DRAFT REPORT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In terms of ***Section 24 and 24(D) of NEMA (Act No. 107 of 1998)***

for:

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED CLEARANCE OF 380,8600 HA OF INDIGENOUS VEGETATION IN ORDER TO ESTABLISH A TOWNSHIP WHICH WILL ALSO INCLUDE THE ESTABLISHMENT OF A CEMETERY ON PORTION 1 AND 2 OF THE FARM KALAHARI GHOLF EN JAG LANDGOED NO. 775 (TO BE KNOWN AS KATHU EXTENSION 6), GAMAGARA LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

NC/EIA/05/JTG/GAM/KAT1/2018

Report Date: October 2018

Designated Officer: Ms. N. Mokonopi

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Compiled for:

Gamagara Local Municipality

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Landowner:	Gamagara Local Municipality		
Contact person:	Mr Kgomodikae Leserwane		
Postal address:	PO Box 1001, Kathu,		
Postal code:	8446	Cell:	N/A
Telephone:	053 723 6000	Fax:	053 723 2021
E-mail:	protea@gamagara.co.za		

In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application.

Local authority in whose jurisdiction the proposed activity will fall:	Gamagara Local Municipality

Environmental Assessment Practitioner (EAP):[1]	**Prof. A.B. de Villiers from AB Enviro Consult CC**		
Contact person:	Mr. JP de Villiers		
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1. Contents

EXECUTIVE SUMMARY

Gamagara Local Municipality has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Integrated Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

The activity is listed in terms of the Regulations (in force since 4 December 2014) in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (NEMA) 1998 (Act 107 of 1998) as amended and published in Government Notice No. R 326 of 2017. The proposed development triggers the following regulations and listed activities:

Number and date of the relevant notice:	**Activity No (s) (in terms of the relevant notice) :**	**Listed activity as per project description[2]:**
GN.R. 327, 7 April 2017	23	The development of a cemetery of 5 323 square metres in size.
GN.R. 325, 7 April 2017	15	The clearance of 380,8600 hectares of indigenous vegetation, in order to establish a township on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

The purpose of the study is therefore to determine the impacts that the environment may have on the proposed activity, as well as the possible impacts that the activity may have on the environment.

The study is being conducted according to normal scientific practices. A theoretical background review was compiled for the different variables by using available information from the literature. Field verification was undertaken and visits paid to the site to gather further information and/or to verify information. It also includes the identification of *key interest groups*, both governmental and non-governmental, and to establish good lines of communication. Specialist studies were undertaken to determine the impacts on sensitive areas and to determine whether the proposed project can be sustainably implemented. The specialists will also advise on mitigation measures where applicable.

1. INTRODUCTION

Gamagara Local Municipality has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Integrated Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

1.1 THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The purpose of this document is to adhere to the requirements for compilation of Environmental Impact Assessment Reports as published in Government Notice R. 982 of 8 December 2014 and amended by Government Notice R 326 of April 2017, Appendix 3, and the National Environmental Management Act (Act 107 of 1998) (NEMA).

1.2 DESCRIPTION OF THE PROCESS FOLLOWED

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

1) *"The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—*
   a. *shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;*
   b. *serve as the general framework within which environmental management and implementation plans must be formulated:*
   c. *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;*
   d. *serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and*
   e. *guide the interpretation administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
2) *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
3) *Development must be socially, environmentally and economically sustainable.*
4) *(a) Sustainable development requires the consideration of all relevant factors including the following:*
   - *(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied:*
   - *(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
   - *(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*

(iv) *that waste is avoided. or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*

(v) *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*

(vi) *that the development use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*

(vii) *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*

(viii) *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

(b) *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*

(c) *Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*

(d) *Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*

(e) *Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*

(f) *The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured.*

(g) *Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*

(h) *Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*

(i) *The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.*

(j) *The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*

(k) *Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*
(l) *There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.*
(m) *Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*
(n) *Global and international responsibilities relating to the environment must be discharged in the national interest.*
(o) *The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*
(p) *The costs of remedying pollution, environmental degradation consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*
(q) *The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*
(r) *Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure."*

The above mentioned principals and the applicable legislation, Policies and Guidelines as described in Paragraph 5 of this Report were taken into account in the assessment of the Environmental Impacts for the proposed development. The process followed can be described as follows:

1) The EAP was contracted by the Gamagara Local Municipality as their Independent Environmental Assessment Practitioner.
2) A Geotechnical Engineer was appointed to determine whether the Geology and Soils of the site is suitable for the proposed development
3) The Civil Engineer was appointed to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services.
4) A Town and Regional Planner designed the proposed development in such a way that the layout of the proposed development, takes into account the measures described by the Civil Engineer and that the layout satisfies the needs of future occupiers of the site.
5) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
6) A Botanical and Wetland specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
7) An Engineer was appointed to to calculate the 1:100 year flood lines for the proposed development. According to section 144 of the National Water Act (ACT No. 36 of 1998), no person may establish a township unless the layout plan shows (in a form acceptable to the local authority concerned) lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years.
8) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
9) Desk top studies were conducted and alternatives assessed.

10) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
11) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
12) All the information obtained from the above mentioned processes is being used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.

The inputs from Specialists, interested and affected parties, together with the knowledge of the EAP is being used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

1.3 SCOPING PHASE

The Scoping phase included the necessary investigations to assess the suitability of the identified sites and its surrounding environment, for the development proposal. The scoping exercise described the "status quo" of the biophysical, social, economic and cultural environment, and identifies the anticipated environmental aspects associated with the proposed development. Scoping included the identification of *key interest groups*, (both government and non-government), and strived to establish efficient and effective communication. Identifying and informing Interested and affected parties of the proposed development may have an impact on the focus of the EIA. (*S. Cliff, 2015*)

The purpose of the Scoping Report was to document the outcome of the Scoping Phase of the project. The report fulfiled the requirements of the EIA Regulations (2014) for the documentation of the scoping phase. The Scoping Report was compiled in accordance with Section 21(3) of NEMA's 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017.

The Draft scoping Report was submitted to DENC on 25 June 2018 and approved on 5 July 2018. The Final Scoping report was submitted to the Department on 01 August 2018 and approved on 20 August 2018.

1.4 EIA PHASE

The EIA phase determines the *significance of the impact* of the proposed activity on the surrounding Environment. During the EIA phase, an Environmental Impact Assessment Report (EIAR) is compiled, and, following public review, is submitted to the approving authority – the DENC, for final decision-making.

The EIA process is undertaken in accordance with the NEMA's 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017.

The DEIR (including all specialist reports) have been made available to all registered interested and affected parties (I&APs), providing them an opportunity to comment and to verify that the issues raised through the process have been captured and adequately addressed and considered within the study.

1.4.1 Objective of the environmental impact assessment process

The objective of the environmental impact assessment process is to, through a consultative process-

1. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

2. describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
3. identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
4. determine the –

    i. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    ii. degree to which these impacts-

    (aa) can be reversed;
    (bb) may cause irreplaceable loss of resources, and
    (cc) can be avoided, managed or mitigated;

5. identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
6. identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

identify suitable measures to avoid, manage or mitigate identified impacts; and identify residual risks that need to be managed and monitored.

1.4.2 Scope of assessment and content of environmental impact assessment reports

The EIA assesses those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project design, construction, and operation phases, and recommends appropriate mitigation measures for potentially significant environmental impacts. The Environmental impacts are assessed both before and after mitigation to determine:

- The significance of the impact despite mitigation; and
- The effectiveness of the proposed mitigation measures.

The EIA addresses potential environmental impacts and benefits associated with all phases of the project, including design, construction and operation, and aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

Table 1 below provides a summary of the legislative requirements in terms of an EIA Report as stipulated in Section 23 of the 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017. Cross-references are provided in terms of the relevant section within this DEIA Report where the NEMA and DEIA Report requirements have been addressed.

Table 1: DEIA Report content as per Section 23 of NEMA's 2014 EIA Regulation (GN R. 982) as amended and published in Government Notice R. 326 of 7 April 2017 Appendix 3.

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
Appendix 3, section 3 (a)	Details of the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae;	Paragraph 2
Appendix 3, section 3 (b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including – (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Paragraph 4 Paragraph 4 Paragraph 4
Appendix 3, section 3 (c)	A plan which locates the proposed activity or activities applied for, at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Figure 1, 2, 3A,B and Figure 3C Paragraph 4
Appendix 3, section 3 (d)	A description of the scope of the proposed activity, including – (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development;	Paragraph 3 Paragraph 3
Appendix 3, section 3 (e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Paragraph 5
Appendix 3, section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.	Paragraph 6
Appendix 3, section 3 (g)	a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report	Paragraph 4
Appendix 3, section 3 (h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including- (i) Details of all alternatives considered; (ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Paragraph 8 Paragraph 10 Paragraph 10 Paragraph 8 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) If no alternatives, including alternative footprints for the activity were investigated, the motivation for not considering such and; (x) A concluding statement indicating the location of the preferred alternatives, including preferred footprint within the approved site as contemplated in the accepted scoping report.	Paragraph 9 Paragraph 9 Not Applicable Paragraph 12
Appendix 3, section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Paragraph 9 Paragraph 8 Paragraph 9
Appendix 3, section 3 (j)	An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9
Appendix 3, section 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Paragraph 11
Appendix 3, section 3 (l)	An environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	 Paragraph 12.2 and 12.2 Figure 2 Paragraph 12
Appendix 3, section 3 (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the	Paragraph 11 and 12

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
	development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	
Appendix 3, section 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	Paragraph 12
Appendix 3, section 3 (o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Paragraph 3.1.2.1
Appendix 3, section 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	
Appendix 3, section 3 (q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Paragraph 12.4
Appendix 3, section 3 (r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Not Applicable
Appendix 3, section 3 (s)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	 Paragraph 13 Paragraph 13 Paragraph 13 Paragraph 13
Appendix 3, section 3 (t)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable
Appendix 3, section 3 (u)	An indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Not Applicable
Appendix 3, section 3 (v)	Any specific information that may be required by the competent authority.	Not Applicable
Appendix 3, section 3 (w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not Applicable

1.4.3 Assumptions, uncertainties, limitations and gaps in knowledge:

This report is based on current available information and, as a result, the following limitations and assumptions are implicit –

The report is based on the *project description* provided by Maxim Planning Solutions as a result of reports that was compiled by the following Specialist:

- A Geotechnical Engineer was appointed to determine whether the Geology and Soils of the site is suitable for the proposed development
- The Civil Engineer was appointed to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services.
- A Town and Regional Planner designed the proposed development in such a way that the layout of the proposed development, takes into account the measures described by the Civil Engineer and that the layout satisfies the needs of future occupiers of the site.

- A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- A Botanical specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- A Wetland Specialist was appointed to determine the status of the Wetland.
- An Engineer was appointed to calculate the 1:100 year flood lines for the proposed development. According to section 144 of the National Water Act (ACT No. 36 of 1998), no person may establish a township unless the layout plan shows (in a form acceptable to the local authority concerned) lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years.
- An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- Desk top studies were conducted and alternatives assessed.

Descriptions of the biophysical and social environments are based on specialist fieldwork, investigations, and the Public Participation Process.

2. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

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

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

PERSONAL PARTICULARS AND CAREER HISTORY OF PROF DE VILLIERS

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Lecturer & Professor – Potchefstroom University 1969- 2004

ACADEMIC AND PROFESSIONAL QUALIFICATIONS

Post–Matric Qualifications

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

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
1986	Professional Natural Scientist	S.A. Council for Natural Scientists	Environmental Science
1994	Quality Auditor	ESKOM	Auditing
1998	Personnel & Verifying Auditor	SAATCA	Environmental Auditing
2006	Environmental Assessment Practitioner	Interim Certification Board EAPSA	Environmental Science

MEMBERSHIP AND PARTICIPATION IN SOCIETIES, COUNCILS, ETC.

Name of professional societies	**YEAR**	**Capacity**
S.A. Geographical Society.	1967-1996	Board Member
Society for Geography	1968-2004	Member
SAGS Western Transvaal	1985-1989 1987-1989 1996	Chairman
Africa Geographical Association	1993-1995	Vice-President.
Society for the Vaal River Catchment	1980-1999	Member
S.A. Society for Photogrammetry, Remote Sensing and Cartography	1984-1996	Member
Dendrological Society	1986-2005	Member
Birdlife South Africa	2003-present	Member
British Geomorphological Research Group	1985-1997	Member
Int Com on Water Resource Systems	1985-1997	Member
Int Com on Continental Erosion	1986-1990	Member
Int Com on Remote Sensing and Data Transmission	1986-1991	Member
Society for S.A. Geographers	1995-2005	Member
SA Photogrammetrical and Geo. Info.	1995-2003	Member
S.A. Association of Geomorphologists	1994-1999	Board Member and member
SADC Mine Dump Study Group	1996-2005	Member

***Chairman of the Committee for Interested and Affected Parties (CIP) (2004-2008)** for International Accreditation by the influential accrediting body of **Price, Waterhouse Coopers-International Environmental Auditors in Southern Africa.**

Member of Price Waterhouse Coopers CIP (2004-2010)

2.1. ACADEMIC COURSES TAUGHT AT POST-MATRIC LEVEL

1.1 The Geography of Economic Activities and Regional Geography (3rd year and honours students)
1.2 Weather and Climate (1st, 2nd, and 3rd year students)
1.3 Geomorphology (1st year up to PhD level)
1.4 Remote Sensing and the Environment (3rd year and Honours)
1.5 Quantitative Geography (3rd year up to Masters Level)

1.6 Environmental Management (2nd year, up to PhD level)
1.7 Environmental Analysis (3rd year and up to Masters Level)
1.8 Geography of Soil (3rd year and Honours)
1.9 Cartography (1st year to Honours)
1.10 As professor, 26 Masters & 4 PhD D students completed their studies in environmentally related subjects under his tutor- and co-tutorship.

2.2 INVOLVEMENT IN COURSES AND WORKSHOPS

ENVIRONMENTAL COURSES: Partially responsible for course development and taught various courses for environmental officers employed by the North West Province over a period of 3 years (1998-2001). These courses were aimed at improving their knowledge of the environment as well as their understanding of the environmental interactions specifically related to the North West province.

STATE OF THE ENVIRONMENT REPORT (SOE) Involved in the first SOE prepared by the North West Province and was responsible for most of the physical geographical aspects (1999).

2.3 ENVIRONMENTAL PROJECTS

The following projects are typical examples, of such projects which he co-ordinated and managed:

MOOI RIVER CATCHMENT STUDIES: This was a study on the impacts of the mining activities on the quality and quantity of water in the Mooi River catchments and was done for the North West Province. He co-ordinated and managed this project. The team consisted of a PhD student as well as two teams of local and international students; one responsible for the biophysical variables, and the other for socio-cultural aspects.

SADC MINE DUMPS STUDY GROUP: Acted as co-ordinator for the formulation of tools to assess the effects of mine dumps on the environment in the SADC region. One group was involved in the Zimbabwean copper belt region, and the other in the Tanzanian gold mining area. The studies were undertaken for the Carl Duisberg Geselschaft (Germany). The research team consisted of geographers, ecologists and mining experts. From this study, a pilot program, the “South African Environmental Management System” (SEMS) developed, which was applied successfully by a team of researchers in a pilot study in the Carletonville region.

SADC DEVELOPMENT OF TRAINING MODULES FOR ENVIRONMENTAL STUDIES USING GIS: Member of the three-person team who developed these training modules. It was applied at the Copper belt University, the University of Dar Es Salaam as well as at the Potchefstroom University as an introduction to the integration of environmental data (both biophysical and socio-economic) for the interpretation of geographical regions.

ENVIRONMENTAL DEGRADATION - THE RESULT OF INDISCRIMINATE LOCATION OF SLIME DAMS IN THE SADC REGION: Co-ordinated this study in the Far West Rand Area;

conducted case studies in Zambia and South Africa. The team consisted of researchers from the Netherlands, Germany, Zambia and Tanzania.

LAND USE CHANGES IN THE NORTH WEST PROVINCE: An Environmental Management Support System for SOE North-West University Team leader. This project was undertaken for DACE (NWP) and various students participated – each involved in a specific aspect of the environment. This data was co-ordinated and eventually incorporated into the SOE report.

2.4 RESEARCH PUBLICATIONS AND CONFERENCES

He published 11 environmentally related articles in peer-reviewed magazines, and appeared professionally at 30 conferences with a direct bearing on environmental work.

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

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

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

YEAR	Qualification	Institution	Field of Study
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2002	Masters degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS
2001	Map Info	SPATIAL TECHNOLOGY	GIS

EXPERIENCE OF THE CONSULTANCY

Over a period of 22 years (1996-2018) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 360 projects. Environmental Control Officer's duties are also performed on various projects.

The company was involved (from 1992-1994) in evaluation of 114 applications for the subdivision of land, 23 applications for resort developments, and 54 applications for business rights for the Department of Agriculture, Conservation and the Environment - North West Province.

The consultancy is qualified to undertake professional studies in waste management and is still involved in the development of waste disposal- (solid and liquid effluent), and emission studies. These studies are conducted both academically and practically. This work relates to mine waste, domestic waste and effluent as well as to the monitoring of waste disposal. Environmental audits in this respect are undertaken on a regular basis.

3. DESCRIPTION OF THE ACTIVITY

Gamagara Local Municipality has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Integrated Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish an Integrated Human settlement on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

Preliminary indications are that the township will consist of a mixed use, including: See Figure 2 for a copy of the proposed Layout Plan.

- Residential (350m² minimum): 3886 erven
- Residential (600m² minimum): 787 erven
- Residential (800m² minimum): 391 erven
- Residential Building (flats): 5 erven
- Business: 30 erven
- Church: 11 erven
- Primary School: 3 erven
- Secondary School: 1 erf
- Crèche: 7 erven
- Cemetery: 1 erf
- Public Open Space: 21 erven
- Sub-station: 2 erven
- Recreational (Sports field): 2 erven
- Taxi rank: 1 erf
- **TOTAL: 5148 erven**

The property owner is the Gamagara Local Municipality and even though the project is financed by the Northern Cape Department of Co-operative Governance, Human Settlements and Traditional Affairs, the owner of the township and the developer will still remain the Gamagara Local Municipality.

The activity is listed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014. The proposed development triggers the following regulations:

Number and date of the relevant notice:	**Activity No (s) (in terms of the relevant notice) :**	**Listed activity as per project description[3]:**
GN.R. 327, 7 April 2017	23	The development of a cemetery of 5 323 square metres in size.
GN.R. 325, 7 April 2017	15	The clearance of 380,8600 hectares of indigenous vegetation, in order to establish a township on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

The proposed development would connect to municipal infrastructure (upgrades are required in order to accommodate the development):

ENGINEERING SERVICES

WATER

Source

The main sources of water for Kathu are:

- Vaal Gamagara Pipeline (Sedibeng Water)
- Dewatering from mining activities (Kumba Iron Ore)
- Municipal boreholes

The study area will be part of Kathu West. In accordance with the Kathu Water Management Plan of 2012 the main water source for Kathu West to be the Vaal Gamagara pipeline.

Potable water from Vaal Gamagara Water Pipeline

The Vaal Gamagara Pipeline is in process of upgrading. The current allocation of the Vaal Gamagara Scheme to Kathu is 500 000 m³/annum (equivalent to 57m³/h or 15,8ℓ/s). The current projected allocation for Kathu (post upgrading of scheme) in accordance with the *Royal Haskoning/Sedibeng Water regional water scheme design report dated 18 January 2016* is 239 ℓ/s (7 537 104 m³/annum).

The design peak flow for the study area is 1.5 x AADD (same as summer peak) which is 5 910 774 ℓ/day or 68.4ℓ/s. It is therefore evident that sufficient potable water supply to the study area is only feasible once the Vaal Gamagara Water Scheme has been upgraded and the desired performance achieved.

However, with the rest of Kathu, especially the East also heavily dependent on the Vaal Gamagara Pipeline, augmentation of water supply to the West should also be considered. This will also reduce the cost of water for the Municipality as potable water from Sedibeng is currently the most expensive available water resource for Gamagara Municipality.

Mine Dewatering and Municipal Borehole fields

Additional options for augmentation of water supply to the study area is mine dewatering and municipal boreholes. Raw water from Sishen Mine is transferred via a 250 mm steel pipe to the Municipal Softener Plant (water treatment works). Raw water is stored in a 1.7ML concrete reservoir before it is passed through a softener (treatment) plant with the capacity of 174 m3/hr or 4.2 Mℓ/day (based on 24 operational hours). Potable water from the plant is stored in a downstream concrete reservoir with a capacity of 3.4ML from which distribution to various supply points manifests. One of the points is the Sesheng 2ML reservoir which is fed by a 100mm diameter steel pipeline from the Softener Plant. Water from the Khai Appel borehole fields also supply the Sesheng 2ML reservoir via a 160mm diameter pipe line. A direct feed from the Sesheng elevated tower to the proposed Kathu West reservoir complex can therefore be done.

Water Treatment

The Vaal Gamagara Water Scheme distributes potable water to Kathu. The main source for the study area therefore does not needs any treatment. However, because of the costs of the Gamagara Municipality insisted in augmenting the study area with supply from their other sources namely Mine Dewatering and Municipal boreholes.

The municipal boreholes in the vicinity of the study area currently supply to the Sesheng 2ML reservoir. More boreholes are also envisaging to be explored in the vicinity of the study area.

Mine dewatering passes via the water treatment works (softener plant) for treatment and reaches the Sesheng 2ML reservoir. If the Sesheng reservoir complex and the proposed reservoir complex of the study area to be linked the Municipality's objective to augment from own sources in all Sedibeng/Vaal Gamagara supply areas can be realised. The will trigger other secondary upgrades such as the water treatment works, Sesheng reservoir complex and the related link lines.

Storage and Distribution

In accordance with the water demand calculations the study area will need at least a 13.7ML (48- hour storage capacity) low level reservoir. It also needs a 2ML (2-hour peak storage capacity) elevated reservoir to cater for peak demand. A pump station with back-up power generator to lift water from the low-level reservoir to the elevated reservoir at a rate of 282 l/s completes the system.

Conclusion:

A water demand at peak flow of 70ℓ/s is anticipated. The current Kathu water sources and bulk infrastructure cannot accommodate the demand. The recommended bulk water infrastructure requirements to enable development feasibility are therefore:

- 355mm Ø additional connection to the Vaal Gamagara pipe line to provide at least 70 ℓ/s

- A low-level reservoir with a 13.7 ML storage capacity
- A high-level reservoir with a 2 ML storage capacity
- A booster pump station @ 282 ℓ/s with back-up generator

The formal bulk allocation supply to Kathu from Vaal Gamagara is only 15.8ℓ/s. The bulk pipe line is in process of a major upgrade. An increase in bulk water allocation quota of 239 ℓ/s to Kathu is envisage. Once these upgrades are completed and the desired system performance achieved the study area can be supplied according to its' demand. Augmentation from mine dewatering and municipal borehole water can also be possible in future.

SANITATION

The existing Kathu bulk sewer infrastructure cannot accommodate the calculated/estimated sewer inflows from the study area. The study area will therefore need a dedicated reticulation with main outfall sewer lines and a pump station plus rising main (pump line) to the Waste water treatment works. The existing waste water treatment works is also operating at full capacity which means a significant upgrade should also be needed.

Main Outfall Pipelines

It is envisaged that the entire internal sewer network will require main collectors ranging from 200mm Ø to 355mm Ø to handle the PWWF of 6 308 197ℓ/d or 73.01ℓ/s. With relatively flat terrain sloping to the north west it is expected that all outfall sewer lines to confluence at this lowest point.

The following outfall sewer pipe sizes and lengths have been identified for the Study Area:

1. 200mm Ø PVC-U 400KPa = 825m 2.
2. 250mm Ø PVC-U 400KPa = 3837m
3. 355mm Ø PVC-U 400KPa = 905m

Pump Station and Rising Main

In accordance with the analysis and calculations it can be deduced that a new pump station and rising main with a capacity to accommodate a pumping flow rate of 91.26ℓ/s will be required to transfer sewer from this lowest point of the study area to the WWTW.

The following infrastructure been identified for the Study Area:

1. Dry well pump station capable of a delivery rate at least 91.26 ℓ/s
2. 355mm Ø PVC-U class 12 = 7 540m

Waste Water Treatment Works

In 2014 the Kathu WWTW's capacity was increased to 6.8 Mℓ/d. The study area of 5 148 stands (extension 6 to 10) was not part of the consideration during the planned upgrade of 2014. It is expected that the study area will have an addition loading of 4.38 Mℓ/d on the waste water treatment works. As the

works have no spare capacity currently an additional upgrade similar in magnitude to the 6.8Mℓ/d module done in 2014 is required.

During the 2014 upgrades, the old pasveer ditch module was decommissioned via a mothballing method. The decommissioned pasveer ditches is equivalent to 4.4Mℓ/d which can be utilised as a temporary measure whilst the new upgrades are being initiated. The capacity of the old system is just about adequate to accommodate the services demand of the study area. Please note, further investigation should be undertaken to determine what the cost implications will be to recommission pasveer ditch modules and to review whether the old technology is still able to achieve the appropriate standard of effluent in accordance with the Water Use License of the Works

Conclusion

An estimated sewage peak flow of 73.01 ℓ/s will be generated by the fully developed study area. The current bulk sewer infrastructure cannot cater for this impact. The recommended bulk sewer infrastructure requirements to enable development feasibility are therefore:

- 200mm Ø PVC-U 400KPa outfall sewer line
- 250mm Ø PVC-U 400KPa outfall sewer line
- 355mm Ø PVC-U 400KPa outfall sewer line
- Pump station at 91.26 ℓ/s
- 355mm Ø PVC-U class 12 pump line
- 4.4ML/day Waste Water Treatment Works

It is recommended that a separate investigation should be undertaken to determine the costs of recommissioning the mothballed section of treatment works to ensure the accommodation of 4.38Mℓ/d requirement of the development. This should be considered a temporary mitigation to ensure there is sufficient capacity at the WWTW.

STORMWATER

Surface Drainage

All minor stormwater will be accommodated on the surfaced streets and bus and taxi routes. Unsurfaced streets will make use of concrete side drains drifts. Underground systems such as culverts and storm water pipes will be used to convey storm water underneath roads at crossing or to convey water to retention ponds.

Retention Ponds

The natural contours of the study area fall from a south-eastern to a north-western direction. A natural retention ponds is situated near Khai Appel in the north west. Storm water will drain naturally in the direction of the pond at Khai Appel. Formal storm water infrastructure will also be provided to facilitate storm water drainage to the Khai appel retention pond or the perennial Vlermuislaagte River.

4. DESCRIPTION OF THE PROPERTY

The property is located on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province. The proposed development comprises a total area of 380,8600hectares.

The Surveyor-general 21-digit site reference number are:

C	O	4	1	0	0	0	0	0	0	0	0	0	7	7	5	0	0	0	1
C	O	4	1	0	0	0	0	0	0	0	0	0	7	7	5	0	0	0	2

Landowner:	Gamagara Local Municipality		
Contact person:	Mr Kgomodikae Leserwane		
Postal address:	PO Box 1001, Kathu,		
Postal code:	8446	Cell:	N/A
Telephone:	053 723 6000	Fax:	053 723 2021
E-mail:	protea@gamagara.co.za		

In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application.

Local authority in whose jurisdiction the proposed activity will fall:	Gamagara Local Municipality		
Municipal Ward No:	7		
Nearest town or districts:	Kathu		
Contact person:	Mr Kgomodikae Leserwane		
Postal address:	PO Box 1001, Kathu,		
Postal code:	8446	Cell:	N/A
Telephone:	053 723 6000	Fax:	053 723 2021
E-mail:	protea@gamagara.co.za		

Site Co-ordinates	**Latitude (S):**			**Longitude (E):**		
Coordinates of corner points of study area	27º	41’	34.53”	23º	2’	28”
	27º	40’	51.78”	23º	2’	35.11”
	27º	39’	53.31”	23º	0’	46.92”

	27º	40’	22.94”	23º	0’	43.18”
	27º	40’	35.59”	23º	0’	50.86”
	27º	40’	38.75”	23º	1’	0.50”

The proposed township area detailed above is located within the jurisdiction of the Gamagara Local Municipality that in turn falls within the jurisdiction of the John Taolo Gaetsewe District Municipality.

See Figure 1 for a Locality Map and Sensitivity Map and Figure 2 for a copy of the proposed Layout Plan.

Ms. J. Mans of the Northern Cape: Department of Fisheries and Forestry have been consulted in relation to the extent of the Kathu Forest Protected Woodland and buffer area. It was confirmed that the proposed development site falls outside the Kathu Forest and its buffer zone in her e-mail of 2018/03/27:

“*Dear Mr. de Villiers*

According to my colleague in Pretoria, Mr. Izak van der Merwe, the proposed residential area falls outside of the proposed buffer. See map attached. Therefore there are no land-use restrictions, but should any individual protected tree be affected (i.e. Boscia albitrunca; Vachellia erioloba or Vachellia haematoxylon), the developer must apply for and obtain a valid Forest Act License prior to disturb of such specimens. Trees with bird nests may not be damaged or disturbed without a valid Fauna Permit from Nature Conservation.

Kind Regards,

Jacoline Mans
Designation: Chief Forester (NFARegulation)
Directorate: Forestry Management (Other Regions) Northern Cape
Department of Agriculture, Forestry and Fisheries
Tel: 054 338 5909
Fax: 054 334 0030
Web: www.daff.gov.za
E-mail: JacolineMa@daff.gov.za

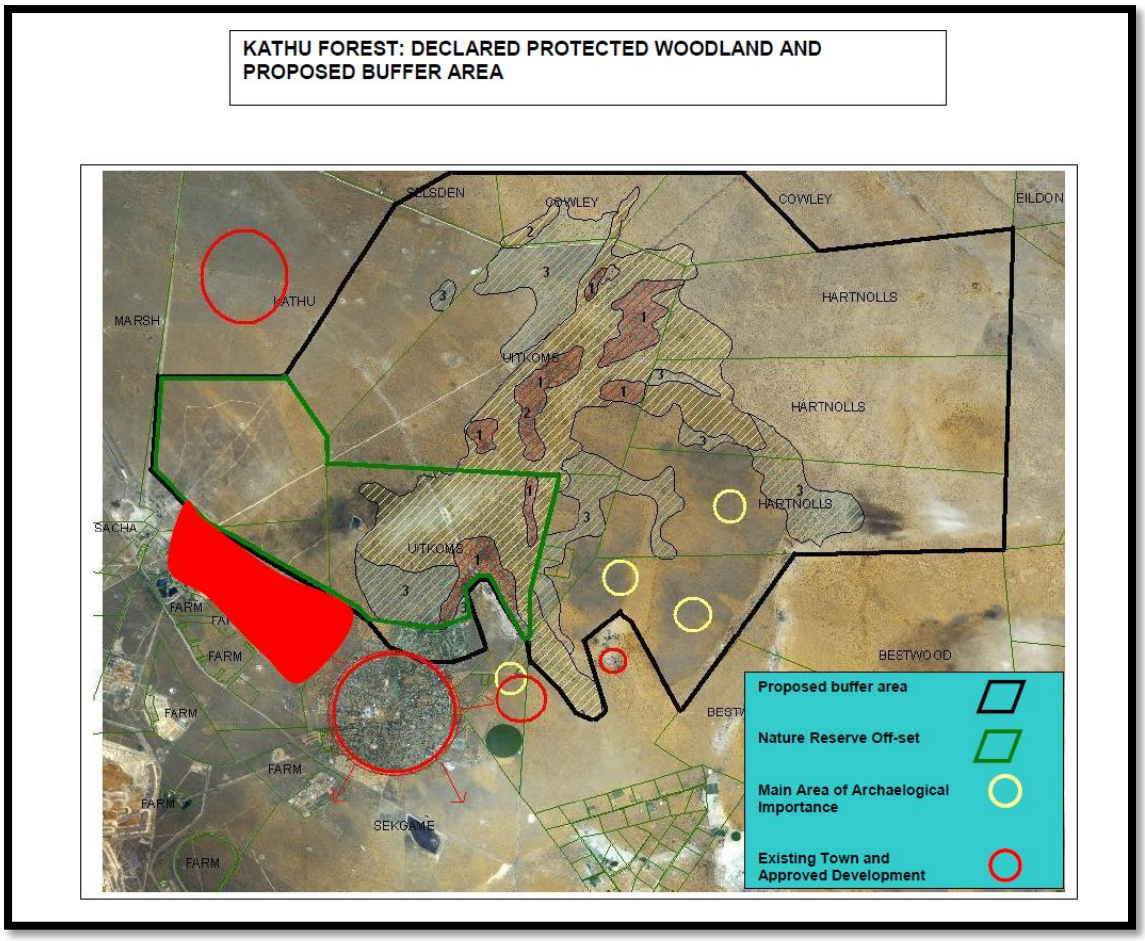


Figure 1a: LOCALITY MAP AND SENSITIVITY MAP

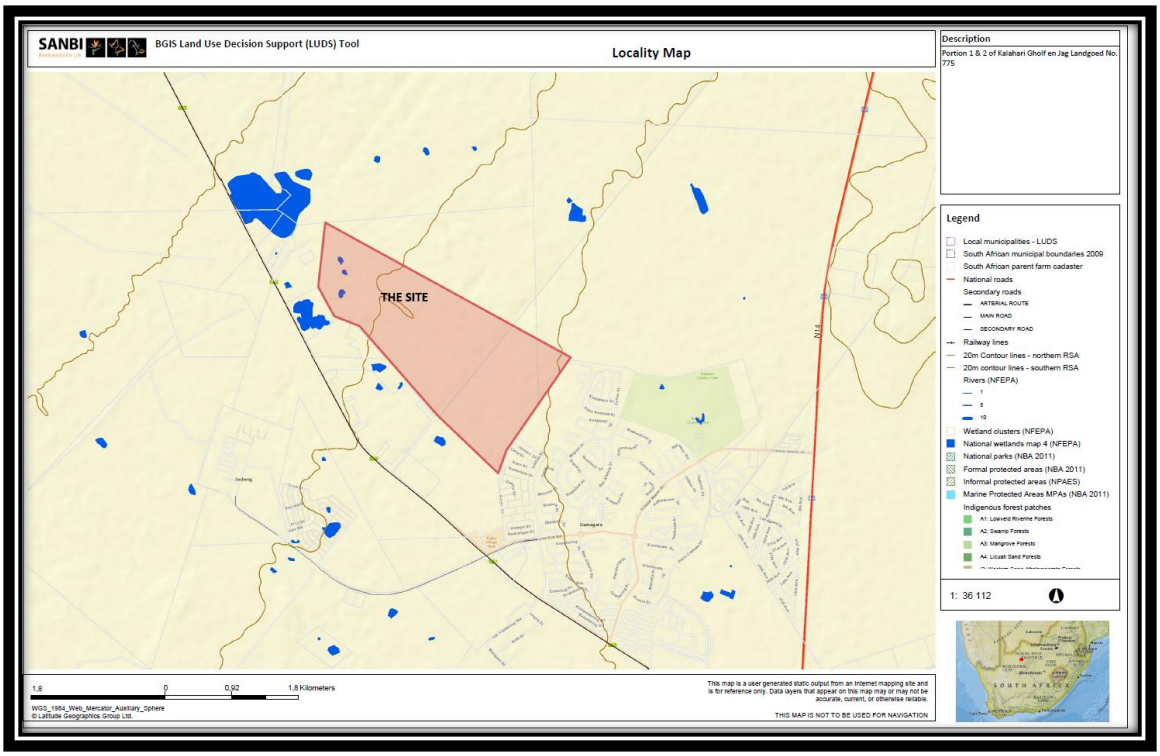


Figure 1b: SENSITIVITY MAP

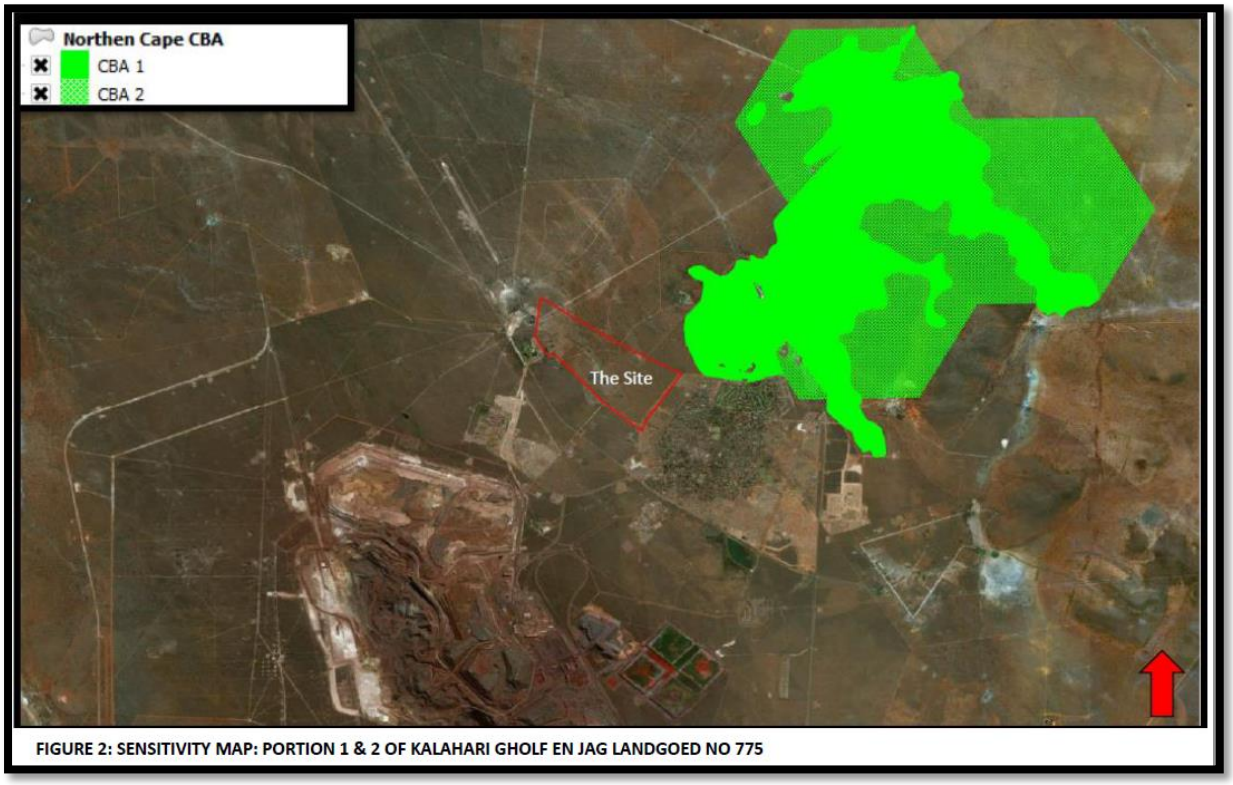


FIGURE 2: SENSITIVITY MAP: PORTION 1 & 2 OF KALAHARI GHOLF EN JAG LANDGOED NO 775

Figure 2: PROPOSED LAYOUT PLAN

An old dry streambed runs roughly from east to west through the area, while a section of the old (tarred) Sishen-Kuruman road from north to south on the eastern side of the area. The old (now dysfunctional) Khai Appel Recreational Resort/Caravan Park is located on its western boundary, while new residential (township) developments are found on its eastern boundary. A number of old dry pans are located in the area, as well as recent quarries for various materials in some areas. Please see Figure 3 below. A small section close its eastern boundary has also been recently cleared of trees. The area is however not heavily disturbed by past agricultural activities and rural/urban developments. The Sishen Iron Mine is located a few kilometers to the south of the area.

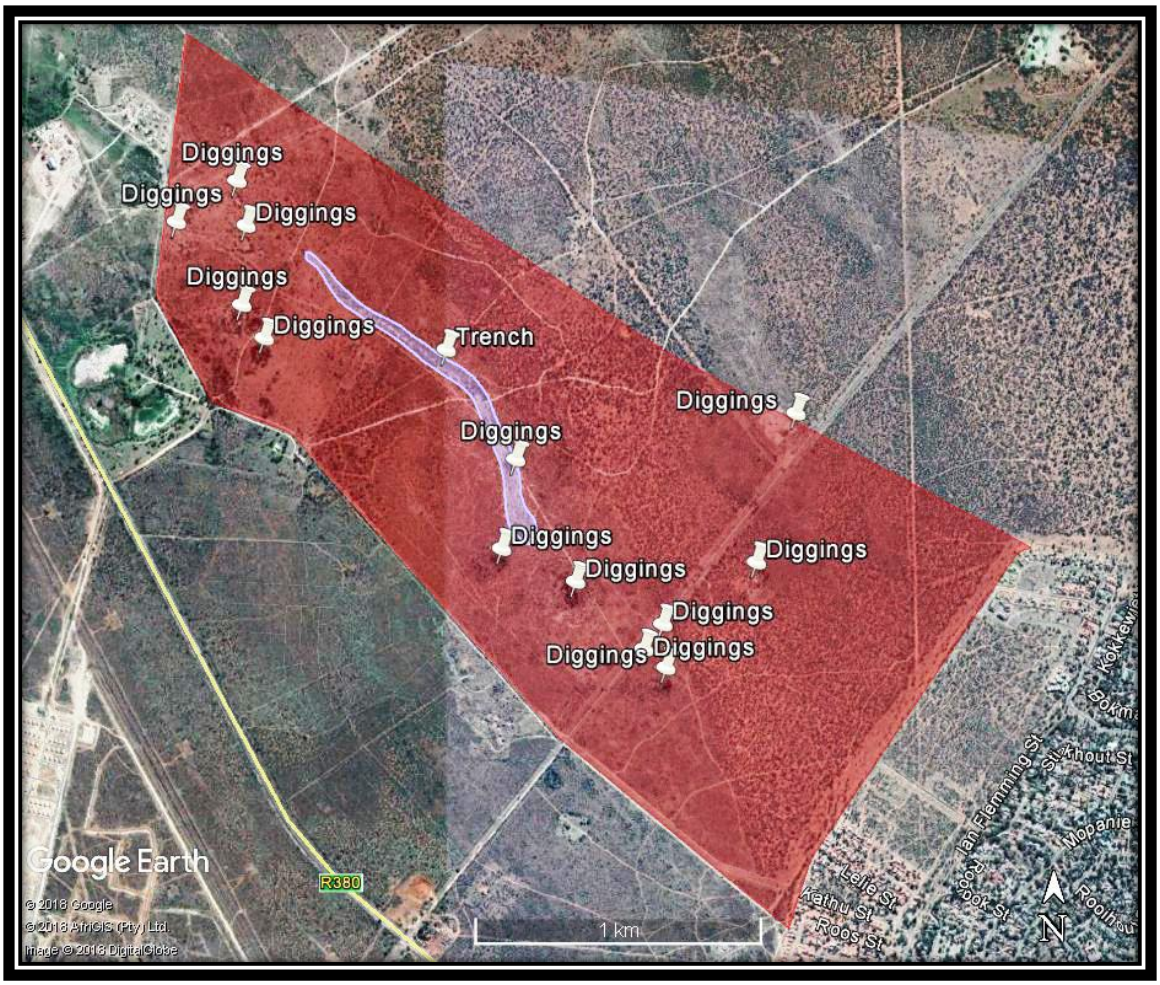
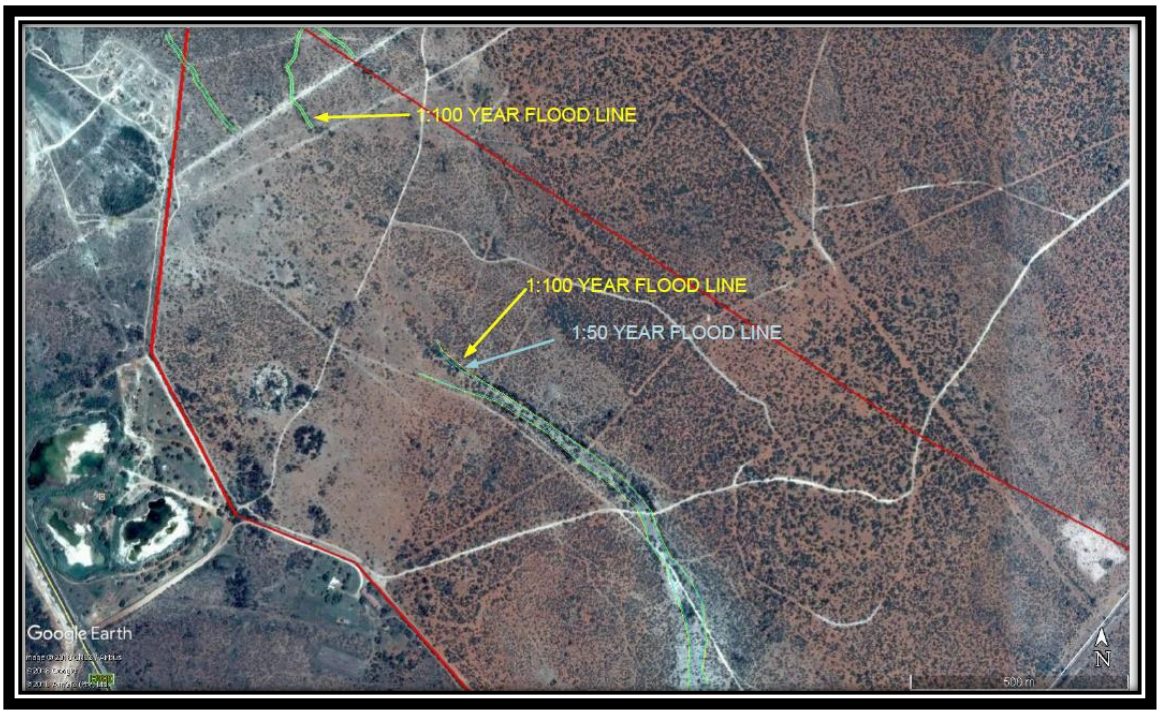


Figure 3 Map of the site with indication of diggings and trench at the site.

A botanical / wetland Specialist has been appointed to assess the old dry streambed that runs from east to west through the area. He concluded that "*A trench is also present, probably owing to diggings of the past, though the origin of this trench is not clear*". He further stated that "*Wetlands appear to be absent. Historical diggings are present at various places at the site. Water could gather at these diggings. Local dipping of landscape at these diggings may result in some water gathering after rainfall. As a pre-caution the trench and some of the diggings at the site could be part of a stepping-stone conservation corridor in the larger area. If the development is approved as many as practical Vachellia erioloba (Camel Thorn) should be conserved to serve as an urban conservation corridor for the Camel Thorn Forest and its buffer zone to the east of the site."*

An Engineer was appointed to dermine the possible 1:100 year flood lines for the area. He identified the following areas that may be subject to flooding (Please see Figure 4 Below). These areas were incorporated into the Layout Plan.



Vegetation at much of the site is characterised by shrub-height *Senegalia mellifera* (Black Thorn) savanna. Other indigenous small trees at the site include *Tarchonanthus camphoratus* (Vaalbos) and *Grewia flava* (Velvet Raisin). Few medium-sized *Vachellia erioloba* trees (Camel Thorn) are sparsely distributed in parts visibly dominated by *Senegalia mellifera* at central and western parts of the site. *Vachellia erioloba* (Camel Thorn) increases noticeably in the southeastern, eastern and northeastern parts of the site. A concentration of fairly large *Vachellia erioloba* trees is found in the central-eastern part of the site. Only a few individuals of *Boscia albitrunca* (Shepherd's Tree) are found at the site. Indigenous grass species include *Eragrostis lehmanniana* (Lehman's Love Grass), *Aristida congesta* (Tassel Three-awn) and *Enneapogon cenchroides.* Low shrubs (Karoo bushes) in particular *Pentzia calcarea* are conspicuous at the site.

Some areas at the site appear disturbed and has visible low cover of grasses and herbs. Exotic weed species are found at modified and degraded areas. These invasive weeds include *Argemone ochroleuca* (White-flowered Mexican Poppy), *Schkuhria pinnata* (Dwarf Marigold), *Chenopodium album* (White Goosefoot), *Tagetes minuta* (Khaki Weed), *Bidens pilosa* (Common Blackjack), *Bidens bipinnata* (Spanish Black Jack), *Datura ferox* (Large Thorn-apple), *Datura stramonium* (Common Thorn-apple), *Salsola kali* (Russian Tumbleweed) and *Verbesina encelioides* (Wild Sunflower).

Vachellia karroo (Sweet Thorn) trees is conspicuous at diggings.

There is little scope for the site to be a corridor of particular conservation importance. If the development is approved cultivation of indigenous plant species will be an asset for urban conservation corridors.

Photo 1 A view of the old Sishen-Kuruman Road that runs through a part of the area.

Photo 2 Part of site where bush-encroachment by shrub-height *Senegalia mellifera* (Black Thorn) is conspicuous.

Photo 3 Disturbed open vegetation at part of the site.

Photo 4 Open, disturbed vegetation at the site.

Photo 5 Vegetation near the southern boundary of the site. *Vachellia erioloba* (Camel Thorn) individuals of 5-10 m are scattered throughout this area.

Photo 6 A conspicuous concentration of *Vachellia erioloba* (Camel Thorn) individuals is found at the central eastern part of the site. These *Vachellia erioloba* trees are in the >5-10 m height class but many are over 7.5 m.

Photo 7 Shallow non-perennial streambed and noticeable concentration of *Vachellia karroo* (Sweet Thorn).

5. LEGAL AND OTHER REQUIREMENTS

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act No. 107 of 1998 as amended.	NEMA is South Africa's overall environmental legislation and has, as its primary objective to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith (Government Gazette, 1998). The Act provides for the right to an environment that is not harmful to the health and well-being of South African citizens; the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (Government Gazette, 1998).	National & Provincial	27 November 1998

	Section 30 (1, 3 and 4) of NEMA states that: (1)(a) ‘‘incident’’ means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed. (b) ‘‘responsible person’’ includes any person who; (i) Is responsible for the incident; (ii) Owns any hazardous substance involved in the incident; or (iii) Was in control of any hazardous substance involved in the incident at the time of the incident; (3) The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or by-products released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to; (i) the Director-General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident. (4)The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident; (a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and		

	property of persons; (b) undertake clean-up procedures; (c) remedy the effects of the incident; (d) assess the immediate and long-term effects of the incident on the environment and public health.		
The Bill of Rights, Constitution of South Africa, Section 27 (1)(b)	The Constitution of the Republic of South Africa is the legal source of all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act, it is stated that: Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Given that environmental management is founded partly on the principles of public participation, Section 195 of the Constitution is of primary relevance: (1) Public administration must be governed by the democratic values and principles enshrined in the constitution, including the following principles: (a) (b) (c) (d) (e) Peoples needs must be responded to, and the public must be encouraged to participate in policymaking. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information (Government Gazette, 1996).	National Government	1994
New Regulations 2017 in terms of NEMA	Legislation consulted during the environmental impact assessment process to determine whether any listed activities would be triggered. The Regulations were also consulted to determine inter alia the requirements regarding the contents	National & Provincial	7 April 2017

	of basic assessment reports and environmental management programmes and the public participation process that should be followed.		
National Water Act (36 OF 1998)	National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological integrity, economic growth and social equity when managing and using water. The major objectives of the National Water Act are to: •Aid in providing basic human needs; •Meet the growing demand of water in a sustainable manner; •Ensure equal access to water and use of water resources; •Protect the quality of water of natural resources; •Ensure integrated management of water resources; •Foster social and economic development; and •Conserve aquatic and related ecosystems. Section 19 of the National Water Act states that the person responsible for land upon which any activity is or was performed which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. Chapter 3 of the National Water Act (36 of 1998), deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. In terms of Section 30 of NEMA and Section 20 of the National Water Act, the responsibility for remedying the situation rests with the person responsible for the incident or the substance involved. If there is a failure to act, the relevant Catchment Management Agency may take the	Department of water and sanitation	1998

	necessary steps and recover the costs from every responsible person.		
National Environmental Management: Biodiversity Act (NEMBA) (ACT NO. 10 OF 2004)	The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. In terms of Chapter 4 of the Above Act: 52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection. (b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection. (2) The following categories of ecosystems may be listed in terms of subsection: (a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation; (b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;	National & Provincial	2004

	(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and (d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c). (3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list. 53 (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process. (2) A threatening process, identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of the National Environmental Management Act (1998) and a listed ecosystem must be regarded as an area identified for the purpose of that section.		
National Environmental Management: Protected Areas Act (ACT NO. 57 OF 2003)	This Act aims to provide for a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity. The Protected Areas Act tries to ensure the protection of the entire range of biodiversity, referring to natural landscapes and seascapes. The Act makes express reference to the need to move towards Community Based natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the management of protected areas. The purpose of the Act is: •To protect ecologically viable areas representative of South Africa's biological diversity and its natural	National & Provincial	2003

	landscapes and seascapes and their ecological integrity. •To conserve biodiversity in those areas; •To protect South Africa's rare species; •To protect vulnerable or ecologically sensitive areas; •To assist in ensuring the sustained supply of environmental goods and services; •To provide for the sustainable use of natural and biological resources; •To create or augment destinations for nature-based tourism; •To manage the interrelationship between natural environmental biodiversity, human settlement and economic development; •To contribute to human, social, cultural, spiritual and economic development; •To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species. This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures which must be followed before any of the kinds of protected areas are declared.		
Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002	The Act distinguishes between mining permits and mining rights as follows: **Mining Permit**: Required where the activity will last less than two years and affects an area of less than 1.5ha in extent (valid for 3 years). In terms of the Act a mining permit requires a submission of an Environmental Management Plan (EMP to DME for approval prior to the onset of activities). **Mining Right**: Required for larger mining operations (renewable and valid for 30 years). In terms of the	Relevant Provincial Authorities.	2002

	Act a mining right requires the submission of an Environmental Management Programme (EMProg) to DME for approval prior to the onset of activities. In light of their limited spatio-temporal extent, borrow pits (for the provision of construction material) and quarry operations would typically require a mining permit. The closure of borrow pits requires the submission of a closure application; this must be submitted within 180 days after ceasing operations. It is important to recognise that the mining right/permit holder's liability persists until such time as a Closure Certificate has been issued by DME.		
National Heritage Resources Act, Act No. 25 of 1999	Legislation consulted during the impact assessment process, to determine the legal requirements relating to the management of heritage resources that are present in and around the site.	SAHRA	1999
National Environmental Management: Waste Act, Act No. 59 of 2008, read together with the List of Waste Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment, GN No. 921 of 29 November 2013	Legislation consulted to determine whether a waste licence will have to be obtained for the development. Should the old canal be demolished, *Category A: Activity number: 14* might be triggered. However, it is considered unlikely at this stage as it is envisaged that the existing canal will remain operational.	National & Provincial	2008
National Environmental Management: Air Quality Act (Act 39 of 2004)	To protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social Development. Construction activities may cause some air pollution.	Relevant Provincial Authorities.	2004
The Conservation of Agricultural Resources Act (Act 43 of 1983)	This Act regulates the flow pattern of runoff water, control of weeds and invader plants.	Relevant Provincial Authorities.	1983
National Veldt and Forest Fire Act (Act 101 of 1998)	Chapter 4 places a duty on owners to prepare and maintain firebreaks.	Relevant Provincial Authorities.	1998

National Forests Act, Act 84 of 1998 (NFA) read with GN1602 of December 2016.	During the construction phase of the development certain protected trees may be affected. Licences will have to be obtained from the Minister before the affected trees may be cut, disturbed, damaged or destroyed. GN1602 of December 2016 contains the list of protected trees.	National and Provincial authorities.	1998
Northern Cape Nature Conservation Act, 2009 (Act. No. 9 of 2009)	This Act contains schedules of protected and specially protected species (fauna and flora) that may not be disturbed without a valid fauna and flora Permit from Nature Conservation.	Northern Cape Provincial Authority.	2009
Occupational Health and Safety Act (Act 85 of 1993)	To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the protection of persons other than persons at work against hazards to health.	Relevant Provincial Authorities.	1993
National Heritage RESOURCES Act (Act 25 of 1999)	**Regulation 38.** (1) states that any person who intends to undertake a development categorised as—*(a)* the construction of a canal exceeding 300m in length; must get authorization from SAHRA	Relevant Provincial Authorities.	1999

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

The following aspects have been dealt with:
SCHEDULE

Actions	Timeframe
1. Project Initiation and Scoping Phase	
1.1 Communication with authorities and source and analyse relevant baseline information and undertake site inspections	5 days
1.2 Identify key interested and affected parties (I&APs)	1 day
1.3 Compilation of terms of reference for specialist studies	2 days
1.4 Commission specialist studies	1 day
1.5 Compile Environmental Application Form for the project and submit to the authorities	Once the Environmental Application form has been submitted, the scoping report which has been subject to public participation (30 days) needs to be submitted within 44 days
1.6 Compile draft Scoping Report (SR) and make available to the public for a 30 day commenting period	5 days for compilation and 30 days for commenting period
1.7 Prepare an Information Sheet (summary of the draft SR) and distribute to I&APs	1 day
1.8 Compile and publish media notices (for the EIA) in relevant newspapers	7 days
1.9 Compile and place poster/s along the boundary of the site	1 day
1.10 Receive and address first round of comments from public	3 days

1.11 Should the draft SR require substantial changes, these changes will be incorporated into the final SR and distributed	The competent authority must within 43 days of receipt of the scoping report accept / refuse the report with our without conditions
1.12 Address comments received on the SR, finalise Scoping Report and submit to authorities	As above
1.13 Compile a Plan of Study for the assessment phase and submit to authorities for approval	As above
The total time allowed for the Scoping phase of the application	**87 days**
2. Assessment Phase	
2.1 Undertake assessment phase by assessing and evaluating potential impacts identified in the Scoping phase.	5 days
2.2 Review and manage specialist studies required.	Ongoing
2.3 Compile a draft Environmental Impact Report (EIR).	5 days
2.4 Compile a draft Environmental Management Plan for the Construction phase.	Included above
2.5 Compile an Information Sheet (summary of EIR) and distribute to identified I&APs	1 day
2.6 Distribute DEIR to I&APs	1 day
2.7 Allow the identified public to provide comment within a 30 day period on above report.	3 days for compilation and 30 days for commenting period
2.8 Address comments received and finalise EIR	3 days
2.9 Should the draft EIR require substantial changes, these changes will be incorporated into the final EIR and distributed for a 21 day commenting	3 days plus 21 day commenting period
2.10 Finalise EIR and update comments and response table for submission to authorities	5 days
2.11 Submit EIR to authorities for a final decision	1 day (The department requires the submission of the Final EIR within 106 days of the approval of the Scoping report), **therefore all information from the client's side must be provided within this timeframe to ensure the application is not withdrawn**)
2.12 Once the decision is issued, all I&Ps must be formally informed of the decision	The Competent Authority has 107 days from the date of receipt of the EIR and EMPr to determine the application
Total number of days allowed for the compilation and consideration of the EIR	**213 (may require additional 50 days public participation and consideration)**
TOTAL AMOUNT OF DAYS:	**300-350 days**

6. NEED AND DESIRIBILITY

As in the rest of South Africa, there is a housing shortage in the area. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which

provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

The proposed development will address this shortage.

During the construction phase of the proposed development, jobs will be created and thus the unemployment rate of the area will be reduced.

7. ALTERNATIVES

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

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

The alternatives considered for the proposed development includes land use alternatives (including the No-go option). The various alternatives will be assessed in the EIAR, in terms of environmental, social and technical feasibility.

7.1 Land Use Alternatives

7.1.1 Mixed land use township (Alternative 1)

Alternative Site layouts have been developed for the proposed development. The current layout plan is the product of the appointed Town and Regional planner.

Preliminary indications are that the township will consist of a mixed use, including: See Figure 2 for a copy of the proposed Layout Plan.

- Residential (350m² minimum): 3886 erven
- Residential (600m² minimum): 787 erven
- Residential (800m² minimum): 391 erven
- Residential Building (flats): 5 erven
- Business: 30 erven
- Church: 11 erven
- Primary School: 3 erven
- Secondary School: 1 erf
- Crèche: 7 erven
- Cemetery: 1 erf
- Public Open Space: 21 erven
- Sub-station: 2 erven

- Recreational (Sports field): 2 erven
- Taxi rank: 1 erf
- **TOTAL: 5148 erven**

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities shops, banking facilities, clinics, etc. and want their living environment, such as residential townships to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure (schools), as well as some retail or commercial activities;
- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised and informal settlements in the area. The commercial node will:
  - Promote entrepreneurial services and products;
  - Be within walking distance to places of refreshment and trade for residents;
  - Provide Job opportunities; and
  - Improve neighbourhood quality.

7.1.2 Single land use: Housing only (Alternative 2)

By providing only one land use type (i.e., housing), mixed income development and social integration across race and income levels, *cannot be achieved*.

A Commercial node on site is commonly utilised as a "Multi-Purpose Community Centre/Rural Service Centre" which is defined as "a focal point at which a range of essential services can be obtained by people living in its vicinity". In turn, a commercial node acts as a pool of human and physical resources from which the inputs necessary for development can be distributed efficiently, and from which a community can draw to promote their development".

By restricting a township to one land use only, the above benefits to the local community, and subsequent council area, cannot be realised, and hence, is not a preferred land use option.

7.1.3 No-go Alternative

The only other alternative that exists for the proposed development is the "no-go" option which will imply that the status quo will prevail. This is unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if

children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

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

8.1 BIO-PHYSICAL ASPECTS

8.1.1 GEOLOGY

The majority of the site is underlain by tholeitic and calc-alkaline basaltic and andesitic lava, tuff and pyroclastic breccia of the Allanridge Formation (Va), Ventersdorp Supergroup, but is covered by recent alluvium (m) in the form of Aeolian red sand (Qw) and calcrete (T-Qc). It is indicated on the geology map as T-Qk/Va.

The site is covered by recent Aeolian red sand with calcrete covering the lava.

No dolomite occurs in the area and no stability investigation is required

If the proposed mitigation measures as described in the Geotechnical report are adhered to, it will ensure a sustainable development as far as this variable is concerned.

8.1.2 TOPOGRAPHY

The site is located on a shallow northwestern slope of 1098 to 1120 MASL, the lowest point towards the perennial Vlermuislaagte River. A detailed site survey has been carried out to establish levels. Historical diggings are present at various places at the site. The Engineering report and the Layout plan will address issues regarding storm water.

8.1.3 CLIMATE

The site is situated within the Northern Cape Province which lies within the summer rainfall region of South Africa. Statistics obtained from the closest Class 1 weather station are that of Kuruman (station number - 0393/778A5). The temperature statistics is for the period 1945 – 1984, while the rainfall records is for the period 1932 - 1984. These statistics gives a good indication of the climatic conditions that may be expected at Kathu.

Extreme climatic events may have an influence on the project during the construction and operational phase and will have to be taken into consideration.

8.1.3.1 Rainfall

The average yearly precipitation for Kuruman is 455 mm/year. The absolute yearly maximum received was 964 mm during 1974, while the year with the lowest rainfall was 1965 when only 172mm was received. The maximum 24 hr precipitation received was 127 mm on 15 April 1955. The rainy season

reaches its maximum during January through to March (with averages in excess of 80 mm). Thunder occur on average 33,8 days per year.

The variability of rainfall as well as high intensity events can influence the project. Prolonged wet spells may affect the proposed development as excess water may accumulate on uneven portions. During extremely dry spells, the possibility of dust generation, as well as the detrimental effects on vegetation, will have to be taken into consideration. Droughts occur as part of the long-term climatic cycles throughout the country.

8.1.3.2 Temperature

Summers are hot. A maximum of 40°C was recorded on the 9th of January 1940, while the winters are mild during the day. Frost regularly occur during the night (minimum temperatures of below 0°C have already been recorded during the months April through to September). A minimum of –10 °C was recorded on the 12th of June 1979. In general the daily average maximum (for the year) is 25,9°C, while the average daily minimum for the year is 9,6°C.

The influence of temperature on the project is considered as very low and of very little significance, whilst the project cannot influence this variable. This variable will only play a minor role during the different phases of the project. Because extremely high temperatures may occur, (mostly during dry spells) the adverse effects due to temperature will be negative in relation to the project; however, the general nature of the average conditions will on the other hand be positive. The impacts should therefore be considered as "variable". It is important to ensure proper management steps are taken in the different phases of the project. The influence of the environment on the project during these phases is considered positive, as extreme events are rare.

The project itself cannot influence this variable and is considered "not applicable.

8.1.3.3 Wind

Winds are highly variable but tend to be northerly with a westerly component becoming dominant in the late winter to early spring, and a easterly component during the summer months.

8.1.4 SOIL

The majority of the site is underlain by tholeitic and calc-alkaline basaltic and andesitic lava, tuff and pyroclastic breccia of the Allanridge Formation (Ra), Ventersdorp Supergroup, but is covered by recent alluvium (m) in the form of Aeolian red sand (Qw) and calcrete (T-Qc). Severe problems are foreseen regarding the excavatability to 1,5m depth almost across the site.

Zoning of the site revealed zones with constraints ie: **highly collapse potential** of the soil, underlain by **calcrete gravel and boulders**. It was zoned as follows:

Engineering Geological Zonation

Special Development with Risk:

Site Class CR to C1R/1A2F: This zone is characterized by very loose collapsible aeolian sand (C to C1) exhibiting an open texture, with thickness less than 0,75m, with less than 10mm movement measured at surface. The risk of hard pan calcrete, calcrete gravel and shallow rock and scattered rock calcrete

boulders or rock outcrop (R) will restrict the placing of services. Pneumatic tools, a competent TLB or excavator or even blasting will be required during the placing of services. Foundations will require special foundation techniques with proper compaction and site specific drainage. It is classified as CR to C1R according the NHBRC guidelines (1995) & SAICE Code of practice (1995) and 1A2F according to the classification for urban development (Partridge, Wood & Brink).

Development with expected problems or increased cost

Site Class PQ: Quarried areas or borrow pits must be rehabilitated including backfilling with a controlled fill to engineer's specification before any development can take place.

Undevelopable:

Site Class PD: Perennial drainage features where the 1:100 year flood line will determine or specify the allowable distance of development from rivers, usually 32m from the center of the river.

Special construction techniques will be required to enable proper development. This includes the use of **special compaction** techniques of strip footings with slab on the ground foundations **or soil or steel reinforced rafts** with **site drainage provision** as described.

8.1.5 SURFACE DRAINAGE

The site is located on a shallow slope towards the northwest. Plate flow is the dominant drainage pattern on site, and a drainage channel intersects the site. Larger areas within the higher lying catchment area can lead to flash floods during heavy rainfalls. Drainage occurs in a northwesterly direction towards the Vlermuislaagte River, but any drainage feature dissipates into the sandy colluvium or pebble marker on site.

A Botanical / wetland Specialist has been appointed to assess the old dry streambed that runs from east to west through the area. He concluded that "*A trench is also present, probably owing to diggings of the past, though the origin of this trench is not clear*". He further stated that "*Wetlands appear to be absent. Historical diggings are present at various places at the site. Water could gather at these diggings. Local dipping of landscape at these diggings may result in some water gathering after rainfall. As a pre-caution the trench and some of the diggings at the site could be part of a stepping-stone conservation corridor in the larger area. If the development is approved as many as practical Vachellia erioloba (Camel Thorn) should be conserved to serve as an urban conservation corridor for the Camel Thorn Forest and its buffer zone to the east of the site."*

An Engineer was appointed to determine the possible 1:100 flood lines for the area. He identified the following areas that may be subject to flooding (Please see Figure 4 Below). These areas were incorporated into the Layout Plan.

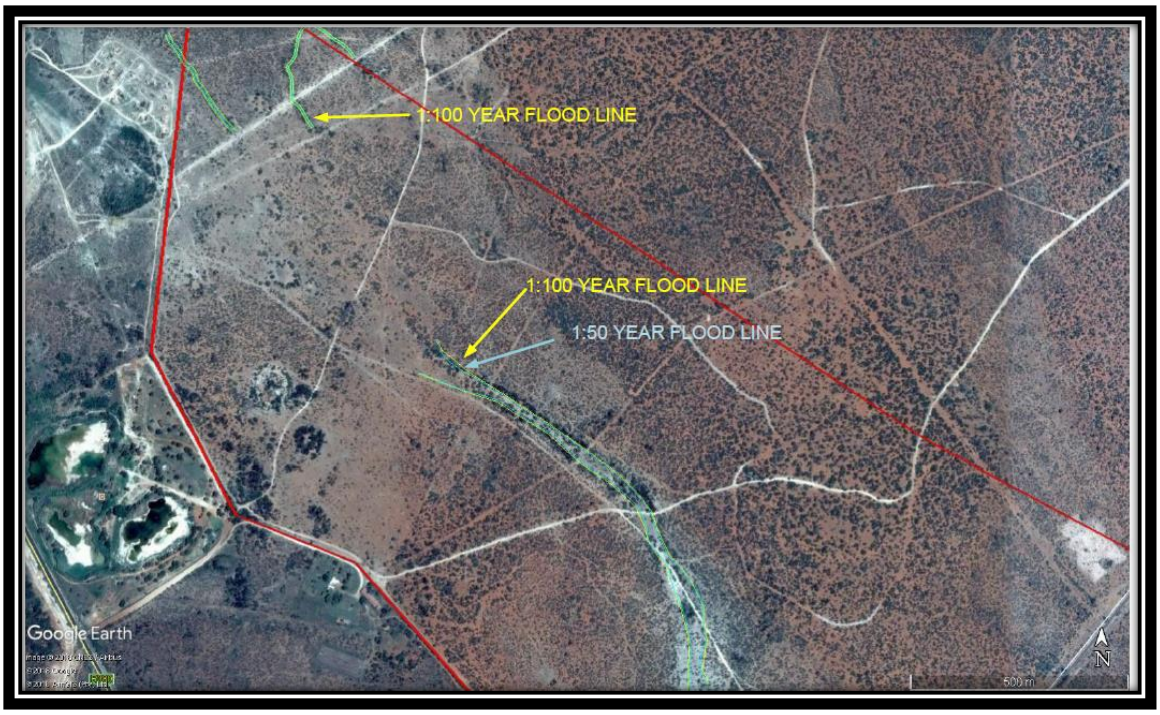


Figure 4: 1:100 year flood lines

Erosion by sheet flow may occur in disturbed areas. Storm water drainage will have to be considered during the planning phase of the development and will have to be incorporated into the final layout plan. Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures. Storm water diversion measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments must be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape.

8.1.6 GROUND WATER

No seepage or the presence of perennial fluctuations of ground water was encountered on site, but a seasonal perched water table may exist on the calcrete. A calcrete profile indicates that some perennial water level fluctuations occur.

Ground water in the form of seepage was not intersected in any test pit during the investigation, but normal water tightening techniques such as damp course on foundation levels are required. The expected high permeability of the silty sand may lead to leachate from sanitation systems to reach the ground water, and a closed water borne sewage system is recommended.

Possible infiltration into the groundwater must be taken into account. During the construction phase, no spills of lubricants or construction worker sewage should be allowed to pollute the ground water. During the operational phase, sewage systems must also not pollute groundwater. These aspects have been addressed in the EMPr.

8.1.7 FLORA

Terrestrial vegetation at much of the site is characterised by shrub-height *Senegalia mellifera* (Black Thorn) savanna on flat terrain (gentle slopes). Other indigenous small trees at the site include *Tarchonanthus camphoratus* (Vaalbos) and *Grewia flava* (Velvet Raisin). Few medium-sized *Vachellia erioloba trees* (Camel Thorn) are sparsely distributed in parts where *Senegalia mellifera* is visibly abundant such as at central and western parts of the site. *Vachellia erioloba* (Camel Thorn) increases noticeably in the southeastern, eastern and northeastern parts of the site. A concentration of fairly large *Vachellia erioloba* trees is found at an area in the eastern part of the site. Only a few individuals of *Boscia albitrunca* (Shepherd's Tree) are found at the site.

In broad terms the site contains a *Senegalia mellifera* (Black Thorn) savanna largely in the western parts and a *Vachellia erioloba* (Camel Thorn) mixed savanna largely in the eastern parts.

A trench and diggings are present at the site where *Vachellia karroo* (Sweet Thorn) trees are often conspicuous.

Roads and tracks are found at the site. Bush-encroachment characterized by dense covers of *Senegalia mellifera* (Black Thorn) is encountered at some parts of the site whereas in other parts vegetation appears sparse and degraded.

The vegetation type representing the Savanna Biome at the site is Kathu Bushveld (SVk 12). Kathu Bushveld is not listed as threatened according to the National List of Threatened Ecosystems (2011).

Trench and diggings at the site could be conservation corridors of particular conservation concern whether as linked or stepping stone corridor systems.

Ecological sensitivity at the site is medium-low at the flat areas where a visible high cover of *Senegalia mellifera* is present. Ecological sensitivity at the concentration of fairly large *Vachellia erioloba* trees at an area at the eastern part of the site is medium to medium-high.

No Threatened or Near Threatened plant or animal species appear to be present at site.

Two plant species which are not threatened but listed as Declining, *Boophone disticha* and *Vachellia erioloba* are present at the site.

If the development is approved individuals of the Declining plant species *Boophone disticha* need to be relocated to a suitable site nearby before the construction phase. *Boophone disticha* (Poison Bulb) contains highly poisonouos substances and the translocation operation should be done with necessary care.

Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for.

Establisment of exotic weeds should be monitored and exotic weeds at the site should be eradicated. A declared invader such as the mesquite tree (*Prosopis* species), should not be planted or allowed to spread from adjacent areas to the proposed footprint.

The site falls outside the Kathu Forest and its buffer zone. The conservation of *Vachellia erioloba* (a protected tree species that is also listed as Declining) should therefore receive special attention. If the development is approved a special effort should be made (apart from applying for the necessary permits) to conserve and cultivate *Vachellia erioloba* (Camel Thorn) trees to enhance the conservation of these magnificent trees in the larger area.

Three sample plots KT1, KT2 and KT3 of 50 m x 50 m were deliberately placed where conspicuous densities of *Vachellia erioloba* is present to gain an idea of the densities and height class distribution of *Vachellia erioloba* in the eastern half of the site where *Vachellia erioloba* is conspicuous in the mixed *Vachellia erioloba* savanna at the site. Table 4.26 of the Botanical / Wetland Specialist's Report indicates densities and height classes of Camel Thorn trees, *Vachellia erioloba* (= *Acacia erioloba*) at the site. No camel thorn trees taller than 10 m are found at the site (this is in contrast to other areas north and north-east of Kathu where such larger Camel Thorn trees are found). A relatively high density of Camel Thorn trees > 2 m of up to 96/ ha is present at the central-eastern part of the site. In other areas where conspicuous densities of *Vachellia erioloba* are found the density of individuals taller than 2 m ranges from 52/ ha to 84/ ha. Overall the density of *Vachellia erioloba* individuals taller than 2 m ranges from 0/ ha at the *Senegalia mellifera* savanna at the western parts of the site to around 54/ ha, 84/ha in eastern parts of the site and then at its most dense around 96/ ha at the central-eastern parts of the site.

If the development is approved, the key would be to conserve and cultivate as many as practical locally indigenous tree species at the urban area so that an urban conservation corridor could be created for the Kathu Forest which is further to the east outside the site.

8.1.8 FAUNA

Mammals

Literature sources that were used are Friedman & Daly (2004), Skinner & Chimimba (2005) and Wilson & Reeder (2005). Since the site falls outside reserves, threatened species such as the black rhinoceros (*Diceros bicornis*) and the African wild dog (*Lycaon pictus*) are obviously not present. No smaller mammals of particular high conservation significance are likely to be found on the site as well.

Birds

With bird species which often have a large distributional range, their presence does not imply that they are particularly dependent on a site as breeding location. Literature sources that were mainly consulted are Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No threat to any threatened bird species or any bird species of particular conservation importance are foreseen.

No bird's nests of particular conservation concern such as nests of large raptors or nests of sociable weavers, have been found at the site

Reptiles

The Southern African Reptile Conservation Assessment (SARCA) was launched in May 2005 (Branch, Tolley, Cunningham, Bauer, Alexander, Harrison, Turner & Bates, 2006). Its primary aim is to produce a conservation assessment for reptiles of South Africa, Lesotho and Swaziland within a four year period, ending 2009 (Branch *et al*., 2006). Therefore a full up-dated conservation assessment of reptiles, taking into account the recent IUCN (2001) criteria, will only be available in the near future. While the conservation statuses of reptile species are under revision Alexander & Marais (2007) as well as Tolley & Burger 2007) give useful indications of possible red listings in the near future. There appears to be no threat to any reptile species of particular high conservation importance if the site is developed.

Amphibians

According to Minter, Burger, Harrison, Braack, Bishop and Kloepfer (2004) as well as Du Preez & Carruthers (2009), *Pyxicephalus adspersus* (Giant Bullfrog) is listed as near threatened (Minter *et al*., 2004; Du Preez & Carruthers, 2009). Though currently this species is listed as Least Concern (IUCN) it remains as species which is considered as of special conservation priority. There is no suitable habitat for *Pyxicephalus adspersus* (Giant Bullfrog) at the site. There appears to be no threat to any amphibian species of particular high conservation importance if the site is developed.

Butterflies

Studies about the vegetation and habitat of threatened butterfly species in South Africa showed that ecosystems with a unique combination of features are selected by these often localised threatened butterfly species (Deutschländer and Bredenkamp 1999; Edge 2002, 2005; Terblanche, Morgenthal & Cilliers 2003; Lubke, Hoare, Victor & Ketelaar 2003; Edge, Cilliers & Terblanche, 2008). Threatened butterfly species in South Africa can then be regarded as bio-indicators of rare ecosystems.

Four species of butterfly in Gauteng Province, northeastern Northern Cape Province and North West Province combined are listed as threatened in the recent butterfly conservation assessment of South Africa (Mecenero *et al*., 2013). The expected presence or not of these threatened butterfly species as well as species of high conservation priority that are not threatened, at the site (Table 4.22 and Table 4.23) follows.

Assessment of threatened butterfly species

***Aloeides dentatis dentatis* (Roodepoort Copper)**

The proposed global red list status for *Aloeides dentatis dentatis* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.,* 2013). *Aloeides dentatis dentatis* colonies are found where one of its host plants *Hermannia depressa* or *Lotononis eriantha* is present. Larval ant association is with *Lepisiota capensis* (S.F. Henning 1983; S.F. Henning & G.A. Henning 1989). The habitat requirements of *Aloeides dentatis dentatis* are complex and not fully understood yet. See Deutschländer and Bredenkamp (1999) for the description of the vegetation and habitat characteristics of one locality of *Aloeides dentatis* subsp. *dentatis* at Ruimsig, Roodepoort, Gauteng Province. There is not an ideal habitat of *Aloeides dentatis* subsp. *dentatis* on the site and it is unlikely that the butterfly is present at the site.

***Anthene lindae* (Kalahari Hairtail)**

Small but distinct butterfly species discovered by R.F. Terblanche in 1990 at the present Witsand Nature Reserve in the Northern Cape. Recent red listing and exinction risk assessments list *Anthene lindae* as Vulnerable (Henning, Terblanche & Ball, 2009; Mecenero *et al.*, 2013). The butterfly is intimately associated with *Acacia erioloba* which may prove to be the larval food plant (Terblanche, 1994; Jessnitz pers. comm). However, all the localities for this butterfly species have been found on what appears to be a unique catchment area and basins with particular high water tables on the western side of the Langberg mountain chain, Northern Cape Province (Terblanche & Taylor, 2000). According to Henning *et al.* (2009) *Anthene lindae* has up to date only been found at an ecotone between Gordonia Plains Shrubland and Olifantshoek Plains Thornveld (Mucina & Rutherford, 2006). *Anthene lindae* is not found everywhere where *Vachellia erioloba* is present (Terblanche In prep.) and based on the present knowledge and surveys, presence of the butterfly at the site is unlikely. This butterfly species may however be found at the core of the Kathu Forest outside the site at low water table situations.

Chrysoritis aureus (Golden Opal/ Heidelberg Copper)

The proposed global red list status for *Chrysoritis aureus* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.,* 2013) *Chrysoritis aureus* (Golden Opal/ Heidelberg Copper) is a resident where the larval host plant, *Clutia pulchella* is present. However, the distribution of the butterfly is much more restricted than that of the larval host plant (S.F. Henning 1983; Terblanche, Morgenthal & Cilliers 2003). One of the reasons for the localised distribution of *Chrysoritis aureus* is that a specific host ant *Crematogaster liengmei* must also be present at the habitat. Fire appears to be an essential factor for the maintenance of suitable habitat (Terblanche, Morgenthal & Cilliers 2003). Research revealed that *Chrysorits aureus* (Golden Opal/ Heidelberg Copper) has very specific habitat requirements, which include rocky ridges with a steep slope and a southern aspect (Terblanche, Morgenthal & Cilliers 2003). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon is highly unlikely.

Lepidochrysops praeterita **(Highveld Blue)**

The proposed global red list status for *Lepidochrysops praeterita* according to the most recent IUCN criteria and categories is Endangered (G.A. Henning, Terblanche & Ball, 2009; Mecenero *et al.,* 2013). *Lepidochrysops praeterita* is a butterfly that occurs where the larval host plant *Ocimum obovatum* (= *Becium obovatum*) is present (Pringle, G.A. Henning & Ball, 1994), but the distribution of the butterfly is much more restricted than the distribution of the host plant. *Lepidochrysops praeterita* is found on selected rocky ridges and rocky hillsides in parts of Gauteng, the extreme northern Free State and the south-eastern Gauteng Province. No ideal habitat appears to be present for the butterfly on the site. It is unlikely that *Lepidochrysops praeterita* would be present on the site and at the footprint proposed for the development.

Orachrysops mijburghi **(Mijburgh's Blue)**

The proposed global red status for *Orachrysops mijburghi* according to the most recent IUCN criteria and categories is Endangered (Mecenero *et al.,* 2013). *Orachrysops mijburghi* favours grassland depressions where specific *Indigofera* plant species occur (Terblanche & Edge 2007). The Heilbron population of

Orachrysops mijburghi in the Free State uses *Indigofera evansiana* as a larval host plant (Edge, 2005) while the Suikerbosrand population in Gauteng uses *Indigofera dimidiata* as a larval host plant (Terblanche & Edge 2007). There is no suitable habitat for *Orachrysops mijburghi* on the site and it is unlikely that *Orachrysops mijburghi* would be present on the site.

Conclusion on threatened butterfly species

There appears to be no threat to any threatened butterfly species if the site is developed.

Assessment of butterfly species that are not threatened but also of high conservation priority

Colotis celimene amina (Lilac tip)

Colotis celimene amina is listed as Rare (Low density) by Mecenero *et al.* (2013). In South Africa *Colotis celimene amina* is present from Pietermaritzburg in the south and northwards into parts of Kwa-Zulu Natal, Gauteng, Limpopo, Mpumalanga and the North West Provinces (Mecenero *et al.* In press.). Reasons for its rarity are poorly understood. It is highly unlikely that *Colotis celimene amina* would be present at the site.

Lepidochrysops procera (Savanna Blue)

Lepidochrysops procera is listed as Rare (Habitat specialist) by Mecenero *et al.* (2013). *Lepidochrysops procera* is endemic to South Africa and found in Gauteng, KwaZulu-Natal, Mpumalanga and North West (Mecenero *et al.,* 2013). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

Metisella meninx (Marsh Sylph)

Henning and Henning (1989) in the first South African Red Data Book of Butterflies, listed *Metisella meninx* as threatened under the former IUCN category Indeterminate. Even earlier in the 20th century Swanepoel (1953) raised concern about vanishing wetlands leading to habitat loss and loss of populations of *Metisella meninx*. According to the second South African Red Data Book of butterflies (Henning, Terblanche & Ball, 2009) the proposed global red list status of *Metisella meninx* has been Vulnerable. During a recent large scale atlassing project the *Conservation Assessment of Butterflies of South Africa, Lesotho and Swaziland: Red List and Atlas* (Mecenero *et al.,* 2013) it was found that more *Metisella meninx* populations are present than thought before. Based on this valid new information, the conservation status of *Metisella meninx* is now regarded as Rare (Habitat specialist) (Mecenero *et al.,* 2013). Though *Metisella meninx* is more widespread and less threatened than perceived before, it should be regarded as a localised rare habitat specialist of conservation priority, which is dependent on wetlands with suitable patches of grass at wetlands (Terblanche In prep.). Another important factor to keep in mind for the conservation of *Metisella meninx* is that based on very recent discoveries of new taxa in the group the present *Metisella meninx* is species complex consisting of at least three taxa (Terblanche In prep., Terblanche & Henning In prep.). The ideal habitat of *Metisella meninx* is treeless marshy areas where *Leersia hexandra* (rice grass) is abundant (Terblanche In prep.). The larval host plant of *Metisella meninx* is wild rice grass, *Leersia hexandra* (G.A. Henning & Roos, 2001). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

Platylesches dolomitica (Hilltop Hopper)

Platylesches dolomitica is listed as Rare (Low density) by Mecenero *et al.* (2013). Historically the conservation status of *Platylesches dolomitica* was proposed to be Vulnerable (Henning, Terblanche & Ball 2009). However this butterfly which is easily overlooked and has a wider distribution than percieved before. *Platylesches dolomitica* has a patchy distribution and is found on rocky ledges where *Parinari capensis* occurs, between 1300 m and 1800m (Mecenero *et al*. 2013, Dobson Pers comm.). Owing to a lack of habitat requirements and ideal habitat the presence of the taxon at the site is highly unlikely.

8.1.9 AIR QUALITY

Air quality will have no influence on the project. The project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

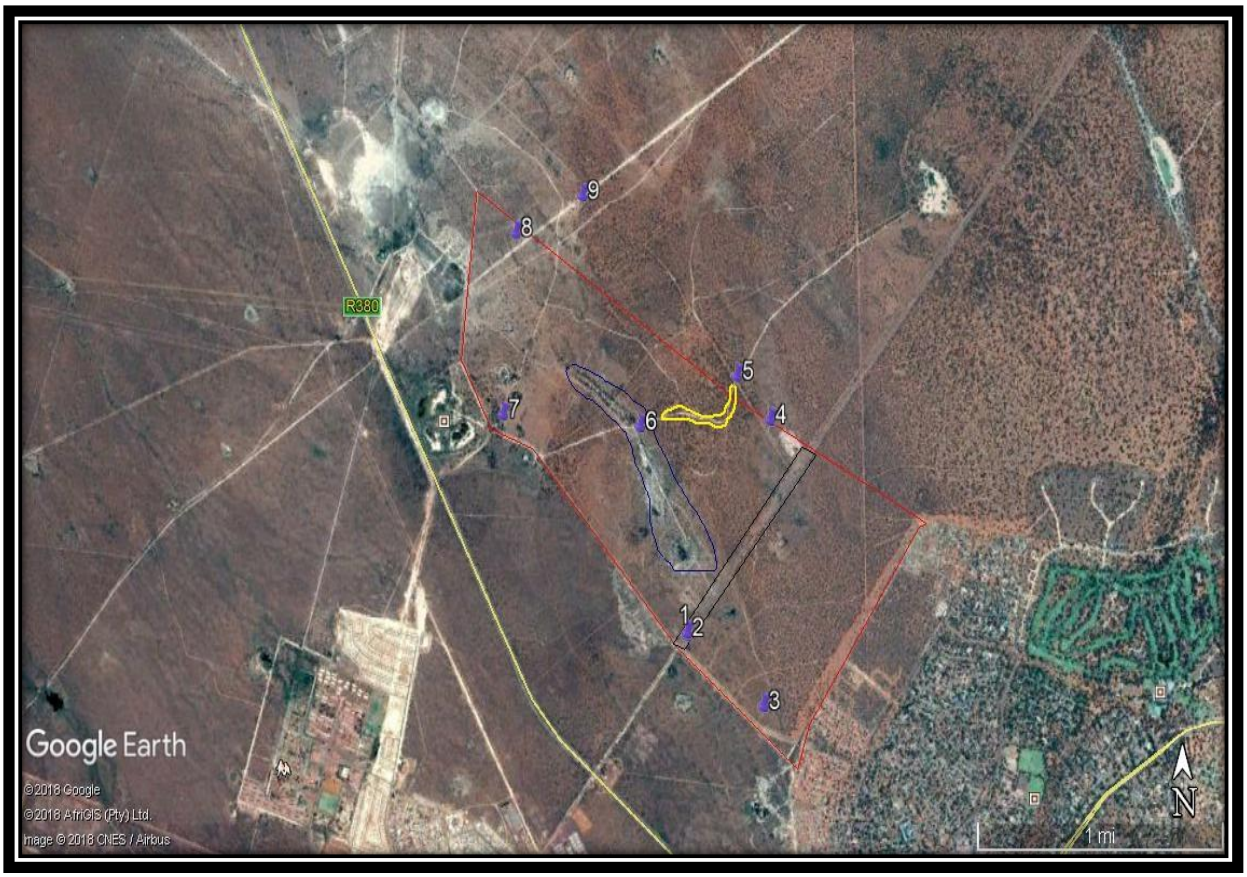
8.1.10 NOISE

It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any more noise during the operational phase than that already experienced on site.

8.1.11 ARCHAEOLOGY

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel, although some archaeological material & historical sites were identified during the assessment in January 2018.

A total of 9 sites were found during the assessment of the area, with 8 of these Stone Age and 1 a recent historical grave site. Three (3) of the Stone Age sites are located around the old Sishen-Kuruman tar road periphery/in the road reserve and on the surface of a smaller graded dirt road in the area. The tar road material might come from a secondary source. The number of sites and finds dating to the Stone Age might be more than those identified and recorded during the assessment, as it is clear that the area could contain many more similar sites and scatters of material of varying density throughout. The old streambed that runs in the area also contained some scattered tools from the MSA/LSA, but the whole section was not walked and therefore the whole streambed section is a potential area for the presence of Stone Age sites.



Aerial view of study area (red polygon) & Sites found. The old tarred road between Sishen & Kuruman is demarcated in black; while the dry streambed has been demarcated in blue and the Site 5 road in yellow (Google Earth 2018).

Sites 1 & 2 are located in close proximity to each other and are situated next to the old tar road and in the road reserve. Stone tools are scattered amongst gravel used for the road construction and include cores, handaxes, possible choppers, broken blades, flakes and waste. When the rest of the tar road section was assessed it became clear that these types of tools are located only close to and in the road reserve (an approximately 15m section both sides). Beyond that hardly any material occurs. It is highly likely that this Stone Age material comes from a secondary source (i.e. a quarry from which the road building material was sourced) and is not in situ. ***The range of material found here makes the "road site" relatively significant and if the road is to be impacted (re-used/removed) then it is recommended that possible surface sampling of representative material is undertaken. The source of the material should also be traced and the Stone Age material mapped along the road.***

Site 5 is located along another road in the study area. This is a dirt road that has been graded through a section of red aeolian sands and MSA & LSA artifacts (scrapers, blades, flakes) have been exposed in the road and next to it. ***The area around the road (in the red sands) most likely also contain scatters of tools that will be exposed eventually through natural erosion and care should be taken should development occur here that if material is uncovered an expert be called in to investigate.***

Site 6 is located in the old dry streambed in the area. Scattered/individual Stone tools are found throughout the area. The material has been heavily rolled (water working) and includes MSA/LSA flakes, blades, scrapers and other artifacts. ***It is recommended that the streambed area be avoided by the development***. Sites 3, 4, 8 & 9 are all surface sites containing single or denser scatter of MSA/LSA tools (blades, scrapers, cores, flakes and waste) on them. One of these sites (Site 9) falls outside the footprint of study area and is located in an old dry pan area.

It is highly likely that many more similar surface sites and scatters of Stone Age material are located in the study area but might not be visible at this current stage. Material is covered by the red aeolian sands and will erode out over time. It is therefore also possible that development actions could uncover more sites and material. It is recommended that a more detailed mapping and assessment of the Stone Age of the study area be undertaken.

8.2 SOCIO ECONOMIC FACTORS

8.2.1 CULTURAL SITES

The Site 7 graveyard is located close to the fence with the Khai Appel Resort/Caravan Park and contains between 12 and 15 graves. Most of the graves are stone-packed and with cement borders, while a few have cement headstones with inscriptions. Three individuals could be identified and includes (1) Beney Konieng who was born in April 1959 and died on 5 April 1960; (2) Mrs. Ross Hugo who died on the 20th of October 1961 and (3) Mrs. L. Sebego who was born in 1889 and died in 1965. ***Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. The best would be however to keep the site fenced-off and protected.***

From a cultural heritage point of view the development can therefore continue, taking cognizance of the above recommendations.

8.2.2 SOCIOLOGICAL AND ECONOMIC ISSUES

The socio-economic status of the area will have an impact on the project and will be addressed as part of the Public Participation Process. It is envisaged that the proposed development will have a positive influence on the local population by providing much needed housing for previously disadvantaged people living in the area. New employment opportunities and injection of capital into the local community will result.

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology:

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

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
		proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances
Reversibility	Low	There is little chance of correcting the adverse impact
	Medium	There is a moderate chance of correcting the adverse impact
	High	There is a high chance in correcting the adverse impact
Risk	Low	Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring.
	Medium	Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management
	High	High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.

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

Geographical attributes

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

Physical attributes

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

Biological attributes

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

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

Zoogeography is the branch that studies distribution of animals.

Social attributes

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

Economic attributes

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

Heritage attributes

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

Cultural attributes

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

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

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
DIRECT IMPACTS:					
Geographical Physical Social Economic	380,8600 ha of indigenous vegetation will be transformed in order to establish the development.	Duration	Long term	Obtain the necessary environmental authorization for the development.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
		Probability	Definite	Implement the mitigation measures as described in the Environmental Management Plan.	Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	A Cemetery will form part of the development.	Duration	Long term	Conduct the necessary Geo-Hydrological investigation to ensure that the area is suited for this land use.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	Plan for the provision of services for the development.	Duration	Long term	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the provision and maintenance of ablution facilities for construction workers to prevent pollution of surface and underground water.	Duration	Short term	Provide portable ablution facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to manage possible impacts that the project can have on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
		Significance	Medium	The findings of the Geo-Technical Engineer must be incorporated into the design of the project. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The development will have an impact on a graveyard that was found on site.	Duration	Permanent	Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. The best would be however to keep the site fenced-off and protected	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	An unnamed non-perennial stream (Or trench) intersects the site on the eastern side of the development area.	Duration	Permanent	The 1:100 year flood line will have to be determined and will have to be incorporated into the final layout plan. No development will occur within this area. Plan to have the area below the 1:100 year flood line demarcated as a no-go zone during the construction phase of the development.	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Indirect impacts:					
Geographical Physical	Plan to control dust generation from the proposed project	Duration	Short term		Short term
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
Social Economic	which could impact on the surrounding area.	Magnitude (Intensity)	Low	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to create new employment opportunities. Plan to use local labour to ensure local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
Cumulative impacts:					
Geographical Physical Social	Plan the development to ensure the social well-being of	Extent	Local	Ensure that the development is constructed as planned.	Local
		Magnitude (Intensity)	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
Economic	the community for which the development is intended	Probability	Definite	The demand for housing will be partially addressed in the area.	Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation.	Extent	Local	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development. Plan for the upgrading of bulk water and ablution supply pipelines; reservoirs; pump stations and WWTW as described in the Civil Engineer's Recommendations. Ensure that the development is constructed as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		High
	Plan for the increase in traffic volumes that will result from the proposed development	Extent	Local	The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site	Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium

	ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)				
	ALTERNATIVE 2: Single land use: Housing only				
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
	DIRECT IMPACTS:				
Geographical Physical Social Economic	380,8600 ha of indigenous vegetation will be transformed in order to establish the development.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management plan.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
		Duration	Long term		Long term

	ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)				
	ALTERNATIVE 2: Single land use: Housing only				
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
	Plan for the provision of services for the development.	Extent	Local	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.	Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the provision and maintenance of ablution facilities for construction workers to prevent pollution of surface and underground water.	Duration	Short term	Provide portable ablution facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to manage possible impacts that the project can have on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised. The findings of the Geo-Technical Engineer must be incorporated into the design of the project. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite

	ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)				
	ALTERNATIVE 2: Single land use: Housing only				
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
		Significance	Medium	The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The development will have an impact on graveyard that was found on site.	Duration	Permanent	Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. The best would be however to keep the site fenced-off and protected	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	An unnamed non-perennial stream (Trench) intersects the site on the eastern side of the development area.	Duration	Permanent	The 1:100 year floodline will have to be determined and will have to be incorporated into the final layout plan. No development will occur within this area. Plan to have the area below the 1:100 year flood line demarcated as a no-go zone during the construction phase of the development.	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
			Indirect impacts:		
Geographical Physical Social Economic	Plan to control dust generation from the proposed project which could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High

	ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)				
	ALTERNATIVE 2: Single land use: Housing only				
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
		Risk	Low	Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Medium
	Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to create new employment opportunities. Plan to use local labour to ensure local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Cumulative impacts:				
Geographical Physical Social Economic	Plan the development to ensure the social well-being of the community for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation.	Extent	Local	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development. Plan for the upgrading of bulk water and ablution supply pipelines; reservoirs; pump stations and WWTW as	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		High

	ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)				
	ALTERNATIVE 2: Single land use: Housing only				
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
				described in the Civil Engineer's Recommendations. Ensure that the development is constructed as planned.	
	Plan for the increase in traffic volumes that will result from the proposed development	Extent	Local	The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site	Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	No clearance of indigenous vegetation.	Duration	Long term	No mitigation measures required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
Indirect impacts:					
Geographical Physical Social Economic Cultural	No new employment opportunities will be created during the planning and design phase. No skills enhancement will take place If this option is implemented, the projected boost to the local	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	High		High

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
	and regional economy will not take place.				
Cumulative impacts:					
Geographical Physical Social Economic Cultural	If this option is implemented, the projected boost to the local and regional economy will not take place. No new employment opportunities will be created. No improvement to local skills development will take place. No broadened Tax base for the Gamagara Local Municipality.	Extent Magnitude (Intensity) Probability Significance Reversibility Risk	Local Medium Definite High High Medium	Ensure that the development is constructed and operated as planned.	Local Medium Definite High High Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
DIRECT IMPACTS:					
Geographical Physical Social Economic	380,8600 ha of indigenous vegetation will be transformed in order to establish the development.	Duration Extent Magnitude (Intensity) Probability Significance Reversibility Risk	Long term Local High Definite Medium Low Medium	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management plan.	Long term Local High Definite Medium Low Medium
	Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.	Duration Extent Magnitude (Intensity) Probability Significance Reversibility Risk	Short term Local Low Definite Medium High Low	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term Local Medium Definite Medium High Medium
	Foreign plant species are likely to invade disturbed areas.	Duration Extent Magnitude (Intensity) Probability Significance Reversibility Risk	Short term Local Low Definite Medium High Low	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term Local Low Definite Medium High Medium
	Poorly planned ablution facilities for construction workers may cause pollution of surface and underground water.	Duration Extent Magnitude (Intensity) Probability	Short term Local Medium Definite	Provide portable ablution facilities that will not cause pollution during the construction phase.	Short term Local Medium Definite

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The proposed project can impact on the soil and geology.	Duration	Long term	The findings of the Geo-Technical Engineer must be incorporated into the design of the project. Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Open trenches can be dangerous as they can either collapse on people or on equipment and people- especially small children, can fall into them.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Indirect impacts:					
Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
		Reversibility	High	Start the rehabilitation of disturbed surfaces as soon as possible	High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Waste materials such as glass, plastic, metal or paper present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Non-compliance to the relevant legislation may cause social and environmental problems.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
				environment (acts, regulations, and special guidelines).	
	New employment opportunities will be created. Local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	An unnamed non-perennial stream (Trench) intersects the site on the eastern side of the development area.	Duration	Permanent	No development will occur within this area. Demarcate the area below the 1:100 year flood line as a no-go zone	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The development will have an impact on a graveyard that was found on site.	Duration	Permanent	Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. Fence off (and maintain) the site.	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Cumulative impacts:					
Geographical Physical Social Economic	Enhancement of the social well-being of the local communities for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Solid waste: The proposed development will add additional solid waste into the existing waste stream of the Gamagara Local Municipality. Sewage: The proposed development will add additional sewage into the existing	Extent	Local	Before development can commence, ensure the works in relation to the upgrading of bulk water and ablution supply pipelines; reservoirs; pump stations and WWTW as described in the Civil	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		High

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
	sewage stream of the Gamagara Local Municipality. Water supply: The proposed development will add pressure to the water supply of Gamagara Local Municipality's Water.			Engineer's Recommendations are constructed and operational. Ensure that the development is constructed as planned by the Civil Engineer.	
	Traffic: The proposed development will result in an increase in traffic in the immediate surroundings of the proposed development.	Extent	Local	Ensure that the development is constructed as planned by the Town and Regional Planner	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site	Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
DIRECT IMPACTS:					
Geographical Physical Social Economic	380,8600 ha of indigenous vegetation will be transformed in order to establish the development.	Duration	Long term	Obtain the necessary environmental authorization for the development. Implement the mitigation measures as described in the Environmental Management plan.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
		Duration	Short term		Medium term
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
	Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.	Magnitude (Intensity)	Low	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Foreign plant species are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Poorly planned ablution facilities for construction workers may cause pollution of surface and underground water.	Duration	Short term	Provide portable ablution facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The proposed project can impact on the soil and geology.	Duration	Long term	The findings of the Geo-Technical Engineer must be incorporated into the design of the project. Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Open trenches can be dangerous as they can either	Duration	Short term	Ensure that the trenches are dug	Short term
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
	collapse on people or on equipment and people- especially small children, can fall into them.	Magnitude (Intensity)	Medium	according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Indirect impacts:				
Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Waste materials such as glass, plastic, metal or paper present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
				rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	
	Non-compliance to the relevant legislation may cause social and environmental problems.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	New employment opportunities will be created. Local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	An unnamed non-perennial stream (Trench) intersects the site on the eastern side of the development area.	Duration	Permanent	No development will occur within this area. Demarcate the area below the 1:100 year flood line as a no-go zone.	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The development will have an impact on a graveyard that was found on site.	Duration	Permanent	Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have	Permanent
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
				been obtained) have been. Keep the site fenced-off and protected	
Cumulative impacts:					
Geographical Physical Social Economic	Enhancement of the social well-being of the local communities for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Solid waste: The proposed development will add additional solid waste into the existing waste stream of the Gamagara Local Municipality. Sewage: The proposed development will add additional sewage into the existing sewage stream of the Gamagara Local Municipality. Water supply: The proposed development will add pressure to the water supply of Gamagara Local Municipality's Water.	Extent	Local	Before development can commence, ensure the works in relation to the upgrading of bulk water and ablution supply pipelines; reservoirs; pump stations and WWTW as described in the Civil Engineer's Recommendations are constructed and operational. Ensure that the development is constructed as planned by the Civil Engineer.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		High
	Traffic: The proposed development will result in an increase in traffic in the immediate surroundings of the proposed development.	Extent	Local	Ensure that the development is constructed as planned by the Town and Regional Planner	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site	Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
				developments are approved, such a permit should be applied for	

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	**Potential impacts and risks**	**Assessment criteria**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	No clearance of indigenous vegetation.	Duration	Long term	No mitigation measures required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
Indirect impacts:					
Geographical Physical Social Economic Cultural	No new employment opportunities will be created during the planning and design phase. No skills enhancement will take place If this option is implemented, the projected boost to the local and regional economy will not take place.	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	High		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	If this option is implemented, the projected boost to the local and regional economy will not take place. No new employment opportunities will be created. No improvement to local skills development will take place. No broadened Tax base for the Gamagara Local Municipality	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
DIRECT IMPACTS:					

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**	**Environmental Attribute**
Geographical Physical Social Economic Cultural	Poorly maintained and serviced infrastructure may cause environmental problems.	Extent	Local	It will be the responsibility of the Local Municipality to maintain the infrastructure.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high		High
		Reversibility	High		Medium
		Risk	High		High
Indirect impacts:					
Geographical Physical Social Economic Cultural	Lack of rehabilitation may cause problems	Extent	Local	It will be the responsibility of the Local Municipality to ensure that the rehabilitation plan is implemented	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high		High
		Reversibility	High		Medium
		Risk	High		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	Enhancement of the social well-being of the local communities for which the development is intended	Extent	Local	No mitigation measures required.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium
Geographical Physical Social Economic Cultural	Broadened tax base: The proposed development will generate more income for the Gamagara Local Municipality.	Extent	Local	No mitigation measures required.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium

10. PUBLIC PARTICIPATION

10.1 ADVERTISEMENT AND NOTICE

Publication name	Kathu Gazette	
Date published	22/06/2018	
Site notice 1 position	Latitude	Longitude
	27º41'13.65"	23º01'35.45"
Date placed	20/06/2018	

PLEASE SEE PROOF BELOW

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
(EIR AND SCOPING) NC/EIA/05/JTG/GAM/18/...

Notice is hereby given of an *Environmental Impact Assessment Process* to be conducted for... This process will be undertaken in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (Act No. 107 of 1998) (*Amended Regulations* promulgated on 07 April 2017). The proposed project is classified as, and will be conducted - in terms of Government Notice No. R.326 of 2017 (*Government Notice No. R.325 Listing Notice 2; Activity no 15*); (Government Notice No. R.327 Listing Notice 1: *Activity no 23*). This advertisement complies with the instructions regarding such notices, National Environmental Management Act (Act No. 107 of 1998, as amended) (*Amended Regulations* promulgated on 17 April 2017) (Government Notice No. R.326 of 2017) (*Regulation 41(2)(a);(3)(a&b) and (4)(a&b)*). The competent authority is the Northern Cape Province Department: Environment and Nature Conservation.

PROJECT NAME:

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION:

Clearance of 380,8600 ha of indigenous vegetation in order to establish a mixed use integrated human settlement (township establishment including mixed density residential, business and institutional uses, including a cemetery, parks and roads) on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

CLIENT:
Gamagara Local Municipality

CONSULTANT AND CONTACT PERSON:
Mr. J.P. De Villiers of AB Enviro Consult cc.
7 Louis Leipoldt Street, Potchefstroom, 2531
Tel: 083 5488 109
Fax: 018 293 0671
E-mail: jp@abenviro.co.za

Parties wishing to formally object to and / or comment on the proposed development are requested to forward their objections and comments (with reasons) to AB Enviro Consult, no later than 30 days after the date of this advertisement. An electronic copy of the draft Scoping Report is also available from AB Enviro Consult on request.
Date of this Notice: 22nd June 2018

PROOF OF NEWSPAPER ADVERTISEMENT

BACK TO BASICS
TOWARDS A SAFER TOMORROW
#CrimeMustFall

PROSPECTING RIGHT APPLICATION WITHIOUT BULK SAMPLING: INVITATION FOR A PUBLIC MEETING: DMR Ref: NC30/5/1/1/2/1(12121)PR.

Notice is hereby given in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 as amended by Section 12 of the Act 49 of 2008 and Environmental Authorization in terms of NEMA (Act No 107 of 1998). Bokone Mining Cooperative Limited lodged an application to prospect for Manganese and the **application has been accepted by the DMR.**

The application runs on **farm Lylyveld 545 situated in the magisterial district of Kuruman, Northern Cape Province.**

Invasive activities are planned to include 30 RC drill holes at a depth of 100m.

All interested and affected parties (I&AP's) are invited to register as I&AP's, address any comment and/or objection within 30 days of this advert and to attend the public meeting. The Meeting is scheduled for the 12th July 2018 at Siyathemba Community Hall @ 10:00 till 12:00 in Kathu.

Ndi Geological Consulting Services has been appointed as an independent consultant.

Please feel free to contact **Ndi on cell:082 760 8420, Fax: 086 538 1069** or e-mail to **atshidzaho@gmail.com** or **ndi@ndigeoservices.co.za** should you require any further information in this regard.

If no correspondence is received from you within the stated period, it will be accepted that you have no comments or objections against the proposed prospecting operation.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIR AND SCOPING) REF NO: NC/EIA/05/JTG/GAM/KAT1/2018

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PROJECT NAME: Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Ghoff on Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION: Clearance of 380,8600 ha of indigenous vegetation in order to establish a mixed use integrated human settlement (township establishment including mixed density residential, business and institutional uses, including a cemetery, parks and roads) on Portion 1 and 2 of the farm Kalahari Ghoff on Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

CLIENT: Gamagara Local Municipality

CONSULTANT AND CONTACT PERSON:
Mr. J.P. Da Villiers of AB Enviro Consult cc.
7 Louis Leipoldt Street, Potchefstroom, 2531
Tel: 083 548 8105 | Fax: 018 293 0671 | E-mail: jp@abenviro.co.za

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Date of this Notice: 22 June 2018

KLK Landbou Beperk is 'n diverse publieke maatskappy in die landbou sektor met belange in kleinhandel, brandstof, abattoirs, lewendehawe en motorhandelaarskappe.

VAKATURE

Winkelassistent - Postmasburg Handel

Die suksesvolle kandidaat sal verantwoordelik wees vir :
- Kliëntediens
- Rak en produkversorging
- Ontvang,uitpak en regpak van voorraad
- Daaglikse, weeklikse en maandelikse voorraadtellings
- Algehele netheid van winkel en rakke

Daar word gesoek na aansoekers wat beskik oor:
- Ten minste 'n Graad 12 kwalifikasie
- Sterk diens ingesteldheid
- Organisatoriese vermoë

Werksure: Maandae tot Vrydae 07.30 – 17:00 /Saterdae 08:00-13:00

Rig asseblief jou aansoek aan: Die Takbestuurder: KLK Landbou Beperk, Postmasburg, per faks : **053 313 0390** of e-pos: **postmasburg@klk.co.za**

KLK Landbou Beperk is 'n gelyke geleentheid werkgewer en aanstellings word gedoen ooreenkomstig die maatskappy se Gelyke Geleenthede Plan

Sluitingsdatum: 29 Junie 2018

Aansoekers wat nie binne 14 dae na die sluitingsdatum van ons verneem nie, moet asseblief aanvaar dat die aansoek onsuksesvol was.

LIME ACRES

Zombie walk against drugs

The SAPS, National Union of Mine Workers, Finsch Diamond Mine, PPC Lime, Idwala Lime, SPAR, Lime Acres Primary School, ER24 and the Lime Acres community united in a Zombie Walk against drugs.

The message bordered on staying "above the influence and not under it" refering to the use of drugs and alcohol which make you a zombie.

The main effect of drug and substance abuse is that it controls and takes over your life. Please take heed and say no to drug and substance abuse.

Several messages of support were relayed to the youth by NUM Youth Chairperson, Cross Senombi, Wellness & Careways Christine Crouwcamp and the local ward councillor, Irene Williams.

The SAPS had a drug exhibition explaining to the youth what the different drugs are and the dangers thereof. The Kuilsville High School choir and the Peer Educators drama group entertained the crowd.

The day was packed with sports activities such as soccer, netball, touch rugby and athletics for the youth.

KURUMAN

JTG drug task team hits again

The John Taolo Gaetsewe Cluster SAPS drug task team pounced on an unsuspecting drug suspect at his home in Roos Ave, Kuruman. On Friday 15 June 2018 at about 16:45 police followed up on information and raided this specific premises for drugs. Upon arrival, the police found the suspect allegedly flushing some of the drugs, but managed to retrieve two packets of tik from the toilet bowl. Further information led police to dig up more drugs in the yard of the suspect. The suspected rocks and tik found by the police has an estimated street value of R57 000. The 38-year old male was charged with possession of drugs and should be appearing in the Kuruman Magistrates Court soon. The investigation continues.

KURUMAN

Hijacking, kidnapping and robbery

On 16 June 2018 at about 19h00 pm an adult male went to buy groceries and decided to stop at a tavern in Kuruman CBD. When he stopped at the tavern, he was accosted by four men who hijacked, assaulted and left him in a nearby veld. John Taolo Gaetsewe TRIO Task team, Kuruman Crime Prevention unit and members from Wrenchville SAPS received information and acted upon it in a flash. The team arrested the four male suspects and retrieved the alleged hijacked Ford Icon, groceries and the car radio hours later in Seoding village. The suspects should appear in Mothibistad Magistrates Court soon. The investigation continues.

Constable Alex Bekeer with the four suspects, retrieved the Ford Icon and the robbed goods.

KURUMAN

Fifteen years behind bars

Right : **Investigating officer Constable Khumoetsile Setlhauno.**

The Northern Cape Acting Provincial Commissioner, Major General Koliswa Otola welcomed fifteen years jail term handed to Lubabalo Mongwaketse (25) for the murder of Kealeboga Motlhankanye (23). Lubabalo was sentenced by the Northern Cape High Court on Tuesday 12 June 2018.

Lubabalo was convicted and sentenced for the murder which he committed in April 2017. On the day in which he committed this crime, he accosted the deceased, and constrained him into a veld near Tsineng village in Kuruman, where he brutally stabbed him to death with a knife, broke his jaws, ribs and arms. Subsequent to this barbaric atrocity, Lubabalo undressed the deceased, concealed his clothes in the veld, and dumped the body near Tsineng police station.

Kealeboga's body was found by a passerby, who alerted the police. Lubabalo was arrested shortly after the police followed information which linked him with the murder. Consequent to his arrest, he took the investigating officer into the veld and pointed out where he had hidden the deceased's clothes.

The Northern Cape Acting Provincial Commissioner, Major General Koliswa, commended the investigating officer Constable Khumoetsile Setlhauno for excellent investigation in this case and expressed her gratitude to the National Prosecuting Authority by ensuring that Lubabalo was served with a jail term. "Criminals are not supposed to share the space with law abiding citizens, they deserve hefty jail terms to deter them from committing crime."

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIR AND SCOPING) REF NO: NC/EIA/05/JTG/GAM/KAT1/2018

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PROJECT NAME: Environmental Impact Assessment for the proposed clearance of 380.8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

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CLIENT: Gamagara Local Municipality

CONSULTANT AND CONTACT PERSON:
Mr. J.P. De Villiers of AB Enviro Consult cc.
7 Louis Leipoldt Street, Potchefstroom, 2531
Tel: 083 548 8105 | Fax: 018 293 0671 | E-mail: jp@abenviro.co.za

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Date of this Notice: 22 June 2018

10.2 DETERMINATION OF APPROPRIATE MEASURES

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

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

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
N/A	Neighbours	Letter drop – see photo evidence
Kumba Iron Ore group: Sishen Mine	Neighbour	Private Bag X 506 Kathu 8446
Khai Appel Resort	Neighbour	Post Office box: 1001 Kathu 8446

PLEASE SEE PROOF BELOW

*List of parcels posted:
COD
Insured
Ordinary

*Lys van pakkette gepos:
KBA
Versekerde
Gewone

Post Office

Sender's reference no. Afsender se vewysingsno.	Addressee's name and address Naam en adres van geadresseerde	Trade-charge/Value of ordinary/insured parcel Handelsbedrag/ waarde van gewone/ versekerde pakket R c	COD/ Insurance fee KBA-/ versekerings-koste R c	Parcel no. Pakketno.
	Khai Apple Resort P.O. Box 1001 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 089 035 ZA A BOOK COPY
	Kumba Iron Ore Group Sishen Mine Private Bag X506 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 089 049 ZA A BOOK COPY
	and Land Reform Rural Dev. H.O.D Mr. V. Mathivha Private Bag X5018 Kimberley 8300			REGISTERED LETTER (with a domestic insurance option) RC 189 089 018 ZA A BOOK COPY
	Forestry and Fisheries H.O: J. Mans P.O Box 786 Upington 8800			REGISTERED LETTER (with a domestic insurance option) RC 189 089 021 ZA A BOOK COPY
	Dept. of Environmental Affairs Biodiversity Management Services Mr. Oswald Braaker hart Private Bag X6120 Kimberley 8300			REGISTERED LETTER (with a domestic insurance option) RC 189 088 998 ZA A BOOK COPY
	The Municipal Manager Mr. M. Mokhele P.O. Box 1490 Kuruman 8460			REGISTERED LETTER (with a domestic insurance option) RC 189 089 004 ZA A BOOK COPY
	Ga-Segonyana Local Municipality The Municipal Manager Mr. Ngamodikae Seeletsane P.O Box 1001 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 088 975 ZA A BOOK COPY
	Ga-Segonyana Local Municipality The Councillor Ward 7 P.O. Box 1001 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 089 066 ZA A BOOK COPY

Sender's name and address:
Naam en adres van afsender:

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Geen vergoeding word oorweeg nie tensy navraag i.v.m. hierdie posstuk binne een jaar na die posdatum gedoen word.
*Delete whatever is not applicable/Skrap wat nie van toepassing is nie.

A.R.C.T.

300003

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (18) 294 5005
Fax: + 27 (18) 293 0671
Cell: + 27 (83) 5488 105
E-mail: jp@abenviro.co.za

22/06/2018

Kumba Iron Ore group:
Sishen Mine
Private Bag X 506
Kathu
8446

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province

AB ENVIRO CONSULT was appointed by **Gamagara Local Municipality** to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments within a period of 30 days from the date of this letter. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

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

Yours sincerely,

PROF. A.B. DE VILLIERS

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

7 Louis Leipoldt Street,
Potchefstroom, 2531
Tel: + 27 (18) 294 5005
Fax: + 27 (18) 293 0671
Cell: + 27 (83) 5488 105
E-mail: jp@abenviro.co.za

22/06/2018

Khai Appel Resort
Post Office box: 1001
Kathu
8446

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province

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

Yours sincerely,

PROF. A.B. DE VILLIERS

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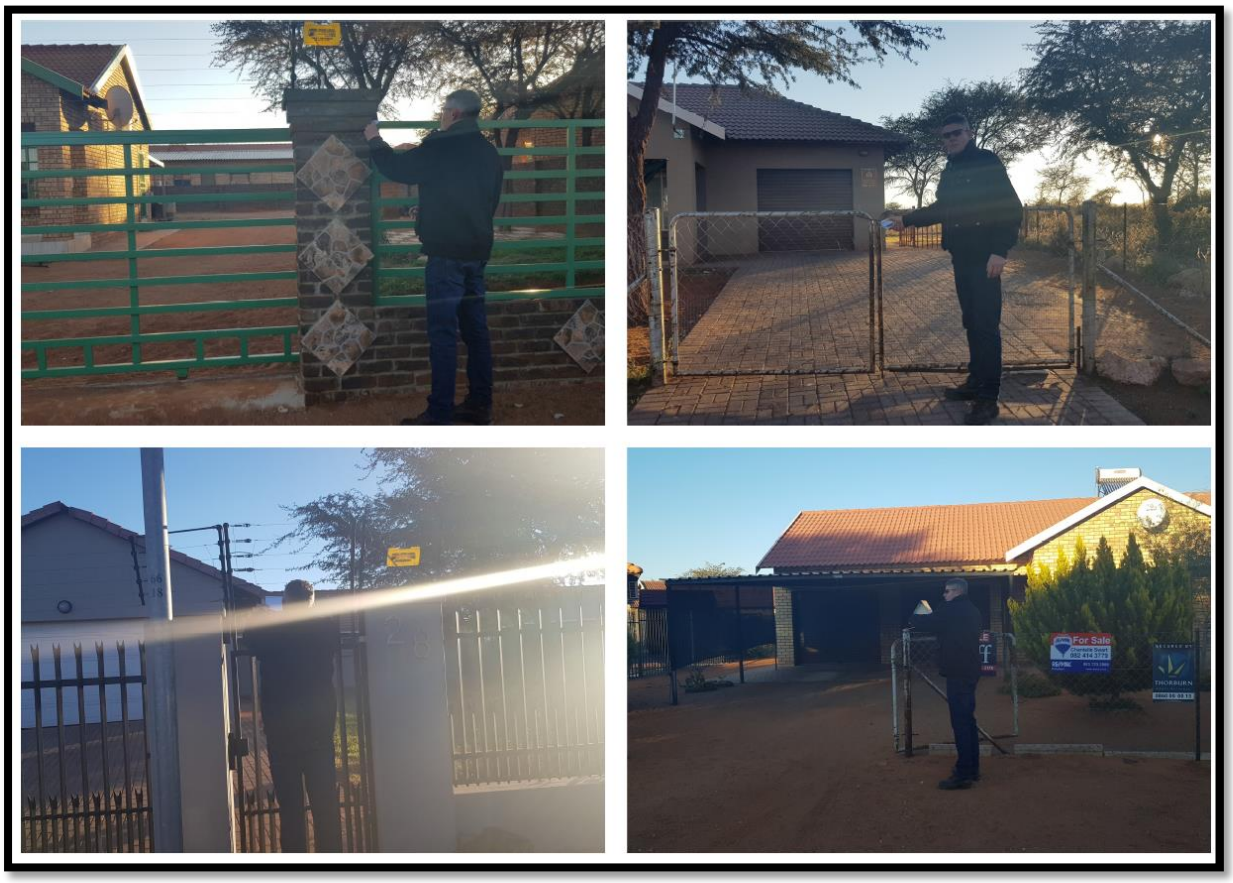
MR.J.P. DE VILLIERS (M Sc,HED, IAIA); MRS.J.E. DU PLOOY (M.E.M)


30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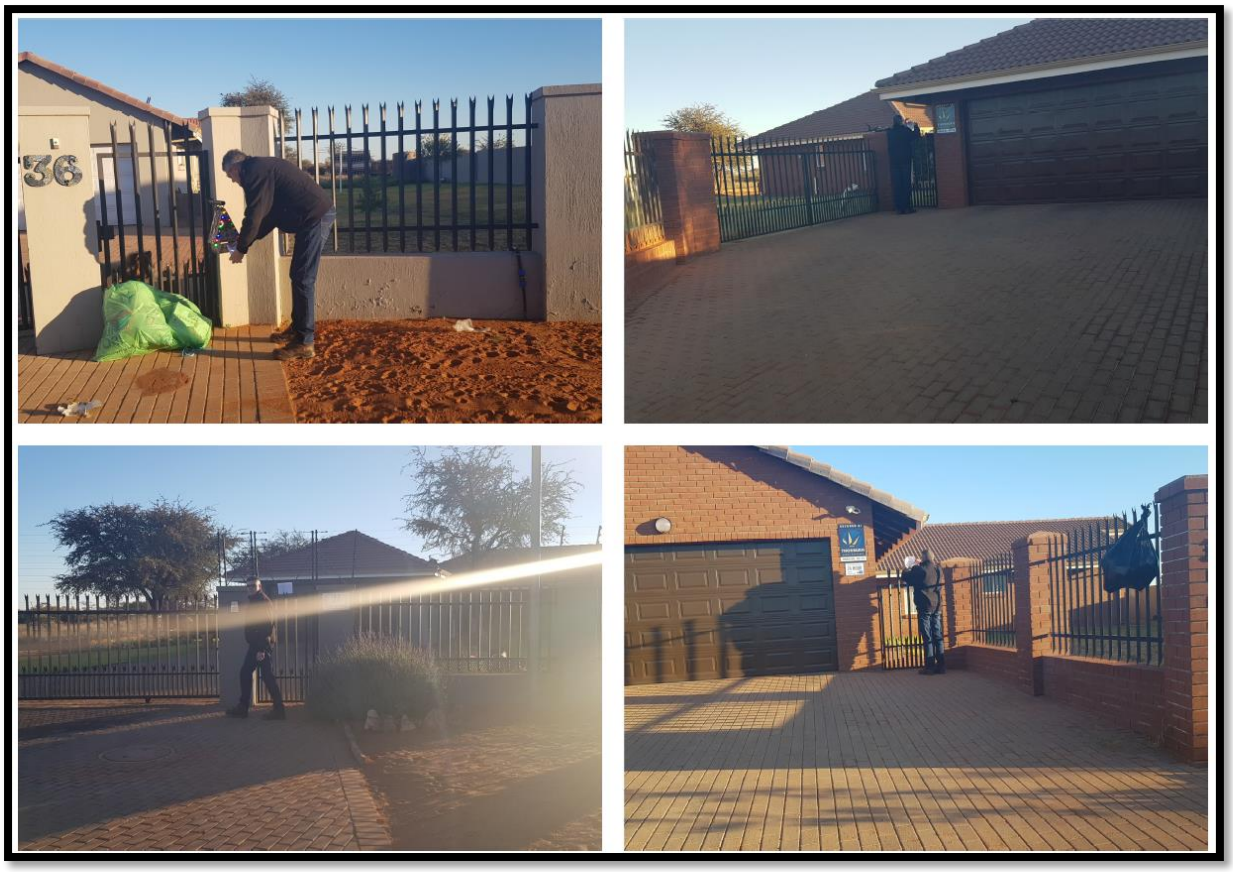


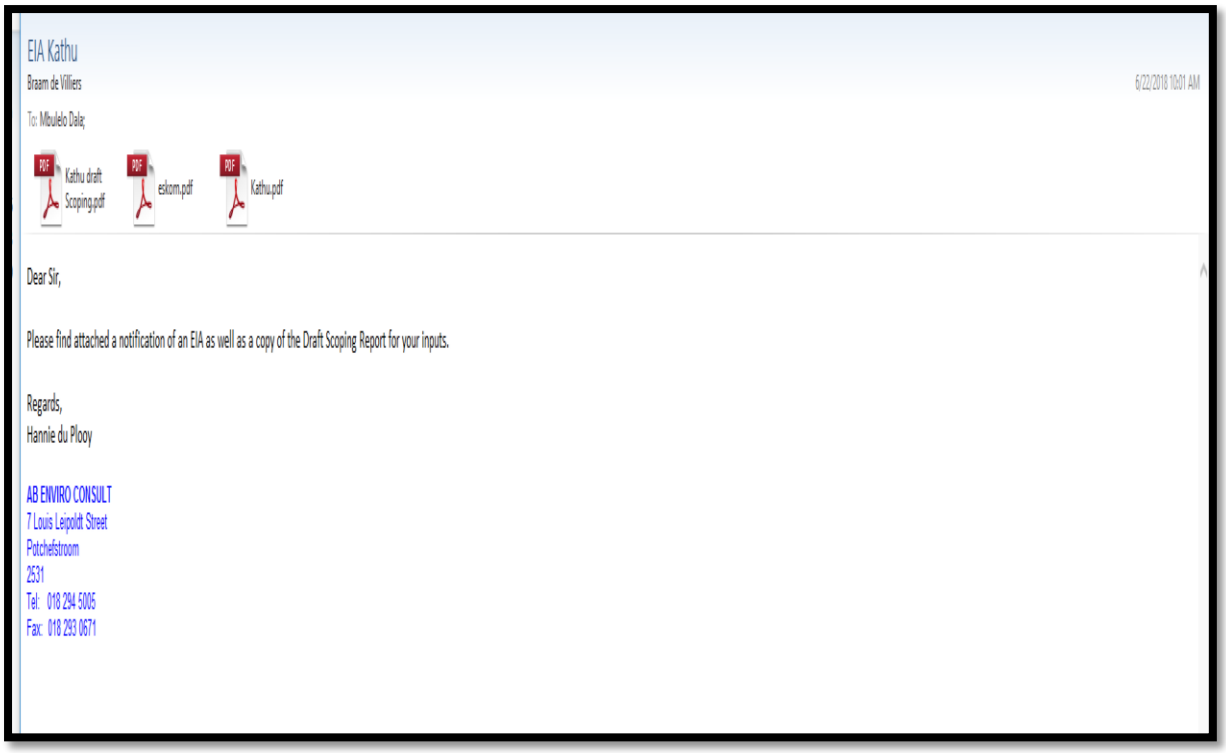
10.3 AUTHORITY PARTICIPATION

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

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Water and Sanitation Northern Cape office	**Mr A Abrahams**	(053) 830 8888	(053) 842 3258		**Private Bag X6101 Beaconsfield Kimberley 8301**
Northern Cape Department of Agriculture and Land Reform and Rural Development	**HOD, Mr. V. Mothibi**	(053) 838 9118	(053) 831 3635	cfortune@agri.ncpg.gov	**Private Bag X5018, Kimberley 8300**
Northern Cape Department of Environment	**Mr. Dewald Badenhorst**	(053) 807 7300	(053) 807 7367		**Private Bag X6120 Kimberley 8301**

and Nature Conservation	**Biodiversity Management services**				
Northern Cape Department of Agriculture, Forestry and Fisheries	**Mrs. J Mans**	(054) 338 5860	(054) 338 0030		**P.O. Box 2782, Upington 8800**
John Taolo Gaetsewe District Municipality	**The Municipal Manager Mr. M. Molusi**	053 712 8700	053 712 2502		**PO Box 1480 Kuruman 8460**
Gamagara Local Municipality	**The Municipal manager Mr Kgomodikae Leserwane**	053 723 6000	053 723 2021		PO Box 1001, Kathu, 8446
Gamagara Local Municipality: Ward 7	**The Councillor Ward 7**	053 723 6000	053 723 2021		PO Box 1001, Kathu, 8446
Eskom	**Mbulelo Dala**	**078 795 1188**		dalaME@eskom.co.za	

PLEASE SEE PROOF BELOW



EIA Kathu

Braam de Villiers 6/22/2018 10:01 AM

To: Mbulelo Dala;

Kathu draft Scoping.pdf

eskom.pdf

Kathu.pdf

Dear Sir,

Please find attached a notification of an EIA as well as a copy of the Draft Scoping Report for your inputs.

Regards,
Hannie du Plooy

AB ENVIRO CONSULT
7 Louis Leipoldt Street
Potchefstroom
2531
Tel: 018 294 5005
Fax: 018 293 0671

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	Northern Cape Dept. of Agric. and Land Reform Thusong Ctr. H.O.D Mr. V. Mathibe Private Bag X5019 Kimberley 8300			REGISTERED LETTER (with a domestic insurance option) RC 189 089 018 ZA A BOOK COPY
	N.C. Dept of Agriculture, Forestry and Fisheries H.O: J. Mans P.O Box 2786 Upington 8800			REGISTERED LETTER (with a domestic insurance option) RC 189 089 021 ZA A BOOK COPY
	N.C. Dept. of Environment and Nature Conservation Biodiversity Management Services Mr. Dawid Bredenhann Private Bag X6120 Kimberley 8300			REGISTERED LETTER (with a domestic insurance option) RC 189 088 998 ZA A BOOK COPY
	John Taolo Gaetsewe Dist. Mun. The Municipal Manager Mr. N. Motlaba P.O. Box 1490 Kuruman 8460			REGISTERED LETTER (with a domestic insurance option) RC 189 089 004 ZA A BOOK COPY
	Ga-Segonyana Local Municipality The Municipal Manager Mr. Ngomadikwe Seeketsane P.O. Box 1001 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 088 975 ZA A BOOK COPY
	Ga-Segonyana Local Municipality The Councillor Ward 7 P.O. Box 1001 Kathu 8446			REGISTERED LETTER (with a domestic insurance option) RC 189 089 066 ZA A BOOK COPY

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Cell: + 27 (83) 5488 105
E-mail: jp@abenviro.co.za

22/06/2018

Northern Cape Department of Agriculture and Land Reform and Rural Development
HOD, Mr. V. Mothibi
Private Bag X5018
Kimberley
8300

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province

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22/06/2018

Northern Cape Department of Environment and Nature conservation
Biodiversity Management services
Mr. Dewald Badenhorst
Private Bag X6120
Kimberley
8301

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province

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22/06/2018

Northern Cape Department of Agriculture, Forestry and Fisheries
FAO: J. Mans
P.O. Box 2782
Upington
880

Dear Sir/Madam

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E-mail: jp@abenviro.co.za

22/06/2018

Department of Water and Sanitation
Mr Abe Abrahams
28 Central Road
Beaconsfield
KIMBERLY
8301
Tel: (053) 830 8800/6 7600

Dear Sir/Madam

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22/06/2018

John Taolo Gaetsewe District Municipality
The Municipal Manager
Mr. M. Molusi
PO Box 1480
Kuruman
8460

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Gamagara Local Muncipality
The Municipal Manager
Mr Kgomodikae Leserwane
PO Box 1001
Kathu
8446

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PO Box 1001
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E-mail: jp@abenviro.co.za

22/06/2018

Eskom
dalaME@eskom.co.za

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10.4 ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
Camel thorn trees of intermediate size and a few mature specimens are present on site.	The EAP acknowledge this statement and will include a condition in the EMPr that license applications will have to be applied for after obtaining all other approvals and shortly prior to the construction phase
Provincially protected plant species are present on site such as *Boophone disticha* which can be relocated successfully under a Flora Permit from the provincial Department of Environment and Nature Conservation (DENC).	During the Construction Phase of the development Flora permits will be applied for should it become necessary
Boscia albffrunca must be retained in the four meter buffer areas due to its natural low growth form. unless if an unusually tall tree may affect the safe vertical clearance distance, in which case a qualified motivation with photographic evidence of the measured distance and GPS coordinates must be supplied to the Department by the appointed Environmental Control Officer.	This will be done and a condition in this regard will be incorporated in to the EMPr
Licensing can be applied for in a phased approach, after obtaining all other approvals and shortly prior to the construction phase. The Department would need a copy of the final approved layout in terms of the NEMA Environmental Authorisation.	This will be done and a condition in this regard will be incorporated in to the EMPr.
All other protected trees present on site must be conserved until such time that individual residences are constructed. Individual owners and/or developers can submit individual license applications per stand. Every application must be accompanied by an approved building plan showing the positions of protected trees per stand. Trees must be color-coded e.g. red trees to be removed and green trees to be retained and GPS coordinates (in degrees, minutes and seconds format) of all trees supplied to the Department. Efforts must be made to retain as many individual Camel thorn trees as possible, through clever design and careful placement of buildings on stands, to avoid larger trees where possible.	This will be done and a condition in this regard will be incorporated in to the EMPr
Every stand will be assessed individually, unless if one developer builds a large number of houses, in which case one application can be submitted, but it will still have to specify stand numbers with building plans per stand and showing all protected trees per stand. The Department has a very strict approach in urban areas, because Camel thorn trees contribute greatly to the landscape value and climate mitigation. Many of these slow-growing, long-lived trees are lost annually in the *Northern* Cape Province, due to large-scale new developments including mining activities and renewable energy facilities	This will be done and a condition in this regard will be incorporated in to the EMPr
In conclusion, a license cannot be granted at this stage, but the department does not foresee a fatal flaw. For any further clarification or correspondence in this regard, please do not hesitate to contact the Forestry Offices in Upington or Kimberley.	The EAP acknowledge this statement and will include a condition in the EMPr that license applications will have to be applied for after

	obtaining all other approvals and shortly prior to the construction phase.

10.5 COMMENTS AND RESPONSE REPORT

I&AP registered:	Comment received:	Response by the EAP:
Mr. W. Voigt	Requested to be registered as I&AP and a copy of the documentation available for public comment	Registered and sent copy of Final Scoping Report
Kalahari Gholf & Jag (Pty) Ltd	Requested a copy of the scoping report	Sent copy of Final Scoping Report
Department of Agriculture, Forestry and Fisheries: Directorate Forestry Management (Other regions)	The inspection confirmed the old tarred N14 road traverses the proposed development site. There are a number of sandy patches with high density Camel thorn trees of intermediate size and a few mature specimens. Some of the *trees* contain active bird nests. Provincially protected plant species are present on site such as *Boophone disticha* which can be relocated successfully under a Flora Permit from the provincial Department of Environment and Nature Conservation (DENC).	A Botanical Specialist has been appointed and he has also confirmed this statement. During the Construction Phase of the development Flora permits will be applied for should it become necessary.
	The Department does not foresee a problem with the development as long as the boundary with the Kathu Forest Protected Woodland Buffer is clearly marked and maintained. During the design, efforts must be made to retain areas *with high* density Camel thorn trees as open public spaces.	According to the Map provided by Department of Agriculture, Forestry and Fisheries: Directorate Forestry Management (Other regions) the proposed development falls outside of the Kathu Forest Protected Woodland Buffer. A fence will be erected between the development and the adjacent land.
	Licensing can be applied for in a phased approach, after obtaining all other approvals and shortly prior to the construction phase. The Department would need a copy of the final approved layout in terms of the NEMA Environmental Authorisation.	This will be done and a condition in this regard will be incorporated in to the EMPr.
	One license application can be submitted for construction of roads and installation of bulk services (i.e. sewerage and water pipes). Trees in roads and obstructing installation of water and sewerage can be marked for felling, although efforts must be made to minimize impacts by carefully selecting the position of such infrastructures. Layout maps and GPS coordinates of affected trees must be supplied to the Department.	This will be done and a condition in this regard will be incorporated in to the EMPr
	The Department has specific guidelines for removal of protected trees under power lines. Trees may only be removed if directly under the lines and up to four meters away on either sides of the outer lines. The whole servitude may not be cleared of protected trees. *Boscia albffrunca* must be retained in the four meter buffer areas due to its natural low growth form. unless if an unusually tall tree may affect the safe vertical clearance distance, in which case a qualified motivation with photographic	This will be done and a condition in this regard will be incorporated in to the EMPr

	evidence of the measured distance and GPS coordinates must be supplied to the Department by the appointed Environmental Control Officer	
	The stem of a tree is commonly accepted to denote the position of a tree. In cases where a tree canopy protrudes into planned roads, the whole tree cannot be removed, but the crown can be trimmed back. Proper pruning requires that branches be removed as close to branch forks as possible and this may result in more of the crown being removed than the part protruding into the road. When pruning trees, care must be taken not to mutilate or disfigure trees and topping is not allowed. The weight of the tree canopy must be carefully balanced with equal lightening of branches on both sides of the tree. If possible, a suitably qualified Arborist must be appointed to prune the trees	This will be done and a condition in this regard will be incorporated in to the EMPr
	All other protected trees present on site must be conserved until such time that individual residences are constructed. Individual owners and/or developers can submit individual license applications per stand. Every application must be accompanied by an approved building plan showing the positions of protected trees per stand. Trees must be color-coded e.g. red trees to be removed and green trees to be retained and GPS coordinates (in degrees, minutes and seconds format) of all trees supplied to the Department. Efforts must be made to retain as many individual Camel thorn trees as possible, through clever design and careful placement of buildings on stands, to avoid larger trees where possible.	This will be done and a condition in this regard will be incorporated in to the EMPr
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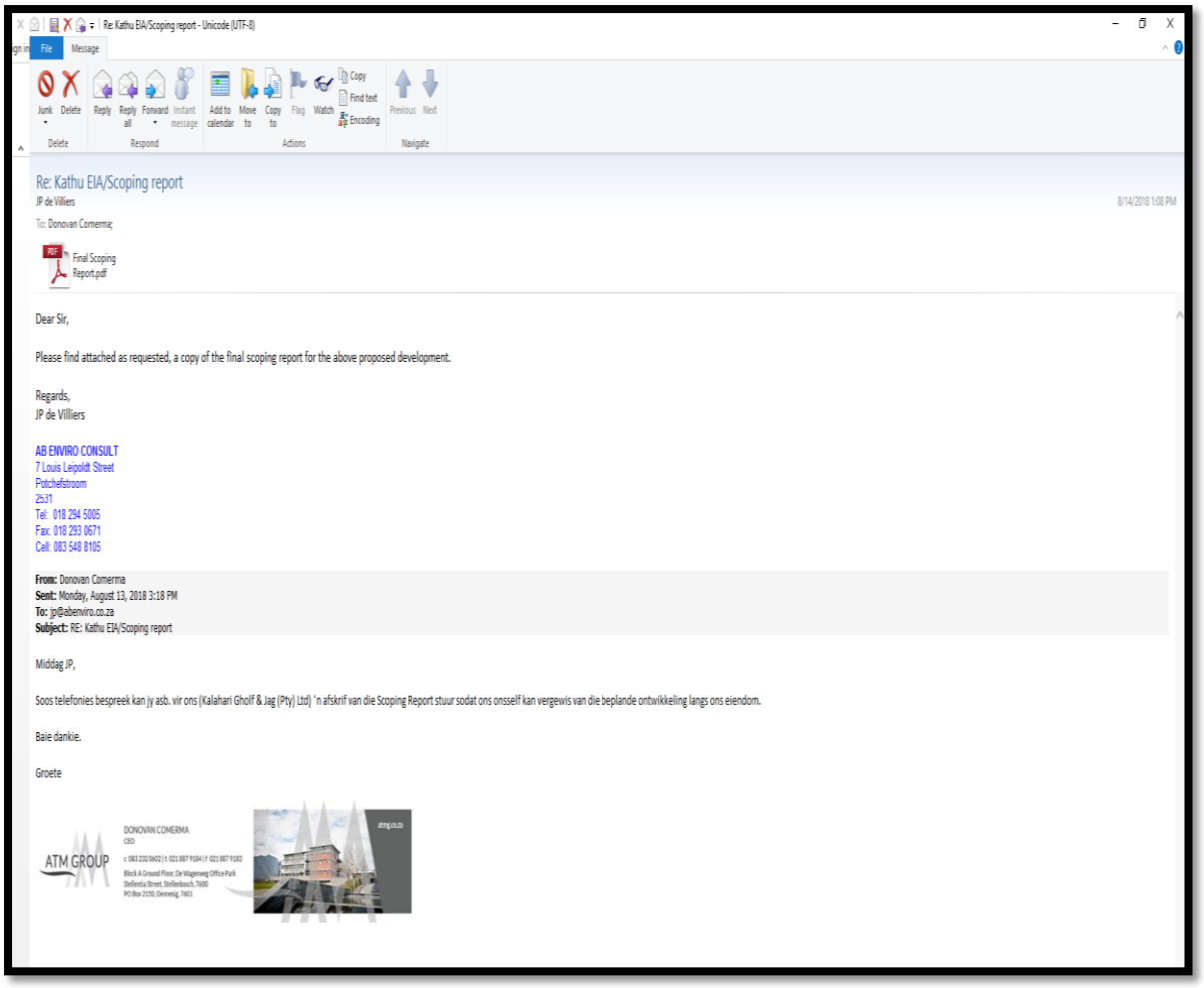
Proof of correspondence:



Re: Kathu EIA/Scoping report - Unicode (UTF-8)

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Re: Kathu EIA/Scoping report

JP de Villiers 8/14/2018 1:08 PM

To: Donovan Comerma;

Final Scoping Report.pdf

Dear Sir,

Please find attached as requested, a copy of the final scoping report for the above proposed development.

Regards,
JP de Villiers

AB ENVIRO CONSULT
7 Louis Leipoldt Street
Potchefstroom
2531
Tel: 018 294 5005
Fax: 018 293 0671
Cell: 083 548 8105

From: Donovan Comerma
Sent: Monday, August 13, 2018 3:18 PM
To: jp@abenviro.co.za
Subject: RE: Kathu EIA/Scoping report

Middag JP,

Soos telefonies bespreek kan jy asb. vir ons (Kalahari Gholf & Jag (Pty) Ltd) 'n afskrif van die Scoping Report stuur sodat ons onsself kan vergewis van die beplande ontwikkeling langs ons eiendom.

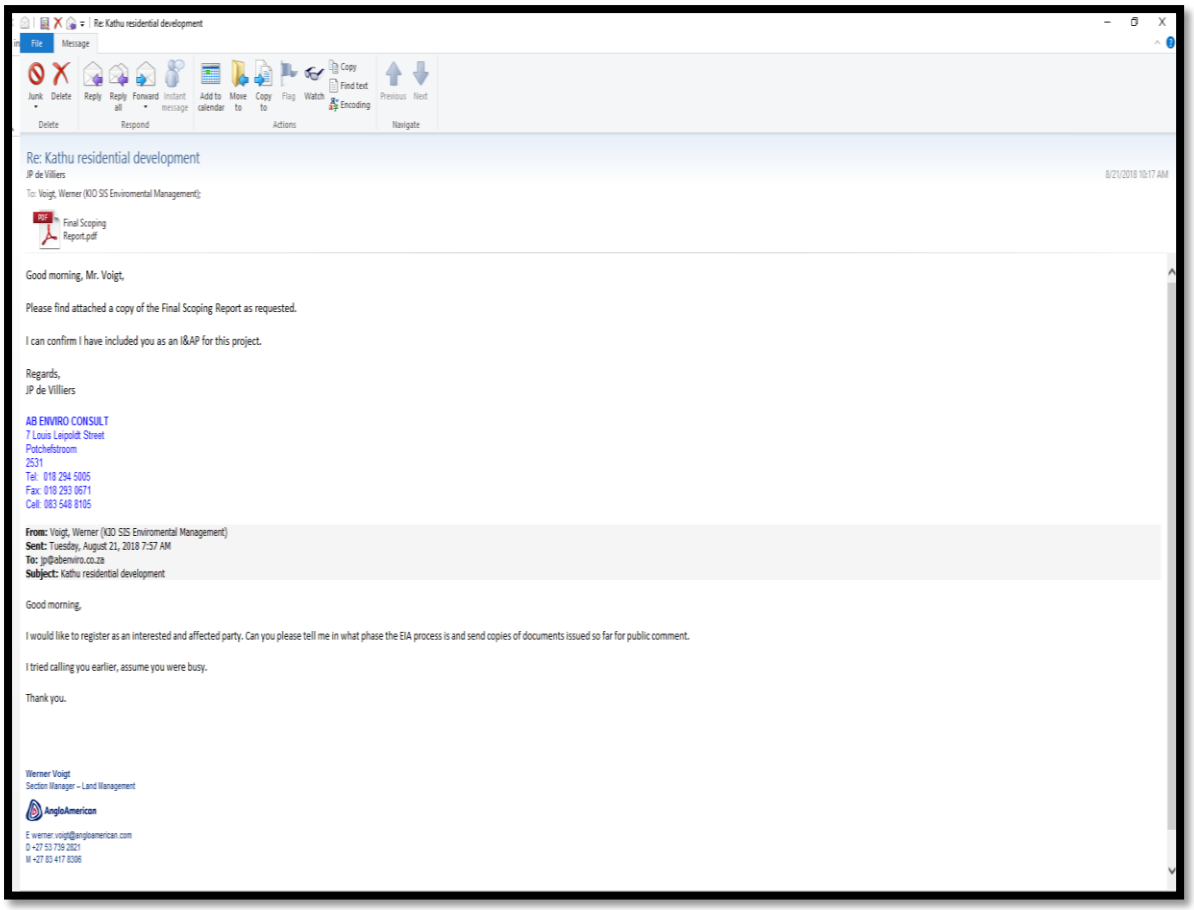
Baie dankie.

Groete

ATM GROUP

DONOVAN COMERMA
CEO

Request and response: Kalahari Gholf & Jag (Pty) Ltd



Re: Kathu residential development

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Re: Kathu residential development

JP de Villiers 8/21/2018 10:17 AM

To: Voigt, Werner (KIO SIS Enviromental Management);

Final Scoping Report.pdf

Good morning, Mr. Voigt,

Please find attached a copy of the Final Scoping Report as requested.

I can confirm I have included you as an I&AP for this project.

Regards,
JP de Villiers

AB ENVIRO CONSULT
7 Louis Leipoldt Street
Potchefstroom
2531
Tel: 018 294 5005
Fax: 018 293 0671
Cell: 083 548 8105

From: Voigt, Werner (KIO SIS Enviromental Management)
Sent: Tuesday, August 21, 2018 7:57 AM
To: jp@abenviro.co.za
Subject: Kathu residential development

Good morning,

I would like to register as an interested and affected party. Can you please tell me in what phase the EIA process is and send copies of documents issued so far for public comment.

I tried calling you earlier, assume you were busy.

Thank you.

Werner Voigt
Section Manager – Land Management

AngloAmerican

E werner.voigt@angloamerican.com
O +27 53 739 2821
M +27 83 417 0306

Request and response: Mr. W. Voigt

Proof of correspondence with DAFF is on p18-19 of this report

11. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF SPECIALISTS

11.1 GEO-TECHNICAL AND GEO-HYDROLOGICAL REPORT (See Appendix A for a copy of his report)

11.1.1 TERMS OF REFERENCE

The aim of this investigation was to identify and evaluate any possible engineering geological problems before commencement of proper township proclamation.

This report is based on the an in-situ evaluation of all the representative soil horizons within the ground profile, visual results of the site visit and other relative exposed geotechnical properties on site and derived from interpretation of laboratory results.

The proposed development site is on a portion of the farm Kalahari Gholf en Jag Landgoed 775, adjacent northwest of the town of Kathu, approximately 380 hectares in size. It is situated northwest of the road to the Sishen Mine. Figure 1 in Appendix A delineates the site.

11.1.2 INFORMATION USED IN THE STUDY

The following was consulted during the investigation:

- The geological map 2624 Vryburg. Scale 1:250 000. The Geological Survey of South Africa.
- The topography map 2723CA Kathu. Scale 1:50 000.The Chief Directorate: Surveys and Land Information, Mowbray.
- A locality map with Google Image showing site boundaries

11.1.3 METHODOLOGY

All available information was studied before and during the site visit.

The investigation commenced with a desk study, where all relevant information is collected and compiled on a base map. The site was divided into land forms, after which the accuracy of the information was checked by means of a field visit.

Test pits were dug and representative disturbed samples were collected and tested. The position of the test pits are represented in FIGURE 3 (Appendix A). The soil profiles were described according to the methods described by Jennings *et al* (Jennings 1973). This method describes each horizon in terms of moisture content, colour, consistency, structure, type of soil and origin of the soil.

Disturbed samples of the soil materials were taken for laboratory analysis. The gradings of the soils were determined by sieve and hydrometer analysis, resulting in cumulative grading curves.

The mechanical properties of the soil material are described in terms of the liquid limit and plasticity index (determined by means of the Atterberg Limit tests) and the linear shrinkage. These values can be used to calculate the potential expansiveness of the soils, and to evaluate the materials for use as construction material. The consistency of a soil is described by means of its Atterberg limits, where the effect of a change in the moisture content on the consistency of a cohesive soil is measured. According to Cernica (1982) these tests are useful "mostly for soil identification and classification". It can also be used to determine the mechanical properties of cohesive soil material. Note that cohesionless soils (i.e. sandy material) cannot be tested for plasticity or collapse potential as this material does not contain enough fines to exhibit consistency, and the taking of undisturbed samples is not possible due to disintegration.

The linear shrinkage test to determine the percentage shrinkage that can be expected, is performed by wetting a soil to approximately its liquid limit and drying the resultant paste in a linear shrinkage mould.

The potential expansiveness of a soil depends upon its clay content, the type of clay mineral, its chemical composition and mechanical character. A material is potentially expansive if it exhibits the following properties (Kantey and Brink, 1952):

- clay content greater than 12 percent,
- plasticity index of more than 12,
- liquid limit of more than 30 percent, and
- linear shrinkage of more than 8 percent.

The potential expansiveness (low, medium, high, very high) is calculated by means of Van der Merwe's method (Van der Merwe, 1964), where the equivalent plasticity index versus the clay content of the material is plotted on a graph divided into heave categories.

If any sample in the study area classifies as potentially expansive, the amount of heave or mobilization in mm measured on the surface will be calculated.

11.1.4 CONCLUSIONS

1. A site of approximately 380 hectares on a portion of the farm Kalahari Gholf en Jag Landgoed 775, Kathu, Northern Cape Province was investigated to determine the engineering geological properties that will influence township proclamation.

2. The majority of the site is underlain by tholeitic and calc-alkaline basaltic and andesitic lava, tuff and pyroclastic breccia of the Allanridge Formation (Ra), Ventersdorp Supergroup, but is covered by recent alluvium (m) in the form of Aeolian red sand (Qw) and calcrete (T-Qc).

3. Severe problems are foreseen regarding the excavatability to 1,5m depth almost across the site.

4. Zoning of the site revealed zones with constraints regarding the **highly collapse potential** of the soil, underlain by **calcrete gravel and boulders**. It was zoned as follows:

Engineering Geological Zonation

Special Development with Risk:

Site Class CR to C1R/1A2F: This zone is characterized by very loose collapsible aeolian sand (C to C1) exhibiting an open texture, with thickness less than 0,75m, with less than 10mm movement measured at surface. The risk of hard pan calcrete, calcrete gravel and shallow rock and scattered rock calcrete boulders or rock outcrop (R) will restrict the placing of services. Pneumatic tools, a competent TLB or excavator or even blasting will be required during the placing of services. Foundations will require special foundation techniques with proper compaction and site specific drainage. It is classified as CR to C1R according the NHBRC guidelines (1995) & SAICE Code of practice (1995) and 1A2F according to the classification for urban development (Partridge, Wood & Brink).

Development with expected problems or increased cost

Site Class PQ: Quarried areas or borrow pits must be rehabilitated including backfilling with a controlled fill to engineer's specification before any development can take place.

Undevelopable:

Site Class PD: Perennial drainage features where the 1:100 year flood line will determine or specify the allowable distance of development from rivers, usually 32m from the centre of the river.

5. **Special construction** techniques will be required to enable proper development. This includes the use of **special compaction** techniques of strip footings with slab on the ground foundations **or soil or steel reinforced rafts** with **site drainage provision** as described.

6. **This investigation was done to reveal the geotechnical properties on site with the techniques as described to form our opinion. Although every possible factor during the investigation was dealt with, it is possible to encounter variable local conditions. This will require the inspection of foundations by a competent person to verify expected problems.**

11.2 SERVICES REPORT (See Appendix B for a copy of this report)

ENGINEERING SERVICES

WATER

Source

The main sources of water for Kathu are:

- Vaal Gamagara Pipeline (Sedibeng Water)
- Dewatering from mining activities (Kumba Iron Ore)
- Municipal boreholes

The study area will be part of Kathu West. In accordance with the Kathu Water Management Plan of 2012 the main water source for Kathu West to be the Vaal Gamagara pipeline.

Potable water from Vaal Gamagara Water Pipeline

The Vaal Gamagara Pipeline is in process of upgrading. The current allocation of the Vaal Gamagara Scheme to Kathu is 500 000 m³/annum (equivalent to 57m³/h or 15,8ℓ/s). The current projected allocation for Kathu (post upgrading of scheme) in accordance with the *Royal Haskoning/Sedibeng Water regional water scheme design report dated 18 January 2016* is 239 ℓ/s (7 537 104 m³/annum).

The design peak flow for the study area is 1.5 x AADD (same as summer peak) which is 5 910 774 ℓ/day or 68.4ℓ/s. It is therefore evident that sufficient potable water supply to the study area is only feasible once the Vaal Gamagara Water Scheme has been upgraded and the desired performance achieved.

However, with the rest of Kathu, especially the East also heavily dependent on the Vaal Gamagara Pipeline, augmentation of water supply to the West should also be considered. This will also reduce the cost of water for the Municipality as potable water from Sedibeng is currently the most expensive available water resource for Gamagara Municipality.

Mine Dewatering and Municipal Borehole fields

Additional options for augmentation of water supply to the study area is mine dewatering and municipal boreholes. Raw water from Sishen Mine is transferred via a 250 mm steel pipe to the Municipal Softener Plant (water treatment works). Raw water is stored in a 1.7ML concrete reservoir before it is passed through a softener (treatment) plant with the capacity of 174 m3/hr or 4.2 Mℓ/day (based on 24 operational hours). Potable water from the plant is stored in a downstream concrete reservoir with a capacity of 3.4ML from which distribution to various supply points manifests. One of the points is the Sesheng 2ML reservoir which is fed by a 100mm diameter steel pipeline from the Softener Plant. Water from the Khai Appel borehole fields also supply the Sesheng 2ML reservoir via a 160mm diameter pipe line. A direct feed from the Sesheng elevated tower to the proposed Kathu West reservoir complex can therefore be done.

Water Treatment

The Vaal Gamagara Water Scheme distributes potable water to Kathu. The main source for the study area therefore does not needs any treatment. However, because of the costs of the Gamagara Municipality insisted in augmenting the study area with supply from their other sources namely Mine Dewatering and Municipal boreholes.

The municipal boreholes in the vicinity of the study area currently supply to the Sesheng 2ML reservoir. More boreholes are also envisaging to be explored in the vicinity of the study area.

Mine dewatering passes via the water treatment works (softener plant) for treatment and reaches the Sesheng 2ML reservoir. If the Sesheng reservoir complex and the proposed reservoir complex of the study area to be linked the Municipality's objective to augment from own sources in all Sedibeng/Vaal Gamagara supply areas can be realised. The will trigger other secondary upgrades such as the water treatment works, Sesheng reservoir complex and the related link lines.

Storage and Distribution

In accordance with the water demand calculations the study area will need at least a 13.7ML (48- hour storage capacity) low level reservoir. It also needs a 2ML (2-hour peak storage capacity) elevated reservoir to cater for peak demand. A pump station with back-up power generator to lift water from the low-level reservoir to the elevated reservoir at a rate of 282 l/s completes the system.

Conclusion:

A water demand at peak flow of 70ℓ/s is anticipated. The current Kathu water sources and bulk infrastructure cannot accommodate the demand. The recommended bulk water infrastructure requirements to enable development feasibility are therefore:

- 355mm Ø additional connection to the Vaal Gamagara pipe line to provide at least 70 ℓ/s
- A low-level reservoir with a 13.7 ML storage capacity
- A high-level reservoir with a 2 ML storage capacity
- A booster pump station @ 282 ℓ/s with back-up generator

The formal bulk allocation supply to Kathu from Vaal Gamagara is only 15.8ℓ/s. The bulk pipe line is in process of a major upgrade. An increase in bulk water allocation quota of 239 ℓ/s to Kathu is envisage. Once these upgrades are completed and the desired system performance achieved the study area can be supplied according to its' demand. Augmentation from mine dewatering and municipal borehole water can also be possible in future.

SANITATION

The existing Kathu bulk sewer infrastructure cannot accommodate the calculated/estimated sewer inflows from the study area. The study area will therefore need a dedicated reticulation with main outfall sewer lines and a pump station plus rising main (pump line) to the Waste water treatment works. The existing waste water treatment works is also operating at full capacity which means a significant upgrade should also be needed.

Main Outfall Pipelines

It is envisaged that the entire internal sewer network will require main collectors ranging from 200mm Ø to 355mm Ø to handle the PWWF of 6 308 197ℓ/d or 73.01ℓ/s. With relatively flat terrain sloping to the north west it is expected that all outfall sewer lines to confluence at this lowest point.

The following outfall sewer pipe sizes and lengths have been identified for the Study Area:

1. 200mm Ø PVC-U 400KPa = 825m 2.
2. 250mm Ø PVC-U 400KPa = 3837m
3. 355mm Ø PVC-U 400KPa = 905m

Pump Station and Rising Main

In accordance with the analysis and calculations it can be deduced that a new pump station and rising main with a capacity to accommodate a pumping flow rate of 91.26ℓ/s will be required to transfer sewer from this lowest point of the study area to the WWTW.

The following infrastructure been identified for the Study Area:

3. Dry well pump station capable of a delivery rate at least 91.26 ℓ/s
4. 355mm Ø PVC-U class 12 = 7 540m

Waste Water Treatment Works

In 2014 the Kathu WWTW's capacity was increased to 6.8 Mℓ/d. The study area of 5 148 stands (extension 6 to 10) was not part of the consideration during the planned upgrade of 2014. It is expected that the study area will have an addition loading of 4.38 Mℓ/d on the waste water treatment works. As the works have no spare capacity currently an additional upgrade similar in magnitude to the 6.8Mℓ/d module done in 2014 is required.

During the 2014 upgrades, the old pasveer ditch module was decommissioned via a mothballing method. The decommissioned pasveer ditches is equivalent to 4.4Mℓ/d which can be utilised as a temporary

measure whilst the new upgrades are being initiated. The capacity of the old system is just about adequate to accommodate the services demand of the study area. Please note, further investigation should be undertaken to determine what the cost implications will be to recommission pasveer ditch modules and to review whether the old technology is still able to achieve the appropriate standard of effluent in accordance with the Water Use License of the Works

Conclusion

An estimated sewage peak flow of 73.01 ℓ/s will be generated by the fully developed study area. The current bulk sewer infrastructure cannot cater for this impact. The recommended bulk sewer infrastructure requirements to enable development feasibility are therefore:

- 200mm Ø PVC-U 400KPa outfall sewer line
- 250mm Ø PVC-U 400KPa outfall sewer line
- 355mm Ø PVC-U 400KPa outfall sewer line
- Pump station at 91.26 ℓ/s
- 355mm Ø PVC-U class 12 pump line
- 4.4ML/day Waste Water Treatment Works

It is recommended that a separate investigation should be undertaken to determine the costs of recommissioning the mothballed section of treatment works to ensure the accommodation of 4.38Mℓ/d requirement of the development. This should be considered a temporary mitigation to ensure there is sufficient capacity at the WWTW.

STORMWATER

Surface Drainage

All minor stormwater will be accommodated on the surfaced streets and bus and taxi routes. Unsurfaced streets will make use of concrete side drains drifts. Underground systems such as culverts and storm water pipes will be used to convey storm water underneath roads at crossing or to convey water to retention ponds.

Retention Ponds

The natural contours of the study area fall from a south-eastern to a north-western direction. A natural retention ponds is situated near Khai Appel in the north west. Storm water will drain naturally in the direction of the pond at Khai Appel. Formal storm water infrastructure will also be provided to facilitate storm water drainage to the Khai appel retention pond or the perennial Vlermuislaagte River.

11.2.2 ELECTRICAL SERVICES

A new 11 kV switching substation will have to be built by the Gamagara LM to distribute the power provided by the Eskom 11 kV supply point. This substation will be located adjacent to the Eskom substation. To supply the electrical demand for the new development it is proposed that two new switching substations should be built to allow for the distribution of electricity throughout the new development. These switching stations will be fed from the new Gamagara 11 kV switching substation.

11.3 FAUNA AND FLORA HABITAT STUDY REPORT (See Appendix C for a copy of this report).

11.3.1 Objectives of the habitat study

The objectives of the habitat study are to provide:

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

Make recommendations to reduce or minimise impacts, should the development be approved.

11.3.2 Scope of study

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

Integration of literature investigation and field observations to make recommendations to reduce or minimise impacts, should the development be approved.

11.3.3 Conclusion

- Terrestrial vegetation at much of the site is characterised by shrub-height *Senegalia mellifera* (Black Thorn) savanna on flat terrain (gentle slopes). Other indigenous small trees at the site include *Tarchonanthus camphoratus* (Vaalbos) and *Grewia flava* (Velvet Raisin). Few medium-sized *Vachellia erioloba trees* (Camel Thorn) are sparsely distributed in parts where *Senegalia mellifera* is visibly abundant such as at central and western parts of the site. *Vachellia erioloba* (Camel Thorn) increases noticeably in the southeastern, eastern and northeastern parts of the site. A concentration of fairly large *Vachellia erioloba* trees is found at an area in the eastern part of the site. Only a few individuals of *Boscia albitrunca* (Shepherd's Tree) are found at the site.
- In broad terms the site contains a *Senegalia mellifera* (Black Thorn) savanna largely in the western parts and a *Vachellia erioloba* (Camel Thorn) mixed savanna largely in the eastern parts.
- A trench and diggings are present at the site where *Vachellia karroo* (Sweet Thorn) trees are often conspicuous.
- Roads and tracks are found at the site. Bush-encroachment characterized by dense covers of *Senegalia mellifera* (Black Thorn) is encountered at some parts of the site whereas in other parts vegetation appears sparse and degraded.
- The vegetation type representing the Savanna Biome at the site is Kathu Bushveld (SVk 12). Kathu Bushveld is not listed as threatened according to the National List of Threatened Ecosystems (2011).
- Trench and diggings at the site could be conservation corridors of particular conservation concern whether as linked or stepping stone corridor systems.
- Ecological sensitivity at the site is medium-low at the flat areas where a visible high cover of *Senegalia mellifera* is present. Ecological sensitivity at the concentration of fairly large *Vachellia erioloba* trees at an area at the eastern part of the site is medium to medium-high.
- No Threatened or Near Threatened plant or animal species appear to be present at site.
- Two plant species which are not threatened but listed as Declining, *Boophone disticha* and *Vachellia erioloba* are present at the site.
- If the development is approved individuals of the Declining plant species *Boophone disticha* need to be relocated to a suitable site nearby before the construction phase. *Boophone disticha* (Poison Bulb) contains highly poisonouos substances and the translocation operation should be done with necessary care.
- Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for.

- Establisment of exotic weeds should be monitored and exotic weeds at the site should be eradicated. A declared invader such as the mesquite tree (*Prosopis* species), should not be planted or allowed to spread from adjacent areas to the proposed footprint.
- No bird's nests of particular conservation concern such as nests of large raptors or nests of sociable weavers, have been found at the site.
- The site falls outside the Kathu Forest and its buffer zone. The conservation of *Vachellia erioloba* (a protected tree species that is also listed as Declining) should therefore receive special attention. If the development is approved a special effort should be made (apart from applying for the necessary permits) to conserve and cultivate *Vachellia erioloba* (Camel Thorn) trees to enhance the conservation of these magnificent trees in the larger area.
- Three sample plots KT1, KT2 and KT3 of 50 m x 50 m were deliberately placed where conspicuous densities of *Vachellia erioloba* is present to gain an idea of the densities and height class distribution of *Vachellia erioloba* in the eastern half of the site where *Vachellia erioloba* is conspicuous in the mixed *Vachellia erioloba* savanna at the site. Table 4.26 indicates densities and height classes of Camel Thorn trees, *Vachellia erioloba* (= *Acacia erioloba*) at the site. No camel thorn trees taller than 10 m are found at the site (this is in contrast to other areas north and north-east of Kathu where such larger Camel Thorn trees are found). A relatively high density of Camel Thorn trees > 2 m of up to 96/ ha is present at the central-eastern part of the site. In other areas where conspicuous densities of *Vachellia erioloba* are found the density of individuals taller than 2 m ranges from 52/ ha to 84/ ha. Overall the density of *Vachellia erioloba* individuals taller than 2 m ranges from 0/ ha at the *Senegalia mellifera* savanna at the western parts of the site to around 54/ ha, 84/ha in eastern parts of the site and then at its most dense around 96/ ha at the central-eastern parts of the site.
- If the development is approved, the key would be to conserve and cultivate as many as practical locally indigenous tree species at the urban area so that an urban conservation corridor could be created for the Kathu Forest which is further to the east outside the site

11.4 WETLAND ASSESSMENT (See Appendix D for a copy of this report)

11.4.1 Aims and objectives of the survey

A survey to investigate key elements of habitats on the site, relevant to the conservation of wetlands is conducted. The importance and significance of the site with special emphasis on the current status of biodiversity and ecological services of the wetland are evaluated. Literature investigations are integrated with field observations to identify potential ecological impacts that could occur as a result of the development and to make recommendations to reduce or minimise impacts, should the development be approved.

The objectives of the wetland habitat assessment are to provide:

- An indication of the existence of wetlands at the site and if so:
- An identification of major aspects of the hydro-geomorphic setting and terrain unit at which the wetland occur;

- An estimate of the size and roughness of the wetland
- An indication of the hydric soils at the site;
- An indication of erodability;
- An indication of the presence or absence of peat at the site;
- An outline of hydrological drivers that support the existence and character of the wetland;
- An assessment of the possible presence or absence of threatened or localised plant species, vertebrates and invertebrates of the region, at the site;
- A description of the functions provided by the wetland at the site;
- An interpretation of the priority of the wetland for local communities in the area;

An interpretation of the priority of the wetland to biodiversity at the site

11.4.2 METHODS

A desktop study comprised not only an initial phase, but also it was used throughout the study to accommodate and integrate all the data that become available during the field observations.

A survey consisted of visits by R.F. Terblanche during 12 March 2018, 16,17 April 2018 and 22 May 2018 to note key elements of habitats on the site, relevant to the conservation of wetlands and riparian zones.

Classification of any inland wetland systems that could be present at the site is according to the Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al*., 2013). One of the major advantages of the Classification System for South Africa (Ollis *et al*., 2013) is that the functional aspects of wetlands are the focal point of the classification. Wetlands are very dynamic systems and their functionality weighs high against the often rapid changes in their appearance, as could be seen from wetland butterfly studies (Terblanche *In prep*). In this document the main guideline for the delineation and identification of wetlands where present is the practical field procedure for identification and delineation of wetlands by DWAF (2005).

11.4.3 CONCLUSION

- A trench and diggings are present at the site where *Vachellia karroo* (Sweet Thorn) trees are often conspicuous.
- Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. In conclusion no wetlands are found at the site.
- As a precaution the diggings (including the trench) at the site where water may gather during high rainfall events, are excluded from the proposed developments so that these could serve as part of a stepping stone conservation corridor in an increasingly developed area.

11.5 HERITAGE IMPACT ASSESSMENT (HIA) (See Appendix E for a copy of this report)

11.5.1 TERMS OF REFERENCE

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;

2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;

3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;

4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;

5. Review applicable legislative requirements

11.5.2 METHODOLOGY

11.5.2.1 Survey of Literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

11.5.2.2 Field Survey

The field assessment section of the study is conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detailed photographs are also taken where needed. The survey was done on foot and vehicle.

11.5.2.3 Oral Histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

11.5.2.4 Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

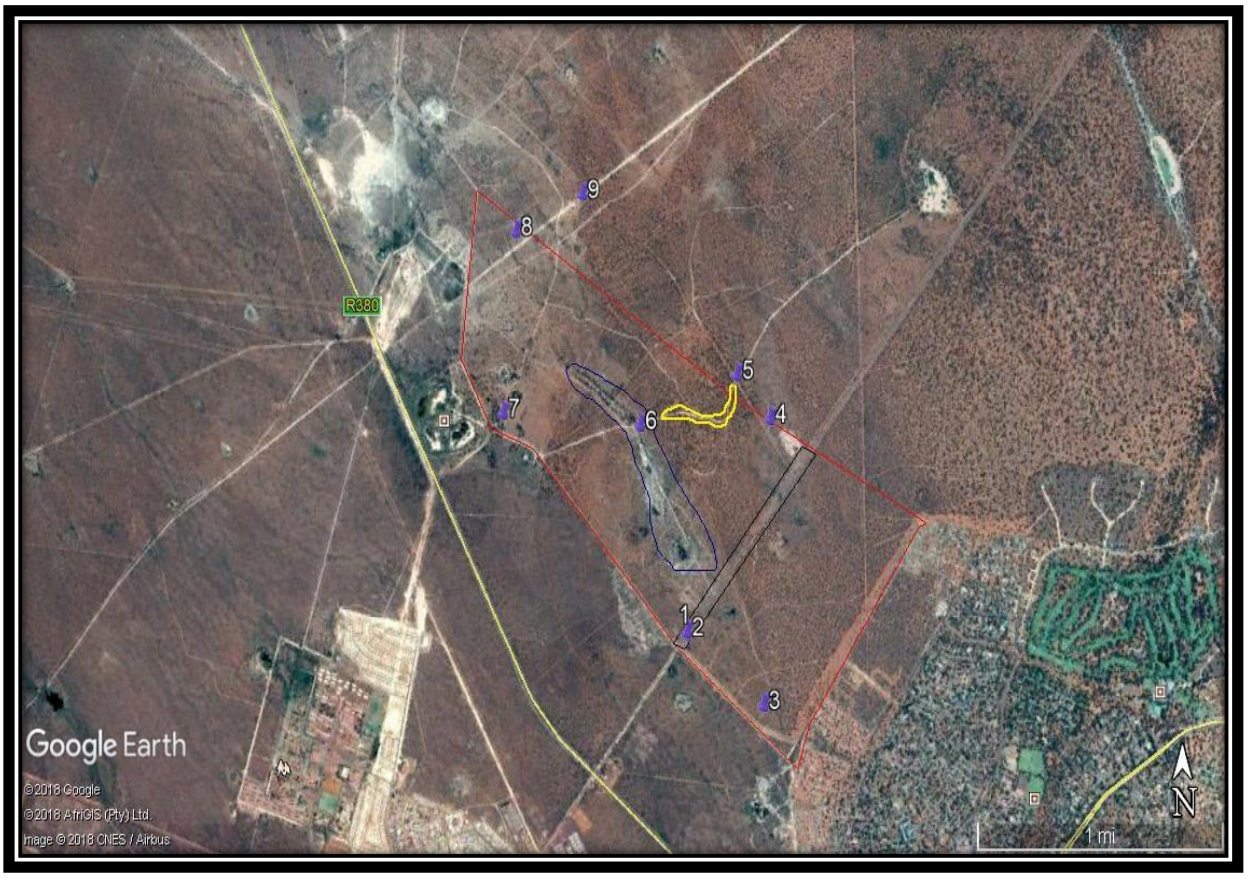
11.5.3 CONCLUSIONS AND RECOMMENDATIONS

APelser Archaeological Consulting (APAC) was appointed by Maxim Planning Solutions to undertake a Cultural Heritage Resources Impact Assessment in respect of proposed township establishment (Kathu Extension) on Portions 1 & 2 of the farm Kalahari Gholf & Jag Landgoed 775 in the Gamagara Local Municipality (Kathu) of the Northern Cape Province.

The project is conducted on instruction from Barzani Development (Pty) Ltd. A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the

study area falls. There are no known sites on the specific land parcel, although some archaeological material & historical sites were identified during the assessment in January 2018.

A total of 9 sites were found during the assessment of the area, with 8 of these Stone Age and 1 a recent historical grave site. Three (3) of the Stone Age sites are located around the old Sishen-Kuruman tar road periphery/in the road reserve and on the surface of a smaller graded dirt road in the area. The tar road material might come from a secondary source. The number of sites and finds dating to the Stone Age might be more than those identified and recorded during the assessment, as it is clear that the area could contain many more similar sites and scatters of material of varying density throughout. The old streambed that runs in the area also contained some scattered tools from the MSA/LSA, but the whole section was not walked and therefore the whole streambed section is a potential area for the presence of Stone Age sites.



Aerial view of study area (red polygon) & Sites found. The old tarred road between Sishen & Kuruman is demarcated in black; while the dry streambed has been demarcated in blue and the Site 5 road in yellow (Google Earth 2018).

Sites 1 & 2 are located in close proximity to each other and are situated next to the old tar road and in the road reserve. Stone tools are scattered amongst gravel used for the road construction and include cores, handaxes, possible choppers, broken blades, flakes and waste. When the rest of the tar road section was assessed it became clear that these types of tools are located only close to and in the road

reserve (an approximately 15m section both sides). Beyond that hardly any material occurs. It is highly likely that this Stone Age material comes from a secondary source (i.e. a quarry from which the road building material was sourced) and is not in situ. ***The range of material found here makes the "road site" relatively significant and if the road is to be impacted (re-used/removed) then it is recommended that possible surface sampling of representative material is undertaken. The source of the material should also be traced and the Stone Age material mapped along the road.***

Site 5 is located along another road in the study area. This is a dirt road that has been graded through a section of red aeolian sands and MSA & LSA artifacts (scrapers, blades, flakes) have been exposed in the road and next to it. ***The area around the road (in the red sands) most likely also contain scatters of tools that will be exposed eventually through natural erosion and care should be taken should development occur here that if material is uncovered an expert be called in to investigate.***

Site 6 is located in the old dry streambed in the area. Scattered/individual Stone tools are found throughout the area. The material has been heavily rolled (water working) and includes MSA/LSA flakes, blades, scrapers and other artifacts. ***It is recommended that the streambed area be avoided by the development***. Sites 3, 4, 8 & 9 are all surface sites containing single or denser scatter of MSA/LSA tools (blades, scrapers, cores, flakes and waste) on them. One of these sites (Site 9) falls outside the footprint of study area and is located in an old dry pan area.

It is highly likely that many more similar surface sites and scatters of Stone Age material are located in the study area but might not be visible at this current stage. Material is covered by the red aeolian sands and will erode out over time. It is therefore also possible that development actions could uncover more sites and material. It is recommended that a more detailed mapping and assessment of the Stone Age of the study area be undertaken.

The Site 7 graveyard is located close to the fence with the Khai Appel Resort/Caravan Park and contains between 12 and 15 graves. Most of the graves are stone-packed and with cement borders, while a few have cement headstones with inscriptions. Three individuals could be identified and includes (1) Beney Konieng who was born in April 1959 and died on 5 April 1960; (2) Mrs. Ross Hugo who died on the 20th of October 1961 and (3) Mrs. L. Sebego who was born in 1889 and died in 1965. ***Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. The best would be however to keep the site fenced-off and protected.***

Finally, it should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass-cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

From a cultural heritage point of view the development can therefore continue, taking cognizance of the above recommendations.

12. CONCLUSIONS AND RECOMMENDATIONS

Gamagara Local Municipality has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Integrated Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province.

As in the rest of South Africa, there is a housing shortage in the area.

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

12.1 ENVIRONMENTAL IMPACT STATEMENT

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

Specialist studies were conducted and a full Public Participation Process was followed. This information was used to generate a sensitivity map that was used by the Town Planner to design the layout plan for the proposed development.

A comprehensive Geotechnical AND Geo-Hydrological study performed identified that the majority of the site is underlain by tholeitic and calc-alkaline basaltic and andesitic lava, tuff and pyroclastic breccia of the Allanridge Formation (Ra), Ventersdorp Supergroup, but is covered by recent alluvium (m) in the form of Aeolian red sand (Qw) and calcrete (T-Qc). Severe problems are foreseen regarding the excavatability to 1,5m depth almost across the site. Zoning of the site revealed zones with constraints regarding the **highly collapse potential** of the soil, underlain by **calcrete gravel and boulders**. **Special construction** techniques will be required to enable proper development. This includes the use of **special compaction** techniques of strip footings with slab on the ground foundations **or soil or steel reinforced rafts** with **site drainage provision.**

The Engineering services report found that insufficient bulk capacity exists to accommodate the proposed development. It is imperative that the following be implemented to accommodate the proposed extension:

A water demand at peak flow of 70ℓ/s is anticipated. The current Kathu water sources and bulk infrastructure cannot accommodate the demand. The recommended bulk water infrastructure requirements to enable development feasibility are therefore:

- 355mm Ø additional connection to the Vaal Gamagara pipe line to provide at least 70 ℓ/s
- A low-level reservoir with a 13.7 ML storage capacity

- A high-level reservoir with a 2 ML storage capacity
- A booster pump station @ 282 ℓ/s with back-up generator

The formal bulk allocation supply to Kathu from Vaal Gamagara is only 15.8ℓ/s. The bulk pipe line is in process of a major upgrade. An increase in bulk water allocation quota of 239 ℓ/s to Kathu is envisage. Once these upgrades are completed and the desired system performance achieved the study area can be supplied according to its' demand. Augmentation from mine dewatering and municipal borehole water can also be possible in future.

An estimated sewage peak flow of 73.01 ℓ/s will be generated by the fully developed study area. The current bulk sewer infrastructure cannot cater for this impact. The recommended bulk sewer infrastructure requirements to enable development feasibility are therefore:

- 200mm Ø PVC-U 400KPa outfall sewer line
- 250mm Ø PVC-U 400KPa outfall sewer line
- 355mm Ø PVC-U 400KPa outfall sewer line
- Pump station at 91.26 ℓ/s
- 355mm Ø PVC-U class 12 pump line
- 4.4ML/day Waste Water Treatment Works

It is recommended that a separate investigation should be undertaken to determine the costs of recommissioning the mothballed section of treatment works to ensure the accommodation of 4.38Mℓ/d requirement of the development. This should be considered a temporary mitigation to ensure there is sufficient capacity at the WWTW.

The Fauna and Flora study conducted revealed that the terrestrial vegetation at much of the site is characterised by shrub-height *Senegalia mellifera* (Black Thorn) savanna on flat terrain (gentle slopes). Other indigenous small trees at the site include *Tarchonanthus camphoratus* (Vaalbos) and *Grewia flava* (Velvet Raisin). Few medium-sized *Vachellia erioloba trees* (Camel Thorn) are sparsely distributed in parts where *Senegalia mellifera* is visibly abundant such as at central and western parts of the site. *Vachellia erioloba* (Camel Thorn) increases noticeably in the southeastern, eastern and northeastern parts of the site. A concentration of fairly large *Vachellia erioloba* trees is found at an area in the eastern part of the site. Only a few individuals of *Boscia albitrunca* (Shepherd's Tree) are found at the site.

In broad terms the site contains a *Senegalia mellifera* (Black Thorn) savanna largely in the western parts and a *Vachellia erioloba* (Camel Thorn) mixed savanna largely in the eastern parts. A trench and diggings are present at the site where *Vachellia karroo* (Sweet Thorn) trees are often conspicuous.

Roads and tracks are found at the site. Bush-encroachment characterized by dense covers of *Senegalia mellifera* (Black Thorn) is encountered at some parts of the site whereas in other parts vegetation appears sparse and degraded.

The vegetation type representing the Savanna Biome at the site is Kathu Bushveld (SVk 12). Kathu Bushveld is not listed as threatened according to the National List of Threatened Ecosystems (2011). The trench and diggings at the site could be conservation corridors of particular conservation concern whether as linked or stepping stone corridor systems.

Ecological sensitivity at the site is medium-low at the flat areas where a visible high cover of *Senegalia mellifera* is present. Ecological sensitivity at the concentration of fairly large *Vachellia erioloba* trees at an area at the eastern part of the site is medium to medium-high. No Threatened or Near Threatened plant or animal species appear to be present at site.

Two plant species which are not threatened but listed as Declining, *Boophone disticha* and *Vachellia erioloba* are present at the site. If the development is approved individuals of the Declining plant species *Boophone disticha* need to be relocated to a suitable site nearby before the construction phase. *Boophone disticha* (Poison Bulb) contains highly poisonouos substances and the translocation operation should be done with necessary care.

Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for.

Establishment of exotic weeds should be monitored and exotic weeds at the site should be eradicated. A declared invader such as the mesquite tree (*Prosopis* species), should not be planted or allowed to spread from adjacent areas to the proposed footprint.

No bird's nests of particular conservation concern such as nests of large raptors or nests of sociable weavers, have been found at the site.

The site falls outside the Kathu Forest and its buffer zone. The conservation of *Vachellia erioloba* (a protected tree species that is also listed as Declining) should therefore receive special attention. If the development is approved a special effort should be made (apart from applying for the necessary permits) to conserve and cultivate *Vachellia erioloba* (Camel Thorn) trees to enhance the conservation of these magnificent trees in the larger area.

The Specialist concluded that if the development is approved, the key would be to conserve and cultivate as many as practical locally indigenous tree species at the urban area so that an urban conservation corridor could be created for the Kathu Forest which is further to the east outside the site

The Wetland impact assessment revealed that a trench and diggings are present at the site where *Vachellia karroo* (Sweet Thorn) trees are often conspicuous. Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. In conclusion no wetlands are found at the site.

As a precaution the diggings (including the trench) at the site where water may gather during high rainfall events, are excluded from the proposed developments so that these could serve as part of a stepping stone conservation corridor in an increasingly developed area

A Heritage Impact Study revealed a total of 9 sites that were found during the assessment of the area, with 8 of them Stone Age and 1 a recent historical grave site. Three (3) of the Stone Age sites are located around the old Sishen-Kuruman tar road periphery/in the road reserve and on the surface of a smaller graded dirt road in the area. The tar road material might come from a secondary source. The number of sites and finds dating to the Stone Age might be more than those identified and recorded during the assessment, as it is clear that the area could contain many more similar sites and scatters of material of varying density throughout.

It is highly likely that many more similar surface sites and scatters of Stone Age material are located in the study area but might not be visible at this current stage. Material is covered by the red aeolian sands and will erode out over time. It is therefore also possible that development actions could uncover more sites and material. It is recommended that a more detailed mapping and assessment of the Stone Age of the study area be undertaken.

A graveyard is located close to the fence with the Khai Appel Resort/Caravan Park and contains between 12 and 15 graves. Most of the graves are stone-packed and with cement borders, while a few have cement headstones with inscriptions. Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. If the site cannot be avoided then the graves can be exhumed and relocated after all due processes (social consultation/getting consent/permits have been obtained) have been successfully completed. The best would be however to keep the site fenced-off and protected.

The Civil Engineer found sufficient civil services are available in the area, provided that bulk infrastructure upgrades are constructed prior to occupation of the new township.

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

The alternatives considered for the proposed development includes “Mixed land use township” (Alternative 1), “Single land use: Housing only” (Alternative 2) and the “No-go option” (Alternative 3).

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities shops, banking facilities, clinics, etc. and want their living environment, such as residential townships to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure (schools), as well as some retail or commercial activities;

- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised and informal settlements in the area. The commercial node will:
  - Promote entrepreneurial services and products;
  - Be within walking distance to places of refreshment and trade for residents;
  - Provide Job opportunities; and
  - Improve neighbourhood quality.

By providing only one land use type (i.e., housing), mixed income development and social integration across race and income levels, *cannot be achieved*. By restricting a township to one land use only, the above benefits to the local community, and subsequent council area, cannot be realised, and hence, is not a preferred land use option.

The only other alternative that exists for the proposed development is the "no-go" option which will imply that the status quo will prevail. This is unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

The proposed development will address this shortage.

12.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

EMPR's aim to identify and minimise the potential impacts that the proposed construction and operational phases of the project may have on the receiving environment. A draft EMPR has been developed which is contained in Appendix G and includes detailed mitigatory measures for the construction phase.

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

- Mechanisms for the on-going identification and assessment of environmental aspects and impacts;
- Environmental management programmes; objectives and targets;
- Environmental monitoring and reporting framework;
- Environmental management procedures; and,

Mechanisms for the recording of environmental incidents and implementing corrective and preventative actions.

12.3 EAP OPINION

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

This is based on the fact that the social and economic benefits to the region will greatly outweigh the negative environmental and social impacts. The proposed application and development of the land as being applied for, is consistent with the institutional planning policy adopted for the area by the Provincial and Local Authorities.

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

The environmental management programme (EMPR) should form part of the contract between the construction company and the applicant. This will help ensure that the EMPR is adhered to. It is suggested that a suitably qualified Environmental Control Officer (ECO) be appointed for the construction phase, as this will have the largest potential impact.

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

1) The mitigation measures as described in this report must be implemented
2) The necessary municipal infrastructure (water and sanitation) must be in place as described in the Civil Engineer's report before the development can proceed
3) The mitigation measures contained in this report are legally binding
4) Mitigation measures must be made known to personnel, contractors and sub-contractors associated with this project
5) Weeds and invader plants that are declared in terms of the Conservation of Agricultural Resource Act (Act 43 of 1983) must be controlled as prescribed in the act

6) An Environmental Control Officer must ensure that conditions stipulated in the Environmental Authorization are compiled by. The name and contact details must be supplied to The Department of Rural, Environmental and Agricultural Development (North West province) - prior to the commencement of the activities
7) The contractor/s responsible for the construction must leave the site free from erosion, pollution and/or unwanted material. The affected areas must be rehabilitated to the satisfaction of the department
8) Two plant species which are not threatened but listed as Declining, *Boophone disticha* and *Vachellia erioloba* are present at the site. If the development is approved individuals of the Declining plant species *Boophone disticha* need to be relocated to a suitable site nearby before the construction phase. *Boophone disticha* (Poison Bulb) contains highly poisonouos substances and the translocation operation should be done with necessary care.
9) Two protected tree species *Vachellia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd's Tree) are found at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for.
10) If during the construction phase any archaeological / historical / cultural features are discovered, the work in the direct vicinity of the find must be stopped. Under no circumstances shall any artifacts be destroyed. Such a site must be marked and fenced off and SAHRA notified as soon as possible.
11) The contact details of an accredited SAHRA Specialist must be kept on site to ensure that should any archaeological / historical / cultural features be discovered, he can be on site as soon as possible to determine the way forward.
12) As far as possible, employment opportunities should be given to the local labor force in order to stimulate growth in the local and regional economy
13) In the event of non-compliance to any of the conditions contained in the EA, the contractor / applicant will be held responsible
14) The applicant is responsible for all costs necessary to comply with the above conditions unless otherwise specified in the contracts of the contractor/s.

13. AFFIRMATION BY EAP

I , declare under oath that I:

a. act as the independent environmental practitioner in this application ;
b. do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Section 24G of the National Environmental Management Act, read together with the Environmental Impact Assessment Regulations, 2006;
c. do not have and will not have a vested interest in the proposed activity proceeding;
d. have no, and will not engage in, conflicting interests in the undertaking of the activity;
e. undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Section 24G of the National Environmental Management Act, read together with the Environmental Impact Assessment Regulations, 2006;
f. will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
g. will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
h. will keep a register of all interested and affected parties that participated in a public participation process; and
i. will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Name of company:

Date:

Signature of the Commissioner of Oaths:

Date

Designation

Official stamp:

14. LIST OF REFERENCES

Department of Environmental Affairs and Tourism. 1992. Integrated Environmental Management. Pretoria, DEAT.

Department of Environmental Affairs and Tourism. 1998. *Guideline Document - EIA Regulations*. Pretoria, DEAT.

Department of Environmental Affairs. 1988. *Climate of South Africa, climate statistics up to 1984*. Weather Bureau (WB40). Pretoria, Government Printer.

Department of Transport, 19--. *Climate of South Africa Part 1 Climate statistics.* Weather Bureau (WB20). Pretoria Government Printer.

The State Government of NSW through the Department of Planning 2008; *Development Near Rail Corridors and Busy Roads – Interim Guideline, DoP 08_048.*

S. Cliff. 2015. Environmental Scoping report for the proposed high density residential township "Tanganani extension 7", to be located on a part of Portion 119 of the farm Diepsloot 388 JR, City of Johannesburg Municipality, Gauteng

APPENDIX A

GEOTECHNICAL AND GEO-HYDROLOGICAL REPORT

APPENDIX B

CIVIL ENGINEERING REPORT AND ELECTRICAL SERVICES

APPENDIX C

FAUNA AND FLORA HABITAT SURVEY REPORT

APPENDIX D

WETLAND IMPACT ASSESSMENT REPORT

APPENDIX E

HERITAGE IMPACT ASSESSMENT REPORT

APPENDIX F

ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX G

PROOF THAT THE DRAFT EIAR HAS BEEN SENT TO DW&S