Figure 9** Railway Bridge



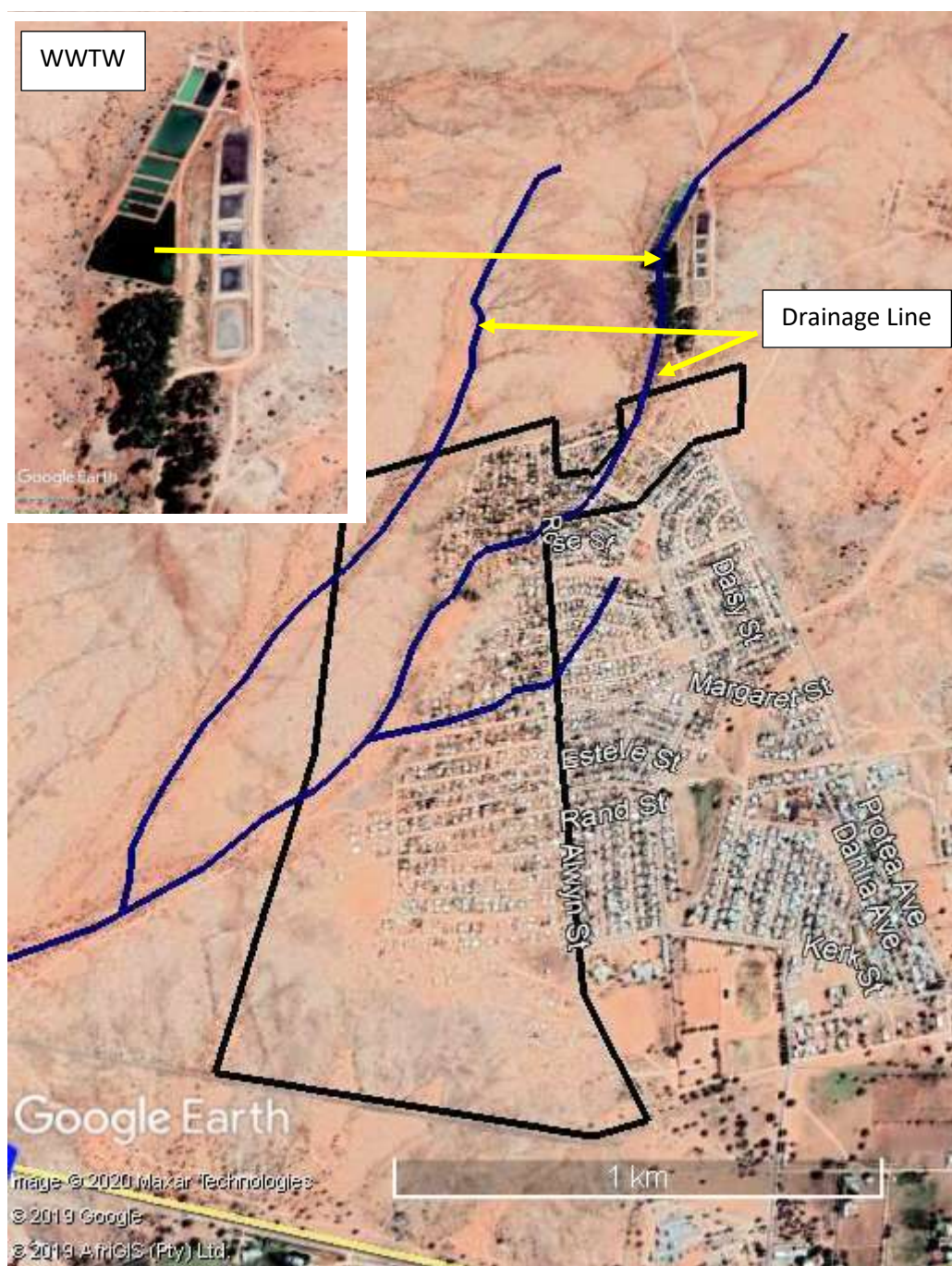
**Figure 10** N14 Road Bridge.

## **8 Wastewater Treatment Works**



**Figure 11** WWTW and dwellings





**Figure 12 Wastewater Treatment Works Drainage**

The Keimoes WWTWs (Figure 11 and 12) is located adjacent and just to the north of the proposed housing development. This is an anaerobic pond system. It was constructed in a drainage line. This drainage line passes through the proposed housing development (Figure 12, details supplied by Macroplan).

The distance between the last active ponds and the first houses is less than 400m.

There are problems at the WWTW. Reportedly, spills occur from time to time, to the discomfort of the existing residents in the already built-up part of the proposed housing. Obviously, these problems need to be addressed, probably by constructing a proper and formalized drainage channel, where the drainage line is today.

Better still, an extra pond should be constructed large enough to contain spills, instead of letting partly treated sewage down the drainage line and through the housing. That is if the entire works in not in need of upgrading.

The other drainage lines running though the proposed development, as indicated in Figure 1, should be channelized as well, to contain storm water in the event of a high rainfall event.

## 9 Existing Housing



**Figure 13** Existing Housing





**Figure 14** Existing housing Continued



**Figure 15** New dwellings

Existing housing in the proposed housing scheme is mostly of the informal type (Figure 13) Some residents have built themselves proper houses with brick and mortar (Figure 14).

New informal dwellings (Figure 15) are constructed on a daily basis.

Litter (Figure 1) is an enormous problem, with current clean-up services clearly not coping, apart from inadequate community awareness levels that is not helpful.

## **10 Biomonitoring the Lower Orange River**

The biomonitoring was carried out according to the description of Dickens & Graham (2002).

Biomonitoring was carried out on the Lower Orange River during site visits for successive WULAs. So far 10 samples have been analyzed at 9 localities (Table 1). The site furthest east was at Hopetown and furthest west at Augrabies, with Upington in the middle. All of these are located upstream of the Augrabies Falls.

Another sample was analyzed at Styerkraal just east of the border post of Onseepkans downstream of the Augrabies Falls.

The river is mostly braided, with many smaller streams and with islands in the middle. The river sports many rapids and riffles, but also pool-like features where the river is broad and slower flowing.

The bottom is mainly muddy, with some large rocky outcrops in the middle of the river.

## **11 Impacts on the Lower Orange River**

The river is heavily utilized for agriculture, with the banks entirely modified into cultured vineyards. A multitude of large electric water pumps have been placed in the river for abstracting large volumes of water for irrigation. Abstraction significantly lowers the flow in the river.

Berms for the purpose of flood protection have been constructed on the banks of the river for most of its length. These berms have been constructed by the Department of Water Affairs and now have been a feature of the landscape for many decades. The berms keep flood water out of adjacent agricultural land and has denaturalised the riparian zone.

The single most impact on the Orange River are the two very large dams, The Gariep Dam and the Vanderkloof Dam. The river flow has been modified to a much even regime, different from the varied flow with high peak flows and low drought flows.

The Lower Orange River is lined with a dense system of mostly dry drainage lines. These drainage lines only flow during and shortly after heavy rains. Their contribution to the flow of the Orange River is insignificant. Most of the flow comes from the Lesotho Highlands and some from the Vaal River. However, many of these drainage lines have been transformed into engineered agricultural return flow furrows that carries the excess of over irrigation back to the Orange River. Agricultural return flow adds much to the nutrient load of the Orange River because runoff contains fertilizer.



Nitrogen is added in large quantities. Since phosphorus readily binds to the soil, not much phosphorus is added.

Return flow can contain a heavy silt load, thereby elevating turbidity in the river.

It is suspected that pesticides in agricultural return flow have a heavy impact on biomonitoring results, significantly reducing the SASS5 score.

The banks of the Orange River in the area is densely overgrown with Spaanse Riet (*Arundo donax*). This is classified as an aggressive and exotic invasive plant, which effectively prevents access to the river. The reeds result in a homogeneous aquatic habitat. This lack of variation suppresses the SASS5 score, with only a limited number of aquatic macroinvertebrate species present in this habitat.

## 12 Lower Orange River Biomonitoring Results

The biomonitoring results have been captured in Table 1 and depicted in Figure 16.

The classes from A to F in Figure 1 has been assigned for mature rivers on flood plains such as the Lower Orange River.

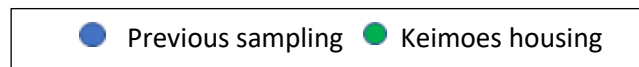
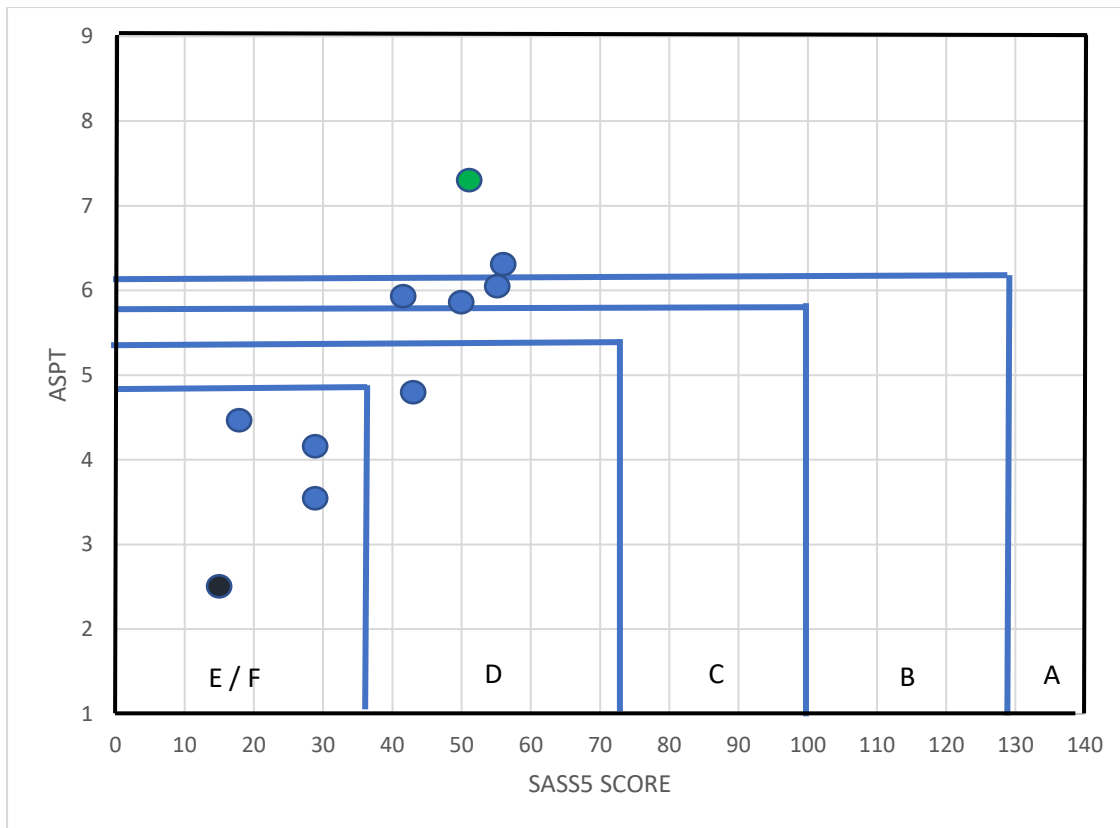
Only 2 of the samples were classified a good and relatively unimpacted (Class A). Four were in Class B and C, which can be regarded as acceptable under the circumstances of an impacted river reach. These classes can possible be labelled as the ideal, a compromise between agriculture and aquatic ecological functioning.

Four samples were poor (Classes E and F), an undesirable state of affairs.

The one sample downstream of the Augrabies Falls was extremely poor.

**Table 1** Biomonitoring in the Lower Orange River

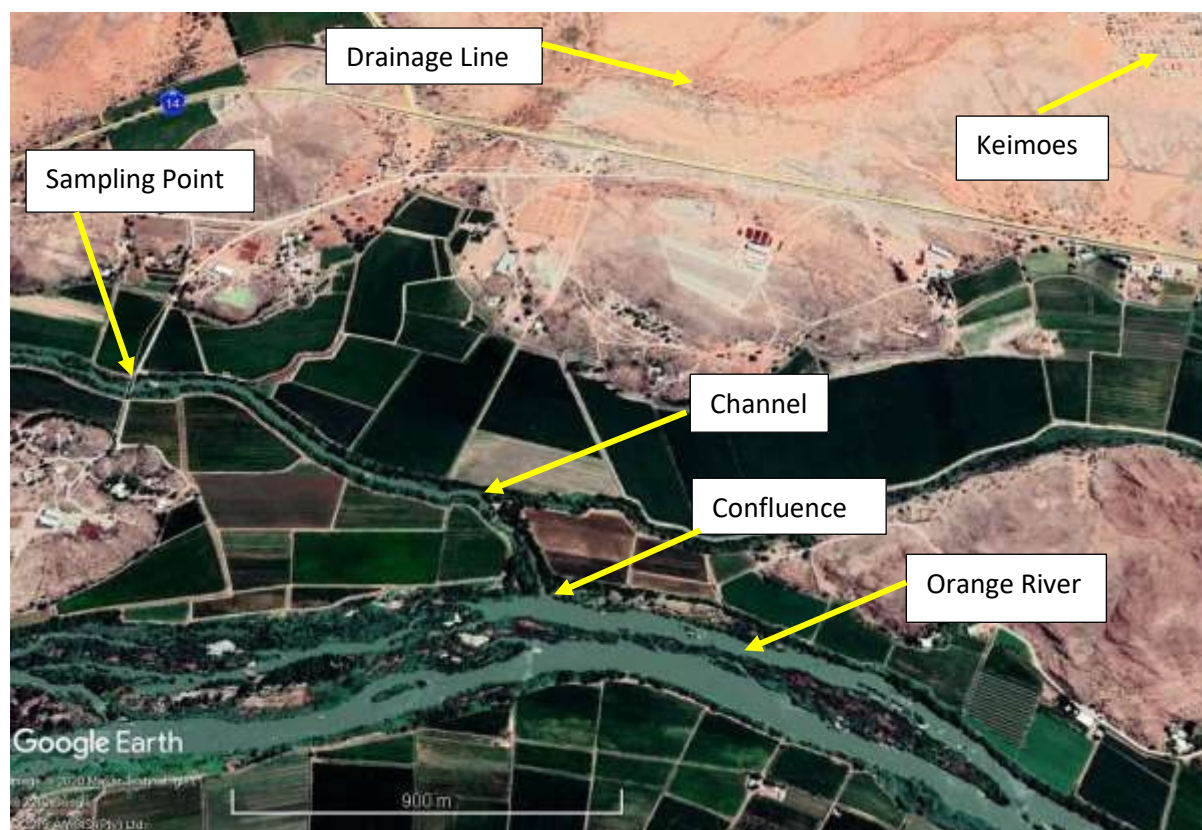
Locality	Coordinates	Date	SASS 5	No Taxa	ASPT
Augrabies Lair trust	28°38'41.53S 20°26'08.49E	5/09/17	18	4	4.5
Augrabies Lair Trust	28°38'41.53S 20°26'08.49E	5/10/17	43	9	4.8
Grobbershoop	28°52'31.80S 21°59'13.49E	14/8/18	41	7	5.9
Kakamas Triple D	28°45'08.37S 20°35'06.16E	15/8/18	50	9	5.6
Hopetown Sewer	29°36'05.07S 24°06'05.00E	7/10/18	29	7	4.1
Hopetown Sewer	29°36'08.06S 24°21'06.16E	7/10/18	29	8	3.6
Keimoes Housing	28°42'37.12S 20°55'07.81E	8/02/19	51	7	7.3
Upington Erf 323	28°27'11.91S 21°16'14.02E	12/2/19	56	9	6.2
Upington Affinity	28°27'11.91S 21°16'14.02E	20/5/19	54	9	6
Styerkraal	28°27'25.28S 21°15'01.87E	21/5/19	15	6	2.5



Integrity Class	Description
A	Pristine; not impacted
B	Very Good; slightly impacted
C	Good; measurably impacted with most ecological functioning intact
D	Fair; impacted with some loss of ecological functioning
E	Poor; loss of most ecological function
F	Very Poor; loss of all ecological function

**Figure 16** Lower Orange River Biomonitoring Results

### 13 Keimoes Biomonitoring



**Figure 17** Sampling Point

The sampling point for biomonitoring was chosen as close as possible to the confluence of the drainage line with the Orange River (Figure 17). This is where the new housing development would have an impact, if approved. These two points were 350m apart.

Access to the river was a consideration, which was made possible by a road to a bridge (Figure 18). This bridge was over a side channel of the Orange River. The road and bridge led to a large island, cut off from the main land by the channel. The channel flows back into the Orange River 8.7km downstream, as the crow flies.

The river at the sampling points was fast flowing,  $1\text{ms}^{-1}$  and more in the middle, slower on the sides. It was overgrown with spaanse riet *Arundo donax* and a willow tree *Salix* sp., probably *S. babylonica* (Figure 19). The river here was a homogeneous, fast-flowing channel without any features such as rapids and natural bedrock.

Access to the water was allowed over the pipes from the pump installation on the river's bank (Figure 20). The river here became deep quite abruptly that rendered sampling hazardous.

The substrate on the bottom was muddy. The bridge's pylons and the pipes where taken as bedrock, for the purpose of sampling and habitat diversity.



**Figure 18** Bridge



**Figure 19** Vegetation at sampling point





**Figure 20** Irrigation pipes

**Table 2** Water Quality

Parameter	Value
Dissolved Oxygen $\text{mg l}^{-1}$	5.8
Temperature $^{\circ}\text{C}$	27.5
pH	8.2
Electrical conductivity $\text{mSm}^{-1}$	34

**Table 3** Biomonitoring Score

Parameter	Score
SASS5 score	51
Number of taxa	7
ASPT	7.3

The oxygen concentration (Table 2) was rather low on the day of sampling, which is not unusual for such a high temperature of more than 27 degrees centigrade. The oxygen concentration was still high enough to support a varied macro-invertebrate fauna.

The electrical conductivity indicated that the water was fresh, without much saltiness.

The pH was slightly on the alkaline side, but not enough to have an impact on the score. But then a purposeful effort with the sampling collection net only rendered 7 taxa.

The SASS5 score (Table 3) was 51, which was quite high for such a homogeneous habitat, with only a little submerged vegetation, emerging vegetation, muddy bottom and bedrock, impacted by surrounding vineyards. In fact, it rendered an “A” classification (Figure 16), which was much better than the rest of samples that were taken by WATSAN along the Orange River for the purpose of comparison. This is perhaps unusual and it can be expected that the score will be lower during follow-up sampling rounds.

It is not expected that the proposed housing development will significantly lower the score at the sampling point, unless something disastrous happens, such as a large sewage spill during a high rainfall event.

## 14 Present Ecological State

The PES is a protocol that have been produced by Dr Neels Kleynhans (Table 4, 5 and 6) in 1999 of the then DWAF to assess river reaches. The scores given are solely that of the practitioner and are based on expert opinion.

**Table 4** Habitat Integrity according to Kleynhans, 1999

Category	Description	% of maximum score
A	Unmodified, natural	90 – 100
B	Largely natural with few modifications. A small change in natural habitats and biota, but the ecosystem function is unchanged	80 – 89
C	Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged	60 – 79
D	Largely modified. A significant loss of natural habitat, biota and ecosystem function.	40 – 59
E	Extensive modified with loss of habitat, biota and ecosystem function	20 – 39
F	Critically modified with almost complete loss of habitat, biota and ecosystem function. In worse cases ecosystem function has been destroyed and changes are irreversible	0 - 19

The larger drainage line and its catchment (31 000ha) is for most of its surface area still in a near-pristine condition. The proposed Keimoes housing scheme in the south eastern corner covers only 0.16% of the sub-catchment. The sub-catchment is heavily impacted along the Orange River, with the drainage line entirely transformed into irrigation return flow canals and with most of its original ecological functioning lost. This stark contrast complicates the PES evaluation. Cattle and sheep in the sub-catchment were regarded as exotic fauna. There is a patch of exotic blue gum trees around and downstream of the WWTW. Water quality is affected by the WWTW and the large-scale agriculture.

The assessment of the much smaller adjacent drainage line rendered an entirely different result as the proposed development is 16.9% of the total surface area and as

much of the adjacent sub-catchment has already been developed. Moreover, the lower part of the adjacent sub-catchment makes up a much larger portion and is entirely transformed.

The reason that it did not score much lower than it did is because there is little if any water abstraction from the drainage line. A classification of C for both instream and riparian are probably a class too high for the conditions on the ground. In these arid environments the scope for water abstraction is limited and it should weigh much less for this specific assessment.

**Table 5** Present Ecological State of the larger drainage line

Instream				Maximum
	Score	Weight	Product	score
Water abstraction	24	14	336	350
Flow modification	18	13	234	325
Bed modification	18	13	234	325
Channel modification	17	13	221	325
Water quality	22	14	308	350
Inundation	19	10	190	250
Exotic macrophytes	22	9	198	225
Exotic fauna	15	8	120	200
Solid waste disposal	16	6	96	150
Total		100	1937	2500
% of total			77.5	
Class			C	
Riparian				
Water abstraction	24	13	312	325
Inundation	19	11	209	275
Flow modification	18	12	216	300
Water quality	22	13	286	325
Indigenous vegetation removal	22	13	286	325
Exotic vegetation encroachment	22	12	264	300
Bank erosion	23	14	322	350
Channel modification	17	12	204	300
Total			2099	2500
% of total			84.0	
Class			B	



**Table 6** Present Ecological State of the adjacent drainage line

Instream				
	Score	Weight	Product	Maximum score
Water abstraction	24	14	336	350
Flow modification	8	13	104	325
Bed modification	9	13	117	325
Channel modification	8	13	104	325
Water quality	10	14	140	350
Inundation	5	10	50	250
Exotic macrophytes	18	9	162	225
Exotic fauna	4	8	32	200
Solid waste disposal	4	6	24	150
Total		100	1069	2500
% of total			42.8	
Class			C	
Riparian				
Water abstraction	24	13	312	325
Inundation	5	11	55	275
Flow modification	8	12	96	300
Water quality	12	13	156	325
Indigenous vegetation removal	4	13	52	325
Exotic vegetation encroachment	18	12	216	300
Bank erosion	23	14	322	350
Channel modification	8	12	96	300
Total			1305	2500
% of total			52.2	
Class			C	

The proposed housing development is not about to change the classification of the larger sub-catchment. The development's surface area as a part of the whole is too small to have a significant impact. Unless a mishap such as a major sewage spill happens, but only if the WWTW is upgraded into a much larger plant capable of larger spills.

It can be expected that the classification of the smaller adjacent sub-catchment will be adjusted to a lower class, once the new expansion of the housing takes hold. The question can be asked if it really matters, because there is little if any of the original ecological function left and that not much more can be lost if impacts increase.

## 15 Ecological Importance

The Ecological Importance (EI) is based on the presence of especially fish species that are endangered on a local, regional or national level (Table 7).

There are no fish the drainage lines, as there is no permanent water. According to this assessment, which is prescribed for WULA's, the drainage lines are not important. Neither were any other organisms observed during the site visit that could be described as endangered.

**Table 7** Ecological Importance according to endangered organisms (Kleynhans, 1999).

Category	Description
1	One species or taxon are endangered on a local scale
2	More than one species or taxon are rare or endangered on a local scale
3	More than one species or taxon are rare or endangered on a provincial or regional scale
4	One or more species or taxa are rare or endangered on a national scale (Red Data)

## 16 Ecological Sensitivity

Ecological Sensitivity (ES) is often described as the ability of aquatic habitat to assimilate impacts. It is not sensitive if it remains the same despite of the onslaught of impacts. Put differently, sensitive habitat changes substantially, even under the pressure of slight impacts.

The Ecological Sensitivity also refers to the potential of aquatic habitat to bounce back to an ecological condition closer to the situation prior to human impact. If it recovers, it is not regarded as sensitive.

The drainage lines will predictably not recover to anything resembling their original, un-impacted state, despite the housing development being removed. Once developed, it is most unlikely that the houses and streets will ever be removed.

From this perspective, the aquatic environment and its surrounds can be regarded as ecologically sensitive.

## **17 Possible Impacts**

The impacts of the new housing development would be severe on the aquatic environment and surrounds, as all housing development do. The smaller, fainter drainage lines would inevitably make way for streets and houses and the larger more prominent ones will have to be canalised with formal structures to accommodate any flood water during large rainfall events.

## **18 Mitigation Measures**

The footprint of the proposed housing scheme should be kept as small as possible. Construction vehicles and building material should be kept inside of the demarcated development area and not be allowed onto adjacent land.

Loose sediments, rubble and building material should not be allowed to wash down the catchment during rainfall events.

Litter collection systems should be installed in the drainage lines downstream of the new housing scheme. Litter that accumulates here should be regularly collected and disposed of properly on the municipal waste disposal site.

Protection measures should be put in place to conserve those drainage lines of the larger sub-catchment that are relatively untouched and still in a reasonably good state. Trampling by cattle and goats, as well as humans, is always a concern in similar developments.

Leaky sewerage and potable water provision systems can change the arid state of the drainage lines and surrounds. Leaks should be prepared as not to change the status of the aquatic environment.

## **19 Impact Assessment**

Some of the decision-making authorities prescribe an impact assessment according to a premeditated methodology (Table 26.1, Appendix).

The main benefit of this exercise is that it allows for the evaluation of mitigation measures. Later follows the Risk Matrix. This is different from the Impact Assessment as it does not attempt to weigh the success of mitigation measures.

The results of the impact assessment are given in Table 8.

Like with most urban developments, the impact on the aquatic environment is definite and severe. In this case mitigation measures are not about to make a difference.

Environmental authorities will have to decide if the little and degraded aquatic habitat that was and probably still is available on the site is worth saving, instead of giving the go-ahead for the proposed development.

It is surmised that the aquatic habitat that consists of already degraded drainage lines do not have adequate conservation value prevent the proposed urban development.

The inefficiency of mitigation should therefore not be a consideration. The best that can be done is to ensure that the near-pristine drainage lines adjacent to the new housing scheme are not impacted.

**Table 8 Impact Assessment**

<b>Description of impact</b>  Clearing of the site Construction of roads Trenching of potable water supply and sewage lines Trenching of electricity supply Construction of houses Landscaping of terrain Removal of vegetation Destruction of aquatic habitat, drainage lines								
<b>Mitigation measures</b>  Do not disturb any land outside of designated site Construct outside of rainy season Construct underground storm water system.								
Type Nature	Spatial Extent	Severity	Duration	Significance	Probability	Confidence	Reversibility	Irreplaceability
Without mitigation								
Direct	Local	High	Permanent	High	Definite	Certain	Irreversible	Irreplaceable
With mitigation measures								
Direct	Local	High	Permanent	High	Definite	Certain	Irreversible	Irreplaceable

## 20 Risk Matrix

The assessment was carried out according to the interactive Excel table that is available on the DWS webpage. Table 9 is a replica of the Excel spreadsheet that has been adapted to fit the format of this report.

The purpose of the Risk Matrix is to determine if a General Authorisation of a License is applicable.

The methodology is set out in the Appendix. It has been copied directly out of the DWS webpage.



**Table 9 Risk Matrix**

No.	Activity	Aspect	Impact	Significance	Risk Rating
1	Clearing of the site Construction of roads Trenching of potable water supply and sewage lines Trenching of electricity supply Construction of houses Landscaping of terrain	Mobilise sediments	Sediment deposition of downstream drainage lines. Altering of habitat	32,5	Low
2	Hardening of urban surfaces	Alter flow regime	Altering aquatic habitat	45	Low
3.1	Habitation of new housing scheme	Litter	Litter in drainage line	40	Low
3.2		Trampling	Altering of drainage lines	47.5	Low

**Table 9 Continued Risk Rating**

No	Flow	Water Quality	Habitat	Biota	Severity	Spatial scale	Duration	Consequence
1	1	2	1	1	1.25	1	1	3.25
2	2	2	1	1	1.5	1	2	4.5
3.1	1	1	1	1	1	1	2	4
3.2	1	1	3	2	1.75	1	2	4.75

No	Frequency of activity	Frequency of impact	Legal issues	Detection	Likelihood	Significance	Risk Rating
1	2	2	5	1	10	32.5	Low
2	2	2	5	1	10	45	Low
3.1	2	2	5	1	10	40	Low
3.2	2	2	5	1	10	47.5	Low

The following assumptions were made for the completion of the Risk Matrix:

- Since the housing development would destroy aquatic habitat, it would serve no purpose to assess the area that is about to be destroyed. The outcome is predictable. It would inevitably result a “Medium” or “High” rating.
- Moreover, a direct environmental risk will predictably render a rating of high, for which a License is required. To expect the DWS head office in Pretoria to produce a License for each and every small housing development in the country would prove an enormous task, untenable, an impossible situation.
- It is assumed that the decision-making authorities will decide that the sacrifice of the aquatic habitat is permissible for the sake of providing essential housing.
- In this event, at Keimoes, the sacrifice will be small, as the area to be developed forms a miniscule part of the available sub-catchment area.
- The assessment should made provision for the fact that the affected parts of the sub-catchments are already heavily impacted.
- The assessment is best done on the drainage lines and aquatic habitat downstream and adjacent of the proposed housing scheme, as this is the only area that can realistically be assessed, given the nature of most housing developments.
- For the construction phase, the frequency of activity and the frequency of the impact, it can be reasoned that it only once, only during construction, after which it ends.
- It can be reasoned that the diversion of flow only happens during very occasional rainfall events, once in several years, during the operational phase, post-construction, of the development. The impact is permanent and would last in perpetuity. However, the altering of the flow regime will make little if any difference to the downstream PES.

These conditions and assumptions are in a high degree valid for all of the new housing developments in the arid areas in the Northern Cape.

The environmental risk, given these assumptions, came out as “Low”.

Hence, it is recommended that a General Authorization is granted for this proposed housing development. A License is not required.

## 21 Resource Economics

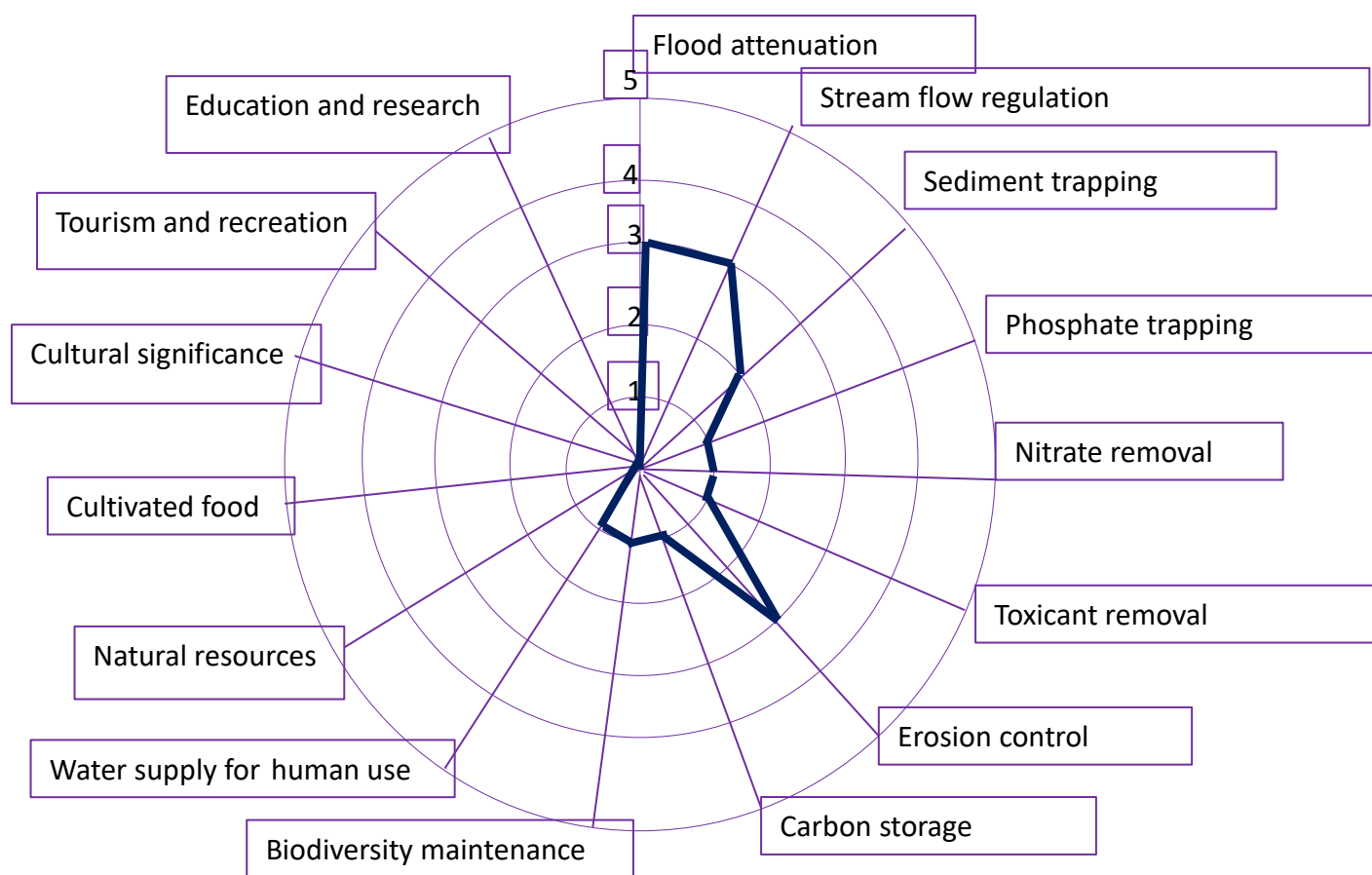
The goods and services delivered by the environment, in this case the drainage lines, is a Resource Economics concept as adapted by Kotze *et al* (2009). The methodology was designed for the assessments of wetlands, but in the case of these environments, the goods and services delivered are particularly applicable, hence it was decided to include it in the report.

The diagram (Figure 21 and 22) is an accepted manner to visually illustrate the resource economic footprint the drainage line, from the data in Table 10. The size of the star shape is important. Large star shape will attract the attention of the decision-making authorities.

**Table 10.** Goods and Services

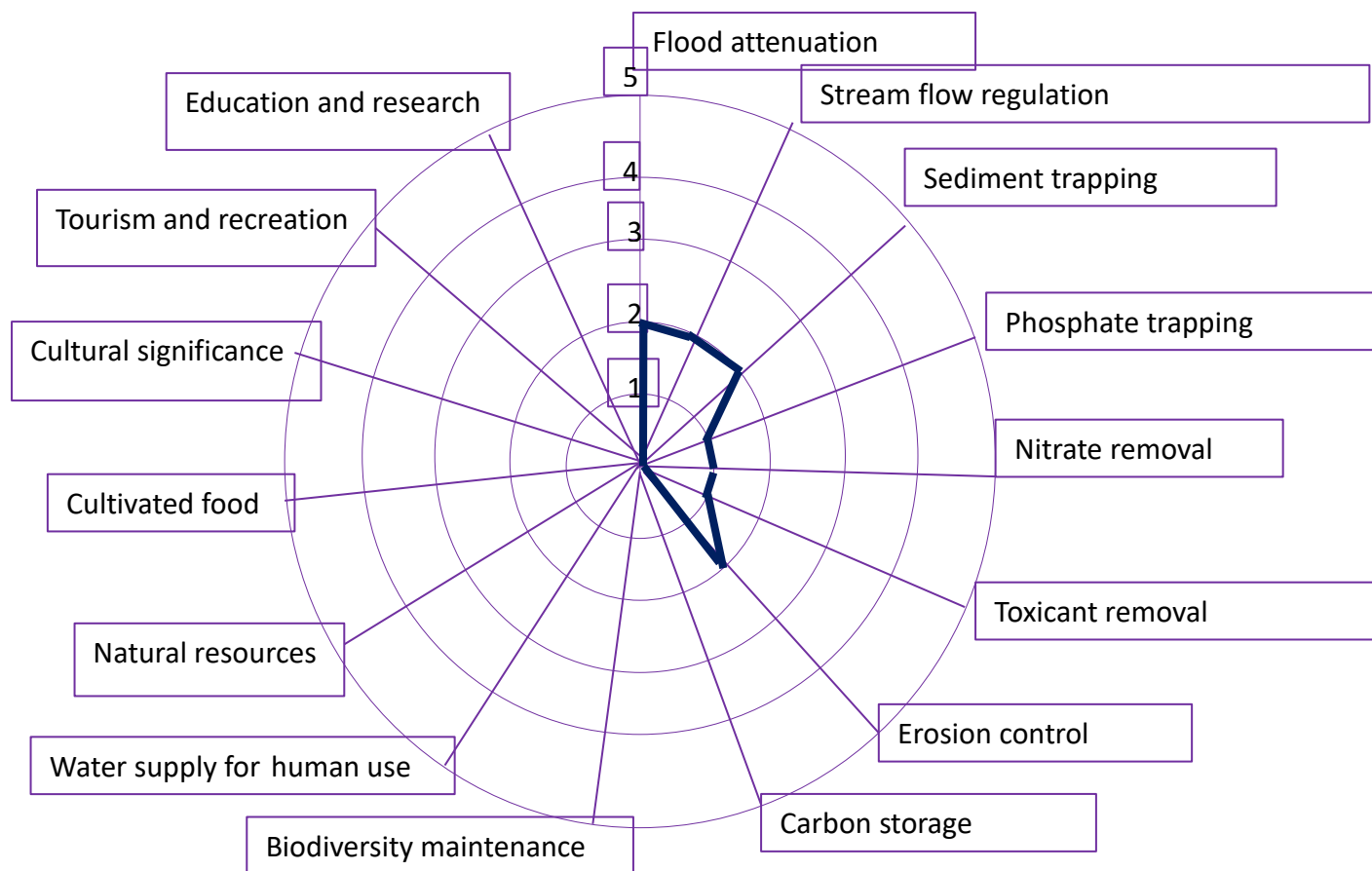
Goods & Services	Drainage Line Large Catchment	Drainage Line Adjacent Catchment
Flood attenuation	3	2
Stream flow regulation	3	2
Sediment trapping	2	2
Phosphate trapping	1	1
Nitrate removal	1	1
Toxicant removal	1	1
Erosion control	3	2
Carbon storage	1	0
Biodiversity maintenance	1	0
Water supply for human use	0	0
Natural resources	0	0
Cultivated food	0	0
Cultural significance	0	0
Tourism and recreation	0	0
Education and research	0	0

Again, these assessments were carried out for only the drainage lines directly downstream of the proposed housing scheme.



**Figure 21.** Resource Economics Footprint of the Larger Drainage Lines





**Figure 22.** Resource Economics Footprint of the Adjacent Drainage Lines

The star shapes of these spider diagrams are small to very small. The environmental goods and services of the drainage lines are extremely limited. As the houses and streets are constructed, the environmental services will decrease even more.

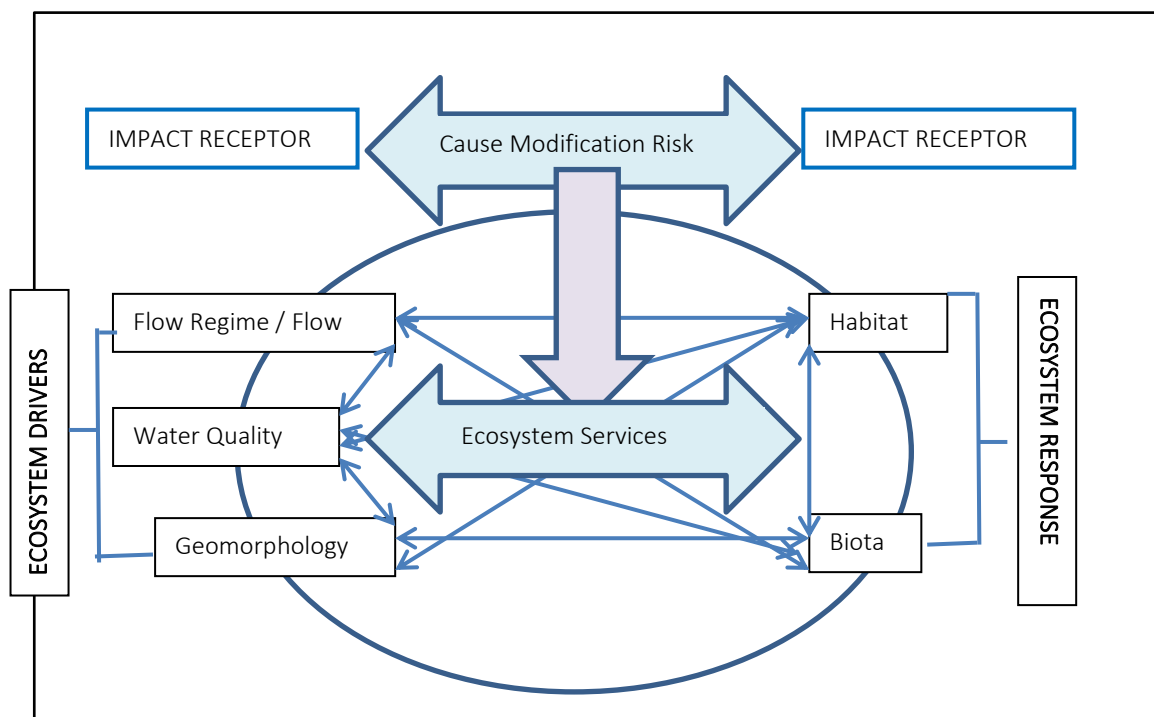
Not much will be lost in terms of services because of the proposed housing scheme.

## 22 Conclusions

An anthropogenic activity can impact on any of the ecosystem drivers or responses and this can have a knock-on effect on all of the other drivers and responses. This, in turn, will predictably impact on the ecosystem services (Figure 23). The WULA and the EAI must provide mitigation measured for these impacts.

Figure 23 has been adapted from one of the most recent DWS policy documents.

The driver of the mostly dry drainage lines is the occasional flood that follows sudden and intense rainfall events. This is followed by prolonged droughts and intense summer heat that prevents the development of any viable aquatic habitat. This is apart from shallow ground water that explains the growth of vegetation along the drainage lines.



**Figure 23** Minimum Requirements for a S21(c) and (i) Application

The proposed urban development will entirely alter the drainage lines. The lines would be replaced with streets and houses. As the aquatic habitat is insignificant, this does not indicate a loss of aquatic ecosystem functioning.

The conservation of drainage lines along the Lower Orange River deserves and demands attention by decision-making authorities, environmental practitioners, the conservation and farming community alike. As more of these drainage lines are impacted upon, and because impacts are radical by nature, because sections of drainage lines are replaced by vineyards or other forms of agriculture, or transformed

into return flow infrastructure, or housing schemes, the necessity for a widely accepted conservation policy becomes urgent as development escalates.

A percentage of still unimpacted drainage lines should be identified, prioritised and set aside for conservation. Only specified practices with no or limited impacts should be allowed in these sub-catchments and their drainage lines.

A General Authorization is the appropriate level of approval for this particular WULA. A License is not called for.

## 23 References

Dickens, CWS & PM Graham. 2002. *The South African Scoring System (SASS) Version 5 Rapid Bioassessment*. African Journal of Aquatic Science 2002, 27: 1–10.

Kleynhans, C.J. 1999. *Assessment of Ecological Importance and Sensitivity*. Department of Water Affairs and Forestry. Pretoria.

Kotze, G., G. Marneweck, A. Batchelor, D. Lindley & Nacelle Collins. 2009. *A technique for rapidly assessing ecosystem services supplied by wetlands*. Water Research Commission, Pretoria.

Mucina, L. & M. Rutherford. 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19: 1 – 2019. SANBI, Pretoria

## 24 Declaration of Independence

I, Dirk van Driel, as the appointed independent specialist hereby declare that I:

- Act/ed as the independent specialist in this application
- Regard the information contained in this report as it relates to my specialist input/study to be true and correct and;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management act;
- Have and will not have vested interest in the proposed activity;
- Have disclosed to the applicant, EAP and competent authority any material information have or may have to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the environmental Impact Assessment Regulations, 2010 and any specific environmental management act.
- Am fully aware and meet the responsibilities in terms of the NEMA, the Environmental Impacts Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R543) and any specific environmental management act and that failure to comply with these requirements may constitute and result in disqualification;
- Have ensured that information containing all relevant facts on respect of the specialist input / study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties facilitated in such a manner that all interested and affected parties were provided with reasonable opportunity to participate and to provide comments on the specialist input / study;
- Have ensured that all the comments of all the interested and affected parties on the specialist input were considered, recorded and submitted to the competent authority in respect of the application;
- Have ensured that the names of all the interested and affected parties that participated in terms of the specialist input / study were recorded in the register of interested and affected parties who participated in the public participation process;
- Have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable or not and;
- Am aware that a false declaration is an offence in terms of regulation 71 of GN No. R543.

Signature of the specialist:



31 January 2020



## 25 Résumé

**Dr Dirk van Driel**  
PhD, MBA, PrSciNat, MWISA  
**Water Scientist**

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### Experience

<b>WATSAN Africa</b> , Cape Town. Scientist	<b>2011 - present</b>
<b>USAID/RTI, ICMA &amp; Chemonics.</b> Iraq & Afghanistan Program manager.	<b>2007 -2011</b>
<b>City of Cape Town</b> Acting Head: Scientific Services, Manager: Hydrobiology.	<b>1999-2007</b>
<b>Department of Water &amp; Sanitation, South Africa</b> Senior Scientist	<b>1989 – 1999</b>
<b>Tshwane University of Technology, Pretoria</b> Head of Department	<b>1979 – 1998</b>
<b>University of Western Cape and Stellenbosch University 1994- 1998</b> part-time <ul style="list-style-type: none"><li>- Lectured post-graduate courses in Water Management and Environmental Management to under-graduate civil engineering students</li><li>- Served as external dissertation and thesis examiner</li></ul>	

### Service Positions

- Project Leader, initiator, member and participator: Water Research Commission (WRC), Pretoria.
- Director: UNESCO West Coast Biosphere, South Africa
- Director (Deputy Chairperson): Grotto Bay Home Owner's Association
- Member Dassen Island Protected Area Association (PAAC)

### Membership of Professional Societies

- South African Council for Scientific Professions. Registered Scientist No. 400041/96
- Water Institute of South Africa. Member
- South African Wetland Society

## Reports

- Process Review Kathu Wastewater Treatment Works
- Effluent Irrigation Report Tydstroom Abattoir Durbanville
- River Rehabilitation Report Slangkop Farm, Yzerfontein
- Fresh Water and Estuary Report Erf 77 Elands Bay
- Ground Water Revision, Moorreesburg Cemetery
- Fresh Water Report Delaire Graff Estate, Stellenbosch
- Fresh Water Report Quantum Foods (Pty) Ltd. Moredou Poultry Farm, Tulbagh
- Fresh Water Report Revision, De Hoop Development, Malmesbury
- Fresh Water Report, Idas Valley Development Erf 10866, Stellenbosch
- Wetland Delineation Idas Valley Development Erf 10866, Stellenbosch
- Fresh Water Report, Idas Valley Development Erf 11330, Stellenbosch
- Fresh Water Report, La Motte Development, Franschhoek
- Ground Water Peer Review, Elandsfontein Exploration & Mining
- Fresh Water Report Woodlands Sand Mine Malmesbury
- Fresh Water Report Brakke Kuyl Sand Mine, Cape Town
- Wetland Delineation, Ingwe Housing Development, Somerset West
- Fresh Water Report, Suurbraak Wastewater Treatment Works, Swellendam
- Wetland Delineation, Zandbergfontein Sand Mine, Robertson
- Storm Water Management Plan, Smalblaar Quarry, Rawsonville
- Storm Water Management Plan, Riverside Quarry
- Water Quality Irrigation Dams Report, Langebaan Country Estate
- Wetland Delineation Farm Eenzaamheid, Langebaan
- Wetland Delineation Erf 599, Betty's Bay
- Technical Report Bloodhound Land Speed Record, Hakskeenpan
- Technical Report Harkerville Sand Mine, Plettenberg Bay
- Technical Report Doring Rivier Sand Mine, Vanrhynsdorp
- Rehabilitation Plan Roodefontein Dam, Plettenberg Bay
- Technical Report Groenvlei Crusher, Worcester
- Technical Report Wiedouw Sand Mine, Vanrhynsdorp
- Technical Report Lair Trust Farm, Augrabies
- Technical Report Schouwtoneel Sand Mine, Vredenburg
- Technical Report Waboomsrivier Weir Wolseley
- Technical Report Doornkraal Sand Mine Malmesbury
- Technical Report Berg-en-Dal Sand Mine Malmesbury
- Wetland Demarcation, Osdrif Farm, Worcester
- Technical Report Driefontein Dam, Farm Agterfontein, Ceres
- Technical Report Oewerzicht Farm Dam, Greyton
- Technical Report Glen Lossie Sand Mine, Malmesbury
- Preliminary Report Stellenbosch Cemeteries
- Technical Report Toeka & Harmony Dams, Houdenberg Farm, Koue Bokkeveld
- Technical Report Kluitjieskraal Sand & Gravel Mine, Swellendam
- Fresh Water Report Urban Development Witteklip Vredenburg
- Fresh Water Report Groblershoop Resort, Northern Cape
- Fresh Water Report CA Bruwer Quarry Kakamas, Northern Cape
- Fresh Water Report, CA Bruwer Sand Mine, Kakamas, Northern Cape
- Fresh Water Report, Triple D Farms, Agri Development, Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Hopetown
- Fresh Water Report Hopetown Sewer
- Fresh Water Report Hoogland Farm Agricultural Development, Touws River

- Fresh Water Report Klaarstroom Waste Water Treatment Works
- Fresh Water Report Calvinia Sports Grounds Irrigation
- Fresh Water Report CA Bruwer Agricultural Development Kakamas
- Fresh Water Report Zwartfontein Farm Dam, Hermon
- Statement Delsma Farm Wetland, Hermon
- Fresh Water Report Lemoenshoek Farms Pipelines Barrydale
- Fresh Water Report Water Provision Pipeline Brandvlei
- Fresh Water Report Erf 19992 Upington
- Botanical Report Zwartejongensfontein Sand Mine, Stilbaai
- Fresh Water Report CA Bruwer Feldspath Mine, Kakamas
- Sediment Yield Calculation, Kenhardt Sand Mine
- Wetland Demarcation, Grabouw Traffic Center
- Fresh Water Report, Osdrift Sand Mine, Worcester
- Fresh Water Report, Muggievlag Storm Water Canal, Vredenburg
- Fresh Water Report, Marksman's Nest Rifle Range, Malmesbury
- Fresh Water Report Bruintjiesrivier Farm Dam, Bonnievale

## 26 Appendix

### 26.1 Biomonitoring Score Sheet

SASS5 Score Sheet										
Date	08 Feb 19	Taxon	Weight	Score	Taxon	Weight	Score	Taxon	Weight	Score
Locality	Orange River	Porifera	5		<b>Hemiptera</b>			<b>Diptera</b>		
	Keimoes	Coelenterata	1		Belostomatidae	3		Athericidae	10	
		Turbellaria	3		Corixidae	3		Blepharoceridae	15	
		Oligochaeta	1		Gerridae	5	5	Ceratopogonidae	5	
Coordinates	28°42' 37.12"	Huridinea	3		Hydrometridae	6		Chironomidae	2	
	20°55'07.81"	<b>Crustacea</b>			Naucoridae	7	7	Culicidae	1	
		Amphipodae	13		Nepidae	3		Dixidae	10	
DO mg/l	5.8	Potamonautidae	3		Notonectidae	3		Empididae	6	
Temperature °C	27.5	Atyidae	8	8	Pleidae	4		Ephydriidae	3	
pH	8.2	Palaemonidae	10		Veliidae	5		Muscidae	1	
EC mS/m	34	Hydracarina	8		<b>Megaloptera</b>			Psychodidae	1	
		<b>Plecoptera</b>			Corydalidae	10		Simuliidae	5	
SASS5 Score	51	Notonemouridae	14		Sialidae	8		Syrphidae	1	
Number of Taxa	7	Perlidae	12		<b>Trichoptera</b>			Tabanidae	5	
ASPT	7,3	<b>Ephemeroptera</b>			Dipseudopsidae	10		Tipulidae	5	
		Baetidae 1 sp	4		Ecmonidae	8		<b>Gastropoda</b>		
Other Biota	<i>Oreochromis</i>	Baetidae 2 sp	6	6	Hydropsychidae 1 sp	4		Ancylidae	6	
	<i>mossambica</i>	Baetidae >3 sp	12		Hydropsychidae 2 sp	6		Bulinidae	3	
	<i>Cyprinus carpio</i>	Caenidae	6		Hydropsychidae <2 sp	12		Hydrobiidae	3	
		Ephemeridae	15		Phylopotamidae	10		Lymnaeidae	3	
		Heptageniidae	13		Polycentropodidae	12		Physidae	3	
		Leptophlebiidae	9		Psychomyiidae	8		Planorbidae	3	
		Oligoneuridae	15		<b>Cased Caddis</b>			Thiaridae	3	
Comments		Polymitarcyidae	10		Barbarochthonidae	13		Viviparidae	5	
		Prosopistomatida	15		Calamoceratidae	11		<b>Pelecypoda</b>		
		Teloganodidae	12	12	Glossostomatidae	11		Corbiculidae	5	
		Trichorythidae	9		Hydroptilidae	6		Sphariidae	3	
		<b>Odonata</b>			Hydrosalpingidae	15		Unionidae	6	
		Calopterygidae	10		Leptostomatidae	10				
		Clorocyphidae	10		Leptoceridae	6				
		Chorolestidae	8		Petrothrincidae	11				
		Coenagrionidae	4		Pisulidae	10				
		Lestidae	8		Sericostomatidae	13				
		Platycnemidae	10		<b>Coleoptera</b>					
		Protoneuridae	8		Dyticidae	5	5			
		Aesthidae	8		Elmidae Dryopidae	8				
		Corduliidae	8	8	Gyrinidae	5				
		Gomphidae	6		Haliplidae	5				
		Libellulidae	4		Helodidae	12				
		<b>Lepidoptera</b>			Hydraenidae	8				
		Pyrilidae	12		Hydrophilidae	5				
					Limnichidae	10				
					Psephenidae	10				
Score				34			17			0



## 26.2 Methodology used in determining significance of impacts

The methodology to be used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives is provided in the following tables:

**Table 26.2.1** Nature and type of impact

Nature and type of impact	Description
Positive	An impact that is considered to represent an improvement to the baseline conditions or represents a positive change
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new negative factor
Direct	Impacts that result from the direct interaction between a planned project activity and the receiving environment / receptors
Indirect	Impacts that result from other activities that could take place as a consequence of the project (e.g. an influx of work seekers)
Cumulative	Impacts that act together with other impacts (including those from concurrent or planned future activities) to affect the same resources and / or receptors as the project

**Table 26.2.2** Criteria for the assessment of impacts

Criteria	Rating	Description
Spatial extent of impact	National	Impacts that affect nationally important environmental resources or affect an area that is nationally important or have macro-economic consequences
	Regional	Impacts that affect regionally important environmental resources or are experienced on a regional scale as determined by administrative boundaries or habitat type / ecosystems
	Local	Within 2 km of the site
	Site specific	On site or within 100m of the site boundary
Consequence of impact/ Magnitude/ Severity	High	Natural and / or social functions and / or processes are severely altered
	Medium	Natural and / or social functions and / or processes are notably altered
	Low	Natural and / or social functions and / or processes are slightly altered
	Very Low	Natural and / or social functions and / or processes are negligibly altered
	Zero	Natural and / or social functions and / or processes remain unaltered
Duration of impact	Temporary	Impacts of short duration and /or occasional
	Short term	During the construction period
	Medium term	During part or all of the operational phase
	Long term	Beyond the operational phase, but not permanently
	Permanent	Mitigation will not occur in such a way or in such a time span that the impact can be considered transient (irreversible)

**Table 26.2.3** Significance Rating

Significance Rating	Description
High	<p>High consequence with a regional extent and long-term duration</p> <p>High consequence with either a regional extent and medium-term duration or a local extent and long-term duration</p> <p>Medium consequence with a regional extent and a long-term duration</p>
Medium	<p>High with a local extent and medium-term duration</p> <p>High consequence with a regional extent and short-term duration or a site-specific extent and long-term duration</p> <p>High consequence with either local extent and short-term duration or a site-specific extent with a medium-term duration</p> <p>Medium consequence with any combination of extent and duration except site-specific and short-term or regional and long term</p> <p>Low consequence with a regional extent and long-term duration</p>
Low	<p>High consequence with a site-specific extent and short-term duration</p> <p>Medium consequence with a site-specific extent and short-term duration</p> <p>Low consequence with any combination of extent and duration except site-specific and short-term</p> <p>Very low consequence with a regional extent and long-term duration</p>
Very low	<p>Low consequence with a site-specific extent and short-term duration</p> <p>Very low consequence with any combination of extent and duration except regional and long term</p>
Neutral	Zero consequence with any combination of extent and duration

**Table 26.2.4** Probability, confidence, reversibility and irreplaceability

Criteria	Rating	Description
Probability	Definite	>90% likelihood of the impact occurring
	Probable	70 – 90% likelihood of the impact occurring
	Possible	40 – 70% likelihood of the impact occurring
	Unlikely	<40% likelihood of the impact occurring
Confidence	Certain	Wealth of information on and sound understanding of the environmental factors potentially affecting the impact
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact
Reversibility	Reversible	The impact is reversible within 2 years after the cause or stress is removed
	Irreversible	The activity will lead to an impact that is in all practical terms permanent
Irreplaceability	Replaceable	The resources lost can be replaced to a certain degree
	Irreplaceable	The activity will lead to a permanent loss of resources.



## 26.3 Risk Matrix Methodology

### RISK ASSESSMENT KEY (Referenced from DWA RISK-BASED WATER USE AUTHORISATION APPROACH AND DELEGATION GUIDELINES)

#### Negative Rating

TABLE 1- SEVERITY

How severe does the aspects impact on the environment and resource quality characteristics (flow regime, water quality, geomorphology, biota, habitat)

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means	

TABLE 2 – SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and/or REC not impacted
One month to one year, PES, EIS and/or REC impacted but no change in status
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation
Life of the activity, PES, EIS and/or REC permanently lowered
More than life of the organisation/facility, PES and EIS scores, a E or F

TABLE 4 – FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES

How is the activity governed by legislation?

No legislation
Fully covered by legislation (wetlands are legally governed)
Located within the regulated areas

TABLE 7 – DETECTION	
How quickly can the impacts/risks of the activity be observed on the environment (water resource)	
Immediately	
Without much effort	
Need some effort	
Remote and difficult to observe	
Covered	

TABLE 8: RATING CLASSES		
RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	(M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale
A low risk class must be obtained for all activities to be considered for a GA		

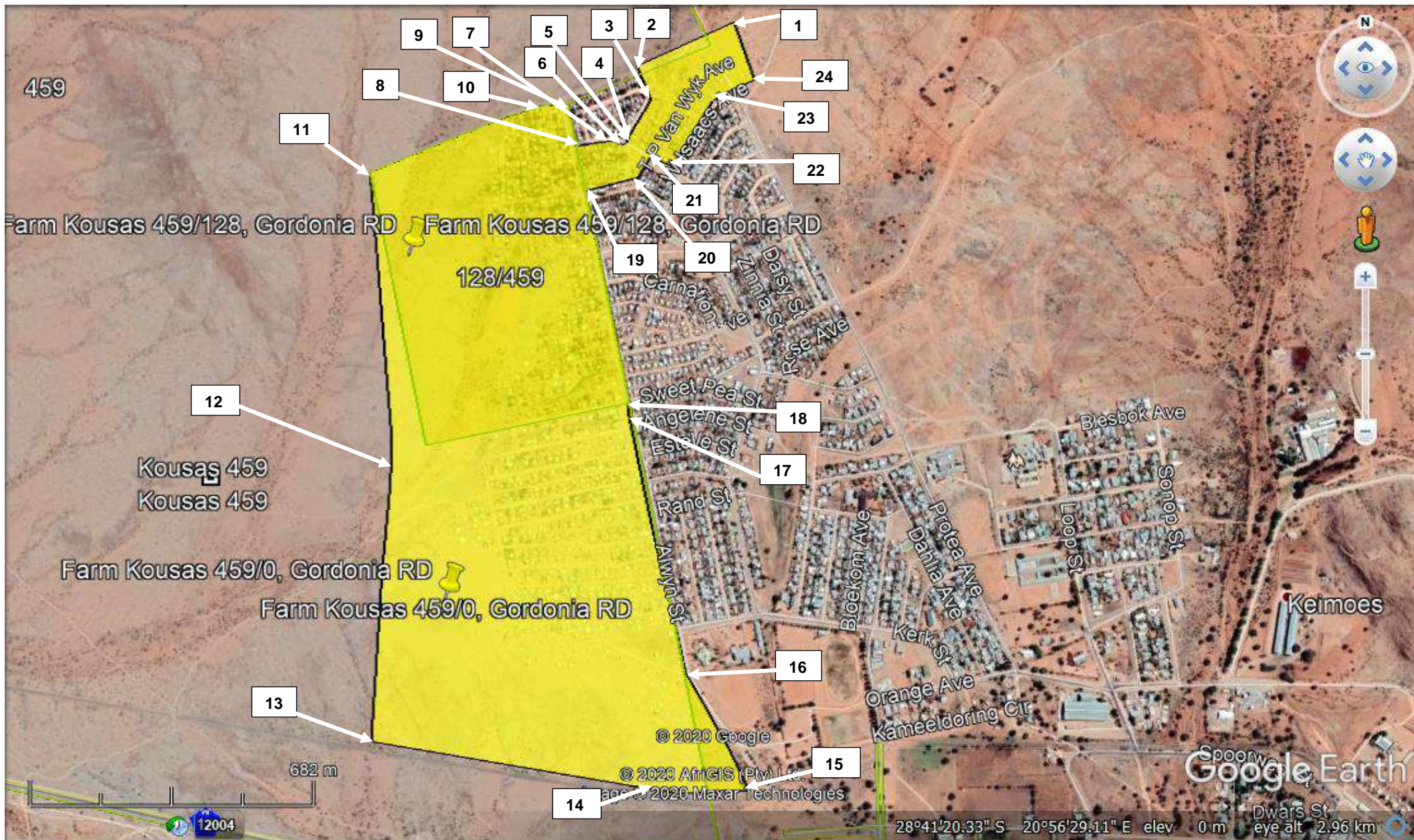
TABLE 9: CALCULATIONS
Consequence = Severity + Spatial Scale + Duration
Likelihood=Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Significance \Risk= Consequence X Likelihood

## Appendix 4

### List of Co-ordinates – Gamakor Low Cost Housing Development

Coordinates of corner points of study area	Point	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
	1	28°	41'	14.73"	20°	57'	11.09"
	2	28°	41'	18.20"	20°	57'	2.41"
	3	28°	41'	20.85"	20°	57'	3.70"
	4	28°	41'	24.15"	20°	57'	1.47"
	5	28°	41'	24.33"	20°	57'	1.17"
	6	28°	41'	24.06"	20°	57'	0.33"
	7	28°	41'	24.10"	20°	56'	59.10"
	8	28°	41'	24.46"	20°	56'	56.97"
	9	28°	41'	21.10"	20°	56'	56.20"
	10	28°	41'	21.18"	20°	56'	54.14"
	11	28°	41'	26.44"	20°	56'	38.53"
	12	28°	41'	48.12"	20°	56'	40.43"
	13	28°	42'	10.85"	20°	56'	38.55"
	14	28°	42'	15.01"	20°	57'	5.60"
	15	28°	42'	14.79"	20°	57'	12.02"
	16	28°	42'	5.62"	20°	57'	6.46"
	17	28°	41'	45.12"	20°	57'	1.44"
	18	28°	41'	44.49"	20°	57'	1.58"
	19	28°	41'	27.96"	20°	56'	57.78"
	20	28°	41'	26.92"	20°	57'	2.42"
	21	28°	41'	25.28"	20°	57'	3.60"
	22	28°	41'	26.19"	20°	57'	5.55"
	23	28°	41'	20.92"	20°	57'	9.15"
	24	28°	41'	19.27"	20°	57'	12.90"







# REGISTER OF INTERESTED AND AFFECTED PARTIES (I&APs)

EnviroAfrican Ref: 0488

# EnviroAfrica

I&AP List for:

Gamakor Low Cost Housing

DENC Ref:

Environmental Planning and Impact Assessment Consultants

Advert Placed:

Kalahari Bulletin

Date:

17/01/2019

Omgewingsbeplanning en Impakbeoordeling Konsultante

No.	Title	Initials/Name	Surname	Affiliation	Postal Address	Town/City	Code	Telephone	Fax	E-mail
<b>1. Applicant</b>										
1.1	Mr	Izak	De Waal	Kai !Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mm@kaigarib.gov.za">mm@kaigarib.gov.za</a> <a href="mailto:dewaali@kaigarib.gov.za">dewaali@kaigarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
<b>2. Property / Land Owners:</b>										
2.1	Mr	Izak	De Waal	Kai !Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mm@kaigarib.gov.za">mm@kaigarib.gov.za</a> <a href="mailto:dewaali@kaigarib.gov.za">dewaali@kaigarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
<b>3. Occupiers</b>										
3.1		Mailrops done								
<b>4. Municipality</b>										
4.1	Mr	Marius	Louw	Kai !Garib Municipality (Mayor)	Private Bag X6	Kakamas	8870	(054) 461 6700 079 867 0617	(054) 461 6401	<a href="mailto:mayor@kaigarib.gov.za">mayor@kaigarib.gov.za</a> <a href="mailto:mariuslouw111@gmail.com">mariuslouw111@gmail.com</a>
4.2	Mr	Izak	De Waal	Kai !Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mm@kaigarib.gov.za">mm@kaigarib.gov.za</a> <a href="mailto:dewaali@kaigarib.gov.za">dewaali@kaigarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
4.3	Ms	Angela	Filander	Kai !Garib Municipality	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:filandera@kaigarib.gov.za">filandera@kaigarib.gov.za</a> <a href="mailto:angelafilander27@gmail.com">angelafilander27@gmail.com</a>
4.4	Mr	Tinus	Galloway	ZF Mgcawu District Municipality	Private Bag X6039	Upington	8800	(054) 337 2800	(053) 337 2888	<a href="mailto:Tgalloway@zfm-dm.gov.za">Tgalloway@zfm-dm.gov.za</a>
4.5	Mr	Gilbert	Lategan	ZF Mgcawu District Municipality	Private Bag X6039	Upington	8800	(054) 337 2800	(053) 337 2888	<a href="mailto:admin@zfm-dm.gov.za">admin@zfm-dm.gov.za</a>
<b>5. Municipal Ward Councillor:</b>										
5.1	Mr	Victor	Jacco	Ward Councillor - Ward 6	Private Bag X6	Kakamas	8870	054 461 6700 082 945 4910	054 461 6401	<a href="mailto:jaccovictor6@gmail.com">jaccovictor6@gmail.com</a>
<b>6. Ratepayers's association</b>										
<b>7.State Organisations:</b>										
7.1	Mr	L.L.M	Wa Modise (HOD)	NC Department of Agriculture & Land Reform	Private Bag X5018	Kimberley	8300	087 630 0387	(053) 831 4685/3635	
7.2	Ms	Jacoline	Mans	Dept Agriculture, Forestry, Fisheries	P.O.Box 2782	Upington	8800	054 338 5909	054 334 0030	<a href="mailto:JacolineMa@daff.gov.za">JacolineMa@daff.gov.za</a>
7.3	Mr	Abe	Abrahams	Department of Water & Sanitation- Northern Cape	28 Central Road Beaconsfield	Kimberley	8301	053 830 8800 082 883 6741	(053) 831 4534	<a href="mailto:AbrahamsA@dws.gov.za">AbrahamsA@dws.gov.za</a>
7.4	Mr	Steven	Shibambu	Northern Cape Department of Water and Sanitation	Private Bag X5912	Upington	8800	054 338 5819	086 699 2007	<a href="mailto:shibambus@dws.gov.za">shibambus@dws.gov.za</a>
7.5	Ms	Alexia	Hlengani	Northern Cape Department of Water and Sanitation - Upington	Private Bag X5912	Upington	8800	055 338 5819	087 699 2007	<a href="mailto:HlenganiA@dws.gov.za">HlenganiA@dws.gov.za</a>
7.6	Ms	Chantel	Schwartz	Department of Water & Sanitation- Northern Cape	Private Bag X5912	Upington	8800	054 338 5836	054 334 0205	<a href="mailto:SchwartzC@dws.gov.za">SchwartzC@dws.gov.za</a>
7.7	Ms.	T.	Tsimakwane	NC Department of Environment and Nature Conservation	Private Bag x 6102	Kimberley	8300	053 807 7300	053 807 7328	<a href="mailto:Ttsimakwane@ncpg.gov.za">Ttsimakwane@ncpg.gov.za</a>

7.8	Mr.	Ordain	Riba	Northern Cape Department of Environment and Nature Conservation	Provincial Building (First Floor), Corner of Rivier & Nelson Mandela Road, Upington, 8800	Upington	8800	060 991 4817	0538313530	<a href="mailto:oriba.denc@gmail.com">oriba.denc@gmail.com</a> <a href="mailto:ORiba@ncpg.gov.za">ORiba@ncpg.gov.za</a>
7.9	Mr.	Olebile	Seshupo	Northern Cape Department of Environment and Nature Conservation - De Aar	47 Church Street	De Aar	7000	053 631 0601 0768332502	0538313530	<a href="mailto:olebileseshupo@gmail.com">olebileseshupo@gmail.com</a>
7.10	Ms.	Sylvia	Moholo	Department of Roads and Public Works	Private Bag X5002	Kimberley	8300	053 838 5202	053 832 7380	<a href="mailto:sylvia.moholo@dpw.gov.za">sylvia.moholo@dpw.gov.za</a>
7.11	Ms	I.	Lekalake	Northern Cape Department: Co-operative Governance, Human Settlements and Traditional Affairs	Private Bag X5005	Kimberley	8300	053 830 9400	053 831 2904	<a href="mailto:Ilekakalake@ncpg.gov.za">Ilekakalake@ncpg.gov.za</a> <a href="mailto:IKhunou@ncpg.gov.za">IKhunou@ncpg.gov.za</a>
7.12	Ms	Livhu	Tshilate	Northern Cape Department: Co-operative Governance, Human Settlements and Traditional Affairs	Private Bag X5005	Kimberley	8300	054 830 9400	054 831 2904	<a href="mailto:livhutshilate@gmail.com">livhutshilate@gmail.com</a> <a href="mailto:LTshilate@ncpg.gov.za">LTshilate@ncpg.gov.za</a>
7.13	Ms.	Natasha	Higgitt	South African Heritage Resource Agency (SAHRA)	P.O.Box 4637	Cape Town	8000	021 462 4502	021 462 4509	<a href="mailto:nhiggitt@sahra.org.za">nhiggitt@sahra.org.za</a>
<b>8. Neighbours/Surrounding Property Owners</b>										
		Maidrops done								
<b>9. Other</b>										
9.1	Ms.	Marina	Jordaan	Kakamas Water Users Association	Private Bag X4	Kakamas	8870	054 431 0725	054 431 0348	<a href="mailto:marinakwgv@isat.co.za">marinakwgv@isat.co.za</a>

18 March 2020

**Kai !Garib Local Municipality**  
Private Bag X6  
**KAKAMAS**  
8870

Attention: Mr. Izak De Waal (Municipal Manager)

**NEMA PUBLIC PARTICIPATION PROCESS - AVAILABILITY OF THE DRAFT SCOPING REPORT FOR COMMENT**

**PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

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All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely

Emile Esquire



EnviroAfrica CC

**SOMERSET MALL 7137**

**18 MAR 2020**

**COUNTER 1**

18 March 2020

**Kai !Garib Local Municipality**  
Private Bag X6  
**KAKAMAS**  
8870

Attention: Mr. Marius Louw (Mayor)

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Yours sincerely

Emile Esquire



*EnviroAfrica CC*



18 March 2020

**Kai !Garib Local Municipality**  
Private Bag X6  
**KAKAMAS**  
8870

Attention: Ms. Angela Filander

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Yours sincerely

Emile Esquire



*EnviroAfrica CC*

18 March 2020

**Kai !Garib Local Municipality**  
Private Bag X6  
**KAKAMAS**  
8870

Attention: Mr. Victor Jacco (Ward Councillor)

**NEMA PUBLIC PARTICIPATION PROCESS - AVAILABILITY OF THE DRAFT SCOPING REPORT FOR COMMENT**

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Yours sincerely

Emile Esquire



*EnviroAfrica CC*

18 March 2020

**ZF Mgcawu District Municipality**  
Private Bag X6039  
**UPINGTON**  
8800

Attention: Mr. Tinus Galloway

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Emile Esquire



*EnviroAfrica CC*

18 March 2020

**ZF Mgcawu District Municipality**  
Private Bag X6039  
**UPINGTON**  
8800

Attention: Mr. Gilbert Lategan

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Yours sincerely

Emile Esquire



**EnviroAfrica CC**



18 March 2020

**Department of Agriculture and Land Reform**  
Private Bag X5018  
**KIMBERLEY**  
8300

Attention: Mr. L.L.M. Wa Modise (HOD)

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Yours sincerely

Emile Esquire



*EnviroAfrica CC*

18 March 2020

Department of Agriculture, Forestry and Fisheries  
P.O. Box 2782  
**UPINGTON**  
8800

Attention: MS. Jacoline Mans

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Emile Esquire



*EnviroAfrica CC*

**Department of Water and Sanitation**  
28 Central Road  
Beaconsfield  
**KIMBERLEY**  
8301

Unit 7 Pastorie Park  
Cnr Reitz & Lourens St., Somerset West  
CK 97/46008/23  
VAT4870170513

18 March 2020

**Department of Water and Sanitation**  
Private Bag X5912  
**UPINGTON**  
8800

Attention: Mr. Steven Shibambu

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**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Please do not hesitate to contact us for any further information.

Yours sincerely

Emile Esquire



EnviroAfrica CC



18 March 2020

Department of Water and Sanitation  
Private Bag X5912  
**UPINGTON**  
8800

Attention: Mr. Chantel Swartz

**NEMA PUBLIC PARTICIPATION PROCESS - AVAILABILITY OF THE DRAFT SCOPING REPORT FOR COMMENT**  
**PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128**  
**OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI !GARIB**  
**LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

**Application for environmental authorization to undertake the following activities:**

Government Notice R327 (Listing Notice 1): Activity No. **9, 10, 12, 19, 24 and 28**

Government Notice R325 (Listing Notice 2): Activities No. **15**

Government Notice R324 (Listing Notice 3): Activities No. **4, 12, 14**

**Public Participation:** Your department has 30 days to comment on the Draft Scoping Report (as per DEA requirement). Should comments not be received within the prescribed timeframes, it would be assumed that no comments are forthcoming and DENC will continue to process the application in the absence of your department's comments. The commenting period is from **27 March 2020 – 30 April 2020**.

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P.O. Box 5367

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely

Emile Esquire



EnviroAfrica CC

18 March 2020

**Department of Environment and Nature Conservation**  
Private Bag X 6102  
**KIMBERLEY**  
8300

Attention: Ms. T. Tsimakwane

**NEMA PUBLIC PARTICIPATION PROCESS - AVAILABILITY OF THE DRAFT SCOPING REPORT FOR COMMENT**

**PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely

Emile Esquire



**EnviroAfrica CC**

18 March 2020

**Department of Environment and Nature Conservation**  
Provincial Building (First Floor)  
Corner of Riviere & Nelson mandela Roads  
**UPINGTON**  
8300

Attention: Mr. Ordain Riba

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Yours sincerely

Emile Esquire



EnviroAfrica CC

18 March 2020

Department of Road and Public Works  
Private Bag X5002  
**KIMBERLEY**  
8300

Attention: Ms. Sylvia Moholo

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Yours sincerely

Emile Esquire



*EnviroAfrica CC*



18 March 2020

Department of Co-Operative Governance, Human Settlements and Traditional Affairs  
Private Bag X5005  
KIMBERLEY  
8300

Attention: Ms. I. Lekalake

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Yours sincerely

Emile Esquire



EnviroAfrica CC

18 March 2020

**South African Heritage Resources Agency**  
P.O. Box 4637  
**CAPE TOWN**  
8000

Attention: Ms. Natasha Niggitt

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**PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MCGAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE**

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Emile Esquire



*EnviroAfrica CC*

18 March 2020

**Kakamas Water Users Association**  
Private Bag X4  
**KAKAMAS**  
8870

Attention: Ms. Marina Jordaan

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Emile Esquire



*EnviroAfrica CC*

## REGISTER OF INTERESTED AND AFFECTED PARTIES (I&APs)

EnviroAfrica Ref: 0488

Environmental Planning and Impact Assessment Consultants  
Ongewingsbeplanning en Impakebeoordeling Konsultante

I&AP List for: **Gamakor Low Cost Housing**  
Advert Placed: **Kalahari Bulletin**

DENC Ref:   
Date:

17/01/2019

No.	Title	Initials/Name	Surname	Affiliation	Postal Address	Town/City	Code	Telephone	Fax	E-mail
1. Applicant										
1.1	Mr	Izak	De Waal	Kai Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mum@kaiGarib.gov.za">mum@kaiGarib.gov.za</a> <a href="mailto:dewaali@kaiGarib.gov.za">dewaali@kaiGarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
2. Property / Land Owners:										
2.1	Mr	Izak	De Waal	Kai Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:mum@kaiGarib.gov.za">mum@kaiGarib.gov.za</a> <a href="mailto:dewaali@kaiGarib.gov.za">dewaali@kaiGarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
3. Occupiers										
3.1	Mallroops dome									
4. Municipality										
4.1	Mr	Marius	Louw	Kai Garib Municipality (Mayor)	Private Bag X6	Kakamas	8870	(054) 461 6700 079 867 0617	(054) 461 6401	<a href="mailto:mayor@kaiGarib.gov.za">mayor@kaiGarib.gov.za</a> <a href="mailto:mariuslouw11@gmail.com">mariuslouw11@gmail.com</a> <a href="mailto:mum@kaiGarib.gov.za">mum@kaiGarib.gov.za</a> <a href="mailto:dewaali@kaiGarib.gov.za">dewaali@kaiGarib.gov.za</a> <a href="mailto:noeniebos@yahoo.com">noeniebos@yahoo.com</a>
4.2	Mr	Izak	De Waal	Kai Garib Municipality (Manager)	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	
4.3	Ms	Angele	Fliander	Kai Garib Municipality	Private Bag X6	Kakamas	8870	(054) 461 6700	(054) 461 6401	<a href="mailto:fliandera@kaiGarib.gov.za">fliandera@kaiGarib.gov.za</a> <a href="mailto:angelafliander27@gmail.com">angelafliander27@gmail.com</a> <a href="mailto:Tgalloway@zfm-dm.gov.za">Tgalloway@zfm-dm.gov.za</a> <a href="mailto:admin@zfm-dm.gov.za">admin@zfm-dm.gov.za</a>
4.4	Mr	Tinus	Galloway	ZF Mgecawu District Municipality	Private Bag X6039	Upington	8800	(054) 337 2800	(053) 337 2888	
4.5	Mr	Gilbert	Lategan	ZF Mgecawu District Municipality	Private Bag X6039	Upington	8800	(054) 337 2800	(053) 337 2888	
5. Municipal Ward Councillors:										
5.1	Mr	Victor	Jacco	Ward Councillor - Ward 6	Private Bag X6	Kakamas	8870	054 461 6700 082 945 4910	054 461 6401	<a href="mailto:jaccovictor6@gmail.com">jaccovictor6@gmail.com</a>
6. Ratepayer's association										
7. State Organisations:										
7.1	Mr	L.L.M	Wie Modise (HOD)	MC Department of Agriculture & Land Reform	Private Bag X5018	Kimberley	8300	087 630 0387	(053) 831 4685/3635	
7.2	Ms	Jacoline	Mans	Dept Agriculture, Forestry, Fisheries	P.O.Box 2782	Upington	8800	054 336 5509	054 334 0050	<a href="mailto:jacolinema@daff.gov.za">jacolinema@daff.gov.za</a>
7.3	Mr	Abie	Abrahams	Department of Water & Sanitation- Northern Cape	28 Central Road Beaconsfield	Kimberley	8301	053 830 8800 082 883 6741	(053) 831 4534	<a href="mailto:AbrahamsA@dws.gov.za">AbrahamsA@dws.gov.za</a>
7.4	Mr	Steven	Shibanbu	Northern Cape Department of Water and Sanitation	Private Bag X5912	Upington	8800	054 336 5819	086 699 2007	<a href="mailto:shibanbus@dws.gov.za">shibanbus@dws.gov.za</a>
7.5	Ms	Chantel	Schwartz	Department of Water & Sanitation- Northern Cape	Private Bag X5912	Upington	8800	054 336 5836	054 334 0205	<a href="mailto:SchwartzC@dws.gov.za">SchwartzC@dws.gov.za</a>

Private Bag X5912  
Upington  
SOMERSET MALL 7137

1.8 MAR 2020  
COUNTER 1



7.6	Ms. T.	Tsimakwane	NC Department of Environment and Nature Conservation	Private Bag x 6102	Kimberley	8300	053 807 7300	053 807 7326	<a href="mailto:Tsimakwane@ncpe.gov.za">Tsimakwane@ncpe.gov.za</a>
7.7	Mr. Ordain	Riba	Northern Cape Department of Environment and Nature Conservation	Provincial Building (First Floor), Corner of River & Nelson Mandela Road, Upington, 8800	Upington	8800	060 991 4817	0538313530	<a href="mailto:ordain.dene@gmail.com">ordain.dene@gmail.com</a> <a href="mailto:Orbba@ncpe.gov.za">Orbba@ncpe.gov.za</a>
7.8	Ms. Sylvia	Moholo	Department of Roads and Public Works	Private Bag X5002	Kimberley	8300	053 838 5202	053 832 7380	<a href="mailto:sylvia.moholo@dpr.gov.za">sylvia.moholo@dpr.gov.za</a>
7.9	Ms. L.	Lekeleke	Northern Cape Department: Co-operative Governance, Human Settlements and Traditional Affairs	Private Bag X5005	Kimberley	8300	053 830 9400	053 831 2804	<a href="mailto:llekaleke@ncpe.gov.za">llekaleke@ncpe.gov.za</a> <a href="mailto:Ikhumou@ncpe.gov.za">Ikhumou@ncpe.gov.za</a>
7.10	Ms. Natasha	Higgit	South African Heritage Resource Agency (SAHRA)	P.O.Box 4637	Cape Town	8000	021 462 4502	021 462 4509	<a href="mailto:nhiggit@sa-hra.org.za">nhiggit@sa-hra.org.za</a>
<b>8. Neighbours/Surrounding Property Owners</b>									
Maildrops done									
<b>9. Other</b>									
9.1	Ms. Marina	Jordan	Kakamas Water Users Association	Private Bag 14	Kakamas	8870	054 431 0725	054 431 0348	<a href="mailto:marinakw@wvnsat.co.za">marinakw@wvnsat.co.za</a>
9.2	Ms. Karen	Clark	IKAP				033 343 1130	033 343 5882	<a href="mailto:KarenC@12h.co.za">KarenC@12h.co.za</a>
9.3	Ms. Sonet	Du Plooy	IKAP				086 083 6337	033 343 5882	<a href="mailto:SonetD@12h.co.za">SonetD@12h.co.za</a>
9.4	Ms. Sherina	Shawe	IKAP				086 083 6337	033 343 5882	<a href="mailto:SherinaS@12h.co.za">SherinaS@12h.co.za</a>

SOMERSET MALL 7137

18 MAR 2020

COUNTER 1

17



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:09 PM  
**To:** 'mm@kaigarib.gov.za'; 'Izak de Waal'; 'Izak de Waal'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

**Tracking:**

**Recipient**

**Read**

'mm@kaigarib.gov.za'

'Izak de Waal'

'Izak de Waal'

'Jackie | Enviro Africa'

Jackie | Enviro Africa

Read: 2020/03/20 2:22 PM

Dear Mr Izak De Waal,

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**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

Please note that an electronic copy of the Draft Scoping Report is available on our website at <https://enviroafrica.co.za/projects/for-public-participation/>, under projects for public participation.

Please do not hesitate to contact us for any further information.

Yours sincerely

Emile Esquire



## EnviroAfrica

*Environmental Consultant*

**EnviroAfrica cc**

p: +27 21 851 1616

f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130

P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:12 PM  
**To:** 'mayor@kaigarib.gov.za'; 'Marius Louw'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

**Tracking:**

**Recipient**

**Read**

'mayor@kaigarib.gov.za'

'Marius Louw'

'Jackie | Enviro Africa'

Jackie | Enviro Africa

Read: 2020/03/20 2:23 PM

Dear Mr Marius Louw,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Government Notice R325 (Listing Notice 2): Activities No. **15**

Government Notice R324 (Listing Notice 3): Activities No. **4, 12, 14**

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All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire



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*Environmental Consultant*

**EnviroAfrica cc**

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**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:15 PM  
**To:** 'filandera@kaigarib.gov.za'; 'Angela Filander'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Tracking:	Recipient	Read
	'filandera@kaigarib.gov.za'	
	'Angela Filander'	
	'Jackie   Enviro Africa'	
	Jackie   Enviro Africa	Read: 2020/03/20 2:23 PM

Dear Ms Angela Filander,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Yours sincerely,

Emile Esquire



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## Emile Esquire

---

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:15 PM  
**To:** 'Tinus Galloway'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Tracking:	Recipient	Read
	'Tinus Galloway'	
	'Jackie   Enviro Africa'	
	Jackie   Enviro Africa	Read: 2020/03/20 2:23 PM

Dear Mr Tinus Galloway,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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**ATT: Emile Esquire**

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire





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**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:16 PM  
**To:** 'admin@zfm-dm.gov.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

<b>Tracking:</b>	<b>Recipient</b>	<b>Read</b>
	'admin@zfm-dm.gov.za'	
	'Jackie   Enviro Africa'	
	Janet Willemse	Read: 2020/03/20 2:30 PM

Dear Mr Gilbert Lategan,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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**ATT: Emile Esquire**

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**Emile Esquire**



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The first of these is the fact that the system is not a simple one. It is a complex system, and as such, it is not possible to understand it by looking at its parts in isolation. The system is a whole, and its behavior is determined by the interactions between its parts. This is a fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The second of these is the fact that the system is dynamic. It is not a static system, and its behavior changes over time. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The third of these is the fact that the system is open. It is not a closed system, and it interacts with its environment. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fourth of these is the fact that the system is self-organizing. It is not a system that is controlled from the outside, and it is not a system that is designed from the top down. It is a system that organizes itself, and its behavior emerges from the interactions between its parts. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fifth of these is the fact that the system is resilient. It is not a system that is fragile, and it is not a system that is easily disrupted. It is a system that is able to withstand change, and it is able to adapt to new circumstances. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The sixth of these is the fact that the system is sustainable. It is not a system that is unsustainable, and it is not a system that is doomed to failure. It is a system that is able to continue to exist, and it is able to thrive in the face of change. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The seventh of these is the fact that the system is equitable. It is not a system that is unfair, and it is not a system that is biased. It is a system that is able to provide for the needs of all its members, and it is able to ensure that everyone has a fair chance of success. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The eighth of these is the fact that the system is transparent. It is not a system that is opaque, and it is not a system that is hidden. It is a system that is able to be understood, and it is able to be managed. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The ninth of these is the fact that the system is accountable. It is not a system that is irresponsible, and it is not a system that is unaccountable. It is a system that is able to be held responsible for its actions, and it is able to be held accountable for its results. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The tenth of these is the fact that the system is inclusive. It is not a system that is exclusive, and it is not a system that is discriminatory. It is a system that is able to include everyone, and it is able to ensure that everyone has a voice. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The eleventh of these is the fact that the system is innovative. It is not a system that is stagnant, and it is not a system that is uncreative. It is a system that is able to generate new ideas, and it is able to implement them. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The twelfth of these is the fact that the system is adaptable. It is not a system that is inflexible, and it is not a system that is rigid. It is a system that is able to change, and it is able to adapt to new circumstances. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The thirteenth of these is the fact that the system is resilient. It is not a system that is fragile, and it is not a system that is easily disrupted. It is a system that is able to withstand change, and it is able to adapt to new circumstances. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fourteenth of these is the fact that the system is sustainable. It is not a system that is unsustainable, and it is not a system that is doomed to failure. It is a system that is able to continue to exist, and it is able to thrive in the face of change. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The fifteenth of these is the fact that the system is equitable. It is not a system that is unfair, and it is not a system that is biased. It is a system that is able to provide for the needs of all its members, and it is able to ensure that everyone has a fair chance of success. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The sixteenth of these is the fact that the system is transparent. It is not a system that is opaque, and it is not a system that is hidden. It is a system that is able to be understood, and it is able to be managed. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The seventeenth of these is the fact that the system is accountable. It is not a system that is irresponsible, and it is not a system that is unaccountable. It is a system that is able to be held responsible for its actions, and it is able to be held accountable for its results. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The eighteenth of these is the fact that the system is inclusive. It is not a system that is exclusive, and it is not a system that is discriminatory. It is a system that is able to include everyone, and it is able to ensure that everyone has a voice. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The nineteenth of these is the fact that the system is innovative. It is not a system that is stagnant, and it is not a system that is uncreative. It is a system that is able to generate new ideas, and it is able to implement them. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

The twentieth of these is the fact that the system is adaptable. It is not a system that is inflexible, and it is not a system that is rigid. It is a system that is able to change, and it is able to adapt to new circumstances. This is another fundamental principle of systems thinking, and it is one that is often overlooked in traditional approaches to problem-solving.

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:18 PM  
**To:** 'jaccovictor6@gmail.com'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr Victor Jacco,

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**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:21 PM  
**To:** 'JacolineMa'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Jacoline Mans,

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**ATT: Emile Esquire**

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Emile Esquire



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*Environmental Consultant*

**EnviroAfrica cc**

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f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:21 PM  
**To:** 'AbrahamsA@dws.gov.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr Abe Abrahams,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

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The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The next section describes the methodology used in the study, including the data collection and analysis techniques. The results of the study are then presented, followed by a discussion of the findings and their implications. The paper concludes with a summary of the main points and a list of references.

The research was conducted in a systematic and rigorous manner, following the principles of good research practice. The data was collected from a representative sample of the population, and the analysis was carried out using appropriate statistical methods. The results of the study are presented in a clear and concise manner, and the implications of the findings are discussed in detail.

The findings of the study have important implications for the field of research. They provide valuable insights into the nature of the phenomenon being studied, and they suggest areas for further research. The results also have practical implications for the development of policies and programs aimed at addressing the issue.

In conclusion, the study has made a significant contribution to the understanding of the topic. The findings are robust and reliable, and they provide a solid basis for further research and action.

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:22 PM  
**To:** 'shibambus@dws.gov.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr Steven Shibambu,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Government Notice R324 (Listing Notice 3): Activities No. **4, 12, 14**

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All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:23 PM  
**To:** 'Schwartz Chantel (UPN)'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Chantel Schwartz,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire



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*Environmental Consultant*

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130



the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995. The public sector has become a major employer in the UK, and its growth has been a major factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a major factor in the overall growth of the economy. The public sector has become a major provider of social services, and its growth has been a major factor in the overall growth of the economy.

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**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:24 PM  
**To:** 'TTshimakwane'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI IGARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms T. Tsimakwane,

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**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:24 PM  
**To:** 'ORiba'; 'oriba.denc@gmail.com'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr Ordain Riba,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Emile Esquire



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The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The second part of the paper describes the methodology used in the study, including the data collection and analysis techniques. The third part of the paper presents the results of the study, and the fourth part discusses the implications of the findings.

The study was conducted using a quantitative research design. Data was collected from a sample of 100 participants using a survey questionnaire. The data was then analyzed using statistical software to determine the relationships between the variables.

The results of the study show that there is a significant positive relationship between the variables. This finding is consistent with the previous research on the topic. The implications of the findings suggest that the research has practical applications in the field.

In conclusion, the study has shown that the research objectives have been achieved. The findings provide valuable insights into the topic and have implications for future research.

**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:25 PM  
**To:** 'sylvia.moholo@dpw.gov.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Sylvia Moholo,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130

The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The methodology section describes the research design and the data collection process. The results section presents the findings of the study, and the conclusion section summarizes the main points and provides recommendations for future research.

The study was conducted in a laboratory setting, and the participants were recruited from a local university. The data was collected using a series of questionnaires and interviews. The results of the study show that there is a significant relationship between the variables being studied. The findings suggest that the research has important implications for the field of study.

The research was supported by a grant from the National Science Foundation. The authors would like to thank the reviewers for their helpful comments and suggestions. The paper is published in the Journal of the American Psychological Association.



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:27 PM  
**To:** 'Ilekalake@ncpg.gov.za'; 'IKhunou@ncpg.gov.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI IGARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms I. Lekalake,

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**ATT: Emile Esquire**

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Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Yours sincerely,

Emile Esquire



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*Environmental Consultant*

**EnviroAfrica cc**

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:28 PM  
**To:** 'Natasha Higgitt'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Natasha Higgitt,

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**ATT: Emile Esquire**

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Yours sincerely,

Emile Esquire



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*Environmental Consultant*

**EnviroAfrica cc**

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The first of these is the fact that the system is not a simple one. It is a complex system, and as such, it is not possible to understand it by looking at its parts in isolation. The system is a whole, and it is only by looking at the whole that we can understand it. This is the first principle of systems thinking: the whole is greater than the sum of its parts.

The second principle is that the system is dynamic. It is not a static system, and it is not a system that can be understood by looking at a single point in time. The system is a process, and it is only by looking at the process that we can understand it. This is the second principle of systems thinking: the system is a process.

The third principle is that the system is interconnected. The parts of the system are not isolated, and they are not independent. They are all connected to each other, and they all influence each other. This is the third principle of systems thinking: the system is interconnected.

The fourth principle is that the system is self-organizing. The system is not a system that is imposed from the outside. It is a system that organizes itself from within. This is the fourth principle of systems thinking: the system is self-organizing.

The fifth principle is that the system is resilient. The system is not a system that is fragile and easily broken. It is a system that is resilient and able to withstand change. This is the fifth principle of systems thinking: the system is resilient.

The sixth principle is that the system is adaptable. The system is not a system that is rigid and inflexible. It is a system that is adaptable and able to change. This is the sixth principle of systems thinking: the system is adaptable.

The seventh principle is that the system is sustainable. The system is not a system that is unsustainable and will eventually collapse. It is a system that is sustainable and able to last. This is the seventh principle of systems thinking: the system is sustainable.

The eighth principle is that the system is equitable. The system is not a system that is unfair and unequal. It is a system that is equitable and fair. This is the eighth principle of systems thinking: the system is equitable.

The ninth principle is that the system is transparent. The system is not a system that is opaque and hidden. It is a system that is transparent and open. This is the ninth principle of systems thinking: the system is transparent.

The tenth principle is that the system is accountable. The system is not a system that is unaccountable and irresponsible. It is a system that is accountable and responsible. This is the tenth principle of systems thinking: the system is accountable.



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:29 PM  
**To:** 'marinakwgv@isat.co.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Marina Jordaan,

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Yours sincerely,

Emile Esquire



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*Environmental Consultant*

**EnviroAfrica cc**

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a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:30 PM  
**To:** 'KarenC@l2b.co.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Karen Clark,

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Yours sincerely,

Emile Esquire



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f: +27 86 512 0154

a: Unit 7, Pastorie Park, Reitz St, Somerset West, 7130





**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:33 PM  
**To:** 'SonetD@l2b.co.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Sonet Du Plooy,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

**Application for environmental authorization to undertake the following activities:**

Government Notice R327 (Listing Notice 1): Activity No. **9, 10, 12, 19, 24 and 28**

Government Notice R325 (Listing Notice 2): Activities No. **15**

Government Notice R324 (Listing Notice 3): Activities No. **4, 12, 14**

**Public Participation:** You as a registered Interested and Affected Party ("I&AP") has 30 days to comment on the Draft Scoping Report (as per DEA requirement). Should comments not be received within the prescribed timeframes, it would be assumed that no comments are forthcoming and DENC will continue to process the application in the absence of your comments. The commenting period is from **27 March 2020 – 30 April 2020**.

All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

Please note that an electronic copy of the Draft Scoping Report is available on our website at <https://enviroafrica.co.za/projects/for-public-participation/>, under projects for public participation.

Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Friday, 20 March 2020 2:34 PM  
**To:** 'SherinaS@l2b.co.za'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Sherina Shawe,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

Please note that an electronic copy of the Draft Scoping Report is available on our website at <https://enviroafrica.co.za/projects/for-public-participation/>, under projects for public participation.

Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



**EnviroAfrica**

*Environmental Consultant*

**EnviroAfrica cc**

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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Thursday, 02 April 2020 4:37 PM  
**To:** 'Natasha Higgitt'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Tracking:	Recipient	Read
	'Natasha Higgitt'	
	'Jackie   Enviro Africa'	
	Jackie   Enviro Africa	Read: 2020/04/03 9:12 AM

Dear Natasha,

Your email correspondence dated 23 March 2020, refers.

The Draft Scoping Report and Specialists Reports were uploaded onto SAHRIS with **Case ID: 13959** as requested.

Please don't hesitate to contact me should you require any additional information.

Kind regards,

Emile Esquire



EnviroAfrica

*Environmental Consultant*

**EnviroAfrica cc**

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---

**From:** Natasha Higgitt <nhiggitt@sahra.org.za>  
**Sent:** Monday, 23 March 2020 9:49 AM  
**To:** Emile Esquire <emile@enviroafrica.co.za>  
**Cc:** 'Jackie | Enviro Africa' <info@enviroafrica.co.za>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Good morning,

Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: <http://sahra.org.za/sahris/>. We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions.

Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.

Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application, and are submitted to SAHRA at the beginning of the Public Review periods. Once all these documents have been uploaded, I will be able to issue an informed comment as per section 38(4) and 38(8) of the NHRA.

Please note that I am working from home and cannot be contacted via the SAHRA office number. Please call me on my cellphone number as shown in my email signature for any queries. I am still available via email and on SAHRIS. Please only contact me during office hours 08:00 – 16:30.

---

**From:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>

**Sent:** Friday, 20 March 2020 14:28

**To:** Natasha Higgitt <[nhiggitt@sahra.org.za](mailto:nhiggitt@sahra.org.za)>

**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>

**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Ms Natasha Higgitt,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

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All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

Please note that an electronic copy of the Draft Scoping Report is available on our website at <https://enviroafrica.co.za/projects/for-public-participation/>, under projects for public participation.

Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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**Natasha Higgitt**

Heritage Officer: Archaeology, Palaeontology and Meteorites Unit

South African Heritage Resources Agency

- *A nation united through heritage* -

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the 1990s, the number of people with a mental health problem has increased by 50% (Mental Health Foundation 2000).

There is a growing awareness of the need to address the needs of people with mental health problems in the community. The Department of Health (1999) has set out a vision for the future of mental health services, which includes a focus on preventing mental health problems, supporting people with mental health problems in the community, and providing specialist services for people with severe mental health problems. The vision is based on the principles of recovery, which emphasizes the importance of helping people to live meaningful lives and to achieve their goals.

One of the key challenges in implementing this vision is the need to develop a workforce that is equipped to provide the range of services that are required. This includes a range of professionals, including mental health nurses, social workers, psychologists, and community workers. It also includes a range of support staff, including care assistants and administrative staff.

The Department of Health (1999) has identified a number of key areas for development in the mental health workforce. These include: increasing the number of people working in the mental health workforce; improving the training and development of the workforce; and ensuring that the workforce is equipped with the skills and knowledge that are required to provide the range of services that are required.

One of the key areas for development is the need to improve the training and development of the workforce. This includes a range of activities, including: providing ongoing training and development opportunities for staff; ensuring that staff are equipped with the skills and knowledge that are required to provide the range of services that are required; and ensuring that staff are able to access the support and supervision that they need.

Another key area for development is the need to ensure that the workforce is equipped with the skills and knowledge that are required to provide the range of services that are required. This includes a range of activities, including: providing ongoing training and development opportunities for staff; ensuring that staff are equipped with the skills and knowledge that are required to provide the range of services that are required; and ensuring that staff are able to access the support and supervision that they need.

Finally, a key area for development is the need to ensure that the workforce is able to access the support and supervision that they need. This includes a range of activities, including: providing ongoing training and development opportunities for staff; ensuring that staff are equipped with the skills and knowledge that are required to provide the range of services that are required; and ensuring that staff are able to access the support and supervision that they need.

In conclusion, the mental health workforce is a key component of the mental health system. It is essential that we develop a workforce that is equipped to provide the range of services that are required. This includes a range of professionals, including mental health nurses, social workers, psychologists, and community workers. It also includes a range of support staff, including care assistants and administrative staff.



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Wednesday, 22 July 2020 10:17 AM  
**To:** 'Hlengani Alexia (UPN)'  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Alexia,

Your email correspondence dated 04 July 2020, refers.

An electronic CD copy of the Draft Scoping Report was posted to your Department on 18 March 2020 and was addressed to Mr. Steven Shibambu.

Please be informed that EnviroAfrica as the appointed Environmental Assessment Practitioner (EAP) will submit the Final Scoping Report to DENC by latest 30 July 2020.

DENC then have to accept the Final Scoping Report so that we can proceed with the Environmental Impact Report (EIR) phase.

Please note that a copy of the EIR that will go out for public comment in future and an electronic CD copy will be posted to your office in order to provide comment.

As previously mentioned, the Draft Scoping Report is still available on our website at <https://www.enviroafrica.co.za/projects/for-public-participation/>

Please don't hesitate to contact me should you require any additional information.

Kind regards,

Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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---

**From:** Hlengani Alexia (UPN) <HlenganiA@dws.gov.za>

**Sent:** Saturday, 04 July 2020 12:59 PM

**To:** Emile Esquire <emile@enviroafrica.co.za>

**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Good day

The challenge is, we don't have internet at all.

Regards  
Alexia

---

**From:** Emile Esquire [<mailto:emile@enviroafrica.co.za>]  
**Sent:** Thursday, 02 July 2020 16:39  
**To:** Hlengani Alexia (UPN) <[HlenganiA@dws.gov.za](mailto:HlenganiA@dws.gov.za)>  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>; 'Bernard' <[bernard@enviroafrica.co.za](mailto:bernard@enviroafrica.co.za)>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Alexia,

My email correspondence dated 29 May 2020 and your email correspondence dated 29 May 2020, refers.

I hope the internet connection at your Department has been restored.

Please find attached pdf copy of the Draft Scoping Report for the Gamakor housing development.

You can also access the Draft Scoping Report on our website under projects for public participation - <https://www.enviroafrica.co.za/projects/for-public-participation/>

Please don't hesitate to contact me should you require any additional information.

Kind regards,

Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

---

**From:** Hlengani Alexia (UPN) <[HlenganiA@dws.gov.za](mailto:HlenganiA@dws.gov.za)>  
**Sent:** Friday, 29 May 2020 1:15 PM  
**To:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Good day

Note that the internet is on and off, and our google is blocked.

Regards

Alexia

---

**From:** Emile Esquire [<mailto:emile@enviroafrica.co.za>]  
**Sent:** Friday, 29 May 2020 11:17  
**To:** Hlengani Alexia (UPN) <[HlenganiA@dws.gov.za](mailto:HlenganiA@dws.gov.za)>  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>; 'Bernard de witt' <[bernard@enviroafrica.co.za](mailto:bernard@enviroafrica.co.za)>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Alexia Hlengani,

Your email correspondence dated 22 May 2020, refers.

Given the current lockdown as a result of the Covid19 pandemic, I feel it would be appropriate to give you electronic access to the Draft Scoping Report for the Gamakor Housing Development.

Please note that an electronic copy of the Draft Scoping Report and associated appendices can be accessed on our website under Current Projects, with the following link: <https://www.enviroafrica.co.za/projects/current/>

You can also access the Draft Scoping Report via WeTransfer on the following links:

<https://wettransfer.com/downloads/047775163e623751fec7dc712ad7c37c20200529090548/fc0645a8ac58d32b4a7d802295a92f3420200529090654/cf370c>

<https://we.tl/t-XwgvMiTa46>

Please don't hesitate to contact me should you require any additional information.

Kind regards,

Emile Esquire



EnviroAfrica

*Environmental Consultant*

**EnviroAfrica cc**

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---

**From:** Hlengani Alexia (UPN) <[HlenganiA@dws.gov.za](mailto:HlenganiA@dws.gov.za)>  
**Sent:** Friday, 22 May 2020 9:26 AM  
**To:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Good morning

Kindly forward us the hardcopy.

Regards  
Alexia

---

**From:** Shibambu Steven (MBA)  
**Sent:** Monday, 23 March 2020 08:44  
**To:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>; Hlengani Alexia (UPN) <[HlenganiA@dws.gov.za](mailto:HlenganiA@dws.gov.za)>  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Good day,

Please note that I am no longer working in NC. Please contact Alexia copied on tjis email.

Regards,  
Steven.

---

**From:** Emile Esquire [<mailto:emile@enviroafrica.co.za>]  
**Sent:** Friday, 20 March 2020 14:22  
**To:** Shibambu Steven (MBA) <[ShibambuS@dws.gov.za](mailto:ShibambuS@dws.gov.za)>  
**Cc:** 'Jackie | Enviro Africa' <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>  
**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOS, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr Steven Shibambu,

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**Public Participation:** Your department has 30 days to comment on the Draft Scoping Report (as per DEA requirement). Should comments not be received within the prescribed timeframes, it would be assumed that no comments are forthcoming and DENC will continue to process the application in the absence of your department's comments. The commenting period is from **27 March 2020 – 30 April 2020**.

All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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Please do not hesitate to contact us for any further information.



Yours sincerely,

Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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## agriculture, forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

Directorate: Forestry Management (Other Regions)  
P.O. Box 2782, Upington, 8800, Tel 054 338 5909, Fax 054 334 0030

Enquiries: J. Mans (Cell 060 973 1660)

E-mail: [JacolineMa@daff.gov.za](mailto:JacolineMa@daff.gov.za)

Date: 01 April 2020

Ref: 40.8.14.2/NC/171

Enviro Africa CC

P.O. Box 5367

Helderberg

7135

Attention: Mr. Emile Esquire (emile@[enviroafrica.co.za](mailto:enviroafrica.co.za))

**RE: COMMENTS ON DRAFT SCOPING REPORT FOR THE PROPOSED FORMALISATION OF LOW COST GAMAKOR HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459 AND ERVEN 1470, 1474 AND 1480 KEIMOS, KAI !GARIB LOCAL MUNICIPALITY**

### 1. NATIONAL FORESTS ACT, ACT 84 OF 1998 (AS AMENDED)

1.1 The Directorate: Forestry Management (Other Regions) in the Department of Environment, **Forestry** and Fisheries (DEFF) is responsible for administration of the National Forests Act, Act 84 of 1998 (NFA) and the National Veld and Forest Fires Act, Act 101 of 1998 (NVFFA) as amended.

1.2 Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette.

1.3 Any person who contravenes the prohibition on the cutting, disturbance, damage or destruction of protected trees referred to in section 15(1)(a); or the possession,

collection, removal, transport, export, purchase or sale of any forest product derived from a protected tree referred to in section 15(1)(b), is guilty of a first category offence and may be sentenced to a fine or imprisonment for a period of up to three years, or to both. See Section 58(1) of the NFA read with s62 and s63.

## 2. COMMENTS ON DRAFT SCOPING REPORT

2.1 The Department of Forestry studied the Draft Scoping Report (DSR) and Biodiversity Impact Assessment Report and take note of the fact that the development affecting Bushmanland Arid Grassland, is located in a Critical Biodiversity Area. However, the site is partially disturbed. There are only three (3) individuals of protected *Vachellia erioloba* present on the 104 ha site. The developer must make an effort to conserve these three trees by incorporating it into the layout design.

2.2 If authorisation is granted for the development, no protected tree may be damaged or disturbed without a valid Forest Act License from the Department of Environment, Forestry and Fisheries. In addition, trees with active bird nest or other significant biodiversity features, may not be damaged or disturbed without a valid **Fauna Permit** from the provincial Department of Environment and Nature Conservation under the Northern Cape Nature Conservation Act (NCNCA), Act 9 of 2009 (if affected).

Kind Regards,



Jacoline Mans  
Chief Forester: Regulations  
**DATE: 01/04/2020**



**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Thursday, 02 April 2020 4:20 PM  
**To:** 'Jacoline Mans'  
**Cc:** 'Jackie | Enviro Africa'  
**Subject:** RE: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Jacoline Mans,

I hereby acknowledge receipt of the attached comment from the Department dated 01 April 2020.

Please note that the contents of the aforementioned correspondence dated 01 April 2020 is duly noted.

Kindly see responses to your points raised below:

1.1. Noted. The Environmental Assessment Practitioner (EAP) takes cognisance of the applicable legislation.

1.2. Noted. The EAP takes cognisance of the of the applicable legislation.

1.3. Noted. The EAP takes cognisance of the applicable legislation.

2.1. Noted. The three protected *Vachellia erioloba* present will be incorporated into the layout design.

2.2. Noted. The recommendations regarding the protected trees will be inserted into the Environmental Management Programme (EMPr).

Thank you for providing comment on the Draft Scoping Report for the aforementioned proposal.

Kind regards,

Emile Esquire



EnviroAfrica

*Environmental Consultant*

**EnviroAfrica cc**

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P.O. Box 5367, Helderberg, 7135

w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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**From:** Jacoline Mans <JacolineMa@daff.gov.za>

**Sent:** Wednesday, 01 April 2020 1:39 PM

**To:** Emile Esquire <emile@enviroafrica.co.za>

**Subject:** Re: DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOE, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

Dear Mr. Esquire

Attached please find comments from the Department of Forestry. Thank you for notifying this Department of the proposed development.

Kind Regards,

Jacoline Mans

Chief Forester: Regulations

Cell 060 973 1660

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**From:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>

**Sent:** 20 March 2020 02:20 PM

**To:** Jacoline Mans

**Cc:** 'Jackie | Enviro Africa'

**Subject:** DRAFT SCOPING REPORT AVAILABLE FOR COMMENT: PROPOSED FORMALIZATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSOUS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE

**EXTERNAL EMAIL: This email originated outside of "DAFF Environment".**

Dear Ms Jacoline Mans,

Notice is hereby given of the submission of a NEMA application, and the public participation process ("PPP"), in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended). The proposed Gamakor housing development includes activities listed in terms of the NEMA EIA Regulations, 2014 (as amended). EnviroAfrica cc has been appointed by the Kai !Garib Local Municipality to undertake the NEMA Application for Environmental Authorisation process.

**Application for environmental authorization to undertake the following activities:**

Government Notice R327 (Listing Notice 1): Activity No. **9, 10, 12, 19, 24 and 28**

Government Notice R325 (Listing Notice 2): Activities No. **15**

Government Notice R324 (Listing Notice 3): Activities No. **4, 12, 14**

**Public Participation:** Your department has 30 days to comment on the Draft Scoping Report (as per DEA requirement). Should comments not be received within the prescribed timeframes, it would be assumed that no comments are forthcoming and DENC will continue to process the application in the absence of your department's comments. The commenting period is from **27 March 2020 – 30 April 2020**.

All comments are to be copied to the Environmental Assessment Practitioner – see details below:

**EnviroAfrica CC**

**ATT: Emile Esquire**

P.O. Box 5367

Helderberg

7135

Fax: 086 512 0154 / Tel: 021 8511616 / E-mail: [info@enviroafrica.co.za](mailto:info@enviroafrica.co.za) / [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

Please note that an electronic copy of the Draft Scoping Report is available on our website at <https://enviroafrica.co.za/projects/for-public-participation/> ,under projects for public participation.

Please do not hesitate to contact us for any further information.

Yours sincerely,

Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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**From:** OLEBILE SESHUPO <olebileseshupo@gmail.com>  
**Sent:** Saturday, 13 June 2020 9:50 PM  
**To:** Emile Esquire  
**Cc:** NCEIAapplications@environment.gov.za; GLetimela; Jackie | Enviro Africa; Bernard de witt; TMakaudi; TMthombeni; dmoleko@ncpg.gov.za; aviwe nyakaza; Kgosi Moleko  
**Subject:** Re: Gamakor Housing - DENC to Acknowledge receipt of NEMA App Form and Draft Scoping Report  
**Attachments:** image001.jpg

Hi Emile

I hope you are well.

At the moment we are not fully back at the office, only senior managers are. So as soon as we are fully operational you will get a confirmation from head office. I am currently the interim officer dealing with applications from ZF.

Kind regards

On Mon, 08 Jun 2020, 11:55 AM Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)> wrote:

Dear Gail,

Please find attached proof of submission of the NEMA Application Form and Draft Scoping Report for the proposed Gamakor Housing project which was submitted to DENC on **18 March 2020**.

I am awaiting the Department's letter acknowledging receipt of the NEMA Application Form and Draft Scoping Report.

The Draft Scoping Report is currently available for comment from **March 2020**.

In addition to the aforementioned, please indicate to which Environmental Officer this project was assigned to.

Your urgent response regarding the aforementioned enquiry would be much appreciated.

Kind regards,

## Emile Esquire



*Environmental Consultant*

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w: [www.enviroafrica.co.za](http://www.enviroafrica.co.za) e: [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)





**COGHSTA**

Department:  
Cooperative Governance, Human Settlements and  
Traditional Affairs  
**NORTHERN CAPE PROVINCE**

Larry Moleko Louw Building  
9 Cecil Sussman Road  
Private Bag X5005  
Kimberley  
8300

Enquiries : Ms. Tshlate

Reference : L1.3.2.P

Date : 22 June 2020

**ENVIRO AFRICA CC**  
P O Box 5367  
**Helderberg**  
7135

Attention: Emile Esquire

**RE:COMMENTS ON THE DRAFT SCOPING REPORT OF PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF THE FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI IGARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE.**

1. The above refers.
2. Department Co-operative Governance, Human Settlements and Traditional Affairs hereby acknowledge the receipt of the above mentioned draft scoping report received on the **22<sup>nd</sup> June 2020**.
3. This letter serve to inform you that this Department has no objection to the approval of the above mentioned draft scoping report received on the **22<sup>nd</sup> June 2020**.

I trust that this meets your favourable consideration

Yours faithfully,

  
.....  
**Mr BS LENKOE**  
**HEAD OF DEPARTMENT**

  
2020/06/30

**DATE**



## Emile Esquire

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**From:** Emile Esquire <emile@enviroafrica.co.za>  
**Sent:** Thursday, 02 July 2020 9:12 AM  
**To:** 'Livhu Tshilate'  
**Subject:** RE: GAMAKOR LOW COST HOUSING (COGHSTA Ref. No.: L1.3.2.P)

Dear Ms Livhu,

Thank you I will contact you shortly.

Kind regards,

Emile Esquire



EnviroAfrica

*Environmental Consultant*

**EnviroAfrica cc**

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**f:** +27 86 512 0154

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P.O. Box 5367, Helderberg, 7135

**w:** [www.enviroafrica.co.za](http://www.enviroafrica.co.za) **e:** [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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**From:** Livhu Tshilate <livhutshilate@gmail.com>  
**Sent:** Thursday, 02 July 2020 9:00 AM  
**To:** Emile Esquire <emile@enviroafrica.co.za>  
**Subject:** Re: GAMAKOR LOW COST HOUSING (COGHSTA Ref. No.: L1.3.2.P)

Good morning Emile

082 939 8588

On Thu, 02 Jul 2020, 08:58 Emile Esquire, <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)> wrote:

Dear Ms Livhu,

Is it possible for to give me your contact number so that we can discuss your enquiry.

Please don't hesitate to contact me at 021 851 1616.

Kind regards,

## Emile Esquire



*Environmental Consultant*

**EnviroAfrica cc**

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**From:** Livhu Tshilate <[livhutshilate@gmail.com](mailto:livhutshilate@gmail.com)>

**Sent:** Wednesday, 01 July 2020 3:37 PM

**To:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>

**Cc:** Jackie | Enviro Africa <[info@enviroafrica.co.za](mailto:info@enviroafrica.co.za)>

**Subject:** Re: GAMAKOR LOW COST HOUSING (COGHSTA Ref. No.: L1.3.2.P)

I will look at it my dear. Public participation we can do the notice

On Wed, 01 Jul 2020, 15:33 Emile Esquire, <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)> wrote:

Dear Ms. Livhu Tshilate,

Please note that an electronic copy of the draft scoping report was provided to your Department for comment and we received your Department's comment dated 22 June 2020.

Kindly note that the draft scoping report is still available for public comment and can also be accessed on our website, under projects for public participation - <https://www.enviroafrica.co.za/projects/for-public-participation/>

Please note that the final scoping report will be send to DENC for acceptance once the commenting period has ended.

Also note that your name will be placed on the list of registered Interested and Affected Parties (I&APs) and will receive all future reports regarding this proposal.

Please don't hesitate to contact me should you require any additional information or clarity.

Kind regards,

**Emile Esquire**

*Environmental Consultant*

**EnviroAfrica cc**

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P.O. Box 5367, Helderberg, 7135

**w:** [www.enviroafrica.co.za](http://www.enviroafrica.co.za) **e:** [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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**From:** Livhu Tshilate <[livhutshilate@gmail.com](mailto:livhutshilate@gmail.com)>

**Sent:** Wednesday, 01 July 2020 11:07 AM

**To:** Emile Esquire <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)>

**Subject:** Re: GAMAKOR LOW COST HOUSING (COGHSTA Ref. No.: L1.3.2.P)

Good morning Emile

Kindly prepare the scoping report so that we can send it to Denc

On Wed, 01 Jul 2020, 10:58 Emile Esquire, <[emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)> wrote:

Dear Ms. Tshilate,

I hereby acknowledge receipt of the attached comment from the Department of Cooperative Governance, Human Settlements and Traditional Affairs (DCOGHSTA) dated 22 June 2020.

EnviroAfrica CC hereby notes that the Department has no objection to the approval of the Gamakor housing project.

I would like to thank you for providing comment on the aforementioned proposal.

Kind regards,

**Emile Esquire**

*Environmental Consultant*

**EnviroAfrica cc**

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**w:** [www.enviroafrica.co.za](http://www.enviroafrica.co.za) **e:** [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

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**From:** CvanColler <[cvancoller@ncpg.gov.za](mailto:cvancoller@ncpg.gov.za)>

**Sent:** Wednesday, 01 July 2020 10:39 AM

**To:** [emile@enviroafrica.co.za](mailto:emile@enviroafrica.co.za)

**Cc:** [livhutshilate@gmail.com](mailto:livhutshilate@gmail.com); LTshilate <[LTshilate@ncpg.gov.za](mailto:LTshilate@ncpg.gov.za)>

**Subject:** GAMAKOR LOW COST HOUSING

Good day

Find the above for your perusal.

Regards,

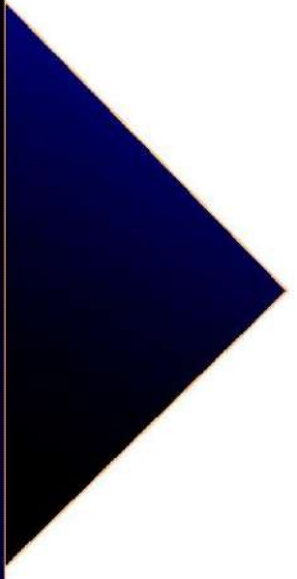
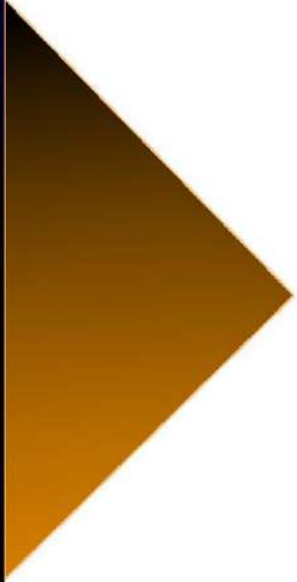


DRAFT SCOPING REPORT: PUBLIC PARTICIPATION COMMENTS RECEIVED - PROPOSED FORMALISATION OF GAMAKOR LOW COST HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459, AND ERVEN 1470, 1474 AND 1480, KEIMOES, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE					
Date	Comment	I&AP	Project	Response	Respondent
23/03/2020	<p>Good morning,</p> <p>Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: <a href="http://sahra.org.za/sahris/">http://sahra.org.za/sahris/</a>. We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions.</p> <p>Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.</p> <p>Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application, and are submitted to SAHRA at the beginning of the Public Review periods. Once all these documents have been uploaded, I will be able to issue an informed comment as per section 38(4) and 38(8) of the NHRA.</p> <p>Please note that I am working from home and cannot be contacted via the SAHRA office number. Please call me on my cellphone number as shown in my email signature for any queries. I am still available via email and on SAHRIS. Please only contact me during office hours 08:00 – 16:30.</p>	SAHRA	Gamakor Housing Development	<p>Dear Natasha,</p> <p>Your email correspondence dated 23 March 2020, refers.</p> <p>The Draft Scoping Report and Specialists Reports were uploaded onto SAHRIS with Case ID: 13959 as requested.</p> <p>Please don't hesitate to contact me should you require any additional information.</p> <p>Kind regards,</p>	EnviroAfrica
23/03/2020	<p>Good day,</p> <p>Please note that I am no longer working in NC. Please contact Alexia copied on tjis email.</p> <p>Regards, Steven Shibambu</p> <p>Good morning</p> <p>Kindly forward us the hardcopy.</p> <p>Regards Alexia Hlengani</p>	Department of Water & Sanitation	Gamakor Housing Development	<p>Dear Alexia Hlengani,</p> <p>Your email correspondence dated 22 May 2020, refers.</p> <p>Given the current lockdown as a result of the Covid19 pandemic, I feel it would be appropriate to give you electronic access to the Draft Scoping Report for the Gamakor Housing Development.</p> <p>Please note that an electronic copy of the Draft Scoping Report and associated appendices can be accessed on our website under Current Projects, with the following link: <a href="https://www.enviroafrica.co.za/projects/current/">https://www.enviroafrica.co.za/projects/current/</a></p> <p>You can also access the Draft Scoping Report via WeTransfer on the following links: <a href="https://wetransfer.com/downloads/047775163e623751fec7dc712ad7c37c20200529090548/fc0645a8ac58d32b4a7d802295a92f3420200529090654/cf370c">https://wetransfer.com/downloads/047775163e623751fec7dc712ad7c37c20200529090548/fc0645a8ac58d32b4a7d802295a92f3420200529090654/cf370c</a></p> <p><a href="https://we.tl/t-XwgvMiTa46">https://we.tl/t-XwgvMiTa46</a></p> <p>Please don't hesitate to contact me should you require any additional information.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica
"	<p>Good day</p> <p>Note that the internet is on and off, and our google is blocked.</p> <p>Regards Alexia Hlengani</p>	Department of Water & Sanitation	Gamakor Housing Development	<p>Dear Alexia,</p> <p>My email correspondence dated 29 May 2020 and your email correspondence dated 29 May 2020, refers.</p> <p>I hope the internet connection at your Department has been restored.</p> <p>Please find attached pdf copy of the Draft Scoping Report for the Gamakor housing development.</p> <p>You can also access the Draft Scoping Report on our website under projects for public participation - <a href="https://www.enviroafrica.co.za/projects/for-public-participation/">https://www.enviroafrica.co.za/projects/for-public-participation/</a></p> <p>Please don't hesitate to contact me should you require any additional information.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica

"	<p>Good day</p> <p>The challenge is, we don't have internet at all.</p> <p>Regards Alexia Hlengani</p>	Department of Water & Sanitation	Gamakor Housing Development	<p>Dear Alexia,</p> <p>Your email correspondence dated 04 July 2020, refers.</p> <p>An electronic CD copy of the Draft Scoping Report was posted to your Department on 18 March 2020 and was addressed to Mr. Steven Shibambu.</p> <p>Please be informed that EnviroAfrica as the appointed Environmental Assessment Practitioner (EAP) will submit the Final Scoping Report to DENC by latest 30 July 2020.</p> <p>DENC than have to accept the Final Scoping Report so that we can proceed with the Environmental Impact Report (EIR) phase.</p> <p>Please note that a copy of the EIR that will go out for public comment in future and an electronic CD copy will be posted to your office in order to provide comment.</p> <p>As previously mentioned, the Draft Scoping Report is still available on our website at <a href="https://www.enviroafrica.co.za/projects/for-public-participation/">https://www.enviroafrica.co.za/projects/for-public-participation/</a></p> <p>Please don't hesitate to contact me should you require any additional information.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica
01/04/2020	<p>RE: COMMENTS ON DRAFT SCOPING REPORT FOR THE PROPOSED FORMALISATION OF LOW COST GAMAKOR HOUSING DEVELOPMENT ON PORTIONS 0 AND 128 OF FARM KOUSAS NO. 459 AND ERVEN 1470, 1474 AND 1480 KEIMOES, KAI IGARIB LOCAL MUNICIPALITY</p> <p>1. NATIONAL FORESTS ACT, ACT 84 OF 1998 (AS AMENDED)</p> <p>1.1 The Directorate: Forestry Management (Other Regions) in the Department of Environment, Forestry and Fisheries (DEFF) is responsible for administration of the National Forests Act, Act 84 of 1998 (NFA) and the National Veld and Forest Fires Act, Act 101 of 1998 (NVFFA) as amended.</p> <p>1.2 Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette.</p> <p>1.3 Any person who contravenes the prohibition on the cutting, disturbance, damage or destruction of protected trees referred to in section 15(1)(a); or the possession, collection, removal, transport, export, purchase or sale of any forest product derived from a protected tree referred to in section 15(1)(b), is guilty of a first category offence and may be sentenced to a fine or imprisonment for a period of up to three years, or to both See Section 58(1) of the NFA read with s62 and s63.</p>	Department: Agriculture, Forestry & Fisheries (DAFF)	Gamakor Housing Development	<p>Dear Jacoline Mans,</p> <p>I hereby acknowledge receipt of the attached comment from the Department dated 01 April 2020.</p> <p>Please note that the contents of the aforementioned correspondence dated 01 April 2020 is duly noted.</p> <p>Kindly see responses to your points raised below:</p> <p>1.1. Noted. The Environmental Assessment Practitioner (EAP) takes cognisance of the applicable legislation.</p> <p>1.2. Noted. The EAP takes cognisance of the of the applicable legislation.</p> <p>1.3. Noted. The EAP takes cognisance of the applicable legislation.</p>	EnviroAfrica
"	<p>2. COMMENTS ON DRAFT SCOPING REPORT</p> <p>2.1 The Department of Forestry studied the Draft Scoping Report (DSR) and Biodiversity Impact Assessment Report and take note of the fact that the development affecting Bushmanland Arid Grassland, is located in a Critical Biodiversity Area. However, the site is partially disturbed. There are only three (3) individuals of protected Vachellia erioloba present on the 104 ha site. The developer must make an effort to conserve these three trees by incorporating it into the layout design.</p> <p>2.2 If authorisation is granted for the development, no protected tree may be damaged or disturbed without a valid Forest Act License from the Department of Environment, Forestry and Fisheries. In addition, trees with active bird nest or other significant biodiversity features, may not be damaged or disturbed without a valid Fauna Permit from the provincial Department of Environment and Nature Conservation under the Northern Cape Nature Conservation Act (NCNCA), Act 9 of 2009 (if affected).</p> <p>Kind Regards, Jacoline Mans Chief Forester: Regulations</p>	DAFF	Gamakor Housing Development	<p>2.1. Noted. The three protected Vachellia erioloba present will be incorporated into the layout design.</p> <p>2.2. Noted. The recommendations regarding the protected trees will be inserted into the Environmental Management Programme (EMPr).</p> <p>Thank you for providing comment on the Draft Scoping Report for the aforementioned proposal.</p> <p>Kind regards,</p>	EnviroAfrica

08/06/2020	<p>Dear Gail,</p> <p>Please find attached proof of submission of the NEMA Application Form and Draft Scoping Report for the proposed Gamakor Housing project which was submitted to DENC on 18 March 2020.</p> <p>I am awaiting the Department's letter acknowledging receipt of the NEMA Application Form and Draft Scoping Report.</p> <p>The Draft Scoping Report is currently available for comment from March 2020.</p> <p>In addition to the aforementioned, please indicate to which Environmental Officer this project was assigned to.</p> <p>Your urgent response regarding the aforementioned enquiry would be much appreciated.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica	Gamakor Housing Development	<p>Hi Emile</p> <p>I hope you are well.</p> <p>At the moment we are not fully back at the office, only senior managers are. So as soon as we are fully operational you will get a confirmation from head office. I am currently the interim officer dealing with applications from ZF.</p> <p>Kind regards, Mr. Olebile Seshupo</p>	DENC
30/06/2020	<p>1. The above refers.</p> <p>2. Department Co-operative Governance, Human Settlements and Traditional Affairs hereby acknowledge receipt of the above mentioned draft scoping report received on th 22nd June 2020.</p> <p>3. This letter serves to inform you that this Department has no objection to the approval of the above mentioned draft scoping report received on 22nd June 2020.</p> <p>I trust that this meets your favourable consideration.</p> <p>Yours faithfully,</p> <p>Mr. BS Lenkoe Head of Department</p>	D:COGHSTA	Gamakor Housing Development	<p>Dear Ms. Tshilate,</p> <p>I hereby acknowledge receipt of the attached comment from the Department of Cooperative Governance, Human Settlements and Traditional Affairs (DCOGHSTA) dated 22 June 2020.</p> <p>EnviroAfrica CC hereby notes that the Department has no objection to the approval of the Gamakor housing project.</p> <p>I would like to thank you for providing comment on the aforementioned proposal.</p> <p>Kind regards,</p>	EnviroAfrica
"	<p>Good morning Emile,</p> <p>Kindly prepare the scoping report so that we can send it to DENC.</p> <p>Ms. Livhu Tshilate</p>	D:COGHSTA	Gamakor Housing Development	<p>Dear Ms. Livhu Tshilate,</p> <p>Please note that an electronic copy of the draft scoping report was provided to your Department for comment and we received your Department's comment dated 22 June 2020.</p> <p>Kindly note that the draft scoping report is still available for public comment and can also be accessed on our website, under projects for public participation -<a href="https://www.enviroafrica.co.za/projects/for-publicparticipation/">https://www.enviroafrica.co.za/projects/for-publicparticipation/</a></p> <p>Please note that the final scoping report will be send to DENC for acceptance once the commenting period has ended.</p> <p>Also note that your name will be placed on the list of registered Interested and Affected Parties (I&amp;APs) and will receive all future reports regarding this proposal.</p> <p>Please don't hesitate to contact me should you require any additional information or clarity.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica
"	<p>I will look at it my dear. Public participation we can do the notice.</p> <p>Ms. Livhu Tshilate</p>	D:COGHSTA	Gamakor Housing Development	<p>Dear Ms Livhu,</p> <p>Is it possible for to give me your contact number so that we can discuss your enquiry.</p> <p>Please don't hesitate to contact me at 021 851 1616.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica
"	<p>Good morning Emile,</p> <p>082 939 8588</p> <p>Ms. Livhu Tshilate</p>	D:COGHSTA	Gamakor Housing Development	<p>Dear Ms Livhu,</p> <p>Thank you I will contact you shortly.</p> <p>Kind regards, Emile Esquire</p>	EnviroAfrica

## ANNEXURE J: SANRAL NOTIFICATION LETTER





Reference:

Date:

(ENQ.PC.SAN) 200707 Gamakor Formalisation – Barzani Development

07 July 2020

South African National Road Agency Limited  
Private Bag X19  
Bellville  
7530

ATT: Me René de Kock / Shaun Dyers

PROJECT: FORMALISATION OF GAMAKOR (KEIMOE) COMMUNITY

INVOLVED PROPERTIES SUMMARY:

- REMAINDER OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE;
- PORTION 128 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE;
- PORTION 95 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.

The above mentioned matter, as well as the attached documentation, refer.

Our office, Macroplan Town and Regional Planners, has been appointed by Barzani Development on behalf of the Department of Cooperative Governance, Human Settlements and Traditional Affairs (hence refer to as COGHSTA), to facilitate the needed town planning procedures involved with the formalisation of the Gamakor Community, which is situated to the west of Keimoes, Kai !Garib Local Municipality, ZF Mgcau District Municipality. The Gamakor informal community has been occupying portions of the above mentioned farm properties for several years and already formed part of the area for future expansion during the compilation of the Kai !Garib Spatial Development Framework in 2012. COGHSTA is currently in the process of addressing the housing backlog in the Northern Cape, with numerous township establishment projects already identified of which the formalisation of the Gamakor Community in Keimoes is one.

In terms of the South African National Roads Agency Limited and National Roads Act (7 of 1998), approval from SANRAL is required for any development adjacent to a national road. In the case of the land portions involved, the objective is to have the properties rezoned and subdivided in terms of the Spatial Planning and Land Use Management Act, No. 16 of 2013, as part of the formalisation of Gamakor. It should furthermore be noted that the Kai !Garib Municipality wishes to establish a direct linkage between the community of Gamakor and the N14 in the future, as such this submission also serves to inform and acquire feedback from SANRAL in regards to a possible future access from the N14 national road. Please note that the mentioned linkage does not form part of the current scope, but will definitely become a reality during the next phase of development in the western components of the town.

The proposed direct linkage of the community of Gamakor to the N14 is motivated on the basis of the general direction in which Keimoes is expanding with the establishment of 1500 land units now and the possible future expansions further to the south of the area now being formalised.

#### **GAMAKOR FORMALISATION PROJECT DESCRIPTION:**

The undertaking of the formalisation of the Gamakor Community by Macroplan derives from an indirect appointment by COGHSTA and is therefore a project of national and provincial importance. The Gamakor Informal community can be found to the west of Keimoes and stretches from the railway line to the northern alignment of Keimoes residential area. The formalisation process pertains to portions of three registered farm portions, namely the Remainder, Portion 95 & Portion 128 of the Farm Kousas, No. 459, Gordonias RD, all held under the ownership of the Kai !Garib Local Municipality. The proposed formalisation will provide sub economic housing with the end goal of securing ownership of land for the current residents.

The Gamakor informal community currently houses an estimate of between 850 to 900 informal stands, of which almost 140 stands accommodate permanent structures. The formalisation of Gamakor entails the design of a formal coherent town planning layout through a SPLUMA process, which is informed by numerous specialist studies. At this stage the project has progressed to a point where a concept layout (**Annexure E**) has been prepared that may be subject to minor alterations to comply with the findings of the specialist studies, but the general layout and functioning thereof should be maintained.

The latest concept layout has been designed to formalise the existing informal residential stands, make provision for residential expansion, incorporate land uses such as business, institutional (churches and a school) and recreational uses, whilst providing a coherent internal road network that promotes easy and accessible movement throughout.

#### **INFORMATION CONCERNING SANRAL:**

The formalisation of Gamakor adjacent to the N14 has not yet been formally submitted to the Local Authority for approval and will be submitted for input and processing during the July and August 2020. The input and approval from SANRAL is a requirement before the approval for the process can be sought from the ZF Mgcau Planning Tribunal on the proposed SPLUMA land use change application. The following aspects may be highlighted and feedback from SANRAL in this regard is of utmost importance:

- **SPLUMA Process:** The formalisation of the Gamakor Community is a legal process guided by the Spatial Planning and Land Use Management Act (Act 16 of 2013) and this legislation clearly states that all state and semi-state department needs to be informed of any development that may directly or indirectly impact on the general functioning of said departments. The properties that comprise the formalisation area borders directly to the N14 national road, as such SANRAL needs to be informed of the planned formalisation process and an approval/ no-objection is needed before the land use change application can be submitted to the local authority,
- **Distance from N14:** The formalisation site is situated approximately **280m north of the N14** national road, as such the Gamakor Community is not situated within the prescribed building lines that SANRAL may impose. It should furthermore be noted that the Transnet railway line is nestled between the formalisation area and the N14.
- **Proposed future Access:** As previously mentioned in this submission, the Kai !Garib Municipality wishes to establish a direct future linkage between the Gamakor Community and the N14. This formal notification letter hereby serve to inform SANRAL of a possible future access from the N14 and to open the general discussion in this regard. The

concept layout makes provision for a future connection and the approximate coordinates for the proposed access from the N14 can be viewed on Figure 3; **Annexure C**. It should be noted that the formalisation process involves the general expansion of Keimoes in a westerly direction and the area is confined by the urban edge as captured on the Keimoes SDF Map (**Annexure D**). It is anticipated that a traffic impact assessment and detail design drawings will be required before SANRAL will consider an access from the N14. Again please note that this will form part of a future expansion project, but that your input are already sought during this process in order for the Municipality to take note of your input and feedback.

- Kindly note that the layout also makes provision from future expansion towards the west, but SANRAL will be notified of any future expansions.

Please refer to **Annexure E** which indicates the envisioned future development approximate 280m north of the N14. **The objectives of this letter are as follow:**

1. To notify SANRAL of the proposed process of formalisation;
2. To obtain a no-objection for the land use changes (subdivision and rezoning), in terms of the Spatial Planning Land Use Management Act (Act 16 of 2013), that need to be followed for the planned township expansion;
3. To obtain input, notify and open general discussions regarding a possible future access from the N14 to the Gamakor Community.

In order to supplement this letter, please find the following documents attached:

- A. Copy of Title Deed
- B. Locality Map
- C. Planning Diagram indicating proposed development in relation to the N10.
- D. Keimoes SDF Map
- E. Preferred Township Establishment Layout

Kindly take note that this submission is lodged in accordance to the provision of the Kai !Garib Final SPLUMA By-Laws and according to §32.(1) of this policy, if an organ of state fails to comment or provide information within 60 days from the date of which this notification letter has been furnished, that organ of state is deemed to have no comment of information to furnish. Please let us know if this letter for an approval meets your requirements and if any additional information needs to be provided. We trust that you will find these matters to be in order and if there are any additional components we can assist you with, please do not hesitate to request such information

We look forward to your inputs in this regard. Please feel free to contact our office in the case of any further enquiries.

Yours Sincerely,




---

**Justus Petrus Theron Pr.Pl.n. A/2394/2016**

M +27 82 821 1024  
 T +27 54 332 3642  
 E [jptheron@mweb.co.za](mailto:jptheron@mweb.co.za)

# ANNEXURE A

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2

L13588/cc

SEELREG  
STAMP DUTY R.....  
FOOI  
FEES R... *Ex PCS*

Prepared by me:

CONVEYANCER  
VENTER PHILIPPUS

GESERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie 66, Act 47/37  
terms of Regulation No.....

AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRATEUR VAN AMES  
REGISTRAR OF DEEDS

Date/Datum: 2020-03-04

DEED OF TRANSFER.

T 889 2014

(By virtue of a Power of Attorney)

BE IT HEREBY MADE KNOWN

PHILIPPUS VENTER

That ~~ANDRIES PETRUS GERBRAND VENTER~~  
appeared before me, Registrar of Deeds, VRYBURG he being duly authorised  
thereto by a Power of Attorney, dated 27 JANUARY 2014, executed at  
Kimberley and granted to him by the

FOR INFORMATION ONLY

NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA

AND the Appearer declared that on 19 August 2010 his Principal as aforesaid donated the following property to the undermentioned Transferee for the use of low cost housing free of charge

NOW THEREFORE the said Appearer in his capacity, as aforesaid, did, by these presents, cede and transfer, to and on behalf of

**KAIL GARIB MUNICIPALITY**

Its successors in title or assigns in full and free property

1. Portion 128 of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 36,0025 (Thirty Six Comma Zero Zero Two Five)  
Hectares

As will appear from Diagram SG Number 741/2009 and held by  
Deed of Transfer Number T88/1931

FOR INFORMATION ONLY

**SUBJECT TO:**

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESKOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.

2. Remaining extent of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 940,0374 (Nine Four Zero Comma Zero Three Seven  
Four) Hectares

Firstly transferred by Deed of Grant Number 955/1894 with diagram  
relating thereto and held by Deed of Transfer Number T88/1931

**SUBJECT TO:**

FOR INFORMATION ONLY

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.

- 4 -

**WHEREFORE** the Appearer in his said Capacity, renouncing all the right and title, the said

**NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA**

heretofore had to the premises, did, in consequence also acknowledged the said transferor to be entirely dispossessed of, and disentitled to the same; and that by virtue of these presents, the said

**KAI GARIB MUNICIPALITY**

Its successors in title or assigns now is and henceforth shall be entitled thereto conformably to local custom; The State, however, reserving its rights,

**IN WITNESS** whereof I, the said Registrar, together with the Appearer, q.q, have subscribed to the presents and have caused the seal of Office to be affixed thereto.

**THUS DONE and EXECUTED** at the Office of the **REGISTRAR OF DEEDS**, in **VRYBURG** on 2014-05-09

q.q.

In my presence

  
REGISTRAR OF DEEDS

FOR INFORMATION ONLY



FOR INFORMATION ONLY

GESERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie 66, Act 47/37  
terms of Regulation No. ....

AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRATEUR VAN AKTES  
REGISTRAR OF DEEDS

Date/Datum: 2020-03-04

24 MAR. 1931

Stamp Duty & .....  
Fees of Office & .....



*By Deed of Grant No 6/1939 of  
18/2/1939 Regd. 7/3/1939 the owner of  
Lot 22 A hereby conveyed is entitled to  
the benefit of certain grazing rights  
on the remainder of the farm, houses  
held hereunder, go with more fully appear  
on reference to the conditions contained  
in the said Deed of Grant No 6/1939  
Deeds Registry,  
Vryburg  
7/3/1939*

*Apply to  
D. S. Registrar of Deeds*

*Die eiendoms skedules hier is onderwerp aan 'n reg  
van vyf akkers van die grootte van die eiendoms van Lot  
No. 19 van die plan houses, afgeleë by Gordon, by die  
aan afgeleë by die plan houses, afgeleë by Gordon, by die  
No. 19/1957. op 6 Augustus 1957 en beide  
gegras word.*

G. H. B. BOSHOFF  
REGISTRAR OF DEEDS

Deed of Transfer, No. 88  
BY VIRTUE OF A POWER OF ATTORNEY, 1931

Prepared by

*Amulph...*  
Conveyancer.

Know all Men whom it may concern:

That ADOLF HEINRICH FRIEDRICH BRUHNS appeared before me,  
Assistant Registrar of Deeds, he, the said Appearer, being duly authorized  
thereto by a Power of Attorney dated at CAPE TOWN, on the 6th. day of  
March, 1931,

and witnessed in accordance with law, and granted to him by BERTHOLD  
NUSSEBAUM, MILTON FREDERICK STERN and HERBERT LESLIE STERN,  
in their capacity as Executors Testamentary in the Estate of  
the late WILLIAM STERN, under and by virtue of Letters of  
Administration, dated at Cape Town on the 4th. June, 1925,

which Power of Attorney was exhibited to me on this day.  
AND the said Appearer declared that his Constituent s / had truly and

FOR FURTHER ENDORSEMENTS SEE  
VIR VERDERE ENDOORSEMENTE SIE

Bl. 5

M. P. ELLIOTT & CO.,  
ATTORNEYS,  
NOTARIES AND  
CONVEYANCERS.  
VRYBURG.

FOR FURTHER ENDORSEMENTS SEE  
VIR VERDERE ENDOORSEMENTE SIE

2.

by Private Treaty  
legally sold, and that he the said Appearer in his capacity as Attorney aforesaid,  
did by these presents, cede and transfer in full and free property, to and on behalf  
of

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

Order  
Its heirs, executors, administrators or assigns,

CERTAIN Remaining Extent of the Redeemed Quitrent Farm

"KOUSAS",

SITUATE in the Division of GORDONIA,

MEASURING as such One Thousand Three Hundred and Seventy Two

(1,372) Morgen, Four Hundred and Twenty Two (422)

Square Rods, Forty One (41) Square Feet,

EXTENDING as the Deed of Grant No. 955 with Diagram annexed  
made in favour of Klaas Bok on the 24th. April, 1894,  
and subsequent Deeds of Transfer, the last whereof  
Deeds of Transfer Nos. 6840, 6841 and 7924, regis-  
tered in favour of William Stern, on the 4th. June,  
1913, and 25th. May, 1916, respectively, will more  
fully point out, and

SUBJECT to such conditions as are therein referred to, and  
specially subject to certain grazing rights in favour  
of the owners of the Lots shown on General Plan  
No. K.60, except Lot marked School Site, in so far  
as these rights do not lapse by Merger by reason of  
this Transfer, and which rights are more fully set  
out in certain Conditions of Sale marked "A" attached  
to the Deeds of Transfer in favour of the said owners.

WHEREFORE.....

FOR INFORMATION ONLY

And the said Appearer declared that whereas the undermentioned property was sold by Private Treaty to the hereinafter-mentioned Transferee,

NOW THEREFORE, the said Appearer in his capacity as Attorney aforesaid, did by these presents, cede and transfer in full and free property, to and on behalf of the

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

Its Order or Assigns,

CERTAIN Remaining Extent of the Redeemed Quitrent Farm  
"KOUSAS",

SITUATE in the Division of GORDONIA,

MEASURING as such One Thousand Three Hundred and Seventy Two  
(1,372) Morgen, Four Hundred and Twenty Two (422)

Square Roods, Forty One (41) Square Feet,

EXTENDING as the Deed of Grant No. 955 with Diagram  
annexed made in favour of Klaas Bok on the 24th.

April, 1894, and subsequent Deeds of Transfer, the  
last whereof Deeds of Transfer Nos. 6840, 6841 and  
7924, registered in favour of William Stern, on the  
4th. June, 1913, and 25th. May, 1916, respectively,  
will more fully point out, and

SUBJECT to such conditions as are therein referred to, and

specially subject to certain grazing rights in favour  
Nos. 1, 8, 9, 11, 11A, 12 to 16 inclusive, 18, 23 to 38 inclusive  
of the owners of the Lots shown on General Plan

No. K. 60, which rights are more fully set out in  
certain Conditions of Sale marked "A" attached to  
the Deeds of Transfer in favour of the said owners.

THEREFORE.....

FOR INFORMATION ONLY

Wherefore the Appearer, renouncing all the right and title his Constituent heretofore had to the Premises, on behalf as aforesaid, did in consequence also acknowledge the said

ESTATE OF THE LATE WILLIAM STERN,

to be entirely dispossessed of, and disentitled to, the same; and that by virtue of these Presents, the said

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

*AM*  
Order  
Its heirs, executors, administrators, or assigns, now is and henceforth shall be entitled thereto conformably to local custom;—Government, however, reserving its rights, the Appearer q.q. finally acknowledging his Constituents to be satisfactorily paid the whole of the purchase money amounting to a sum of ONE HUNDRED AND FIFTY POUNDS STERLING (£150. 0. 0.).

Assistant  
IN WITNESS WHEREOF, I, the said/Registrar of Deeds, together with the Appearer, q.q., have subscribed to these Presents, and have caused the Seal of Office to be affixed thereto.

THUS DONE AND EXECUTED, at the Office of the Registrar of Deeds, at \_\_\_\_\_ on the \_\_\_\_\_ day of the month of \_\_\_\_\_ in the year of Our Lord One Thousand Nine Hundred and Thirty One.

q.q. his Principal.

In my presence,

Assistant, Registrar of Deeds.

Registered in the Register of GORDONIA FARMS Book

Folio \_\_\_\_\_ on the above date.

FOR INFORMATION ONLY



# ANNEXURE B

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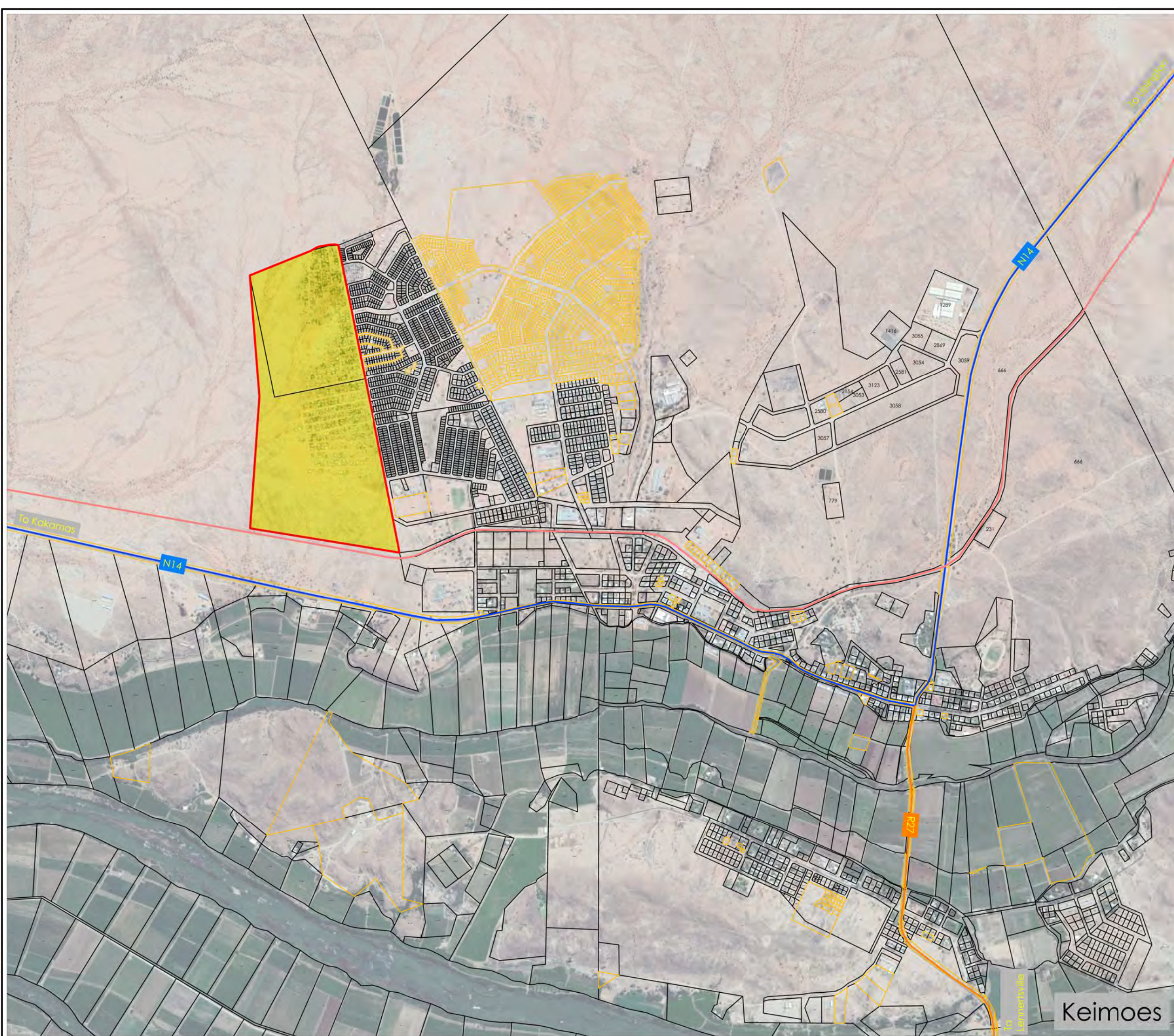






Figure 1  
Locality Map: Region

**Description:**

REMAINDER OF THE FARM KOUSAS, NO. 459 & PORTION  
128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB  
MUNICIPALITY, NORTHERN CAPE PROVINCE

### Legend

- |   |                                 |
|---|---------------------------------|
|  | Study Area                      |
|  | National Road                   |
|  | Provincial Road                 |
|  | Railway Line                    |
|  | Registered Cadastral Land Units |
|  | Surveyed Cadastral Land Units   |



Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401



**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642

4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

## Reference

(FIG1.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed

JP Theron

Date \_\_\_\_\_

May 2020

Drawn

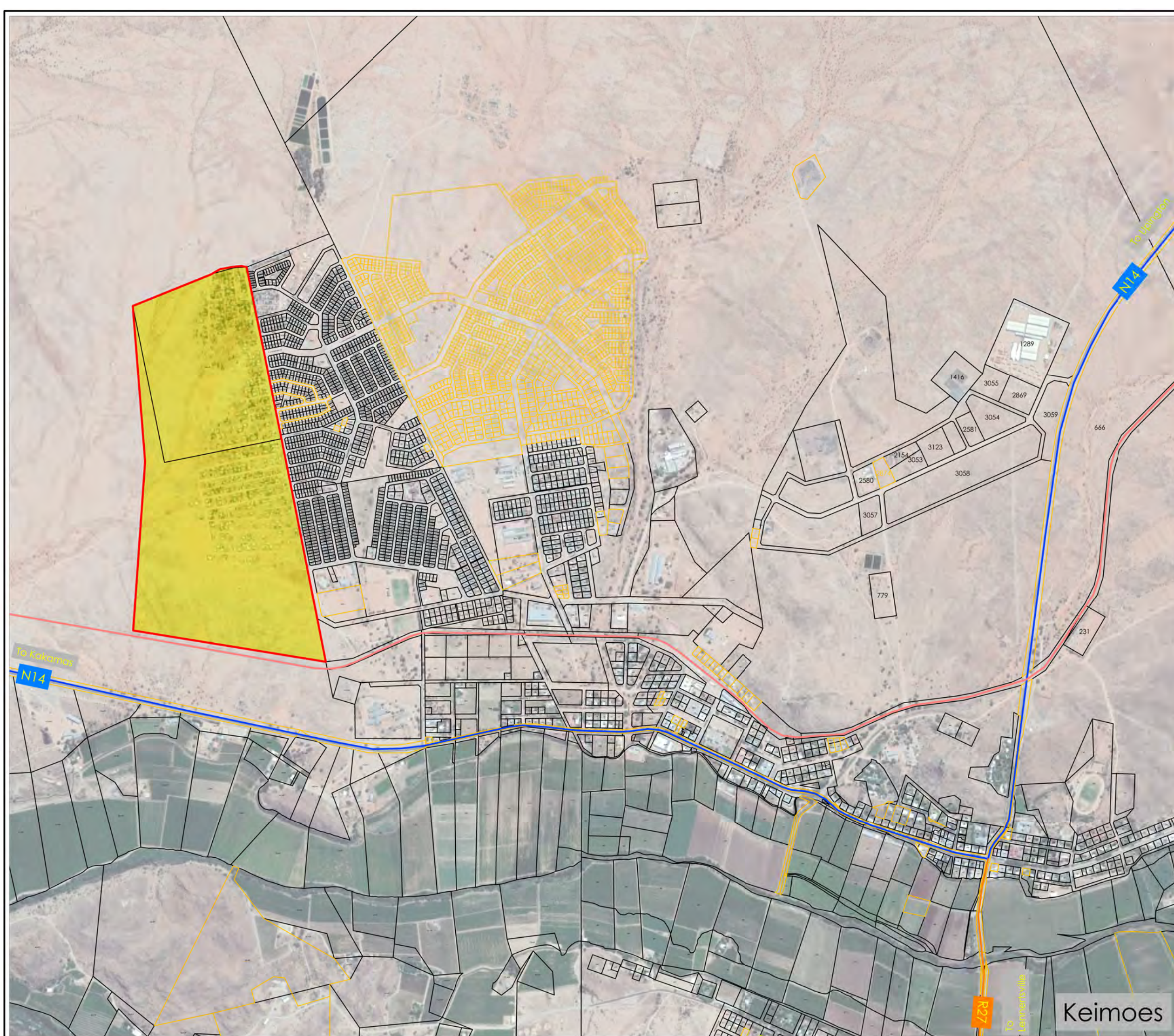
JP Theron

Scale

1: 20 000

Keimoes





### Legend

- |   |                                 |
|---|---------------------------------|
|  | Study Area                      |
|  | National Road                   |
|  | Provincial Road                 |
|  | Railway Line                    |
|  | Registered Cadastral Land Units |
|  | Surveyed Cadastral Land Units   |



Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401



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PO Box 987, Upington 8800 www.macroplan.info

(FIG1.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

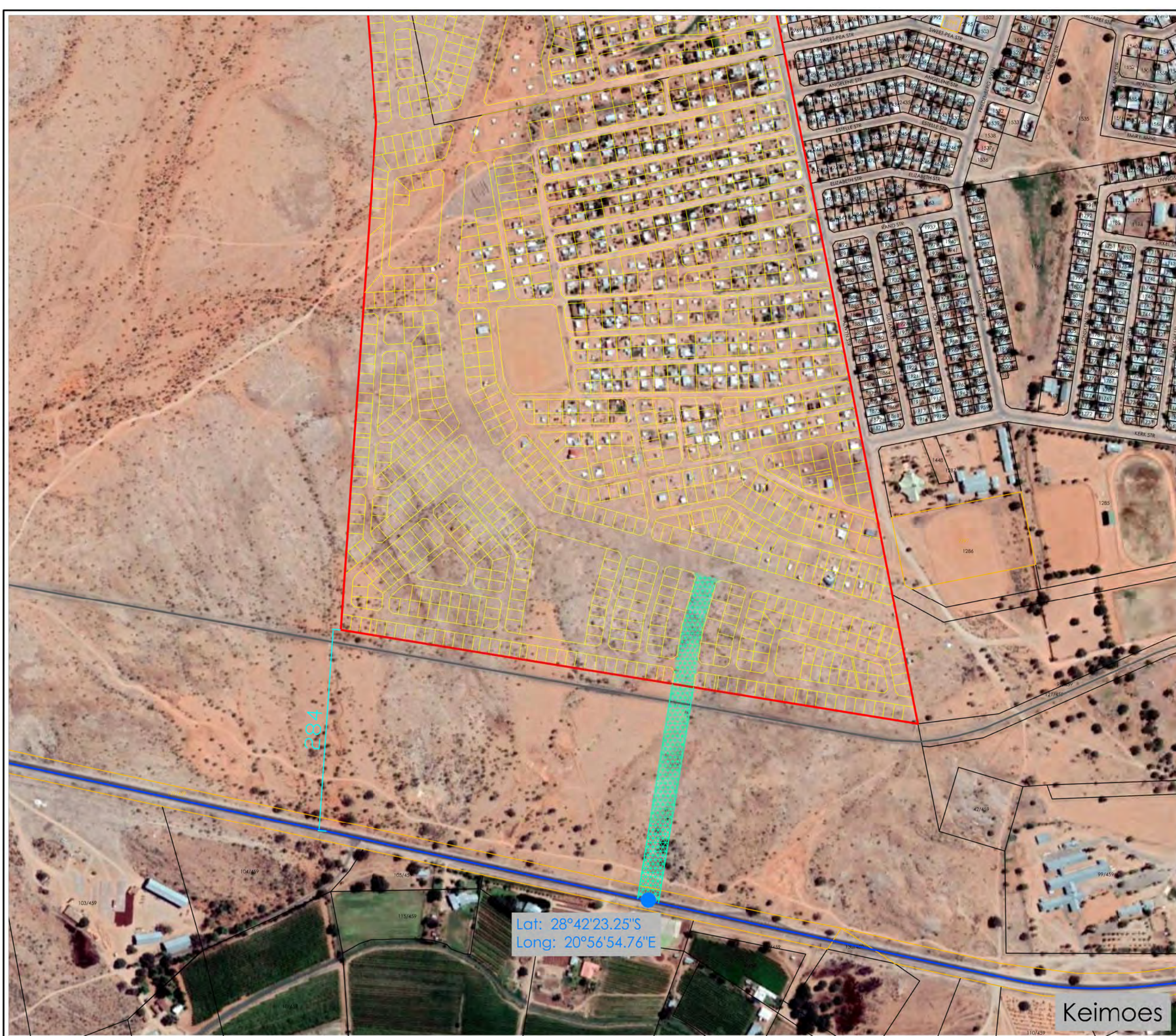
Designed	JP Theron	Date	May 2020
Drawn	JP Theron	Scale	1: 15 000



# ANNEXURE C

---





Page:

Title: **Figure 3**

Description: **Information Concerning SANRAL**

REMAINDER OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

**Legend**

- Study Area
- National Road
- Railway Line
- Proposed Future Access Linkage
- Proposed Access Point

Registered Cadastral Land Units

Surveyed Cadastral Land Units

Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401

**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference:  
(FIG3.SAN) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed JP Theron	Date July 2020
Drawn JP Theron	Scale 1: 5000

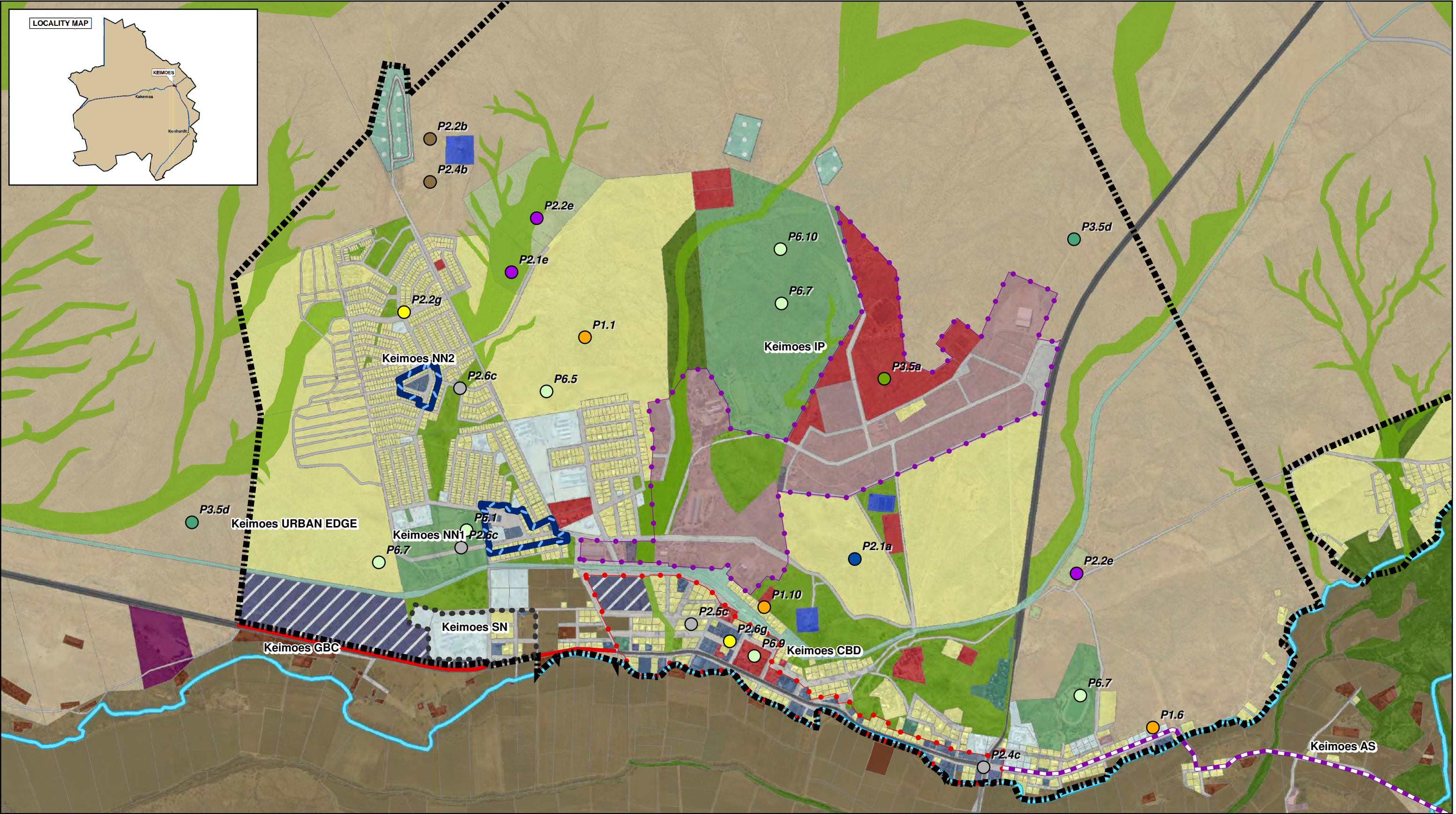




















































# ANNEXURE D


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# PLAN 92a: KEIMOES SDP



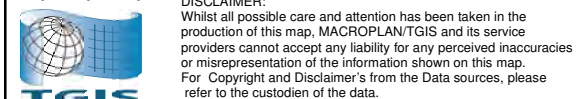
	A.a Statutory Protected Areas		D.i Business Areas		E.d Nuisance Industry		Agriculture development		Roads		Canal		NODE: Neighbourhood
	B.a Non Statutory Conservation Area		D.j Service Related Business		F.a National Roads		Cemeteries		Sanitation		URBAN EDGE		NODE: Speciality
	B.b Ecological Corridors		D.m Mixed Use Development Areas		F.b Main Roads		Electricity		Sport and recreational		ACTIVITY CORRIDOR: General Business		PRECINCT: CBD
	B.c Urban Green Areas		D.n Cemeteries		F.c Minor Roads		Housing		Tourism development		ACTIVITY STREET: Tourism		PRECINCT: Industrial
	C.a Extensive agricultural Areas		D.o Sports Fields and Infrastructure		F.d Public Streets				Water				
	C.b Intensive agricultural Areas		D.p Airport and Infrastructure		F.f Railway Lines								
	D.a Main Towns		D.q Resorts and Tourism Related Areas		F.g Power Lines								
	D.b Local Towns		D.r Farmsteads and Outbuildings		F.i Renewable Energy Structures								
	D.f Institutional Areas		E.a Agricultural Industry		F.j Dams and Reservoirs								
	D.g Authority Areas		E.b Light Industry		F.k Canals								
	D.h Residential Areas		E.c General Industry		F.l Sewerage Plants and Refuse Areas								



**Map compiled by :**



**DISCLAIMER:**  
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**MACROPLAN**  
 Stads- & Streekbeplanners  
 Town & Regional Planners  
 In associasie met:  
 In association with:


**GOBETL**  
 Spatial Design  
 Land Use Specialists



**G O B E T T & A S S O C I A T E S**  
Spatial Design  
Land Use Specialists

Date: 7 August 2012

Projection: Transverse Mercator WGS84, LO21

Data source:  
Cadastral Data - Originally sourced from the Surveyor General January 2012,  
corrected and enhanced by TGIS

SDF Data - Macroplan

Aerial Photography - Rural Development and Land Reform - NGI

Data source:  
Cadastral Data - Originally sourced from the Surveyor General January 2012,  
corrected and enhanced by TGIS

Aerial Photography - Rural Development and Land Reform - NGI



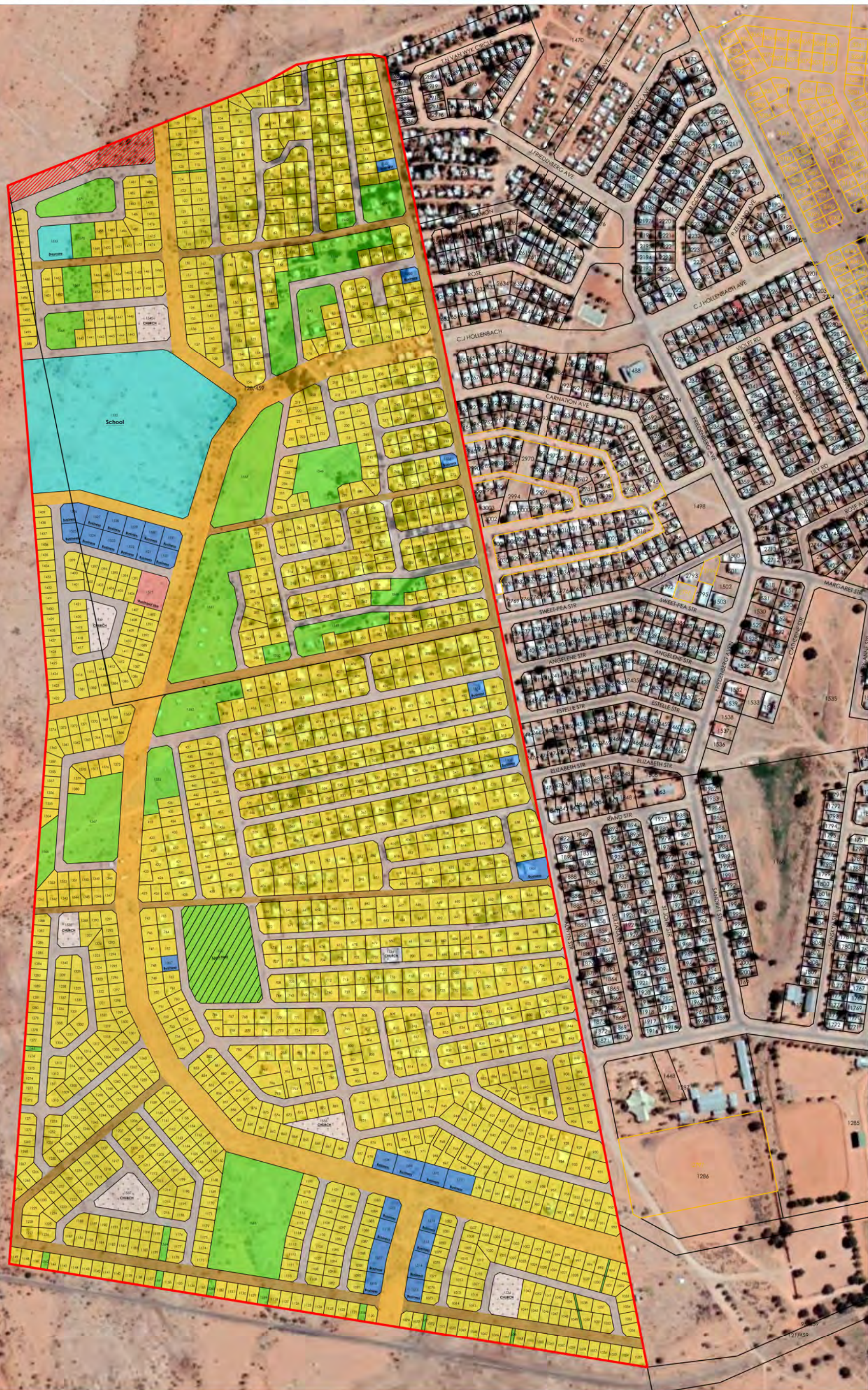


# ANNEXURE E

---



## FORMALISATION OF GAMAKOR INFORMAL COMMUNITY - CONCEPT 5



## Formalisation of Gamakor

Design: JP Theron (A/2394/2016)

Drawn: JP Theron (A/2394/2016)

Date: June 2020












Scale: 1:5000 (A3)

## Detail Layout Plan








CL/DRW/KAI2020/GAM/CON4

### Proposed Land Uses in terms of Kai !Garib Scheme Regulations

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes		
			average size	total area per use	percentage covered by use
	Agricultural Zone I				
	Agricultural Zone II				
	Residential Zone I	1500	N/A		
	Residential Zone II				
	Residential Zone III				
	Residential Zone IV				
	Business Zone I	31	N/A		
	Business Zone II				
	Business Zone III				
	Business Zone IV				
	Business Zone V				
	Industrial Zone I				
	Industrial Zone II				
	Industrial Zone III				
	Institutional Zone I	2	N/A		

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes		
			average size	total area per use	percentage covered by use
	Institutional Zone II	7	N/A		
	Institutional Zone III				
	Open Space Zone I	32			
	Open Space Zone II	1			
	Open Space Zone III				
	Transport Zone I				
	Transport Zone II				
	Transport Zone III				
	Transport Zone IV				
	Authority Zone I	1	N/A		
	Authority Zone II				
	Resort Zone II				
	Special Zone				
	Undetermined Zone		N/A		
	TOTAL	1576			

### Topographical Information

Detail Description	Symbol
Protected Trees	
Contours	
Fences	
Water furrows	
Existing Houses	
Permanent Houses	
New Permanent Houses since project inception	
Rock Outcrops	
Storm-water Furrow	

**Project Descriptions:**

**Formalisation of Gamakor Informal Community**



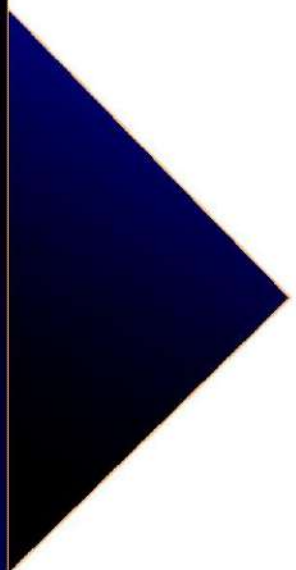
Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401





## ANNEXURE K: TRANSNET NOTIFICATION LETTER



Reference:

Date:

(ENQ.PC.TRANS) 200707 Gamakor Formalisation – Barzani Development

07 July 2020

TRANSNET

Depot Engineer

1B Austen Street

Beaconsfield, Kimberley

8315

P.O. Box 10201

Attention: To whom it may concern

**PROJECT: FORMALISATION OF GAMAKOR (KEIMOE) COMMUNITY**

**INVOLVED PROPERTIES SUMMARY:**

- REMAINDER OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE;
- PORTION 128 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE;
- PORTION 95 OF THE FARM KOUSAS, NO. 459, GORDONIA RD, KAI !GARIB LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.

The above mentioned matter, as well as the attached documentation, refer.

Our office, Macroplan Town and Regional Planners, has been appointed by Barzani Development on behalf of the Department of Cooperative Governance, Human Settlements and Traditional Affairs (hence refer to as COGHSTA), to facilitate the needed town planning procedures involved with the formalisation of the Gamakor Community, which is situated to the west of Keimoes, Kai !Garib Local Municipality, ZF Mgcawu District Municipality. The Gamakor informal community has been occupying portions of the above mentioned farm properties for several years and already formed part of the area for future expansion during the compilation of the Kai !Garib Spatial Development Framework in 2012. COGHSTA is currently in the process of addressing the housing backlog in the Northern Cape, with numerous township establishment projects already identified of which the formalisation of the Gamakor Community in Keimoes is one.

In terms of the Spatial Planning and Land Use Management Act, No. 16 of 2013, approval / input from any state or semi-state department is required for any development that can directly or indirectly impact on the general functioning of said department. Transnet Ltd. has been identified as being an interested and affected party, since the area identified for the formalisation of Gamakor is bordered to the south by a Transnet Ltd. railway line. In the case of the land portions involved, the objective is to have the properties rezoned and subdivided in terms of the Spatial Planning and Land Use Management Act, No. 16 of 2013, as part of the formalisation of Gamakor.

It should furthermore be noted that the Kai !Garib Municipality wishes to establish a direct linkage between the community of Gamakor and the N14 in the future, which will result in the crossing of the railway line as such this submission also serve to inform and acquire feedback from Transnet Ltd. in regards to a possible crossing of the railway line. **Please note that the mentioned linkage does not form part of the current scope, but will definitely become a reality during the next phase of development in the western components of the town.**

The proposed direct linkage of the community of Gamakor to the N14 is motivated on the basis of the general direction in which Keimoes is expanding with the establishment of 1500 land units now and the possible future expansions further to the south of the area now being formalised.

#### **GAMAKOR FORMALISATION PROJECT DESCRIPTION:**

The undertaking of the formalisation of the Gamakor Community by Macroplan derives from an indirect appointment by COGHSTA and is therefore a project of national and provincial importance. The Gamakor Informal community can be found to the west of Keimoes and stretches from the railway line to the northern alignment of Keimoes residential area. The formalisation process pertains to portions of three registered farm portions, namely the Remainder, Portion 95 & Portion 128 of the Farm Kousas, No. 459, Gordonias RD, all held under the ownership of the Kai !Garib Local Municipality. The proposed formalisation will provide sub economic housing with the end goal of securing ownership of land for the current residents.

The Gamakor informal community currently houses an estimate of between 850 to 900 informal stands, of which almost 140 stands accommodate permanent structures. The formalisation of Gamakor entails the design of a formal coherent town planning layout through a SPLUMA process, which is informed by numerous specialist studies. At this stage the project has progressed to a point where a concept layout (**Annexure E**) has been prepared that may be subject to minor alterations to comply with the findings of the specialist studies, but the general layout and functioning thereof should be maintained.

The latest concept layout has been designed to formalise the existing informal residential stands, make provision for residential expansion, incorporate land uses such as business, institutional (churches and a school) and recreational uses, whilst providing a coherent internal road network that promotes easy and accessible movement throughout.

#### **INFORMATION CONCERNING TRANSNET LTD.:**

The formalisation of Gamakor adjacent to the railway line has not yet been formally submitted to the Local Authority for approval, since the approval from Transnet Ltd. is a requirement before submission of the land use change application. The following aspects may be highlighted and feedback from Transnet Ltd. in this regard is of utmost importance:

- **SPLUMA Process:** The formalisation of the Gamakor Community is a legal process guided by the Spatial Planning and Land Use Management Act (Act 16 of 2013) and this legislation clearly states that all state and semi-state department needs to be informed of any development that may directly or indirectly impact on the general functioning of said departments. The properties that comprise the formalisation area borders directly to a Transnet Ltd. railway line, as such Transnet Ltd. needs to be informed of the planned formalisation process and an approval/ no-objection is needed before the land use change application can be submitted to the local authority;
- **Distance from Railway Line:** The continued development alignment along the railway line has been maintained with a 20m buffer (See Annexure C) separating the formalisation area and the railway line. Should this 20m buffer not be sufficient it is requested that Transnet Ltd. communicate their requirements in this regard;



- **Proposed future Access:** Due to the magnitude of the proposed formalisation that comprise of 1500 even and other supporting land uses, the Kai !Garib Local Municipality wishes to establish a direct connection between the community of Gamakor and the N14 in the future. This linkage will require the crossing of the railway line, since the railway line is nestled between Gamakor and the N14. It is anticipated that the crossing will be handled as the current railway crossings in Keimoes, since funding for a bridge construction will not be available. SANRAL has been informed of the planned formalisation and the proposed new access point. It is imperative that Transnet Ltd. take note of possibility of a future linkage to the N14 national road. This office would however in the meantime like to acquire feedback from Transnet Ltd. on the possible crossing of the railway line. Again please note that this will form part of a future expansion project, but that your input are already sought during this process in order for the Municipality to take note of your input and requirements.
- Kindly note that the layout also makes provision from future expansion towards the west, but Transnet Ltd. will be notified of any future expansion.

Please refer to **Annexure E** which indicates the envisioned future development adjacent to the N14

The objectives of this letter are as follow:

1. To notify Transnet Ltd. of the proposed process of formalisation;
2. To obtain a no-objection for the land use changes (subdivision and rezoning), in terms of the Spatial Planning Land Use Management Act (Act 16 of 2013), that need to be followed for the planned township expansion;
3. To obtain notify and open general discussions in regards to a possible future access from the N14 to the Gamakor Community, that will require the crossing of the railway line.

In order to supplement this letter, please find the following documents attached:

- A. Copy of Title Deed
- B. Locality Map
- C. Planning Diagram indicating proposed development in relation to the railway line.
- D. Preferred Township Establishment Layout

Kindly take note that this submission is lodged in accordance to the provision of the Kai !Garib Final SPLUMA By-Laws and according to §32.(1) of this policy, if an organ of state fails to comment or provide information within 60 days from the date of which this notification letter has been furnished, that organ of state is deemed to have no comment of information to furnish. Please let us know if this letter for an approval meets your requirements and if any additional information needs to be provided. We trust that you will find these matters to be in order and if there are any additional components we can assist you with, please do not hesitate to request such information

We look forward to your inputs in this regard. Please feel free to contact our office in the case of any further enquiries.

Yours Sincerely,




---

**Justus Petrus Theron Pr.Pln. A/2394/2016**

M +27 82 821 1024  
T +27 54 332 3642  
E [jptheron@mweb.co.za](mailto:jptheron@mweb.co.za)

# ANNEXURE A

---

2

L13588/cc

SEELREG  
STAMP DUTY R.....  
FOOI  
FEES R... *Ex PCS*

Prepared by me:

CONVEYANCER  
VENTER PHILIPPUS

GESERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie 66, Act 47/37  
terms of Regulation No.....

AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRATEUR VAN AMES  
REGISTRAR OF DEEDS

Date/Datum: 2020-03-04

DEED OF TRANSFER.

T 889 2014

(By virtue of a Power of Attorney)

BE IT HEREBY MADE KNOWN

PHILIPPUS VENTER

That ~~ANDRIES PETRUS GERBRAND VENTER~~  
appeared before me, Registrar of Deeds, VRYBURG he being duly authorised  
thereto by a Power of Attorney, dated 27 JANUARY 2014, executed at  
Kimberley and granted to him by the

FOR INFORMATION ONLY

NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA

AND the Appearer declared that on 19 August 2010 his Principal as aforesaid donated the following property to the undermentioned Transferee for the use of low cost housing free of charge

NOW THEREFORE the said Appearer in his capacity, as aforesaid, did, by these presents, cede and transfer, to and on behalf of

**KAIL GARIB MUNICIPALITY**

Its successors in title or assigns in full and free property

1. Portion 128 of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 36,0025 (Thirty Six Comma Zero Zero Two Five)  
Hectares

As will appear from Diagram SG Number 741/2009 and held by  
Deed of Transfer Number T88/1931

FOR INFORMATION ONLY

**SUBJECT TO:**

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESKOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.



2. Remaining extent of the farm Kousas Number 459

Situated in the Kail Garib Municipality, Division Gordonia,  
Province Northern Cape

In extent 940,0374 (Nine Four Zero Comma Zero Three Seven  
Four) Hectares

Firstly transferred by Deed of Grant Number 955/1894 with diagram  
relating thereto and held by Deed of Transfer Number T88/1931

**SUBJECT TO:**

FOR INFORMATION ONLY

- A. By virtue of registration of Notarial Deed of Servitude Number K13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above the ground or underground, as will more fully appear in the said Notarial Deed.
- B. By virtue of Notarial Deed Number K 13/1976S the right has been granted to ESCOM to convey electricity across the withinmentioned property by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed
- C. By virtue of Notarial Deed Number K 16/1990 S the right has been granted to ESCOM to convey electricity across the withinmentioned property indicated by the figures ABb on Diagram Number 2722/1988 by means of wires and/or cables or other accessories above ground or underground; as will more fully appear from the said Notarial Deed.

- 4 -

**WHEREFORE** the Appearer in his said Capacity, renouncing all the right and title, the said

**NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA**

heretofore had to the premises, did, in consequence also acknowledged the said transferor to be entirely dispossessed of, and disentitled to the same; and that by virtue of these presents, the said

**KAI GARIB MUNICIPALITY**

Its successors in title or assigns now is and henceforth shall be entitled thereto conformably to local custom; The State, however, reserving its rights,

**IN WITNESS** whereof I, the said Registrar, together with the Appearer, q.q, have subscribed to the presents and have caused the seal of Office to be affixed thereto.

**THUS DONE and EXECUTED** at the Office of the **REGISTRAR OF DEEDS**, in **VRYBURG** on 2014-05-09

q.q.

In my presence

  
REGISTRAR OF DEEDS

FOR INFORMATION ONLY

FOR INFORMATION ONLY

GESERTIFISEER 'n juiste afskrif van die duplikaat  
CERTIFIED a true copy of the duplicate original in  
oorspronklike kragtens regulasie 66, Act 47/37  
terms of Regulation No. ....

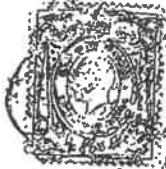
AKTEKANTOOR  
DEEDS OFFICE  
VRYBURG

REGISTRATEUR VAN AKTES  
REGISTRAR OF DEEDS

Date/Datum: 2020-03-04

24 MAR. 1931

Stamp Duty & .....  
Fees of Office & .....



By Deed of Grant No 6/1939 of  
18/2/1939 Regd. 7/3/1939 the owner of  
Lot 22 A, hereby conveyed is entitled to  
the benefit of certain grazing rights  
on the remainder of the farm, houses  
held hereunder, as will more fully appear  
on reference to the conditions contained  
in the said Deed of Grant No 6/1939  
Deeds Registry,  
Vryburg  
7/3/1939  
D. H. B. BOSHOFF  
Asst. Registrar of Deeds

Die oorspronklike oorskrif van hierdie oorskrif is onderwerp aan 'n reg  
van oorskrif oorskrif van die oorskrif van die oorskrif van die oorskrif  
No. 19 van die oorskrif van die oorskrif van die oorskrif van die oorskrif  
van die oorskrif van die oorskrif van die oorskrif van die oorskrif  
No. 75/1957. op 6 Augustus 1957 in hede  
gegee.

G. H. B. BOSHOFF  
REGISTRAR OF DEEDS

Deed of Transfer, No. 88  
BY VIRTUE OF A POWER OF ATTORNEY, 1931

Prepared by

Amulphum  
Conveyancer.

Know all Men whom it may concern:

That ADOLF HEINRICH FRIEDRICH BRUHNS appeared before me,  
Assistant Registrar of Deeds, he, the said Appearer, being duly authorised  
thereto by a Power of Attorney dated at CAPE TOWN, on the 6th. day of  
March, 1931,

and witnessed in accordance with law, and granted to him by BERTHOLD  
NUSSEBAUM, MILTON FREDERICK STERN and HERBERT LESLIE STERN,  
in their capacity as Executors Testamentary in the Estate of  
the late WILLIAM STERN, under and by virtue of Letters of  
Administration, dated at Cape Town on the 4th. June, 1925,

which Power of Attorney was exhibited to me on this day.  
AND the said Appearer declared that his Constituent s / had truly and

FOR FURTHER ENDORSEMENTS SEE  
VIR VERDERE ENDOORSEMENTE SIE

Bl. 5

M. P. ELLIOTT & CO.,  
ATTORNEYS,  
NOTARIES AND  
CONVEYANCERS.  
VRYBURG.

FOR FURTHER ENDORSEMENTS SEE  
VIR VERDERE ENDOORSEMENTE SIE

2.

by Private Treaty  
legally sold, and that he the said Appearer in his capacity as Attorney aforesaid,  
did by these presents, cede and transfer in full and free property, to and on behalf  
of

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

Order  
Its heirs, executors, administrators or assigns,

CERTAIN Remaining Extent of the Redeemed Quitrent Farm

"KOUSAS",

SITUATE in the Division of GORDONIA,

MEASURING as such One Thousand Three Hundred and Seventy Two

(1,372) Morgen, Four Hundred and Twenty Two (422)

Square Rods, Forty One (41) Square Feet,

EXTENDING as the Deed of Grant No. 955 with Diagram annexed  
made in favour of Klaas Bok on the 24th. April, 1894,  
and subsequent Deeds of Transfer, the last whereof  
Deeds of Transfer Nos. 6840, 6841 and 7924, regis-  
tered in favour of William Stern, on the 4th. June,  
1913, and 25th. May, 1916, respectively, will more  
fully point out, and

SUBJECT to such conditions as are therein referred to, and  
specially subject to certain grazing rights in favour  
of the owners of the Lots shown on General Plan  
No. K.60, except Lot marked School Site, in so far  
as these rights do not lapse by Merger by reason of  
this Transfer, and which rights are more fully set  
out in certain Conditions of Sale marked "A" attached  
to the Deeds of Transfer in favour of the said owners.

WHEREFORE.....

FOR INFORMATION ONLY



And the said Appearer declared that whereas the undermentioned property was sold by Private Treaty to the hereinafter-mentioned Transferee,

NOW THEREFORE, the said Appearer in his capacity as Attorney aforesaid, did by these presents, cede and transfer in full and free property, to and on behalf of the

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

Its Order or Assigns,

CERTAIN Remaining Extent of the Redeemed Quitrent Farm  
"KOUSAS",

SITUATE in the Division of GORDONIA,

MEASURING as such One Thousand Three Hundred and Seventy Two  
(1,372) Morgen, Four Hundred and Twenty Two (422)

Square Roods, Forty One (41) Square Feet,

EXTENDING as the Deed of Grant No. 955 with Diagram  
annexed made in favour of Klaas Bok on the 24th.

April, 1894, and subsequent Deeds of Transfer, the  
last whereof Deeds of Transfer Nos. 6840, 6841 and  
7924, registered in favour of William Stern, on the  
4th. June, 1913, and 25th. May, 1916, respectively,  
will more fully point out, and

SUBJECT to such conditions as are therein referred to, and

specially subject to certain grazing rights in favour  
Nos. 1, 8, 9, 11, 11A, 12 to 16 inclusive, 18, 23 to 38 inclusive  
of the owners of the Lots shown on General Plan

No. K. 60, which rights are more fully set out in  
certain Conditions of Sale marked "A" attached to  
the Deeds of Transfer in favour of the said owners.

THEREFORE.....

FOR INFORMATION ONLY

Wherefore the Appearer, renouncing all the right and title his Constituent heretofore had to the Premises, on behalf as aforesaid, did in consequence also acknowledge the said

ESTATE OF THE LATE WILLIAM STERN,

to be entirely dispossessed of, and disentitled to, the same; and that by virtue of these Presents, the said

GOVERNMENT OF THE UNION OF SOUTH AFRICA,

Order

Its heirs, executors, administrators, or assigns, now is and henceforth shall be entitled thereto conformably to local custom;—Government, however, reserving its rights, the Appearer q.q. finally acknowledging his Constituents to be satisfactorily paid the whole of the purchase money amounting to a sum of ONE HUNDRED AND FIFTY POUNDS STERLING (£150. 0. 0.).

IN WITNESS WHEREOF, I, the said/Assistant Registrar of Deeds, together with the Appearer, q.q., have subscribed to these Presents, and have caused the Seal of Office to be affixed thereto.

THUS DONE AND EXECUTED, at the Office of the Registrar of Deeds, at \_\_\_\_\_ on the \_\_\_\_\_ day of the \_\_\_\_\_ month of \_\_\_\_\_ in the year of Our Lord One Thousand Nine Hundred and Thirty One.

q.q. his Principal.

In my presence,

Assistant, Registrar of Deeds.

Registered in the Register of GORDONIA FARMS Book

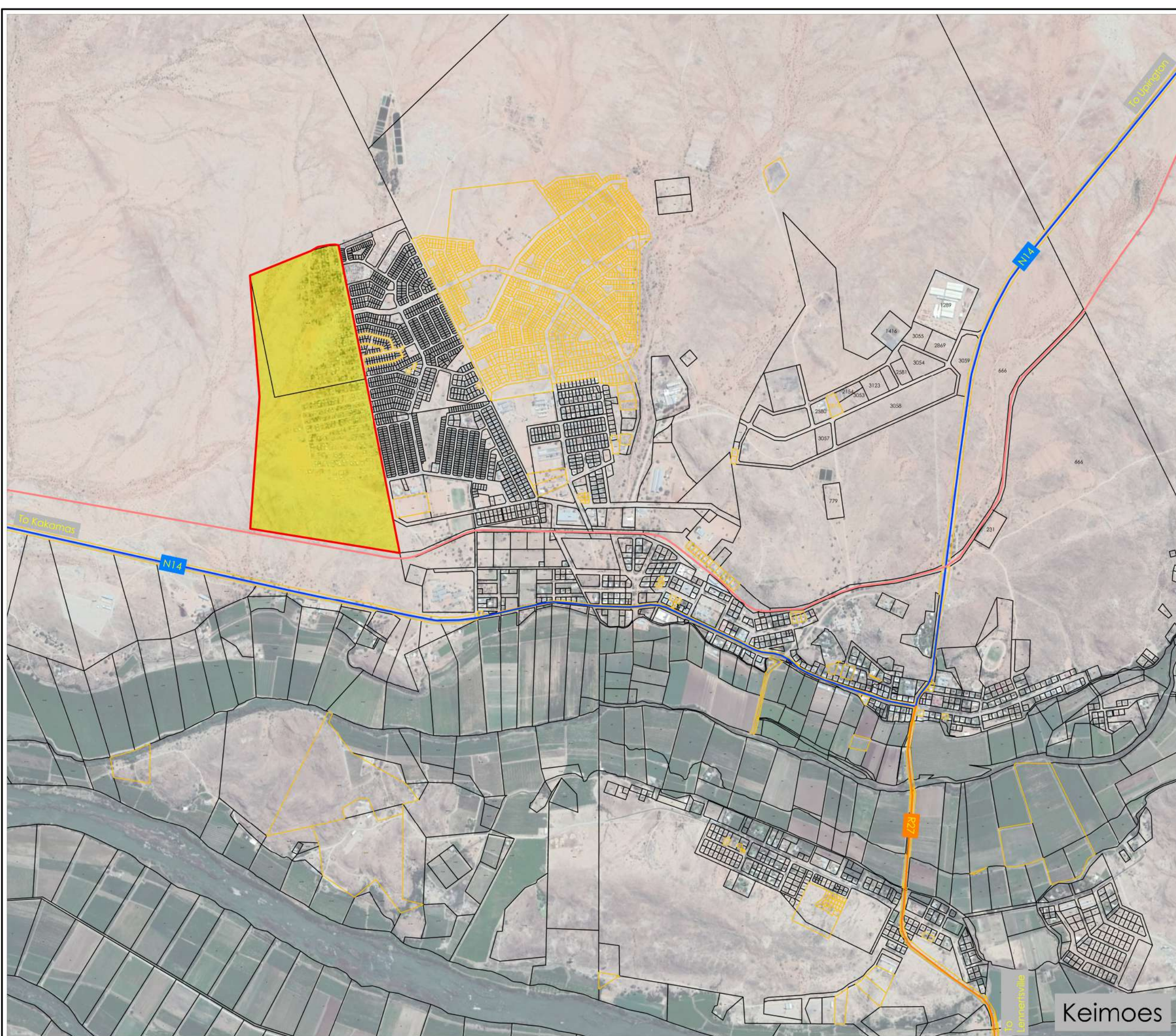
Folio \_\_\_\_\_ on the above date.

FOR INFORMATION ONLY

# ANNEXURE B

---





Page:

Title:

Figure 1

Locality Map: Region

Description:

REMAINDER OF THE FARM KOUSAS, NO. 459 & PORTION 128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB MUNICIPALITY, NORTHERN CAPE PROVINCE

Legend

Study Area

National Road

Provincial Road

Railway Line

Registered Cadastral Land Units

Surveyed Cadastral Land Units

Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401

**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642  
4A Murray Avenue, Upington 8801  
PO Box 987, Upington 8800

macroplan@mweb.co.za  
www.macroplan.info

Reference:

(FIG1.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed:  
JP Theron

Date:  
May 2020

Drawn:  
JP Theron

Scale:  
1: 20 000



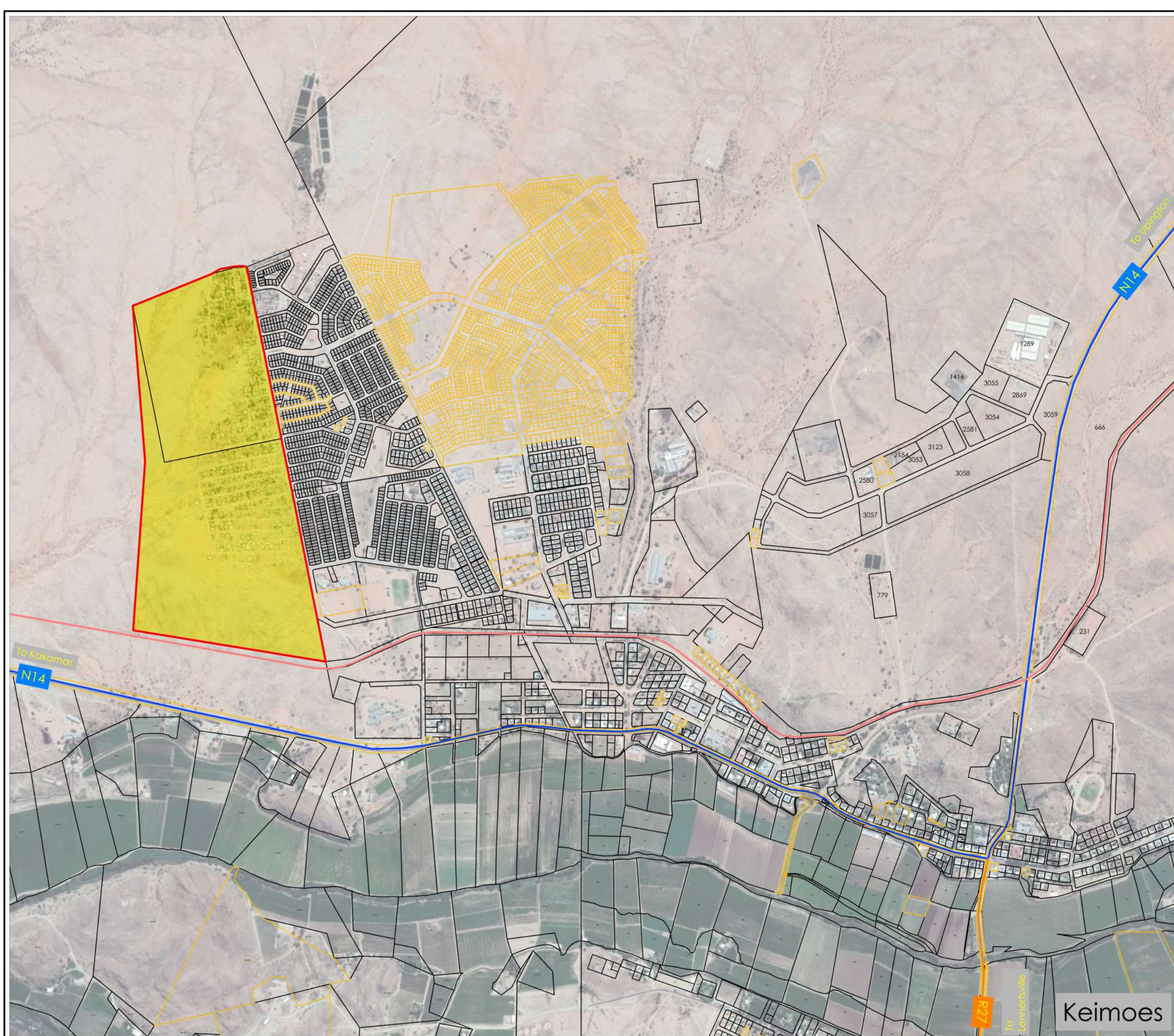



Figure 2  
Locality Map: Local

Description:

REMAINDER OF THE FARM KOUSAS, NO. 459 & PORTION  
128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB  
MUNICIPALITY, NORTHERN CAPE PROVINCE

### Legend

-  Study Area
-  National Road
-  Provincial Road
-  Railway Line
-  Registered Cadastral Land Units
-  Surveyed Cadastral Land Units



Postal Address:  
Private Bag X6  
Kakamas  
8870

Tel No: 054 461 6700  
Fax No: 054 461 6401



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TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES

054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

### Reference

(FIG1.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed	
----------	--

JP Theron

Date
------

May 2020

Drawn

JP Theron

Scale

1: 15 000

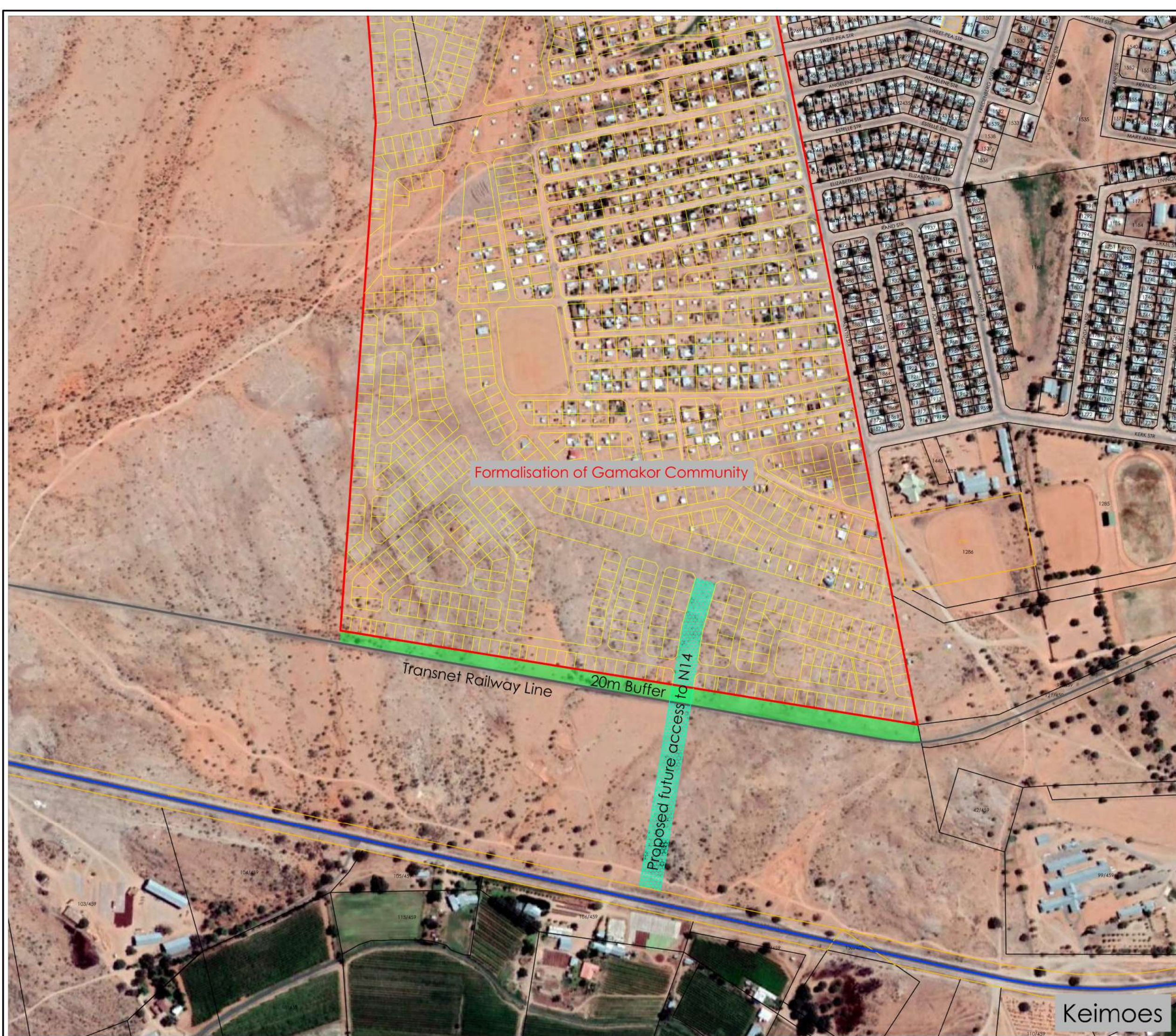
Keimoes



# ANNEXURE C

---





Page:

Title: **Figure 3**  
**Information Concerning Transnet**

Description:  
REMAINDER OF THE FARM KOUSAS, NO. 459 & PORTION  
128 OF THE FARM KOUSAS, NO. 459, KAI !GARIB  
MUNICIPALITY, NORTHERN CAPE PROVINCE

Legend

Study Area

National Road

Railway Line

Proposed Future Access

20m buffer

Registered Cadastral Land Units

Surveyed Cadastral Land Units

Municipality:

Postal Address:  
Private Bag X6  
Kakamas  
8870  
  
Tel No: 054 461 6700  
Fax No: 054 461 6401

Consultant:

**MACROPLAN**  
TOWN & REGIONAL PLANNERS  
YOUR PARTNERS IN PROFESSIONAL PLANNING SERVICES  
  
054 332 3642  
4A Murray Avenue, Upington 8801 macroplan@mweb.co.za  
PO Box 987, Upington 8800 www.macroplan.info

Reference:  
(FIG3.SUB.REZ) 20706 Re & Ptn 128 of the Farm Kousas, No. 459

Designed  
JP Theron

Date  
July 2020

Drawn  
JP Theron

Scale  
1: 5000

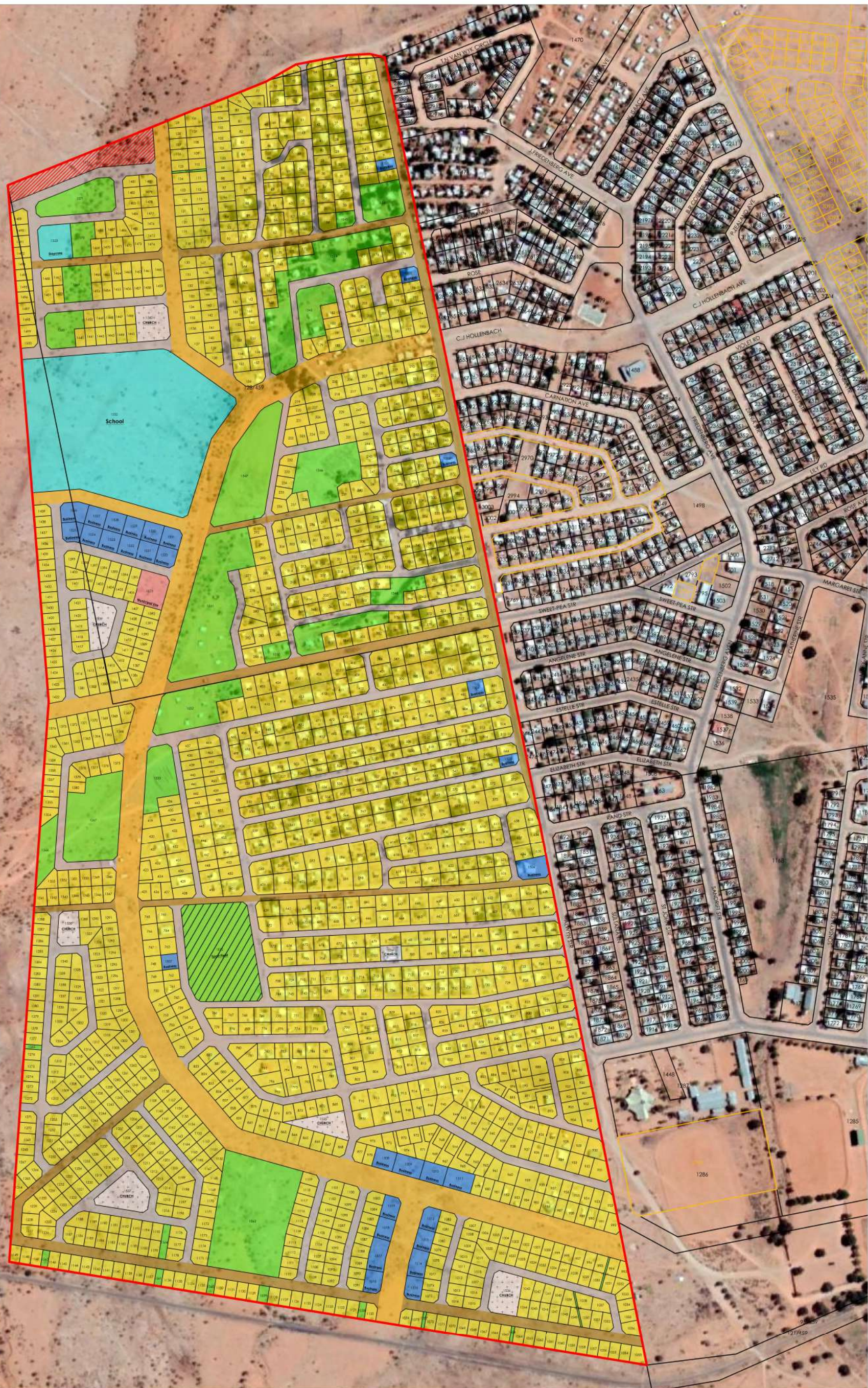


# ANNEXURE D

---



# FORMALISATION OF GAMAKOR INFORMAL COMMUNITY - CONCEPT 5



## Formalisation of Gamakor

Design: JP Theron (A/2394/2016)  
 Drawn: JP Theron (A/2394/2016)  
 Date: June 2020  
 Scale: 1:5000 (A3)  
 Plan no: Detail Layout Plan  
 CL/DRW/KAI2020/GAM/CON4

### Proposed Land Uses in terms of Kai !Garib Scheme Regulations

Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes average size	total area per use	percentage covered by use	Colour & Numbers	Land Use Description	Total Units	Schedule of Sizes average size	total area per use	percentage covered by use
	Agricultural Zone I						Institutional Zone II	7	N/A		
	Agricultural Zone II						Institutional Zone III				
	Residential Zone I	1500	N/A				Open Space Zone I	32			
	Residential Zone II						Open Space Zone II	1			
	Residential Zone III						Open Space Zone III				
	Residential Zone IV						Transport Zone I				
	Business Zone I	31	N/A				Transport Zone II				
	Business Zone II						Transport Zone III				
	Business Zone III						Transport Zone IV				
	Business Zone IV						Authority Zone I	1	N/A		
	Business Zone V						Authority Zone II				
	Industrial Zone I						Resort Zone II				
	Industrial Zone II						Special Zone				
	Industrial Zone III						Undetermined Zone	2	N/A		
	Institutional Zone I	2	N/A				TOTAL	1576			

### Topographical Information

Detail Description	Symbol
Protected Trees	
Contours	
Fences	
Water furrows	
Existing Houses	
Permanent Houses	
New Permanent Houses since project inception	
Rock Outcrops	
Storm-water Furrow	
Project Descriptions:	
Formalisation of Gamakor Informal Community.	



Postal Address:  
 Private Bag X6  
 Kakamas  
 8870

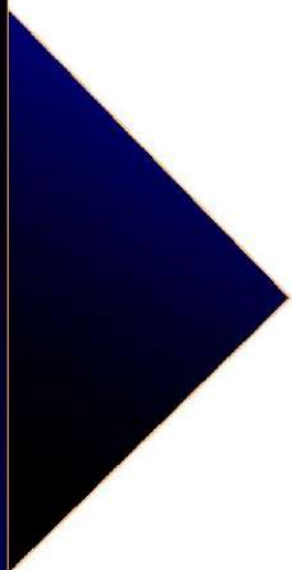
Tel No: 054 461 6700  
 Fax No: 054 461 6401



4A Murray Avenue, Uptington 8801  
 PO Box 987, Uptington 8800  
 054 332 3642  
 macroplan@mweb.co.za  
 www.macroplan.info

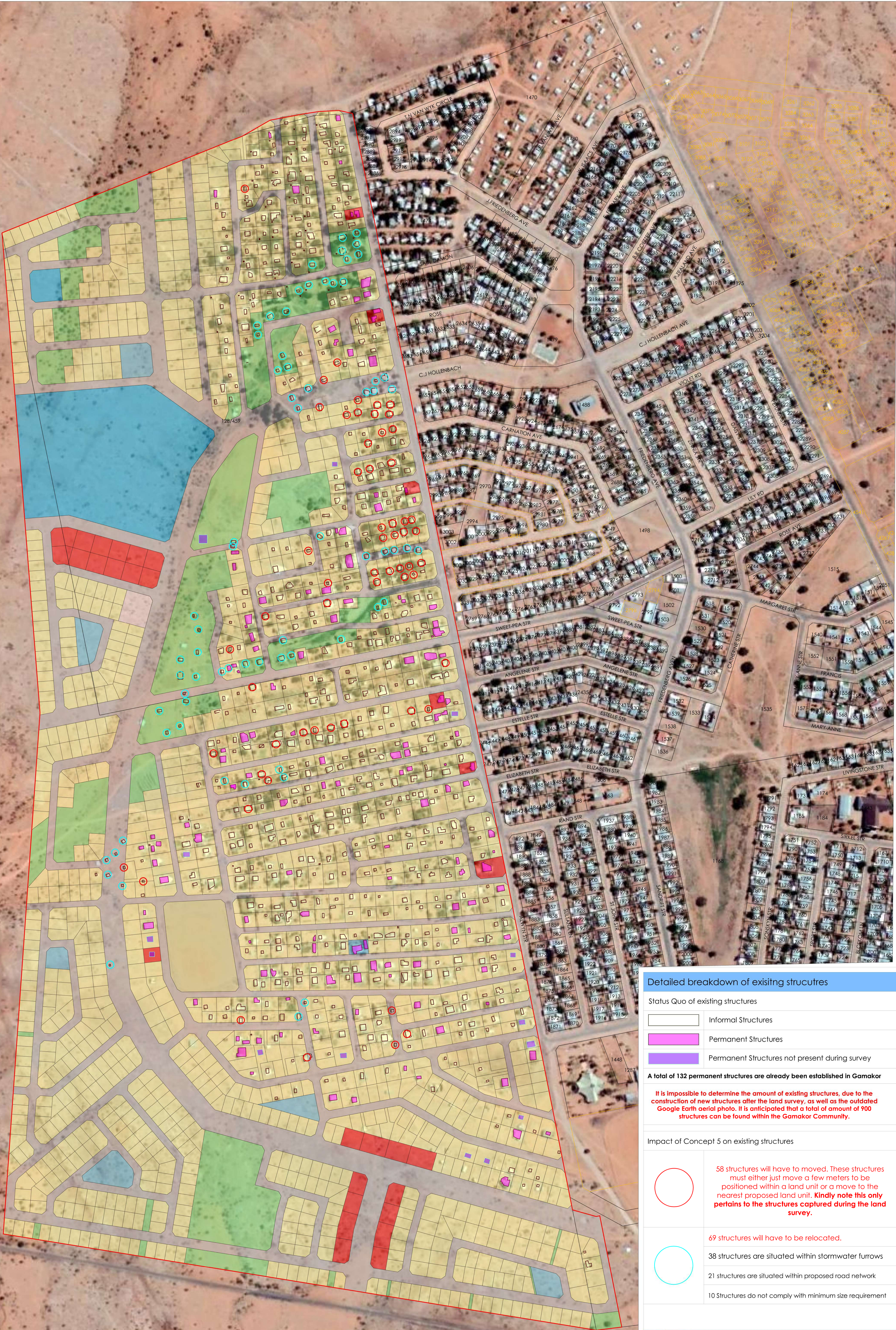


## ANNEXURE L: BREAKDOWN OF HOUSES





BREAKDOWN OF EXISTING PERMANENT AND INFORMAL STRUCTURES



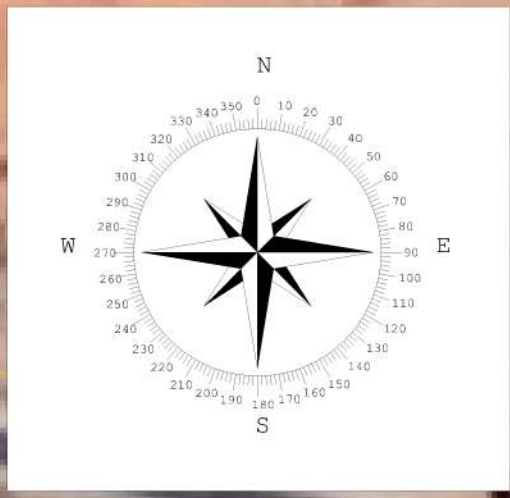
Detailed breakdown of existing strcutres

Status Quo of existing structures	
	Informal Structures
	Permanent Structures
	Permanent Structures not present during survey

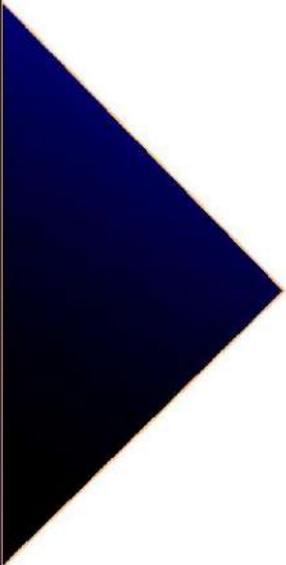
A total of 132 permanent structures are already been established in Gamakor

It is impossible to determine the amount of existing structures, due to the construction of new structures after the land survey, as well as the outdated Google Earth aerial photo. It is anticipated that a total of amount of 900 structures can be found within the Gamakor Community.

Impact of Concept 5 on existing structures	
	58 structures will have to moved. These structures must either just move a few meters to be positioned within a land unit or a move to the nearest proposed land unit. <b>Kindly note this only pertains to the structures captured during the land survey.</b>
	69 structures will have to be relocated.
	38 structures are situated within stormwater furrows
	21 structures are situated within proposed road network
	10 Structures do not comply with minimum size requirement

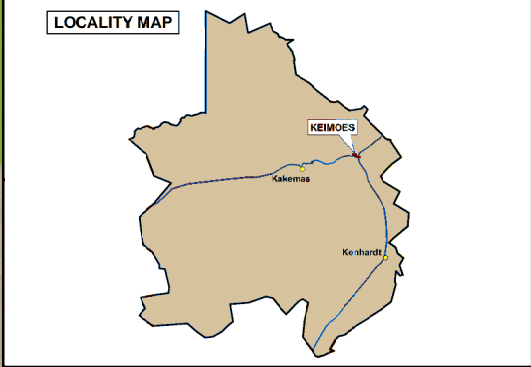








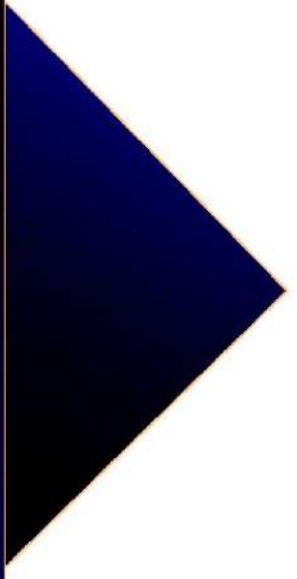
# PLAN 92a: KEIMOES SDP

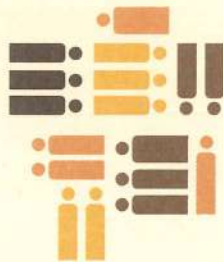


<ul style="list-style-type: none"><li>A.a Statutory Protected Areas</li><li>B.a Non Statutory Conservation Area</li><li>B.b Ecological Corridors</li><li>B.c Urban Green Areas</li><li>C.a Extensive agricultural Areas</li><li>C.b Intensive agricultural Areas</li><li>D.a Main Towns</li><li>D.b Local Towns</li><li>D.f Institutional Areas</li><li>D.g Authority Areas</li><li>D.h Residential Areas</li></ul>	<ul style="list-style-type: none"><li>D.i Business Areas</li><li>D.j Service Related Business</li><li>D.m Mixed Use Development Areas</li><li>D.n Cemeteries</li><li>D.o Sports Fields and Infrastructure</li><li>D.p Airport and Infrastructure</li><li>D.q Resorts and Tourism Related Areas</li><li>D.r Farmsteads and Outbuildings</li><li>E.a Agricultural Industry</li><li>E.b Light Industry</li><li>E.c General Industry</li></ul>	<ul style="list-style-type: none"><li>E.d Nuisance Industry</li><li>F.a National Roads</li><li>F.b Main Roads</li><li>F.c Minor Roads</li><li>F.d Public Streets</li><li>F.f Railway Lines</li><li>F.g Power Lines</li><li>F.i Renewable Energy Structures</li><li>F.j Dams and Reservoirs</li><li>F.k Canals</li><li>F.l Sewerage Plants and Refuse Areas</li></ul>	<b>IDP Projects</b> <ul style="list-style-type: none"><li>Agriculture development</li><li>Cemeteries</li><li>Electricity</li><li>Housing</li></ul>	<ul style="list-style-type: none"><li>Roads</li><li>Sanitation</li><li>Sport and recreational</li><li>Tourism development</li><li>Water</li></ul>	<ul style="list-style-type: none"><li>Canal</li><li>URBAN EDGE</li><li>ACTIVITY CORRIDOR: General Business</li><li>ACTIVITY STREET: Tourism</li></ul>	<ul style="list-style-type: none"><li>NODE: Neighbourhood</li><li>NODE: Speciality</li><li>PRECINCT: CBD</li><li>PRECINCT: Industrial</li></ul>	<b>Map compiled by :</b>  <b>MACROPLAN</b> Stads- & Streekplanners Town & Regional Planners <small>In assosiasie met: In assosiasie met:</small>  <b>GOBETLA</b> Spatial Designs Land Use Specialists	<p>DISCLAIMER: Whilst all possible care and attention has been taken in the production of this map, MACROPLAN/TGIS and its service providers cannot accept any liability for any perceived inaccuracies or misrepresentation of the information shown on this map. For Copyright and Disclaimer's from the Data sources, please refer to the custodian of the data.</p>	<p>Date: 7 August 2012</p> <p>Projection: Transverse Mercator WGS84, LO21</p> <p>Data source: Cadastral Data - Originally sourced from the Surveyor General January 2012, corrected and enhanced by TGIS</p> <p>SDF Data - Macroplan</p> <p>Aerial Photography - Rural Development and Land Reform - NGI</p>	 <b>KAI!GARIB</b> MUNICIPALITY
---	--	--	--	---	---	---	--	---	--	--------------------------------------



## ANNEXURE N: SACPLAN REGISTRATION CERTIFICATES





The South African  
Council *for* Planners  
S A C P L A N

## REGISTRATION CERTIFICATE

Issued in terms of Section 13 (4) of the Planning Profession Act, 2002  
(Act 36 of 2002)

This is to Certify that

**Justus Petrus Theron**

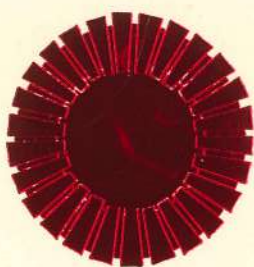
I.D. NUMBER 9106135096085

is registered as a

**Professional Planner**

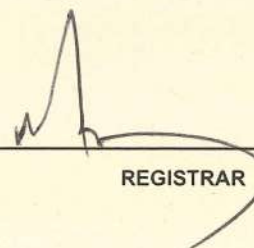
In terms of the Planning Profession Act, 2002 and is authorised  
to act as such in accordance with the said Act and the Rules  
prescribed thereunder.

Issued under the Seal of the Council



REGISTRATION NUMBER: A/2394/2016

  
CHAIRPERSON

  
REGISTRAR

25 / 11 / 2016  
DATE



The South African  
Council *for* Planners  
S A C P L A N

## REGISTRATION CERTIFICATE

Issued in terms of Section 13 (4) of the Planning Profession Act, 2002  
(Act 36 of 2002)

This is to Certify that

**Len Jacobus Fourie**

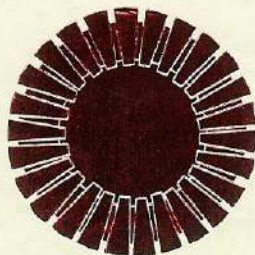
I.D. NUMBER 7411095141083

is registered as a

**Professional Planner**

In terms of the Planning Profession Act, 2002 and is authorised  
to act as such in accordance with the said Act and the Rules  
prescribed thereunder.

Issued under the Seal of the Council



  
CHAIRPERSON

  
REGISTRAR

REGISTRATION NUMBER: A/1322/2006

06/06/2007  
DATE