DRAFT REPORT

SCOPING 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 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province. .

Report Date: December 2020

Compiled by:

AB ENVIRO-CONSULT CC

7 Louis Leipoldt Street

Potchefstroom

2531

Tel: + 27 (83) 5488 105

Fax: + 27 (18) 293 0671

E-mail: jp@abenviro.co.za

Compiled for:

Nama Khoi Local Municipality

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EXECUTIVE SUMMARY

The Applicant, the **Nama Khoi Local Municipality** has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

As in the rest of South Africa, there is a housing shortage in the area. The local municipality intends to promote a more compact city in order to prevent the expansive provision of social and engineering services, as well as to prevent the economic decline of the traditional city centre. The Spatial Development Framework (SDF) addresses the scale or urban growth through planned extensions, infill and redevelopment strategies. The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and basic services.

The new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions.

The integrated human settlement project from the onset aims at providing a proper integrated human settlement that ascribes to the BNG Principles set out above. This will be achieved as follows:

- This project makes provision for a variety of erven that can be utilized for various housing typologies. The largest proportion of the township areas will however be aimed at both the subsidized housing sector through the implementation of one of Government's subsidized housing programmes as well as the need that exists for people that does not qualify for a Government subsidy, due to either already owning other property or earning in excess of the threshold household income prescribed in respect of the various housing subsidy programmes, but who still wishes to acquire an affordable stand where they can construct their own home. This project will also aim at alleviating the plight of people that live in informal settlement areas and in squalid conditions.
- The location of the proposed township area directly adjacent to the existing urban further enhances integration and will offer inhabitants the opportunity to access the existing social and commercial facilities on offer within the existing village area whilst also providing social and business opportunities within the proposed development area itself that can in turn be utilized by and to the benefit of the inhabitants of the existing village area.

The development of the integrated human settlement represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human

settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

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

The 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:

Detailed description of listed activities associated with the project		
Listed activity as described in GN R.327 and 324.	Description of project activity that triggers listed activity	**Anticipated years to complete construction (From date of commencement)**
GN.R. 327 Item 12: *The development of—* *infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs—* *(a) within a watercourse."*	The development of structures (roads) with a physical footprint of 3 750 m^2 within a water course.	10 Years
GN.R. 327 Item 19: *The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;"*	The infilling and depositing of 30 680 m^3 of concrete and compacted backfill material and the excavation 24 000m^3 sand and soil, within a watercourse in order to construct three 3 750 m^2 roads.	10 Years
GN.R. 325 Item 15: *"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management*	The clearance of 123.0452 ha of indigenous vegetation in order to establish a township.	10 Years

plan."		
GN.R. 324 Item 12. g. ii. *"The clearance of an area of 300 square meters or more of indigenous vegetation, except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* ***g. Northern Cape*** *ii. Within critical biodiversity areas identified in bioregional plans*	The clearance of 123.0452 ha of indigenous vegetation, located within a critical Biodiversity area (CBA) in order to establish a township.	10 Years

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.

Although this is only the Scoping phase of the proposed development, no "fatal flaws" has been encountered as of yet. All the issues envisaged at this stage can be mitigated.

1. INTRODUCTION

The Applicant, the **Nama Khoi Local Municipality** has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, some located within a critical biodiversity area and Ecological Support Area, the construction of three roads and the installation of bulk services within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi 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 amended and published in Government Notice R.326 of 7 April 2017, Appendix 2, 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 Applicant, the **Nama Khoi 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. He also designed the proposed infrastructure.
4) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
5) A Fauna and Flora and Wetland specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
6) A Civil Engineer was appointed to dermine the 1:100 year flood line affecting the proposed development.
7) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
8) Desk top studies were conducted and alternatives assessed.
9) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
10) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
11) 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.
12) 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 includes the necessary investigations to assess the suitability of the identified site and its surrounding environment, for the development proposal. The scoping exercise describes the “status quo” of the bio-physical, social, economical and cultural environment, and identifies the anticipated environmental aspects associated with the proposed development. Scoping includes the identification of key interest groups, (both government and non-government), and 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 is to document the outcome of the Scoping Phase of the project. This report fulfils the requirement of the EIA Regulations (2014) for the documentation of the scoping phase. The Scoping Report is 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. Table 1 below provides a summary of the legislative requirements in terms of a Scoping Report as stipulated in Section 21(3) of the EIA Regulations of December 2014 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 Scoping Report where the NEMA and Scoping Report requirements have been addressed.

Table 1: Scoping Report content as per Section 21(3) of NEMA's 2014 EIA Regulations of December 2014 as amended and published in Government Notice R. 326 of 7 April 2017 Appendix 2

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Scoping Reports	Location in this Scoping report
Appendix 2, section 2 (1)(a)	Details of - (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	Paragraph 2
Appendix 2, section 2 (1)(b)	The location of the activity, 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 2, section 2 (1)(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; or (iii) On land where the property has not been defined, the coordinates	Figure 1 and Figure 2, 3 and 4
Appendix 2, section 2 (1)(d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	 Paragraph 3 Paragraph 3
Appendix 2, section 2 (1)(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Paragraph 5
Appendix 2, section 2 (1)(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 location.	Paragraph 6
Appendix 2, section 2 (1)(g)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, 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;	 Paragraph 7 Paragraph 10 Paragraph 10 Paragraph 8 Paragraph 9 Paragraph 9

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Scoping Reports	Location in this Scoping report
	(bb) may cause irreplaceable loss of resources; and	Paragraph 9
	(cc) can be avoided, managed, or mitigated.	Paragraph 9
	(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 9
	(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;	Paragraph 9
	(viii) The possible mitigation measures that could be applied and level of residual risk;	Paragraph 9
	(ix) The outcome of the site selection matrix;	Not Applicable
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Not Applicable
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Paragraph 11
Appendix 2, section 2 (1)(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken including-	Paragraph 12
	(i) A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Paragraph 12.1
	(ii) A description of the aspects to be assessed as part of the environmental impact assessment process;	Paragraph 12.2
	(iii) Aspects to be assessed by specialists;	Paragraph 12.3
	(iv) A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	Paragraph 12.4
	(v) A description of the proposed method of assessing duration and significance;	Paragraph 12.5
	(vi) An indication of the stages at which the competent authority will be consulted;	Paragraph 12.6
	(vii) Particulars of the public participation process that will be conducted during the environmental impact assessment process;	Paragraph 12.7
	(viii) A description of the tasks that will be undertaken as part of the environmental impact assessment process;	Paragraph 12.8
	(ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Paragraph 12.9
Appendix 2, section 2 (1)(i)	An undertaking under oath or affirmation by the EAP in relation to-	Paragraph 13
	(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	Paragraph 13
	(iii) 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

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Scoping Reports	Location in this Scoping report
Appendix 2, section 2 (1)(j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment.	Paragraph 13
Appendix 2, section 2 (1)(k)	Where applicable, any specific information required by the competent authority.	To be included in final Scoping Report
Appendix 2, section 2 (1)(l)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	Not Applicable

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

Name : ABRAHAM BAREND (BRAAM) DE VILLIERS
Date of birth : 1944/01/26
Telephone : (018) 294-5005
Fax : (018) 293-0671
Electronic mail : brama@abenviro.co.za
Address : 7 LOUIS LEIPOLDT STREET
POTCHEFSTROOM
2531
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*	*SA Council for Natural Scientific Professions*	*Environmental Science*
1994	Quality Auditor	ESKOM	Auditing
1998 -2017	Personnel & Verifying Auditor	SAATCA	Environmental Auditing

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
Bird Life 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

2.2.1 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.

2.2.2 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:

2.3.1 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.

2.3.2 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 Duisburg 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.

2.3.3 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 Copperbelt 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.

2.3.4 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.

2.3.5 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
2019	Registered as Environmental assessment Practitioner	EAPASA Registration number: 2019/808	

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

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

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution
2020	Registered as Environmental assessment Practitioner	EAPASA Registration number: **2019/1573**

EXPERIENCE OF THE CONSULTANCY

Over a period of 24 years (1996-2020) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 375 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

The Applicant, the **Nama Khoi Local Municipality** has appointed ***AB Enviro Consult CC***, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads and the installation of bulk services within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

The site is influenced by a number of design factors that were considered for the proposed layout plan to be acceptable. These factors include the slope of the site, flood lines, environmental sensitivity, service provision, erf size, access, road layout and community facilities as well as the geotechnical features. To ensure that the proposed development do not infringe on any design principles and the environmental sensitive areas, development of residential units will only be allowed to take place according to the prescribed methods: subsequently no residential development may take place beyond the 1:100 year flood line.

The proposed Township will consist of the following (See Figure 1 for a copy of the Layout Plan):

Residential	1 500 Stands
Business	6 Stands
Churches	6 Stands
Crèche	3 Stands
School	1 Stand
Sports Field	1 Stand
Municipal	1 Stand
Parks	11 Stands
Area of township	**123,0452 ha**

Figure 1: Layout Plan

CIVIL SERVICES

Bulk services will be connected to Municipal infrastructure. A Civil Engineer has been appointed to assess the availability and design of services in the area and his report will be included in the EIAr.

WATER

Accoring to the Civil Engineer, the current bulk services for Steinkopf does not contain sufficient capacity to serve the addition of a further 8250 people (1500 erven at 5.5 people/erf), with a resultant negative deficit when the additional populations is applied to the reserve capacity.

Bulk Infrastructure	Maximum Effective Capacity (people)	Current Capacity Served (people)	Reserve Capacity (people)	Proposed Additional Capacity (people)	Remainder (people)
160 mm Ø Bulk Water Connection and Trunk Main	17280	10081	7199	8250	-1051
Reservoir	5563	10081	-4518	8250	-12768

Table 1: Summary of bulk infrastructure capacity

It must be noted that in the case of the reservoir the capacity available for domestic use, as a result of the reserved volume of water for fire demand,is insufficient to serve the current domestic demand within a single day. However, if the fire demand is ignored, the reservoir capacity increases to an estimated 11781 people for a period of 48 hours. This situation however does not fall in line with the accepted standards for water storage. Furthermore, the reservoir will still not contain sufficient capacity to serve both the existing population and the additional erven, with a resultant negative deficit of 6550 people. *With regards to the bulk water connection to the Sedibeng line, as stated previously little to no information is forthcoming, thus no evaluation can be made at this time. However, in light of telecoms with Ms A Botes of Sedibeng Water Springbok Region, applications for additional capacity and changes to the current connection may be considered. Considering the existing 160 mm trunk main, the resultant negative deficit as seen in Table 1 is indicative of insufficient capacity to serve the total volume of additional water. It must be noted that the negative deficit is relatively small (1051 people). This may be offset by increasing the allowed velocity within the trunk main by approximately 0.1m/s to 1.3m/s. This increase will have an impact on the operational properties in the form of greater friction loss but will allow the accommodation of the 1051 shortfall within the existing infrastructure. Considering the lack of information in this regard (i.e. available pressure), this may result in too great a head loss within the pipeline, with no water reaching the reservoir as a result.*

Recommendations for Bulk infrastructure:
Upgrade existing connection to Sedibeng water main.
o Upgrade existing trunk main to site of reservoir.
o New concrete reservoir to serve the proposed development.
o New bulk main to proposed development.

The existing reservoir does not contain sufficient capacity to serve the additional proposed erven. Thus, the necessity exists to increase the available storage capacity Thus, it is recommended that a new reservoir to serve the proposed development be constructed in position at the site of the existing reservoir. The capacity of the new reservoir will be 48 hours of the AADD of the negative population deficit assuming no fire demand in the existing reservoir, thus **6550 people**.

It is proposed that a new trunk main to serve the proposed development be installed from the site of the new and existing reservoir, within the road reserve of the existing municipal road network, to the north-west corner of the proposed development. The new bulk main will be sized to serve the total domestic demand for the town of Steinkopf, including the proposed 1500 erven.

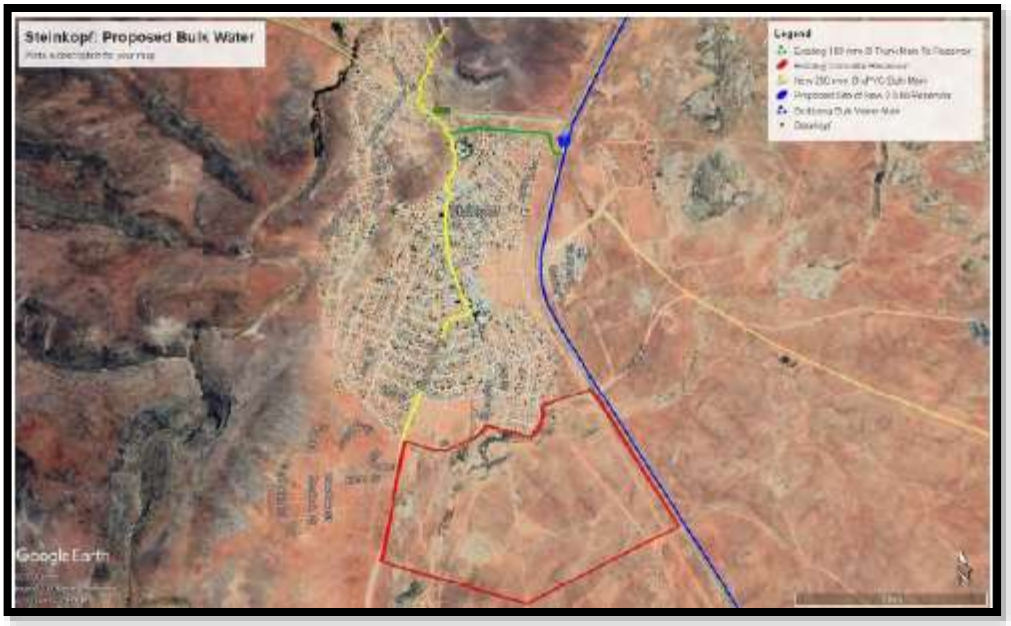


Figure 2: Proposed bulk water

Summary of recommendations:

- Upgrade existing connection to Sedibeng pipeline to 200mmØ.
- Upgrade existing 1.8km trunk main to reservoir site to 200mmØ uPVC Class 16.
- New 2.5 Mℓ concrete reservoir at site of existing reservoir.
- New 250 mm Ø bulk water main to site of the proposed development approximately 2.990kms in length.

SEWER

The maximum capacity for the bulk infrastructure may be summarised as indicated in Column 1 of Table 8 in the form of the total population that may be served. The population that may be served for the WTW is the least amount across all components of the WTW, thus 19938 people.

Bulk Infrastructure	Maximum Effective Capacity (people)	Current Capacity Served (people)	Reserve Capacity (people)	Proposed Additional Capacity (people)	Remainder (people)
300 mm Ø pipeline	25686	10081	15605	8250	7355
WTW	19938	10081	9857	8250	1607

Table 2: Bulk Sewer Capacity

It can be seen that the 300 mm Ø bulk sewer main and the WTW has sufficient capacity to serve the addition of a further 8250 people (1500 erven at 5.5 people/erf), with a residual capacity of 7355 and 1607people for the bulk pipeline and WTW respectively.

Recommendation for Bulk Sewer Infrastructure:
It is recommended that all parts of the proposed new development be drained to the existing Wastewater Treatment Works, via the 300 mm Ø bulk sewer main, as there is sufficient capacity to accommodate the new development. Based on the limited information received we anticipate that a small pump station (Lifting Station) with a short section of rising main (300m) will be required to accommodate a portion of the development situated to the north as it is evident that there is a low lying area.

CONSTRUCTION OF NEW INTERNAL WATER AND SEWAGE PIPELINES WITHIN THE WATERCOURCE OF THE PROPOSED DEVELOPMENT

The pipes will be encased in 200 mm mass concrete and the area on top of the concrete will be soilcrete that will be compacted in 150mm layers to natural ground level.
In the planning for the design phase of the pipelines, cognisance is taken of the following reference documents;

- Red Book – Guidelines for Human Settlement Planning and Design
- SABS 1200 – Standardized Specification for Civil Engineering Construction
- Local Municipal standards

When planning or designing the pipelines, a holistic approach that adheres to all the tenets of the reference or policy documents listed above will be adopted.

<u>The approach to design and construction will encompass the following;</u>

- Appropriate and adequate protection of the river/stream/wetland banks in the vicinity of the pipeline will be incorporated into the design.
- The existing river/stream bank structure will be maintained to reduce disturbance to the river/stream flow.
- Where crossing or running alongside river or stream courses, the existing river/stream bank structure will be maintained to reduce disturbance to the river flow.
- Where the pipeline crosses storm water channels these will be designed to have no impact on normal storm water flow in that all pipes and concrete casing will be buried at least 1.0m below natural channel level in the case of soft material, and level with the natural channel in the case of hard rock material.
- In the case of sewer pipelines, man holes will be provided at all changes in grade and direction and at intervals not exceeding 80m to facilitate maintenance during the lifetime of the pipelines.
- The pipe crossing has been designed to have no impact on normal river/stream flow
- Where pipes are laid through a flood plain (1:100-year flood line), a minimum cover level of 1.0m will be maintained.

Construction Methodology

- Conduct a competent site investigation to build up an informed picture of the task
- Conduct a topographical survey of the pipeline route
- Adequate design of all the stages of construction
- All environmental and Health and Safety requirements and good practice to be adhered to.
- Remove topsoil and stockpile for later use
- Excavate trench for pipeline to the design level
- If the material is firm, normal excavation techniques will apply. In soft material shoring of the trench sides may be required. In hard rock material trench excavation may require the use of pneumatic breakers or blasting
- Install temporary dewatering pumps to keep the excavation dry (if required due to ground water ingress)
- Construct storm water diversion berms where required
- Place concrete to encasement if required. The top level will be determined by the storm water channel level
- Place bedding, lay pipe, place and compact selected fill over the pipeline
- Construct manholes where required. Manholes will be constructed along the pipeline route at changes in grade and direction
- Backfill to specification of drawings.
- Dress backfill, topsoil and revegetate all exposed areas.

See Figure 2 below:

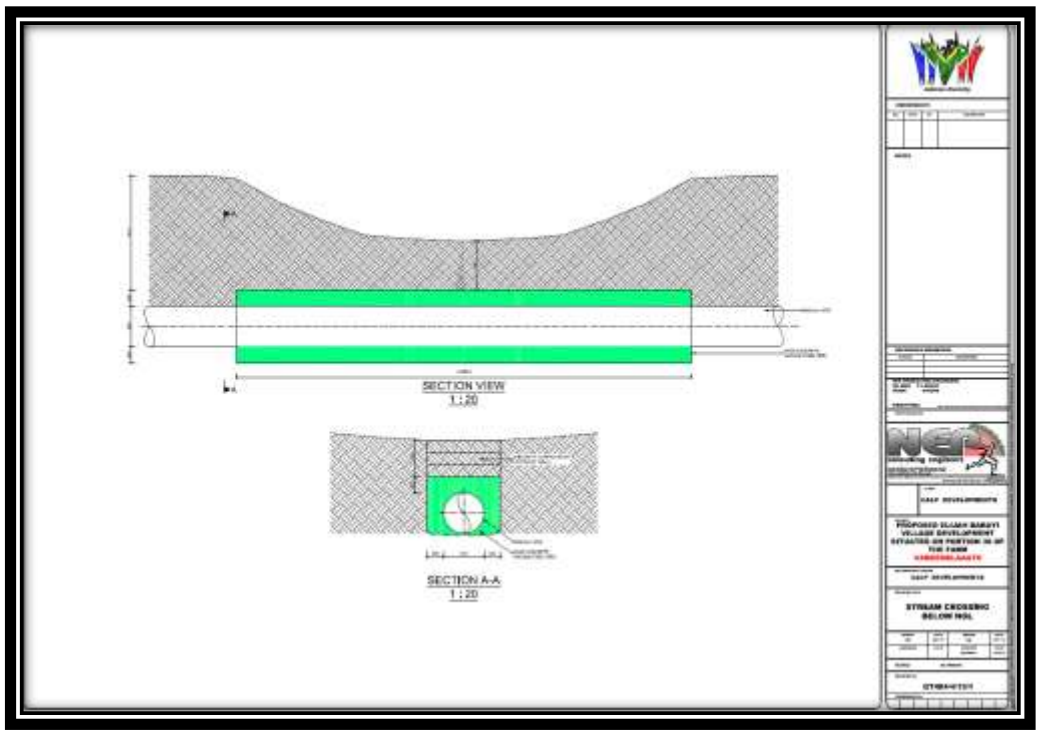


FIGURE 2: PIPELINE INSTALLATION DESIGN

ROADS

Currently Steinkopf has two main point of access from the N7 national road with one arterial road linking these two points of access, one in the northeast and one in the south-east. The arterial road linking the two points of access is a surfaced road, while the remainder of the municipal roads' infrastructure is gravel roads.

Access:

Currently the site of the proposed development is bordered by existing municipal roads infrastructure to the north and west, as well as the N7 national rout to the east. It is recommended that access to the proposed development be provided from the existing roads network situated to north and west of the proposed development. Internal roads that are proposed as part of the development will cross streams

SUSTAINABLE DRAINAGE SYSTEMS

According to L. Soobiah (2020): Swales and biofiltration can be considered for implementation of 'green building' principles, adjacent the roadways, footpaths and for the proposed outlet channels into the main drainage courses. Swales (shallow vegetated channels which collect runoff and then releases it into the drainage system or back to surface at a reduced peak discharge and volume). Swales are constructed with permeable / gravel bases to promote infiltration to the sub-soil and improve run-off quality.

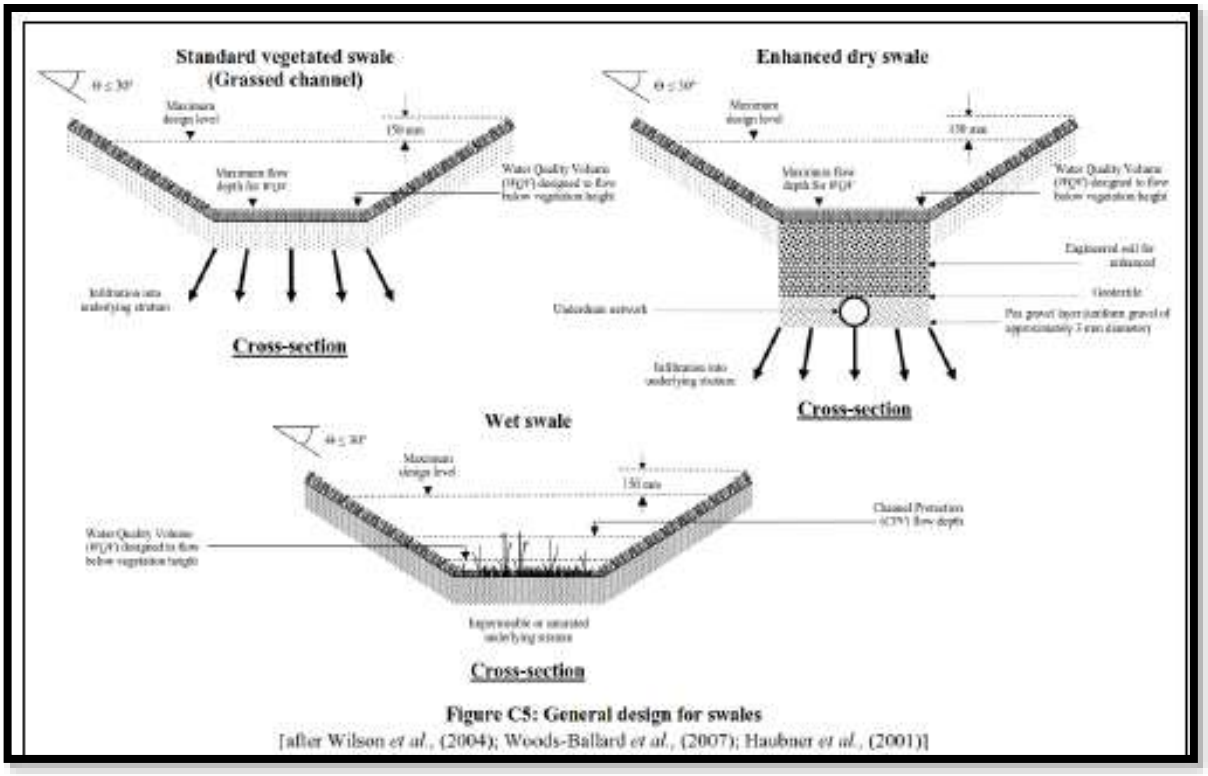


Figure C5: General design for swales
[after Wilson *et al.*, (2004); Woods-Ballard *et al.*, (2007); Haubner *et al.*, (2001)]

Typical swale design

Permeable paving:

The use of permeable pavers for footpaths, roadways and parking areas could be considred to provide reduced runoff and promote infiltration. The use of permeable paving can be implemented in tandem with swales constructed adjacent to the paved surfaces to intercept any surface flow as well as discharge ffrom the underlying sub-base (Soobiah; L. 2020).

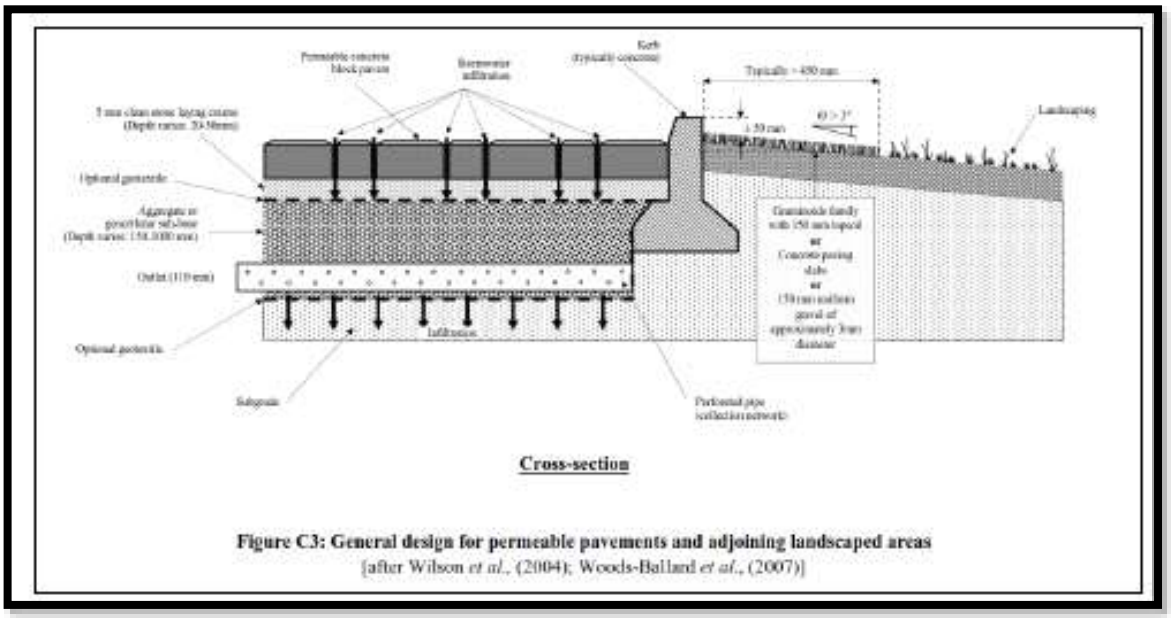


Figure C3: General design for permeable pavements and adjoining landscaped areas
[after Wilson *et al.*, (2004); Woods-Ballard *et al.*, (2007)]

Typical Permeable paving design.

4. DESCRIPTION OF THE PROPERTY

The property is located on a Portion of the remaining extent of Erf 2048, Steinkopf, Nama Khoi Local Municipality, Northern Cape Province. The site is located towards the southern boundary of the existing residential area of Steinkopf and towards the West of the N7 national route towards Namibia. See Figure 4 for a copy of the Locality Map.

The site is located withn a Critical Biodiversity area (CBA 1). See Figure 5 for a sensitivity map.

The site is trampled and overgrazed (See Photograph 1) with numerous tracks (See Photograph 2), clearings (See Photograph 3) and diggings (See Photograph 4). Various dirt roads cross the active channel (streambed) (See Photograph 5) and riparian zone that is present on site. Informal homesteads and paddocks have been erected. See Photograph 6. As mentioned above, the Northern boundary of the site is located adjacent to residential area of Steinkopf. See Photograph 7. Extensive informal dumping occurs at many parts (See Photograph 8). Various alien invasive weeds are widespread at the site. (Photograph 9).

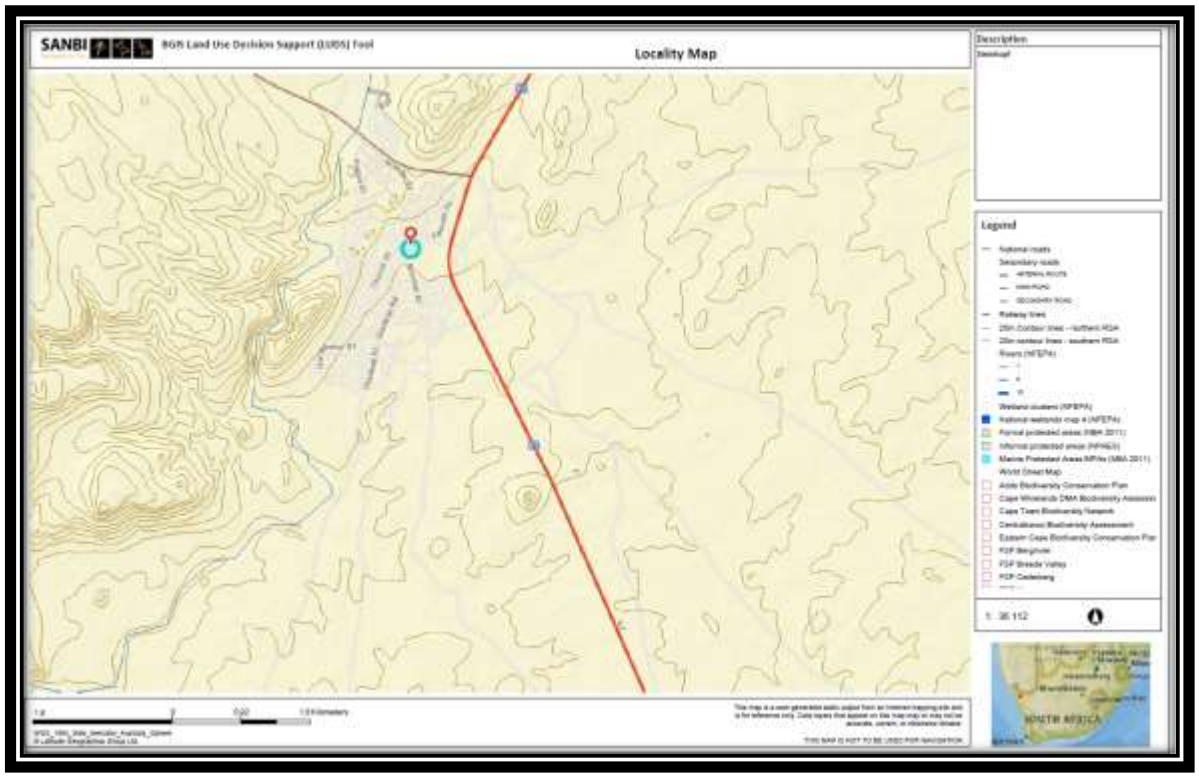


Figure 3: Locality Map.

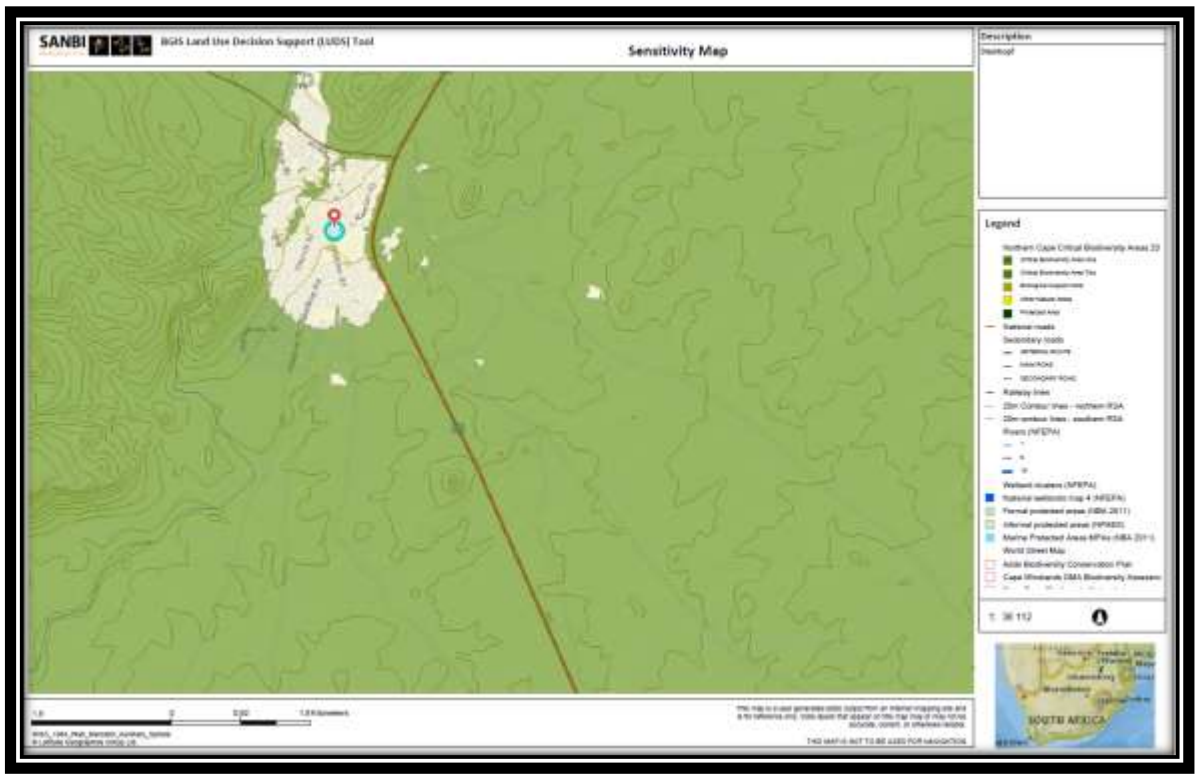


Figure 4: Sensitivity Map.

Photograph 1: The site is trampled and overgrazed.

Photograph 2: Numerous tracks and informal roads are found on site.

Photograph 3: Clearings on site.

Photograph 4: Diggings on site.

Photograph 5: Roads within the streambeds.

Photograph 6: Informal homesteads.

Photograph 7: Residential area located adjacent to the site.

Photograph 8: Informal Dumping takes place.

Photograph 9: Allien invasive species. *Datura stramonium*, at the site.
Photo: R.F. Terblanche.

WATER COURSES

Wetlands such as those that could be classified as Floodplain Wetlands, Channelled Valley-bottom Wetlands, Unchannelled Valley-bottom Wetlands, Depressions (Pans), Seeps or Wetland Flats appear to be absent at site.

Site is situated in the Lower Orange Water Management Area (WMA 14). Site falls outside any FEPA (Freshwater Ecosystem Priority Area) (Nel *et al.*, 2011a, 2011b). The site is part of an Upstream

Management Area which are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas.

At present the functioning of the active channel (streambed) and riparian zone at the site is extensively compromised by informal dumping, likely severe overgrazing, roads and tracks crossing the streambed and visibly high concentrations of alien invasive plant species - all these factors to the extreme. The riparian area has also been modified in the past by diggings.

These features have been incorporated into the Layout Plan and only services will cross the water course

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). 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	National & Provincial	27 November 1998

	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.	National Government	1994

	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).		
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 of basic assessment reports and environmental management programmes and the public participation process that should be followed.	National & Provincial	7 April 2017
National Water Act (36 OF 1998)	National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological 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.	Department of water and sanitation	1998

	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 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.	National & Provincial	2004

	(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; (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 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	National & Provincial	2003

	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 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.	Relevant Provincial Authorities.	2002
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	Legislation consulted to determine whether a waste licence will have to be obtained for the development.	National & Provincial	2008

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	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 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 will be 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 totally 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 new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions. The following factors will be taken into consideration in order to achieve this vision:

- Progressive Informal Settlement Eradication: These settlements must be integrated into the broader urban setup so as to overcome spatial, social and economic exclusion. The plan encourages the eradication of informal settlements through in-situ upgrading in desired locations coupled with the relocation of households where development is not possible or desirable.
- Promoting Densification and Integration: The aim is to integrate previously excluded groups into the city so as to enable them to enjoy the benefits it offers and to create more integrated, functional and environmentally sustainable human settlements, towns and cities.
- Enhancing Spatial Planning: Greater co-ordination and alignment of various planning instruments and economic policies lies at the heart of sustainable human settlements.This requires more than mere co-ordination between departments but there needs to be a single overarching planning authority and/or instrument to provide macro-level guidance to support the development of sustainable human settlements.
- Enhancing the location of New Housing Projects: The location of past housing projects was said to reinforce apartheid spatial settlement patterns. Spatial restructuring aims to achieve a more decisive intervention in land markets. The following interventions are envisaged viz. accessing well located state-owned and parastatal land: acquisition of well-located private land for housing development, funding for land acquisition and fiscal incentives.
- Supporting Urban Renewal and Inner-City Regeneration: Urban renewal and inner-city regeneration often result in the current inhabitants being excluded as a result of the construction of dwelling units they cannot afford. Some municipalities are trying to avoid this by promoting affordable inner-city housing. The "Human Settlements Plan" will support this by encouraging social housing.

- Developing Social and Economic Infrastructure: The need to move away from a housing-only approach towards a more holistic development of human settlements which includes the provision of social and economic infrastructure is emphasized.
- Enhancing the Housing Product: The aim is to develop more appropriate settlement layouts and housing products and to ensure appropriate housing quality.

The development of the proposed integrated human settlement represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

Skills development

The members of the Project Steering Committee will during the entire life-cycle of the project be involved with all processes and it anticipated that the capacity of the officials of the Nama Khoi Local Municipality as well as the relevant community structures will be broadened through the transfer of knowledge and skills specifically relating to the integrated human settlement planning process as well as the statutory processes associated with the township establishment process.

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 appointed Town and Regional planner have produced the proposed layout plan.

The proposed Township will consist of the following (See Figure 1 for a copy of the Layout Plan):

Residential	1500 Stands
Business	6 Stands
Churches	6 Stands
Crèche	3 Stands
School	1 Stand
Sports Field	1 Stand
Municipal	1 Stand
Parks	11 Stands

Area of township **123,0452 ha**

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

According to the Geo-Technical Report, the site is underlain by gneiss, granodiorite or adamellite of the Stalhoek Complex, Vioolsdrift Suite, but is locally covered by recent aeolian sand and calcrete gravel. Locally, the site is covered by alluvial gravel and calcrete. No dolomite occurs therefore no stability investigation and evaluation is required.

Some severe problems are foreseen regarding the excavatability to 1,0m depth on site, and shallow rock, core stones and rock outcrop or hard pan calcrete or gneiss were identified across the site.

Zoning of the site revealed zones with minor constraints regarding the **compressibility, collapse potential** and the **expansive potential** of the soil.

The following zones were identified on the site:

Normal Development with risk:
Site Class CR/1A3F: This zone represents the majority of the area and comprises of a relative thin top layer sandy material less than 0,75m in thickness of slightly collapsible and compressible or low expansive soil underlain by a competent pebble marker, calcrete or gneiss, with estimated total movement of less than 7,5mm measured at surface with the risk of shallow rock, core stones and hard pan calcrete or gneiss rock outcrop adding a R or PR site class designation to the zone with problems relating to restricted excavation to less than 1,0m. Development on solid rock calcrete, calcrete rock outcrop known as hard pan calcrete or gneiss and will have an inflated cost where special pneumatic tools and blasting will be required for the installation of services. Normal foundation techniques will be adequate to enable proper development, with proper compaction within standard strip foundations and drainage provision that will be required. It is classified as CR in terms of the SAIEG & NHBRC guidelines (1995) or the SAICE Code of practice (1995), and 1A3F according to the classification for urban development (Partridge, Wood & Brink)(1993).

Suitable for development with precaution
Site Class PR: Areas with a PR site class designation whith problems relating to restricted excavation to less than 0,5m, consisting of solid rock calcrete, calcrete rock outcrop known as hard pan calcrete or gneiss will have an inflated cost where special pneumatic tools and blasting will be required for the installation of services.

Site Class PQ: Areas where small quarries or filling or dumping of spoil (Pq1) were identified must be rehabilitated before any construction can be allowed, and backfilling with an engineer's material may improve the developability of these zones, but these operations will dramatically increase the development cost in this zone.

Undevelopable: Site Class PD: Perennial drainage features with local steeper slopes within the upper channels and towards the river. The development is usually restricted to 32m from the centre of the river, and outside the 1:100 year floodline

No dolomite occurs on site and a stability investigation and evaluation is not required.

Normal and special construction techniques will be required to enable proper development. This includes the use of **compaction techniques** and **site drainage** as described

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

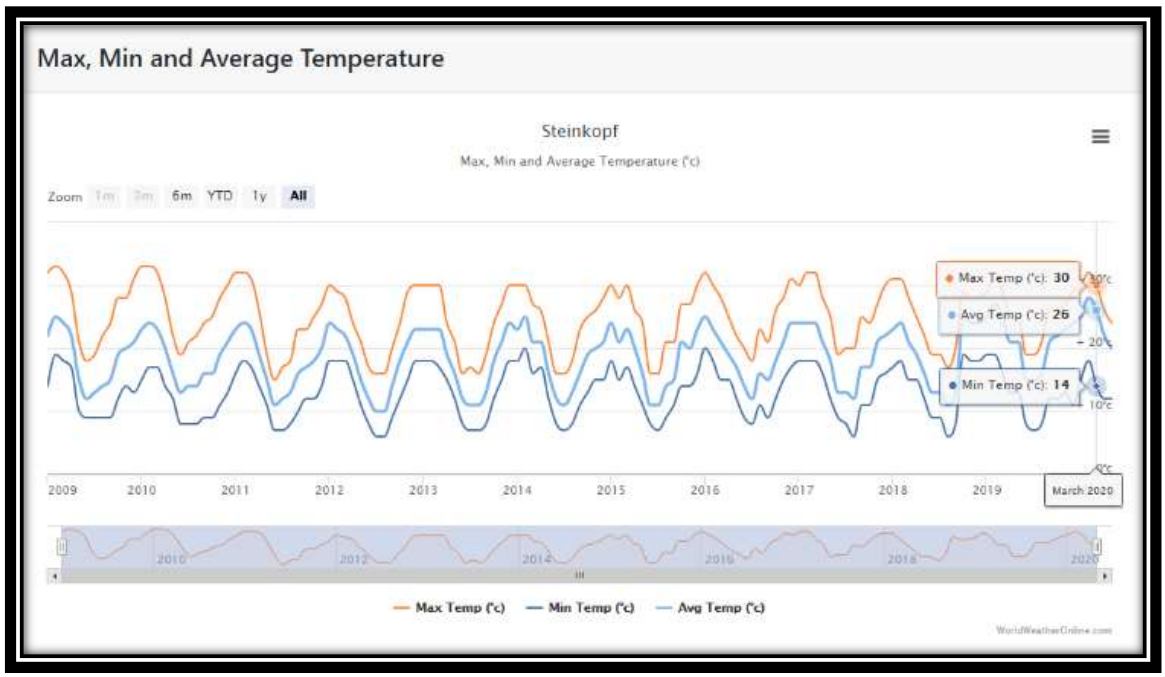
The site is situated on a slightly undulating plain that slopes from 794 to 819 masl towards the centre portion of the site, and then westwards into the Doring River which drains southwards towards the Buffels River. The overall topography of the area can be described as relatively flat and open, with some small rocky ridges, diggings and outcrops present in parts.

A detailed site survey has been carried out to establish levels. The Engineering report and the Layout plan will address issues regarding storm water. As the proposed development will be in close proximity to residential areas, safety of children and people need to be taken into consideration.

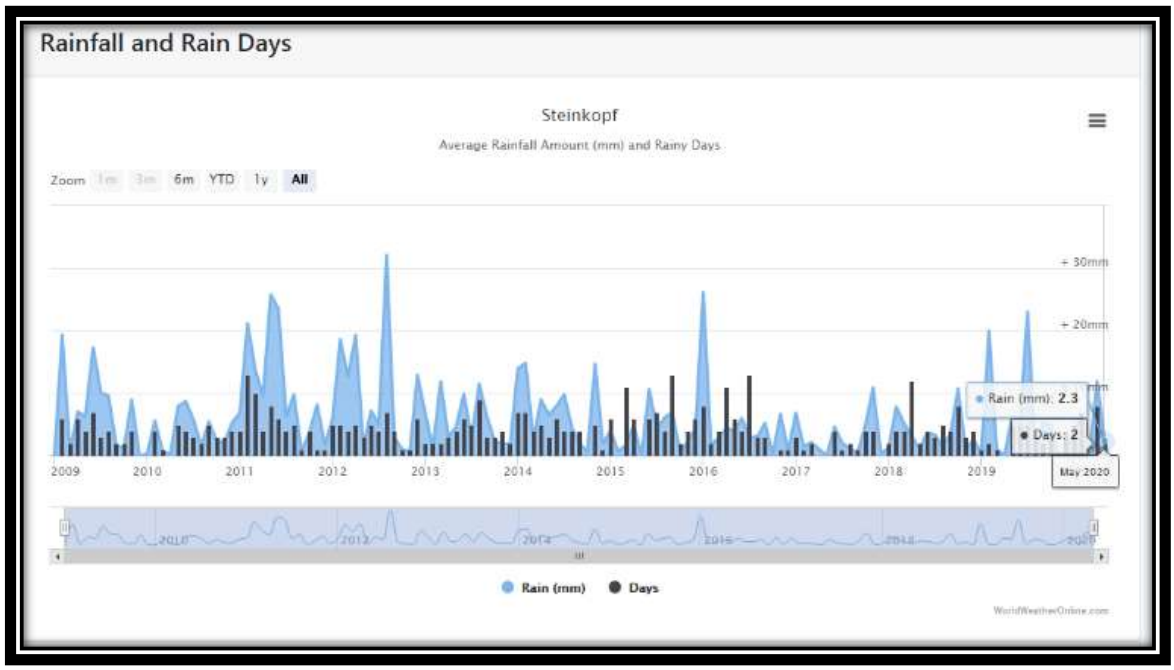
8.1.1. CLIMATE

The region is characterized by summer rainfall with thunderstorms, with annual very low rainfall figures of 205 mm for Springbok recorded at the closest weather stations to the site. (According to the Flood line Report compiled by CWT, rainfall data was derived using software to estimate the rainfall in any catchment where coordinates of a reference point in the catchment is used , the Mean annual precipitation at the reference point is **139 mm)**

Winters are dry with frost common. The warmest months are normally December and January with February the warmest month, and the coldest months are June and July. The Table below provides climatic data for the past 10 years.



Source: https://www.worldweatheronline.com/steinkopf-weather-averages/northern-cape/za.aspx



Source: https://www.worldweatheronline.com/steinkopf-weather-averages/northern-cape/za.aspx

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

Climate Change

According to: WIREs Climate Change 2014, 5605-620. Doi:10.1002/wcc.295: "Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65∘C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa's water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa's high levels of poverty and inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment's water resources if the climate were to become drier. The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support".

Water availability and demand has been calculated by the consulting Civil Engineers, to enable a sustainable waterborne sewage system as well as potable water supply for both the existing and future developments in the area.

8.1.3. SURFACE DRAINAGE, WETLANDS AND RIPARIAN ZONES

A non-perennial river with associated smaller drainage lines runs through the northwestern and western part of the site. This non-perennial river that crosses the northern and western parts of the site is a tributary of the Doring River which is located further west from Steinkopf. During times of exceptional rainfall the active channel of the non-perennial river at the site is likely to be overflown which would then result in a much broader floodplain at some areas. The riparian zone of this non-perennial river is and has therefore indicated to be fairly broad at some areas of the site.

Wetlands such as those that could be classified as Floodplain Wetlands, Channelled Valley-bottom Wetlands, Unchannelled Valley-bottom Wetlands, Depressions (Pans), Seeps or Wetland Flats appear to be absent at site.

The site is situated in the Lower Orange Water Management Area (WMA 14). Site falls outside any FEPA (Freshwater Ecosystem Priority Area) (Nel *et al.*, 2011a, 2011b). The site is part of an Upstream Management Area which are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas.

At present the functioning of the active channel (streambed) and riparian zone at the site is extensively compromised by informal dumping, likely severe overgrazing, roads and tracks crossing the streambed and

visibly high concentrations of alien invasive plant species - all these factors to the extreme. The riparian area has also been modified in the past by diggings.

Present ecological status (PES) of the Non-perennial River at the site is CATEGORY E which means the watercourse is seriously modified. The losses of natural habitats and basic ecosystem functions are extensive. The present ecological status is outside the general acceptable range. Ecological Importance and Sensitivity (EIS) at the site is CATEGORY C which is moderate and refers to floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.

While the present ecological status is poor, the active channel with its associated riparian zone is still regarded as sensitive owing to its importance as part of a corridor of particular conservation concern in the larger area. There is an opportunity for the development to eleviate current pressures on the riparian system if accompanied by well-selected and restricted bridge structures, continuous eradication of alien invasive plant species, measures to curb the extensive informal dumping in the area, cultivation of indigenous plant species and proper rehabilitation of impacts that cross the riparian zone.

The non-perennial river, with its riparian zone and buffer zone, at the site is a corridor of particular conservation importance. This non-perennial river, with its riparian zone and buffer zone, is likely to be impacted by the proposed developments, but to a restricted and limited extent. If the development is approved the construction should be planned in such a manner that surface flow function well while erosion is limited. There is no distinct indication that interflow plays an important role in the maintenance of the non-perennial river. The geomorphological setting and flow regime should be as similar as possible post development, if the development is approved (in this case there would be some positive impact on flow regime). Loss of any wetland animal or plant species of particular conservation importance is not expected.

Loss of Threatened or Near-Threatened Plants, Mammals, Reptiles, Amphibians and Invertebrates at the proposed footprint appears to be unlikely. The proposed footprint is unlikely to harbour any sensitive species, so that impact risk to any sensitive species is very low.

Rubble or waste could lead to infiltration of unwanted pollutants into the soil. Spilling of petroleum fuels and unwanted chemicals onto the soils that infiltrate these soils could lead to pollution of soils and also impact on water quality when the stream flows. Rubble or waste that could accompany the construction effort, if the development is approved, should be removed during and after construction. Measures should be taken to avoid any spills and infiltration of petroleum fuels or any chemical pollutants into the soil during construction phase.

A rehabilitation plan which include the combatting of alien invasive plant species at the watercourse is essential. Infestation by alien invasive species could replace indigenous vegetation or potential areas where indigenous vegetation could recover. Once established combatting these alien invasive plant species may become very expensive to combat in the long term, especially if species such as *Prosopis* (Mesquite) is allowed to establish. Continued monitoring and eradication of alien invasive plant species are imperative.
The Negative Risk Rating in accordance with a risk matrix based on Section 21 c and (i) water use Risk Assessment Protocol and Notice 509 of 2016 (Government Gazette No. 40229: 105-133; Republic of South Africa) at the site is Low

Figure 5: Indications of active channels, riparian zones and buffer zones at the site.

Red outline	Boundaries of the site
Orange-brown outline	Buffer Zone
Light green outline and shading	Riparian Zone
Light blue outline and shading	Active channel (streambed)

All the streams draining stormwater to **Steinkopf** are shown below in Figure 6.

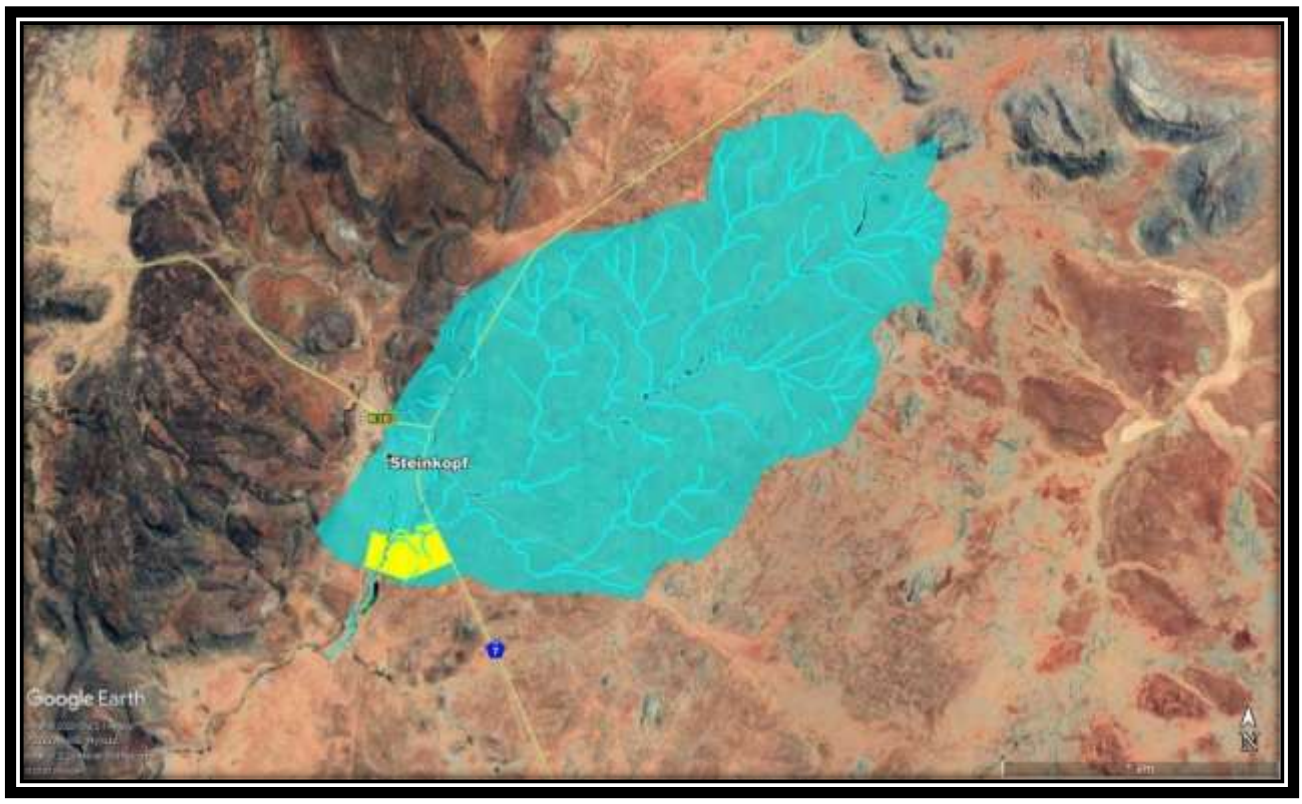


Figure 6: All the streams draining stormwater to Steinkopf

Six of these streams were identified where flood lines will develop that may have an effect on developments on the site. The main stream in this study area is **Stream 1** with a catchment of **57,4 km2** at the study area. **Streams 2 and 3** are Tributaries to **Stream 1.**

Streams 4, 5, and 6 are small streams and the flood peaks for these streams were calculated using the relation of the square roots of the bigger catchment areas and the calculated flood peaks of the relative bigger stream

Figure 7 illustrates the calculated 1:100 year flood lines.

Figure 7: 1:100 year flood lines

8.1.4. GROUND WATER

The permanent or perched water table on site is deeper than 1,5m below ground surface.

Possible infiltration into the groundwater have been taken into account. During the construction phase, no spills of lubricants or construction worker sewage should be allowed to pollute the ground water. Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures, especially within these relative flat areas.

8.1.5. FLORA

The study area is at the proposed footprint south of Steinkopf, Northern Cape Province, South Africa (elsewhere referred to as the site). Site is part of the Succulent Karoo Biome is represented by the Namaqualand Blomveld vegetation type (Mucina & Rutherford 2006).

To serve as local context for the landscape and vegetation at the site an outline of the Namaqualand Blomveld from Mucina and Rutherford (2006) follows.

SKn 3 Namaqualand Blomveld

Distribution: Northern Cape Province and to a small extent also Western Cape Province: Valleys and flat areas (piedmonts, vlaktes) between granitic rocky hills of the Namaqualand Escarpment, from Steinkopf southwards to Bitterfontein. Most of the area at altitudes 460 – 1080 m.

Vegetation and landscape features: Level to slightly undulating sedimentary surfaces between rocky granitic hills and mountains, such as wide plains and broad valleys with dry channels of intermittent water courses. Sparse dwarf shrubs with succulent or ericoid leaves dominate these shrublands. Geophytes and ephemeral herbs and in places also low, spreading, leaf-succulents show spectacular flower displays (hence the name of the unit) in wet years.

Geology and soils: Underlain by granite-gneisses and metasediments of Mokolian age, affected by the Namaqualand Metamorphic Event. Supporting relatively deep, yellow-brown, fine to coarse loamy sand derived through weathering of the granite rocks. Ag and Ae land types make up almost 80% of the area, followed by Fc land type accounting for a further 15%.

Climate: Seasonal winter rainfall (May to September) with sporadic drought periods (well below 100 mm per year) of one or two years in succession. Dew is present throughout the winter. MAP (Mean Annual Precipitation) is 145 mm. An average of 13 days of frost per year, but varying greatly from year to year.

Important taxa: Succulent shrubs: *Drosanthemum hispidum*, *Euphorbia mauritanica*, *Galenia sarcophylla*, *Hypertelis salsoloides*, *Leipoldtia schultzei*, *Ruschia robusta*, *Aridaria noctiflora* subsp. *noctiflora*, *Euphorbia decussata*, *Lycium cinereum*, *Ruschia brevibracteata*, *Tetragonia fruticosa*, *Tetragonia robusta* var. *psiloptera*, *Tylecodon wallichii* subsp. *wallichii.* Low Shrubs: *Eriocephalus microphyllus* var. *pubescens*, *Galenia africana*, *Aptosimum indivisum*, *Aptosimum spinescens*, *Asparagus capensis* var. *capensis, Berkheya fruticosa*, *Hermannia disermifolia*, *Hermannia trifurca*, *Peliostomum virgatum*, *Pentzia incana*, *Pteronia divaricata*, *Tripteris sinuata*, *Zygophyllum retrofractum*. Semiparasitic shrub: *Thesium lineatum*. Woody climbers: *Astephanus triflorus*, *Microloma sagittatum*. Herbaceous climber: *Cysticapnos grandiflora*. Herbs: *Aizoon canariense*, *Arctotheca calendula*, *Arctotis fastuosa*, *Dimorphotheca sinuata*, *Felicia merxmeulleri*, *Foveolina dichotoma*, *Gazania lichtensteinii*, *Gorteria diffusa* subsp*. diffusa*, *Grielum humifusum*, *Heliophila coronopifolia*, *Heliophila variabilis*, *Leysera gnaphalodes*, *Leysera tenella*, *Oncosiphon grandiflorum*, *Oncosiphon suffruticosum*, *Plantago cafra*, *Senecio arenarius*, *Senecio cardaminifolius*, *Ursinia cakilefolia*, *Ursinia nana*, *Adenogramma glomerata*, *Felicia bergiana*, *Felicia namaquana*, *Felicia tenella* subsp. *cotuloides*, *Gazania leiopoda*, *Heliophila seselifolia* subsp. *nigellifolia*, *Hermannia althaeifolia*, *Jamesbrittenia racemosa*, *Lessertia diffusa*, *Lotononis falcata*, *Nemesia affinis*, *Pelargonium redactum*, *Trichogyne paronychioides*, *Zaluzianskya benthamania*. Geophytic herbs: *Massonia depressa*, *Oxalis obtusa*, *Eriospermum paradoxum*, *Hesperantha pauciflora*, *Lachenalia violacea*, *Moraea serpentina*, *Ornithogalum hispidum*, *Oxalis inconspicua*, *Pelargonium triste*, *Tulbaghia dregeana*. Succulent herbs: *Crassula thunbergiana*, *Conicosia elongata*, *Crassula muscosa*, *Tetragonia microptera*. Graminoids: *Karroochloa schismoides*, *Caetobromus involucratus* subsp. *dregeanus*, *Ehrharta barbinodis*, *Ehrharta calycina*, *Ehrharta longiflora*, *Schismus barbatus*.

Note: Though some plant species of the above listed vegetation type are present at the site, not necessarily all of the plant species listed above are present at the site.

Vegetation at the site can be devided in terrestrial vegetation and along a non-perennial river and its associated smaller drainage lines, riparian vegetation. The site overall appears to be conspicuously extensively degraded.

The site appears trampled and overgrazed in many areas. Numerous tracks, clearings and diggings are found at the site. Various dirt roads cross the active channel (streambed) and riparian zone. Informal homesteads and paddocks are present at the site. Northern boundaries of the site are adjacent to residential areas. Extensive informal dumping occurs at many parts. Various alien invasive weeds are widespread at the site.

Terrestrial vegetation at the site comprises mainly small shrubs and sparse cover of vegetation overall. Extensive ecological disturbances at the site are reflected in what appears to be a poor vegetation cover of mostly dwarf shrubs at the terrestrial zone at the site. *Ruschia, Drosanthemum, Leipoldtia* species and other succulent shrubs are conspicuous at the terrestrial zone. The shrub *Galenia africana* is conspicuous at hitherto cleared areas. Restricted patches where the succulents such as *Cheiridopsis denticulata* are found in small clumps interrupt the homogenous sparse shrubland. Taller shrubs and trees are mostly absent at the terrestrial zone and are confined to the riparian zone at the site.

Most conspicuous trees at the riparian zone are the alien invasive *Prosopis velutina/ glandulosa* (Mesquite) and *Schinus molle* (Pepper Tree). Only a single *Vachellia karroo* (Sweet Thorn) individual remains at the site. A prominent shrub species at the riparian zone is the alien invasive *Atriplex nummularia* (Old Man Salt Bush). The indigenous shrub *Galenia africana* (Kraalbos), often associated with disturbed areas, is also visible at the obviously disturbed riparian zone at the site. The indigenous hebaceous shrub *Gomphocarpus fruticosus* is also found at the riparian zone often in the non-perennial active channel. Other alien invasive plant species at the riparian zone which are not mentioned above such as *Ricinus communis*, *Caesalpinia gilliesii*, *Datura stramonium*, *Agave americana*, *Salsola kali*, *Argemone ochroleuca*, *Nicotiana glauca* and *Limonium sinuatum* are also present.

Herbaceous plant species at the site overall include *Aptosimum spinescens*, *Melolobium candicans,* and *Radyera urens*. Succulent species include *Tetraena retrofracta*, *Ruschia robusta*, *Cheiridopsis denticulata*, *Pelargonium carnosum* and *Mesembryanthemum guerichianum.*

The vegetation type representing the Succulent Karoo Biome at the site is Namaqualand Blomveld (SKn 3). The Namaqualand Blomveld is not listed as threatened according to the National List of Threatened Ecosystems (2011).

Some plant species that are not threatened but which is listed as protected according to Northern Cape Nature Conservation Act No. 9 of 2009 are present or are likely to be present at the site. All *Pelargonium* species are listed which then includes *Pelargonium carnosum* which is present at the site. Members of the protected plant families Aizoaceae, Amaryllidaceae, Crassulaceae and Iridacea are also found at the site. A permit for the removal of indigenous vegetation at the site is therefore required.

Ecological sensitivity at the terrestrial zone of the site is medium to low. Ecological sensitivity at the non-perennial active channel (river) and associated smaller drainage lines and its riparian zone, though extremely degraded, are high because these remain a corridor of particular conservation concern in the larger area. Rehabilitation and removal of alien invasive vegetation would be essential to restore some of the functions of this non-perennial river.

8.1.6. FAUNA

ASSESSMENT OF VERTEBRATE SPECIES OF PARTICULARLY HIGH CONSERVATION PRIORITY

Mammals of particular high conservation priority

Threatened mammal species of the Northern Cape Province. Literature sources: Friedman & Daly, (2004), Skinner & Chimimba (2005), Wilson & Reeder (2005). With mammal species which normally needs a large range their residential status does not implicate that they are exclusively dependent on the site or use the site as important shelter or for reproduction. No = Not recorded at site/ Unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Site is part of range	Recorded at site during survey	Likely to be found based on habitat assessment
Bunolagus monticularis Riverine Rabit	Critically Endangered	No	No	No
Chrysospalax villosus Rough-haired golden mole	Vulnerable	No	No	No
Chrysochloris visagiei Visagie's Golden Mole	Critically Endangered	No	No	No
Cryptochloris wintoni De Winton's Golden Mole	Vulnerable	No	No	No
Chryptochloris zyli Van Zyl's Golden Mole	Critically Endangered	No	No	No
Cloeotis percivali Short-eared Trident Bat	Vulnerable/ Near-threatened	No	No	No
Cistugo lesueuri Lesueur's Hairy Bat	Vulnerable	No	No	No
Diceros bicornis Black rhinoceros	Critically Endangered	No	No	No
Eremitalpa granti Grant's Golden Mole	Vulnerable	No	No	No
Felis nigripes Black-footed Cat	Vulnerable	No	No	No
Lycaon pictus African wild dog	Endangered	No	No	No
Loxodonta africana	Vulnerable	No	No	No

African elephant				
Mystromys albicaudatus White-tailed mouse	Endangered	Yes	No	No
Neamblysomus julianae Juliana's Golden Mole	Critically Endangered	No	No	No
Panthera leo Lion	Vulnerable	No	No	No
Rhinolophus blasii Blasi's Horseshoe Bat	Vulnerable	No	No	No
Smutsia temminckii Ground Pangolin	Near threatened	No	No	No

Near threatened mammal species known to occur in the North West Province and Northern Cape Province. Literature sources: Skinner & Chimimba (2005). No = Not recorded at site/ unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Site is part of range	Recorded at site during survey	Likely to be found based on habitat assessment
Ceratotherium simum White Rhinoceros	Near threatened	No	No	No
Cistugo seabrai Angolan Hairy Bat	Near Threatened	No	No	No
Rhinolophus capensis Cape Horseshoe Bat	Near Threatened	No	No	No

Data deficient (or uncertain) mammal species of the North West Province and Northern Cape Province. Literature sources: Skinner & Chimimba (2005). No = Not recorded at site/ unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Recorded at site during survey	Likely be a resident at the site
Myosorex varius Forest shrew	Uncertain	No	No
Rhinolophus denti Dent's Horseshoe Bat	Data Deficient	No	No

Birds of particular high conservation priority

Threatened bird species of the North West Province and Northern Cape Province. Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No = Not recorded at site/ Unlikely to use site as breeding area or particular habitat on which the species depends. Yes = Recorded at site/ Likely to use site as breeding area or particular habitat on which the species depends.

Species	Common name	Threatened Status	Recorded at site during survey	Likely to use site as breeding area or habitat
Aegypius tracheliotos	**Lappet-faced Vulture**	Vulnerable	No	No
Anthropoides paradiseus	**Blue Crane**	Vulnerable	No	No
Aquila rapax	**Tawny Eagle**	Vulnerable	No	No
Ardeotis kori	**Kori Bustard**	Vulnerable	No	No
Balearica regulorum	**Grey Crowned Crane (Mahem)**	Vulnerable	No	No
Botaurus stellaris	**Eurasian Bittern**	Critically Endangered	No	No
Calendulauda burra	**Red Lark**	Vulnerable	No	No
Circus ranivorus	**African Marsh- Harrier**	Vulnerable	No	No
Crex crex	**Corn Crake**	Vulnerable	No	No
Eupodotis senegalensis	**White-bellied Korhaan**	Vulnerable	No	No
Falco naumanni	**Lesser Kestrel**	Vulnerable	No	No
Geronticus calvus	**Southern Bald Ibis**	Vulnerable	No	No
Gorsachius leuconotus	**White-backed Night-heron**	Vulnerable	No	No
Gypaetus barbatus	**Bearded Vulture**	Endangered	No	No
Gyps africanus	**White-backed Vulture**	Vulnerable	No	No
Gyps coprotheres	**Cape Vulture**	Vulnerable	No	No
Neophron percnopterus	**Egyptian Vulture**	Regionally almost extinct	No	No
Neotis ludwigii	**Ludwig's Bustard**	Vulnerable	No	No
Pelecanus rufescens	**Pink-backed Pelican**	Vulnerable	No	No
Polemaetus bellicosus	**Martial Eagle**	Vulnerable	No	No
Rhynchops flavirostris	**African Skimmer**	Endangered	No	No
Sagittarius serpentarius	**Secretarybird**	Vulnerable	No	No
Sarothrura ayresi	**White-winged Flufftail**	Critically Endangered	No	No
Therathopius ecaudatus	**Bateleur**	Vulnerable (in South Africa)	No	No

Tyto capensis	**African Grass-Owl**	Vulnerable	No	No

* Though some of the above bird species that roams over large areas may ocassionally be found at the site, the site does not appear to be a habitat of particular importance to these birds, and these birds also do not use the site as breeding area.

Near threatened bird species of the North West Province and Northern Cape Province. Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No = Not recorded at site/ Unlikely to be particularly dependent on the site as breeding area or habitat. Yes = Recorded at site/ Likely to be particularly dependant on the site as breeding area or habitat.

Species	Common name	Threatened Status	Recorded at site during survey	Likely to use site breeding area or habitat
Buphagus erythrorynchus	**Red-Billed Oxpecker**	Near threatened	No	No
Certhilauda chuana	**Short-clawed Lark**	Near threatened	No	No
Calendulauda barlowi	**Barlow's Lark**	Near Threatened	No	No
Charadrius pallidus	**Chestnut-banded Plover**	Near threatened	No	No
Ciconia nigra	**Black Stork**	Near threatened	No	No
Circus macrourus	**Pallid Harrier**	Near threatened	No	No
Circus maurus	**Black Harrier**	Near threatened	No	No
Eupodotis caerulescens	**Blue Korhaan**	Near threatened	No	No
Falco biarmicus	**Lanner Falcon**	Near threatened	No	No
Falco peregrinus	**Peregrine Falcon**	Near threatened	No	No
Glareola nordmanni	**Black-winged Pratincole**	Near threatened	No	No
Leptoptilos crumeniferus	**Marabou Stork**	Near threatened	No	No
Mirafra cheniana	**Melodious lark**	Near threatened	No	No
Mycteria ibis	**Yellow-billed Stork**	Near threatened	No	No
Pelecanus onocrotalus	**Great White Pelican**	Near threatened	No	No
Phoenicopterus minor	**Lesser Flamingo**	Near threatened	No	No
Phoenicopterus ruber	**Greater Flamingo**	Near threatened	No	No
Rostratula benghalensis	**Greater Painted-snipe**	Near threatened	No	No
Spizocorys sclateri	**Sclater's Lark**	Near Threatened	No	No

Sternia caspia	**Caspian Tern**	Near threatened	No	No

** Though some of the above bird species that roams over large areas may ocassionally be found at the site, the site does not appear to be a habitat of particular importance to these birds, and these birds also do not use the site as breeding area.

Reptiles of particular high conservation priority

Threatened reptile species in North West Province and Northern Cape Province. Main Source: (Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers, 2014). No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
Crocodylus niloticus Nile Crocodile	Vulnerable	No	No	No
Homopus signatus Speckled Dwarf Tortoise	Vulnerable	No	No	No
Pachydactylus goodi Good's Gecko	Vulnerable	No	No	No
Pachydactylus rangei Namib Web-footed Gecko	Critically Endangered (Regionally)	No	No	No

Near threatened reptile species in North West Province and Northern Cape Province. Main Source: Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers (2014). Though *Homoroselaps dorsalis* has not yet been recorded from the North West Province, its presence in some areas or the Province is anticipated. No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
Cordylus imkeae Rooiberg Girdled Lizard	Near Threatened	No	No	No
Cordylus macropholis Large-scaled Girdled Lizard	Near Threatened	No	No	No
Goggia gemmula Richtersveld Pygmy Gecko	Near Threatened	No	No	No
Homopus boulengeri Karoo Dwarf Tortoise	Near Threatened	No	No	No
Homoroselaps dorsalis Striped Harlequin Snake	Near threatened	No	No	No
Typhlosaurus lomiae Lomi's Blind Legless Skink	Near Threatened	No	No	No

Amphibian species of particular high conservation priority

Threatened amphibian species in Northern Cape Province. Sources: Du Preez & Carruthers (2009), Carruthers & Du Preez (2011). No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Red Listed Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
Breviceps macrops Desert Rain Frog	Vulnerable	No	No	No

Near threatened (currently least concern) amphibian species in North West Province and Northern Cape Province. No = Amphibian species is not a resident on the site; Yes = Amphibian species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
Pyxicephalus adspersus Giant Bullfrog	Near threatened (Currently Least Concern)	No	No	No

ASSESSMENT OF INVERTEBRATE SPECIES OF PARTICULAR HIGH CONSERVATION PRIORITY

Butterflies of particular conservation priority

Threatened butterfly species in North West Province, northern Northern Cape Province and Gauteng Province. Sources: Henning, Terblanche & Ball (2009), Mecenero *et al*. (2013). Invertebrates such as threatened butterfly species are often very habitat specific and residential status imply a unique ecosystem that is at stake.

Species	Threatened Status	Recorded at site during survey	Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely
Aloeides dentatis dentatis Roodepoort Russet	**Endangered**	No	Highly unlikely
Anthene lindae Kalahari Hairtail	**Vulnerable**	No	Unlikely
Chrysoritis aureus Golden Opal	**Endangered**	No	Highly unlikely
Chrysoritis trimeni Diamond Opal	**Vulnerable**	No	Highly unlikely
Lepidochrysops praeterita Highveld Blue	**Endangered**	No	Highly unlikely

Orachrysops mijburghi Mijburgh's Blue	**Endangered**	No	Highly unlikely

Butterfly species of the Gauteng Province, North West Province and Northern Cape Province that are not threatened and not near threatened but of which are of particular conservation concern and listed as **Critically Rare/ Rare/ Data Deficient** category (Mecenero *et al.*, 2013). No = Butterfly species is unlikely to be a resident at the study area; Yes = Butterfly species is a resident at the study area.

Species	Threatened Status	Recorded at site during survey	Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely
Chrysoritis beaufortia charlesi Roggeveld Opal	Rare (Restricted Range)	No	Highly unlikely
Chrysoritis beaufortia stepheni Hantam Mountain Opal	Rare (Habitat Specialist)	No	Highly unlikely
Chrysoritis turneri wykehami Hantam Opal	Rare (Habitat Specialist)	No	Highly unlikely
Chrysoritis violescens Violescent Opal	Rare (Habitat Specialist)	No	Highly unlikely
Colotis celimene amina Lilac Tip	Rare (Low density)	No	Highly unlikely
Lepidochrysops jamesi claassensi Hantamsberg Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
Lepidochrysops jamesi jamesi Karoobush Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
Lepidochrysops mcgregori Copper-brown Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
Lepidochrysops penningtoni Arid Nimble Blue	Data Deficient	No	Highly unlikely
Lepidochrysops procera Savanna Blue	Rare (Habitat specialist)	No	Highly unlikely
Metisella meninx Marsh Sylph	Rare (Habitat specialist)	No	Highly unlikely
Platylesches dolomitica Hilltop Hopper	Rare (low density)	No	Highly unlikely
Pseudonympha southeyi kamiesbergensis Kamiesberg Pepperbrown	Rare (Habitat Specialist)	No	Highly unlikely
Thestor calviniae Calvinia Skolly	Rare (Restricted Range)	No	Highly unlikely
Tuxentius melaena griqua Griqua Black Pie	Data Deficient	No	Highly unlikely

Beetles of particular conservation priority

Fruit chafer species (Coleoptera: Scarabaeidae: Cetoninae) in the Gauteng Province and North-West Province which are of known high conservation priority.

Species	Threatened Status	Recorded at site during survey	Likely to be resident based on habitat assessment
Ichnestoma stobbiai	Uncertain	No	No
Trichocephala brincki	Uncertain	No	No

Scorpion species of particular conservation priority

Rock scorpion species (Scorpiones: Ischnuridae) species that are of known high conservation priority in the Gauteng Province and North-West Province.

Species	Threatened Status	Recorded at site during survey	Likely to be resident at site based on habitat assessment
Hadogenes gracilis	Uncertain	No	No
Hadogenes gunningi	Uncertain	No	No

8.2 SOCIO ECONOMIC FACTORS

8.2.1 SOCIAL AMENITIES

As in the rest of South Africa, there is a housing shortage in the area. This is totally 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 diarrhea 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 development guidelines from the Guidelines for human settlement planning and design were taken into account to develop a sustainable area for people to have job opportunities and public facilities close to home. This will encourage a sustainable community and by implementing these guidelines, will help contribute to the upliftment of the community as a whole.

The proposed development also conforms to the following principals and guidelines for development:

- Correction of historically distorted spatial patters
- Discouragement of land invasion and ensuring equitable access to land
- Discouragement of urban sprawl and the promotion of more compact towns
- Promotion of a diverse combination of land use, also at a detailed level
- Optimization of the use of existing resources, including bulk infrastructure
- Sustainable land development patterns and practices
- Promotion of spatial integration

All of the above conclude that there is a need for residential development, and that the proposed township is favorable by the counsel as well as the community.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

8.2.2. AIR QUALITY

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

Three factors govern the significance of household fuel-burning emissions:

(i) the low level of emissions (that is, their height above the ground is generally about 3 m, within people's breathing zone);
(ii) the simultaneous occurrence of peak emissions (during the coldest months of winter and in the early mornings and throughout the evenings) and poor atmospheric dispersion (stable atmosphere with low wind speeds, with the possible development of temperature inversions); and
(iii) the release of such emissions within high human exposure areas, given that such emissions generally occur in dense, low-income settlements where population density is high (in addition, the pollution is not only outdoors, but frequently indoors as well, due to poor ventilation, so it affects the whole family).

The significance of vehicle emissions as contributors to air-pollutant concentrations and health risks is similarly increased by the low level (close to the ground) of the emissions, and their proximity to highly populated areas – on highways, for example, with emissions being particularly high when traffic is congested. Vehicle emissions tend to peak early in the morning and in the evenings, when the potential for atmospheric dispersion is reduced (for example, wind speeds are generally low in the early mornings and evenings, reducing their potential for dispersing pollution).

Given the high volumes of pollutants emitted from fuel-burning within the industrial and power-generation sectors, their contribution to ambient concentrations and public health risks is often lower than might be

expected. This is because these sources are generally characterized by constant releases, relatively high above ground level, and further away from residential settlements than are household fuel-burning and vehicle emissions.

Ranking the significance of different sources of pollution on the basis of the total emissions for which each source is responsible would, for example, place industrial emissions above household fuel-burning. If the aim is to reduce impacts on human health, however, then household fuel-burning would need to be targeted as a top priority (Scorgie et al., 2004d).

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

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

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

Implementing an efficient social protection system to alleviate poverty is central to maintaining conditions that facilitate not only economic growth but also environmental sustainability. Many South African households – including those with access to electricity – use coal, wood, and paraffin, due to the relative cost-effectiveness of such fuels for heating (that is, space heating) and cooking purposes.

Many low-cost housing developments and informal settlements are located close to industrial and mining operations, as such land is both available and inexpensive. Poorer communities are more likely to suffer from poor service delivery, including inadequate waste removal that sometimes results in refuse being set alight illegally. These examples show that poverty alleviation could help to improve air quality by enabling people to choose practices that are friendlier to the environment."

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

The proposed development is planned and will eventually be developed with the above mentioned in mind. The alleviation of poverty (jobs that will be created) and the provision of proper accommodation facilities (which has been designed to be as energy efficient as possible) will contribute towards lessening air pollution in the area.

In addition to the above, it should be noted that 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).

8.2.3 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.

8.2.4 ARCHAEOLOGY AND CULTURAL SITES

Background research indicates that there are a number of cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area falls.

Vegetation cover (trees, shrubs and grass) is very scarce and visibility was therefore very good. Red Aeolian (Kalahari) sands cover sections of the study area. A dry stream bed runs through the area from the north to south in the western section of the footprint, while quarrying activities in the south-western portion has also impacted on the area. Informal dumping of building rubble and household refuse occurs throughout the area, while a few small informal houses are also present. Other impacts include a water pipeline and the south of the study area a water/sewerage treatment plant.

No sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the assessment. Erosion dongas, the dry streambed and the quarry areas were scrutinized for the presence of possible Stone Age material (stone tools) and none were identified. It is possible that individual tools might be present in the area and that material could be covered by red sands, but it seems as if there is a total lack of material in the area. It is more than likely that the surrounding hills in the larger area would be more suitable locations for sites.

The remains of a recent informal dwelling were the only site identified in the study area. The site is not old and of no heritage significance. No mitigation measures are therefore required.

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 proposed Township Establishment on the Remaining Extent of Erf 2048 in Steinkopf should be allowed continue taking the above recommendations into consideration.

8.2.5 AESTHETICS

The topography of the area is relatively flat & open, with some small rocky ridges and outcrops present in parts. Vegetation cover (trees, shrubs and grass) is very scarce and visibility was therefore very good. Red Aeolian (Kalahari) sands cover sections of the study area. A dry stream bed runs through the area from the north to south in the western section of the footprint, while quarrying activities in the south-western portion has also impacted on the area. Informal dumping of building rubble and household refuse occurs throughout the area, while a few small informal houses are also present. Other impacts include a water pipeline and the south of the study area a water/sewerage treatment plant. Dirt roads criss-cross the area and was used as the access points to the area and for assessing the total area.

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

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

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

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

The proposed development will change the scenic resources of the local area from an undeveloped area to a formal residential area. The visual intrusion is considered to be low as the proposed development will have minimal change and blends in well with the surroundings.

The proposed development will require additional lighting on and in buildings and possibly along roads. This will change the night landscape from unlit to lit.

Aesthetics have very little influence as the area is already highly disturbed. The project on the other hand will have a huge impact on the Aesthetics of the area as the informal settlement will be formalized and services will be provided.

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.

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Magnitude (Intensity)	Low	Site-specific and wider natural and/or social functions and processes are negligibly altered. ((A low intensity impact will not affect the natural, cultural, or social functions of the environment).
	Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances
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

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
		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	123,0452 ha of indigenous vegetation, located within a critical biodiversity area will be eradicated in order to establish the development.	Duration	Long term	Obtain the necessary environmental authorization for the development Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area. 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	Low		Medium
	In order to gain access to the proposed development, three 3 750m^2 roads will have to be constructed within the water course.	Duration	Long term	Obtain the necessary environmental authorization for the development. Conduct a Wetland Impact assessment to determine the sensitivity of the area. The 1:100 flood line and the edge of the wetland/riparian zone will have to be determined and will have to be incorporated into the final layout plan. Plan for the following: The construction of the roads and the installation of the pipe is to commence during the dry season to allow for the lowest possible impact on the environment and to simplify the required construction procedures The local vegetation will be stored and used again during the rehabilitation period. Topsoil will be placed in a demarcated area for re-use during the rehabilitation period. The area to be used for stockpiling of the topsoil will be at an approved location. The area to be excavated needs to be clearly marked with lime. Provide shoring and bracing to the excavations where required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Low		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)**
				Erect physical barriers around the excavated area according to OHS requirements. Install and compact bedding where the infrastructure is to be installed according to the engineer's specifications (material description, bedding depth and compaction specifications). Install and compact soilcrete stabilised blanket material directly above the syphon in layers of 150mm. Backfill and compact excavated material in layers of 150mm up to natural ground level. • Backfill will be done in the same sequence; • Top soil will be backfilled after compaction; • Gabions will be installed for erosion control/management; • Storm water berms will be built to control and manage storm water; • Each site will be landscaped after construction. The necessary erosion prevention mechanism shall be employed to ensure the sustainability of all structures; The construction camp shall not be located within the 1:100 year flood line or within a 100m of any watercourse; whichever the greater. Construct the infrastructure in accordance with the designs and ensure the natural flow of the river is not disturbed in the long term. Obtain the necessary environmental authorization for the development. Obtain the necessary Water Use Licenses. Implement the mitigation measures as described in the Environmental Management plan. Implement the mitigation measures as described by the Wetland specialistas	

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)**
				incorporated into the Environmental Management Plan.	
	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. There should be 1 Chemical toilet for every 30 workers on site.	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 Geotechnical 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	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)**
	the destruction of faunal and floral habitats) during the construction phase.	Magnitude (Intensity)	Medium	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.	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
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	If available, 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. 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
		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)**
	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.	Magnitude (Intensity)	Medium	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).	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. Ensure that the development is constructed as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium
	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
	Loss of indigenous vegetation.	Extent	Local	No mitigation measures possible.	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	123,0452 ha of indigenous vegetation, located within a critical biodiversity area will be eradicated in order to establish the development.	Duration	Long term	Obtain the necessary environmental authorization for the development Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area. 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	Low		Medium
	In order to gain access to the proposed development, three 3 750m^2 roads will have to be constructed within the water course.	Duration	Long term	Obtain the necessary environmental authorization for the development. Conduct a Wetland Impact assessment to determine the sensitivity of the area. The 1:100 flood line and the edge of the wetland/riparian zone will have to be determined and will have to be incorporated into the final layout plan. Plan for the following: The construction of the roads and the installation of the pipe is to commence during the dry season to allow for the lowest possible impact on the environment and to simplify the required construction procedures The local vegetation will be stored and used again during the rehabilitation period. Topsoil will be placed in a demarcated area for re-use during the rehabilitation period. The area to be used for stockpiling of the topsoil will be at an approved location. The area to be excavated needs to be clearly marked with lime. Provide shoring and bracing to the excavations where required. Erect physical barriers around the excavated area according to OHS requirements. Install and compact bedding where the infrastructure is to be installed according to the engineer's specifications (material description,	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Low		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)**
				bedding depth and compaction specifications). Install and compact soilcrete stabilised blanket material directly above the syphon in layers of 150mm. Backfill and compact excavated material in layers of 150mm up to natural ground level. • Backfill will be done in the same sequence; • Top soil will be backfilled after compaction; • Gabions will be installed for erosion control/management; • Storm water berms will be built to control and manage storm water; • Each site will be landscaped after construction. The necessary erosion prevention mechanism shall be employed to ensure the sustainability of all structures; The construction camp shall not be located within the 1:100 year flood line or within a 100m of any watercourse; whichever the greater. Construct the infrastructure in accordance with the designs and ensure the natural flow of the river is not disturbed in the long term. Obtain the necessary environmental authorization for the development. Obtain the necessary Water Use Licenses. Implement the mitigation measures as described in the Environmental Management plan. Implement the mitigation measures as described by the Wetland specialistas incorporated into the Environmental Management Plan.	
	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

	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)**
		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 Geotechnical 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. The findings of the Geotechnical 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	Duration	Short term		Short term
		Extent	Local		Local

	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)**
	the destruction of faunal and floral habitats) during the construction phase.	Magnitude (Intensity)	Medium	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.	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
	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	If available, 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. 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
		Extent	Local		Local

	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 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.	Magnitude (Intensity)	Medium	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).	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. Ensure that the development is constructed as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium
	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
	Loss of indigenous vegetation.	Extent	Local	No mitigation measures possible.	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 indigenous vegetation will be removed.	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
	No impact on the watercourses in the area.	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 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 (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	123,0452 ha of indigenous vegetation, located within a critical biodiversity area will be	Duration	Long term	Implement the mitigation measures as described in the	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		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**
	eradicated in order to establish the development.	Probability	Definite	Environmental Management Plan.	Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium
	In order to gain access to the proposed development, three 3 750m^2 roads will have to be constructed within the water course.	Duration	Long term	The construction of the roads and the installation of the pipe is to commence during the dry season to allow for the lowest possible impact on the environment and to simplify the required construction procedures The local vegetation will be stored and used again during the rehabilitation period. Topsoil will be placed in a demarcated area for re-use during the rehabilitation period. The area to be used for stockpiling of the topsoil will be at an approved location. The area to be excavated needs to be clearly marked with lime. Provide shoring and bracing to the excavations where required. Erect physical barriers around the excavated area according to OHS requirements. Install and compact bedding where the infrastructure is to be installed according to the engineer's specifications (material description, bedding depth and compaction specifications). Install and compact soilcrete stabilised	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		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
				blanket material directly above the syphon in layers of 150mm. Backfill and compact excavated material in layers of 150mm up to natural ground level. • Backfill will be done in the same sequence; • Top soil will be backfilled after compaction; • Gabions will be installed for erosion control/management; • Storm water berms will be built to control and manage storm water; • Each site will be landscaped after construction. The necessary erosion prevention mechanism shall be employed to ensure the sustainability of all structures; The construction camp shall not be located within the 1:100 year flood line or within a 100m of any watercourse; whichever the greater. Construct the infrastructure in accordance with the designs and ensure the natural flow of the river is not disturbed in the long term. Implement the mitigation measures as described in the Environmental Management plan. Implement the mitigation measures as described by the Wetland specialistas incorporated into the	

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**
				Environmental Management Plan.	
	Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.	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
	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	Implement the findings of the Geo-Technical Engineer. 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 1: Mixed land use township (Preferred Alternative)					
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	If available, 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 1: Mixed land use township (Preferred Alternative)					
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
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
	<u>Solid waste</u>: The proposed development will add additional solid waste into the existing waste stream of the Local Municipality. <u>Sewage</u>: The proposed development will add additional sewage into the existing sewage stream of the Local Municipality.	Extent	Local	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		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**
	Water supply: The proposed development will add pressure to the water supply of Local Municipality's Water.				
	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
	Indigenous vegetation will be removed.	Extent	Local	No mitigation measures possible.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
DIRECT IMPACTS:					
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

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	**Environmental Attribute**	**Environmental Attribute**	**Assessment rating (With mitigation)**	**Proposed mitigation**	**Assessment rating (Without mitigation)**
		Risk	Medium		Medium
Geographical Physical Social Economic Cultural	Broadened tax base: The proposed development will generate more income for the 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	**Namakwalander**	
Date published	**11/12/2020**	
Site notice position	**29°16'14.50"S**	**17°44'30.58"E**
	29°16'20.98"S	**17°43'50.48"E**
Date placed	**07/12/2020**	

PROOF OF PUBLIC PARTICIPATION CONDUCTED IN LINE WITH COVID-19 PROTOCOLS (SANITIZATION, MASK AND GLOVES IN PLACE)


ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
(EIR AND SCOPING)
DENC REF. NO: NC/EIA/ZF/NAM/NAMASTE/1/2021
PROJECT NAME:
PROJECT DESCRIPTION:
CLIENT:
CONSULTANT AND CONTACT PERSON:

PROOF OF NEWPAPER ADVERTISEMENT (NAMAKWALANDER 11 DECEMBER 2020)

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
(EIR AND SCOPING)
DENC REF. NO: NC/EIA/18/NAM/NAM/STE1/2020

Notice is hereby given of an Environmental Impact Assessment Process to be conducted. 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's 12 and 19) and (Government Notice No. R.324 Listing Notice 3: Activity no's 12(g)(ii)). 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)(c)(d)). The competent authority is the Northern Cape Province Department: Environment and Nature Conservation and the responsible officer is: Mr. A Nyakaza; Tel: 027 718 8800.

PROJECT NAME:

Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048, Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION:

Clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, for the proposed township establishment (consisting of a mix of residential, business, municipal, churches, crèches schools and a sport field) which includes the construction of three roads within a watercourse.

CLIENT:

Nama Khoi Local Municipality

CONSULTANT AND CONTACT PERSON:

Mrs. J.E. (Hannie) Du Plooy of AB Enviro Consult cc.
7 Louis Leipoldt Street, Potchefstroom, 2531
Tel: 071 202 4027
Fax: 018 293 0671
E-mail: hannieduplooy@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 1st February 2021. An electronic copy of the draft Scoping Report is also available from AB Enviro Consult on request.

COVID-19 IS REAL!
STAY SAFE. STAY AT HOME

FORM 2
NOTICE OF INTENTION TO APPLY IN TERMS OF SECTION 20 OF THE ACT FOR A LICENCE. (Reg. 4(1)

NORTHERN CAPE LIQUOR ACT, 2008

Notice is hereby given that it is the intention to lodge the abovementioned application, particulars of which appear hereunder, with the Northern Cape Liquor Board.

Municipality:
Nama Khoi Municipality
Full name, street and postal address of applicant:
Abrie Coetzee. ERF 225, Kleinzee.
Kind of licence applied for:
Bottlestore
Kind of liquor to be sold:
Any kind of liquor
Name under which bussiness is to be conducted and full address of premisis:
AC Liquors. Erf 225, Kleinzee
Extra items to be sold (section 4(5)(a) and (b):
Chips and sigarettes

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	Neighbour	See photo evidence

PROOF OF COVID-19 APPROVED PUBLIC PARTICIPATION PROTOCOLS AS WELL AS PROOF OF LETTER DROP:

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	**The Registry: Consultation on EIA applications**	**Tel: 054 338 5800**	(054) 334 0205		**Louisvale Road Upington 8800**
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 and Nature Conservation	**Mr. Dewald Badenhorst Biodiversity Management services**	(053) 807 7300	(053) 807 7367		**Private Bag X6120 Kimberley 8301**
Northern Cape Department of Agriculture, Forestry and Fisheries	**Mrs. J Mans**	(054) 338 5860	(054) 338 0030		**P.O. Box 2782, Upington 8800**
Northern Cape Department Roads and Public Works	**The director: Roads**	053 839 2100			**PO Box 3132 Kimberley 8300**
Namakwa District Municipality	**Mr Christiaan Fortuin**	0277128000	0277128040		**Private Bag X20, Springbok, 8240**
Nama Khoi Local Municipality	**Ms Samantha A Titus**	0277188100	0277121635		**PO Box 17, Springbok, 8240**
Nama Khoi Local Municipality	**The councilor ward 3**	0277188100	0277121635		**PO Box 17, Springbok, 8240**
SAHRA	**SAHRIS**				

List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE

(with an insurance option/met 'n versekeringsopsie)

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Name and address of sender:
Naam en adres van afsender:

AB ENVIRO CONSULT
7 LOUIS LEIPOLDT STREET
POTCHEFSTROOM
2531

No	Name and address of addressee / Naam en adres van geadreseerde	Insured amount / Versekerde bedrag	Insurance fee / Versekeringsgeld	Postage / Posgeld	Service fee / Diensgeld	Affix Track and Trace customer copy / Plak Volg-en-Spoor-Kliëntafskrif
1	Northern Cape Department of Agriculture and land reform & rural development HOD, Mr V Motnibi Private Bag X5018 Kimberley 8300					INSURED PARCEL PA542693743ZA CUSTOMER COPY 301012
2	Namakwa District Municipality DMM Mr Christiaan Fortuin Private Bag X20. Springbok 8240					INSURED PARCEL PA542693757ZA CUSTOMER COPY 301012
3	Nama Khoi Local Municipality The councillor Ward 3 PO BOX 17. Springbok 8240					INSURED PARCEL PA542693765ZA CUSTOMER COPY 301012
4	Northern Cape Department Roads and Public works Director: Roads PO BOX 3132 Kimberley 8300					INSURED PARCEL PA542693774ZA CUSTOMER COPY 301012
5	Northern Cape Department of Enviro and nature conservation Mr Bodenhast Private Bag X6120 Kimberley 8301					INSURED PARCEL PA542693791ZA CUSTOMER COPY 301012
6	Northern Cape Department of Agriculture Forestry and fisheries FAO: J. Mans P.O Box 2782 Upington 8800					INSURED PARCEL PA542693805ZA CUSTOMER COPY 301012
7	Nama Khoi Local Municipality MM: Ms Samantha A Titus PO Box 17 Springbok 8240					INSURED PARCEL PA542693788ZA CUSTOMER COPY 301012
8						
9						
10						
	Total / Totaal	R	R	R	R	

Number of letters posted / Getal briewe gepos: 7 | SEVEN

Signature of client
Handtekening van kliënt

Signature of accepting officer
Handtekening van aanneembeampte

Date stamp: NOORDBRUG 2020-12-04 3

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof.
Optional insurance of up to R200.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

7 Louis Leipoldt Street,
Potchefstroom, 2531
Fax: + 27 (18) 293 0671
Cell: + 27 (71) 202 4027
hannieduplooy@abenviro.co.za

11/12/2020

Department of Water and Sanitation
The Registry: Consultation on EIA applications
Louisvale Road
Upington
8800

Tel: 054 338 5800

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by **Nama Khoi 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 no later than the 1st February 2021. 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

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

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11/12/2020

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

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11/12/2020

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

Dear Sir/Madam

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Northern Cape Department of Agriculture, Forestry and Fisheries
FAO: J. Mans
P.O. Box 2782
Upington
8800

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hannieduplooy@abenviro.co.za

11/12/2020

Northern Cape Department Roads and Public Works
The Director: Roads
PO Box 3132
Kimberley
8300

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hannieduplooy@abenviro.co.za

11/12/2020

Namakwa District Municipality
District Municipal Manager: Mr Christiaan Fortuin
Private Bag X20
Springbok
8240

Dear Sir/Madam

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Cell: + 27 (71) 202 4027
hannieduplooy@abenviro.co.za

11/12/2020

Nama Khoi Local Municipality
Municipal Manager: Ms Samantha A Titus
PO Box 17
Springbok
8240

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 123,0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by **Nama Khoi 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 no later than the 1st February 2021. 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

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

AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

7 Louis Leipoldt Street,
Potchefstroom, 2531
Fax: + 27 (18) 293 0671
Cell: + 27 (71) 202 4027
hannieduplooy@abenviro.co.za

11/12/2020

Nama Khoi Local Municipality
The Councillor Ward 3
PO Box 17
Springbok
8240

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 123.0452 ha of indigenous vegetation, located within a critical biodiversity area, the construction of three roads within a watercourse, for the proposed township establishment located on a Portion of the remaining extent of Erf 2048,Steinkopf, Nama Khoi Local Municipality, Northern Cape Province.

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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
To Follow	

10.5 COMMENTS AND RESPONSE REPORT

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

11. CONCLUDING STATEMENT.

In the National Framework for Sustainable Development (NFSD) it is stated that *"the achievement of sustainable development is not a once-off occurrence and its objectives cannot be achieved by a single action* or *decision. It is an ongoing* process *that requires* a *particular set of values and attitudes in which economic, social and environmental assets that society has at its disposal, are managed in* a *manner that sustains human well-being without compromising the ability of future generations to meet their own need.* The NFSD further continues to emphasize that South Africa's current development path in certain instances reflects signs of being unsustainable in the long-term. It highlights that a large percentage of growth in economic activity (measured in terms of its contribution to the GDP) is achieved by *"consuming' natural resources and degrading our habitat at accelerating rates with the inevitable consequence that future economic growth and development objectives will be prejudiced. "*

As in the rest of South Africa, there is a housing shortage in the area. This is totally 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 new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions.

The proposed integrated human settlement project from the onset aims at providing a proper integrated human settlement that ascribes to the BNG Principles set out above. This will be achieved as follows:

- This project makes provision for a variety of erven that can be utilized for various housing typologies. The largest proportion of the township areas will however be aimed at both the subsidized housing sector through the implementation of one of Government's subsidized housing programmes as well as the need that exists for people that does not qualify for a Government subsidy, due to either already owning other property or earning in excess of the threshold household income prescribed in respect of the various housing subsidy programmes, but who still wishes to acquire an affordable stand where they can construct their own home. This project will also aim at alleviating the plight of people that live in informal settlement areas and in squalid conditions.
- The location of the proposed township area directly adjacent to the existing urban area further enhances integration and will offer inhabitants the opportunity to access the existing social and commercial facilities on offer within the existing village area whilst also providing social and

business opportunities within the proposed development area itself that can in turn be utilized by and to the benefit of the inhabitants of the existing village area.

The development represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

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

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

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

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 faecal 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.

Skills development

The members of the Project Steering Committee will during the entire life-cycle of the project be involved with all processes and it anticipated that the capacity of the officials of the Nama Khoi Local Municipality as well as the relevant community structures will be broadened through the transfer of knowledge and skills specifically relating to the integrated human settlement planning process as well as the statutory processes associated with the township establishment process.

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

Although this is only the Scoping phase of the proposed development, no "fatal flaws" has been encountered as of yet. All the issues envisaged at this stage can be mitigated.

12 PLAN OF STUDY FOR EIA

12.1 Description of the alternatives to be considered and assessed

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.

12.1 Land Use Alternatives

12.1.1 Mixed land use township (Alternative 1)

Alternative Site layouts have been developed for the proposed development.

The appointed Town and Regional planner have produced the proposed layout plan.

The proposed Township will consist of the following (See Figure 1 for a copy of the Layout Plan):

Residential	1500 Stands
Business	6 Stands
Churches	6 Stands
Crèche	3 Stands
School	1 Stand
Sports Field	1 Stand
Municipal	1 Stand
Parks	11 Stands

Area of township **123,0452 ha.**

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.

12.1.2 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.

12.1.3 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.

12.2 Description of the aspects to be assessed as part of the environmental impact assessment process

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 following aspects and their possible impacts will be assessed

- Geology -structure and rock-type
- Topography- macro and micro-relief
- Climate: Temperature, rainfall, and wind.
- Soil
- Fauna
- Flora
- Surface Water
- Underground water
- Air Quality
- Noise
- Archaeology
- Cultural Sites
- Aesthetics
- Technical issues
- Sociological Issues
- Economic Issues

- The evaluation of concerns in order to assign priority to the important issues: The study is designed to address concerns as well as to prioritise issues as part of the process.
- Developing a strategy for addressing and resolving each issue: All relevant issues will be addressed in order of priority. In this sense the inputs of all I&APs, as well as all other socio-economic factors of importance will be resolved in order of priority.
- Providing feedback at regular intervals in which comments by authorities have been incorporated: Feedback to I&APs is the only logical way by which eventual acceptance can be achieved. It is therefore a standing practise in all studies conducted by the consultant that feedback is provided on a continuous basis.

12.3 Aspects to be assessed by specialists

The process followed can be described as follows:

1) The EAP was contracted by the Applicant, the Nama Khoi Local Municipality in co-operation with the Department of Human Settlements 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. He also designed the proposed infrastructure.

4) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
5) An Ecological and Wetland specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
6) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
7) Desk top studies were conducted and alternatives assessed.
8) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
9) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
10) 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.
11) 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.

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

12.4 Description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists,

And

12.5 Description of the proposed method of assessing duration and significance

Impacts will be 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).

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances
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 will be 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. A surveyor has been appointed to map the area and determine site levels.

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. Various Specialists are involved in assessing different aspects including Civil Engineer, Electrical Engineer, Surveyor, Town Planner, Botanical Specialist, Wetland Specialist, SAHRA Specialist and the EAP.

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. The Botanical Specialist will determine the sensitivity and distribution of flora and associated fauna, and the wetland specialist will ensure that the relevant aquatic ecosystems are assessed.

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. EAP, Town Planner, Civil Engineer and SAHRA specialist.

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. . EAP, Town Planner, Civil Engineer and SAHRA specialist.

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. SAHRA Specialist.

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. SAHRA Specialist.

The inputs from Specialists, interested and affected parties, together with the knowledge of the EAP will be used to determine measures to avoid, mitigate and manage potential impacts. Inputs from I&APs will be considered for all the above in order to ensure a sustainable development.

12.6 Stages at which the competent authority will be consulted

1) The first consultation will be in the form of the application submission
2) A Draft Scoping report will be submitted to the Department
3) 40 Days after this draft has been submitted, the final Scoping report will be submitted to the Department.
4) Once the Final Scoping report has been accepted, a Draft EIA Report will be submitted to the Department.
5) 30 Days after this draft EIA Report has been submitted, the final EIA Report will be submitted to the Department.

12.7 Particulars of the public participation process that will be conducted during the environmental impact assessment process

Public and stakeholder involvement in the EIA process is widely recognised as being an *essential* component of the EIA process. The input and contribution added to the process, by public comment and involvement, leads to better and more acceptable decision-making. The involvement of interested parties, adjacent land owners, NGO bodies and others, can help to identify whether all impacts have been included and whether all risk groups have been identified.

The engagement process will provide stakeholders with the opportunity to raise their issues and concerns and to interact on a one-on-one basis with the project team.

Registered I&APs shall be informed of the approval or rejection of the scoping report, and will be encouraged to continue their active participation in the EIA process by staying involved in the process, and commenting on the scoping report approval conditions / requirements.

The PPP to be conducted during the EIA phase will entail the following:

- ❖ Update the existing stakeholder database, following the review of the draft and final scoping reports by registered IAP's and READ
- ❖ Announcement of the EIA phase of the project, which entails the following:

1) Distribution of Letters, notices, the Draft and final EIAR to all registered I&APs via email, fax or post;
2) Hosting Public Meetings (if necessary);
3) Integration of comments into a Comments and Response Report;

12.8 Description of the tasks that will be undertaken as part of the environmental impact assessment process

Actions
1. Assessment Phase
1.1 Undertake assessment phase by assessing and evaluating potential impacts identified in the Scoping phase.
1.2 Review and manage specialist studies required.
1.3 Compile a draft Environmental Impact Report (EIR).
1.4 Compile a draft Environmental Management Plan for the Construction phase.
1.5 Compile an Information Sheet (summary of EIR) and distribute to identified I&APs
1.6 Distribute DEIR to I&APs
1.7 Allow the identified public to provide comment within a 30 day period on above report.
1.8 Address comments received and finalise EIR
1.9 Should the draft EIR require substantial changes, these changes will be incorporated into the final EIR and distributed.
1.10 Submit EIR to authorities for a final decision
1.11 Once the decision is issued, all I&Ps must be formally informed of the decision

12.9 Measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

An EIA involves *prediction* and thus a certain degree of *uncertainty* is an integral part. There are two types of uncertainty associated with environmental impact assessments: those associated with the process and, those associated with predictions. With the former the uncertainty is whether the most important impacts have been identified and whether recommendations will be acted upon or ignored. For the latter, the uncertainty is in the accuracy of the findings. The main types of uncertainty and the ways in which they can be minimized are summarized as follows:

- **Uncertainty of prediction**: this is important at the data collection stage and the final certainty will only be resolved once implementation commences. Research can reduce the uncertainty;

- **Uncertainty of values**: this reflects the approach taken in the EIA process. Final certainty will be determined at the time decisions are made. Improved communications and extensive negotiations should reduce this uncertainty;

- **Uncertainty of related decision**: this affects the decision making element of the EIA process and final certainty will be determined by post evaluation. Improved coordination will reduce uncertainty.

The importance of *wide consultation* cannot be overemphasized in minimizing the risk of missing important impacts. The significance of impacts is subjective, but the value judgments required are best arrived at by consensus: public participation and consultation with a wide sector of the community will reduce uncertainty.

The accuracy of predictions is dependent on a variety of factors such as lack of data or lack of knowledge. Prediction capabilities are generally good in the physical and chemical sciences, moderate in ecological sciences and poor in social sciences.

The results of the EIA should indicate the level of uncertainty with the use of confidence limits and probability analyses wherever possible. Sensitivity analysis similar to that used in economic evaluation, could be used if adequate quantifiable data are available. A range of outcomes can be found by repeating predictions and adjusting key variables.

An EIA cannot give a precise picture of the future. The EIA enables uncertainty to be managed and, as such, is an aid to better decision making. (*S. Cliff, 2015, P92.*)

13. AFFIRMATION BY EAP

I **Mrs J.E. du Plooy** declare under oath that I:

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

Signature of the Environmental Assessment Practitioner:

Name of company:

Date:

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.

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

PROOF THAT THE DRAFT SCOPING REPORT HAS BEEN SENT TO DEPARTMENT OF WATER AND SANITATION