



FINAL EIA REPORT

Ref: 12/1/9/2-C42

KLIPFONTEIN DEMARCATION: PROPOSED DEMARCATION OF 3000 ERVEN ON THE FARM KLIPFONTEIN 670 LS, POLOKWANE LOCAL MUNICIPALITY, CAPRICORN DISTRICT

March 2016

Prepared for: Winterbach and Associates Town and Regional Planners
On behalf of: Department of Co-operative Governance, Human
Settlement and Traditional Affairs

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Compiled by: N. van der Walt

Reviewed by: J.H. Botha



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Proposed demarcation of 3000 erven on the farm Klipfontein 670 LS, Polokwane Local Municipality, Capricorn District

March 2016

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Mr. J Botha has been employed at AGES Limpopo for the past 11 years and holds the position of Environmental Scientist.

During his employment period he has gained extensive knowledge and experience regarding the development of Environmental Impact Assessments for all types of developments as well as the development of environmental management plans, spatial development frameworks and strategic environmental assessments.

He was also employed at the Limpopo Department of Finance and Economic Development, Environment and Tourism as Senior Manager: Scientific Services where he also obtained extensive knowledge and experience (1994-2004) regarding Environmental Impact Management, Waste and Pollution management

1. GENERAL INFORMATION

AGES Limpopo (Pty) Ltd was appointed by Winterbach and Associates Town & Regional Planners, who acts on behalf of Limpopo Department of Co-operative Governance, Human Settlement and Traditional Affairs (COGHSTA) to conduct an Environmental Impact Assessment in order to obtain the necessary environmental authorisation for the proposed demarcation of 3 000 erven on the farm Klipfontein 670 LS, within the Polokwane Local Municipality, Capricorn District of the Limpopo Province.

1.1. Environmental Impact Assessment (EIA) Process

The environmental studies can be summarized in a two-phased approach:

- Phase 1: Environmental Scoping Study (ESS)
- Phase 2: Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPr)

The scope of the entire EIA process is to provide an assessment of all impacts related to the proposed project in compliance with the EIA Regulations of 2014.

1.2. Scoping Phase

The Scoping Phase entails:

- a description of the proposed activity, the property and the receiving environment;
- the identification of potential significant positive and negative impacts;
- The identification of opportunities, restrictions, alternatives and mitigation measures which need to be further evaluated and investigated during the successive EIA phase. This assessment is particularly important in order to prevent environmental fatal flaws, and avoid sensitive or “no-go” areas.

The Scoping Phase includes the initial Public Participation Process (PPP), which has the aim to identify concerns and issues raised by interested and affected parties (I&AP's). Issues and concerns raised by the I&AP's and key stakeholders during the Public Participation Process were collected, processed and addressed in the Comments and Response Report, which formed part of the Scoping Report.

1.3. EIA Phase

The consultation EIA report was submitted to registered and affected parties for commenting purposes for a period of 30 days from the 4th of February 2016 up and until the 7th of March 2016.

Comments from the stakeholders and I&AP's on the consultation EIAR and the Draft EMPr have been incorporated into the Final EIA Report.

The stakeholders and I&AP's will be informed about the final decision regarding the Environmental Authorization and the appeal process.

2. PROJECT OBJECTIVE

This Environmental Impact Assessment Report (EIAR) was done with the objective to supply the Limpopo Department of Economic Development, Environment and Tourism (LEDET) with the necessary environmental information to make a decision regarding the environmental impact assessment process. The Environmental Impact Assessment process is a requirement in terms of GNR 982 published on 4 December 2014 under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). The following listed activities have been applied for under Regulation 983 and 984 of 4 December 2014.

The following listed activities are triggered in terms of GNR 983 Listing Notice 1:

Activity 9: *The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water –*
(i) With and internal diameter of 0,36 metres or more.
With the installation of civil services, there will be the need for a pipe line for the handling of storm water in the residential area.

Activity 12: *The construction of:*

- *Bridges exceeding 100 square metres in size; where such construction occurs-*
- *within a watercourse*

A bridge will be constructed across a drainage line on Klipfontein 670 LS.

Activity 19: *The infilling/depositing of material of more than 5 m³ into, or the dredging, excavation, removal or moving of soil, sand, pebbles or rock of more than 5 m³ from a watercourse.*
A bridge will be constructed across a drainage line situated on Klipfontein 670 LS. During the construction phase more than 5 m³ of material (soil, rock) will be deposited or removed from the drainage line.

Activity 24(ii): *The development of a road where the road is wider than 8 meters.*
The proposed layout plan will include internal road sections that will be 16m and 30m in diameter. (Layout plan - Appendix 2).

Activity 28(ii): *Residential, mixed, retail, commercial or institutional developments where the land was used for agriculture or afforestation on/or after 01 April 1998 and where the development will occur outside an urban area, and total land to be developed is bigger than 1 ha.*
The project will entail the demarcation of erven on ±93 ha of croplands

The following listed activity is triggered in terms of GNR 984 Listing Notice 2:

Activity 15: *The clearance of an area of 20 hectares or more of indigenous vegetation.*
The proposed development will lead to the removal of ±98 ha of indigenous vegetation.

3. LEGAL AND POLICY REQUIREMENTS

The following is a broad overview of the relevant policy and legal requirements, but not limited to, applicable to the proposed project.

Constitution of South Africa (Act 108 of 1996)

Section 24 of this Act recognises not only that everyone has a right to an environment that is not harmful to our health or well-being, but it also recognises the notion of sustainable development and its supporting principles.

National Environmental Management Act (Act no 107 of 1989)

This Act defines the concept of sustainability, to ensure that any social or economic development will take place in such a way as to preserve the Environment for present and future generations. This Act also takes into account the pollution principles.

National Water Act (Act no 36 of 1998)

Section 19 of the National Water Act, Act 36 of 1998 requires that all reasonable measures be taken to prevent any water pollution from occurring, continuing or recurring. The Act further describes a number of water uses and requires that a water use License have to be obtained for the specified water uses.

National Biodiversity Act (Act 10 of 2004)

The National Environmental Management Biodiversity Act (Act No. 10 of 2004), aims to provide 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.

National Heritage Resources Act (Act 25 of 1999)

The Act makes provision for the undertaking of heritage resources impact assessments for various categories of development as determined by Section 38. It also provides for the grading of heritage resources and the implementation of a three-tier level of responsibilities & functions for heritage resources to be undertaken by the State, Provincial authorities and Local authorities, depending on the grade of the Heritage resources. The Act defines cultural significance, archaeological and paleontological sites & material (Section 35), historical sites and structures (Section 34), graves and burial sites (Section 36) that falls under its jurisdiction. Archaeological sites and material are generally those resources older than a hundred years, while Section 34 also protects structures and cultural landscapes older than 60 years, including gravestones. Procedures for managing grave & burial grounds are clearly set out in Section 36 of the NHRA. Graves older than a 100 years are defined as being archaeological sites and must be dealt with accordingly.

Section 38 of the NHRA makes provision for developers to apply for a permit before any heritage resource may be damaged or destroyed.

National Veld and Forest Fires Act, 1998 (Act 101 of 1998)

This act provides for the control of veld fires. The regulations in terms of this act set certain conditions for the owner of a property for emergency preparedness for the control of veld fires. It also describes the compulsory making of firebreaks to control veld fires that originates on the owner's property as well as on adjacent properties.

Conservation of Agricultural Resources Act (Act 43 of 1983)

This act provide for the control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.

Limpopo Environmental Management Act (Act 7 of 2003)

This act provides for the management and protection of the environment including flora and fauna in Limpopo Province.

National Environmental Management: Waste Act (Act 59 of 2008)

This act has at its core the objective to regulate waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This act also provides national norms and standards for regulation and management of waste by all spheres of government and specific waste management measures. It also provides for the licensing and control of waste management activities and also a national waste information system, compliance and enforcement.

Some listed activities under the EIA regulations of 2006 have been repealed and have been included in this act. These include activities entailing any waste activities including sewage systems.

Subdivision of Agricultural Land Act (Act 70 of 1970)

This act provides for the control over the subdivision of agricultural land for uses other than agriculture.

Minerals and Petroleum Resources Development Act (Act 28 of 2002)

This act provides for the regulation and management of minerals and also the petroleum industry in the RSA and the Department of Minerals and Energy is the Lead Agent for applying this legislation.

4. DESCRIPTION OF PROPERTY

4.1 Project Locality

The study area is located approximately 13 km east of Polokwane.

The proposed demarcation section will be located at approximately the following coordinates:

- 1) Klipfontein 670 LS: 23° 51' 41.60" S, 29° 21' 20.73" E

21 digit Surveyor General code:

T	O	L	S	0	0	0	0	0	0	0	0	0	6	7	0	0	0	0	0
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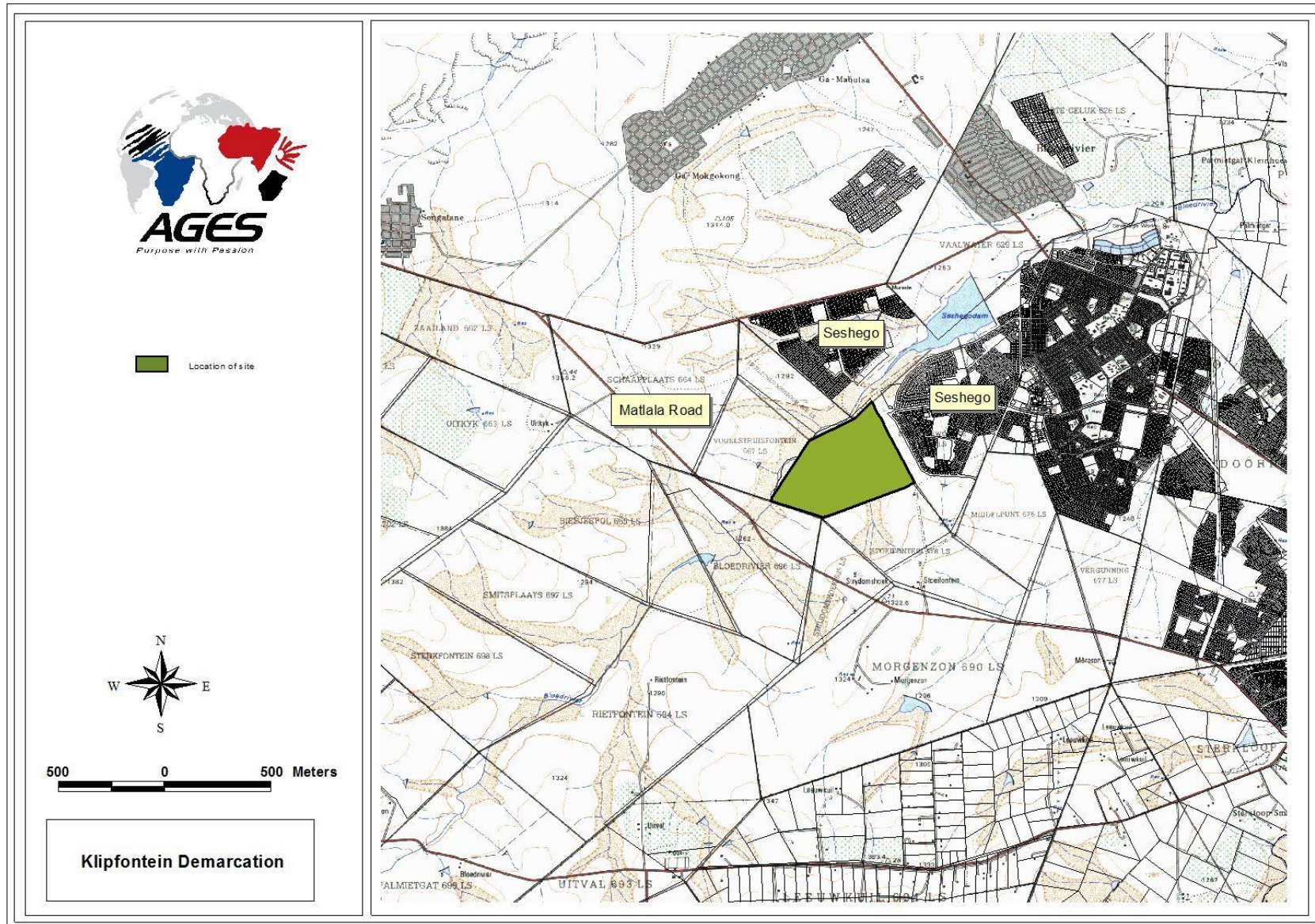


Figure 1: Locality Map – Klipfontein 670 LS



Fig 2. Areal image of location of Klipfontein 670 LS

5. DESCRIPTION OF ACTIVITY

5.1. Nature of activities

The site for the proposed demarcation of 3 000 erven will be situated on the farm Klipfontein 670 LS.

The township establishment will include the following land uses:

FACILITY	NO. OF ERVEN	AREA (±HA)	± % AREA OF LAYOUT	ERF NUMBERS
Residential 1	2969	85.70	41.12	1 - 69; 71 – 127; 129 – 838; 840 – 1056; 1058 – 1206; 1208 – 1223; 1227 – 1465; 1467 – 1642; 1644 – 2021; 2023 – 2048; 2050 – 2415; 2417 – 2446; 2448 – 2496; 2498 – 2637; 2640 – 2743; 2746 – 2937; 2939 – 2989
Residential 3	1	0.46	0.22	2639
Business 1	4	0.77	0.37	128; 839; 2049; 2638
Institutional	9	1.76	0.84	70; 1224 – 1226; 1466; 2022; 2744; 2745; 2938
Educational	4	13.38	6.42	1057; 1207, 1643; 2497
Municipal	2	3.36	1.61	2416; 2447
Public Open Space	13	61.33	29.43	2990 - 3002
Existing Public Roads		41.66	19.99	
TOTAL	3002	208.42	100	Not Applicable
Minimum gradient of streets			1:33	
Maximum gradient of streets			1:21	
Total Length			27.55 km Public Roads	

A site layout plan is included in Appendix 2.

6. NEED AND DESIRABILITY OF PROPOSED DEVELOPMENT (ALSO REFER TO THE MOTIVATIONAL MEMORANDUM)

There is a great need for housing in Polokwane/Seshego and this project will provide some level of relief for housing shortages in this area. The shortage of housing leads to an increase in haphazard, unplanned, unstructured informal settlements (shacking) which cause large problems with regard to the provision of services, sanitation, facilities, roads, erosion and pollution.

The Polokwane Local Municipality intends to re-locate the residents within the Freedom Park informal settlement to this newly proposed formalized planned area.

6.1. MOTIVATION FOR LOCATION OF PROPOSED DEVELOPMENT

This specific demarcated area was identified by the Polokwane Local Municipality for development purposes. The landowner of the area earmarked for the establishment of a township is the Polokwane local municipality. The area is located near the existing formal town of Seshego H is under the jurisdiction of the local municipality. The fact that the local municipality is the landowner of the demarcated area is beneficial since it is very time consuming to formalise any state land due to certain protocol that needs to be followed and permissions that needs to be obtained.

7. DESCRIPTION OF THE AFFECTED ENVIRONMENT

7.1. Land Use

Large areas of the proposed development site are used for crop cultivation (see image of site) as well as grazing for livestock.

7.2. Geology and soil (Geo-Technical Study – See appendix 5)

According to regional geological information, the site is underlain by the Hout River Gneiss and the lithology is of Randian age. The geology includes bedrock materials such as leucocratic gneiss and migmatite and hornblende-biotite gneiss. Muscovite-bearing granite, pegmatite and gneiss also occur.

During the site investigation the presence of gneiss and granite was confirmed. The latter was found particularly along the Blood River banks and was found to be rich in muscovite. In addition to this, localised outcrop and profile traces of diabase were also encountered on site, but were largely restricted to the eastern side of the study area. The profiles on site are dominated by surficial colluvial materials overlying a pebble marker and residual granite horizons. Alluvial deposits occur close to the Blood River.

The area is not subject to dolomite related instabilities.

7.3. Groundwater – Geo-Technical Report

Perched water – while no seepage water was encountered in trail holes it must be taken into account that the geo-technical investigation was conducted at the end of winter when perched and seepage water are expected to be absent. Trail holes showed signs of ferrugenisation which suggests that perched water tables or water migration might occur on a seasonal basis. It is anticipated that perched water may occur on this site above depths of 1 500mm and likely above 1000mm.

7.4. Topography and Climate

The site generally dips to the northwest into the flood plain of the Blood River. The gradient itself is general slight to moderate. Apart from flood plain areas or river flow channels, no notable topographical extremes were found on site.

The proposed development is located in the summer rainfall region of South Africa.

According to the Pietersburg – Hospital Weather Station the mean annual precipitation is approximately 485 mm per annum. Frost occurs fairly infrequent. Mean monthly maximum and minimum temperatures for Polokwane are 33.2°C and 0.6°C for October and June, respectively.

Vegetation features – Ecological study (Appendix 4)

The Ecological Report carried out reflects the following:

The site is situated within the Pietersburg Plateau False Grassveld as described by Acocks (1988) and consists of open, clumpy Sourish Mixed Bushveld dominated by *Vachellia rehmanniana* and *Vachellia tortilis* on Turfloop Granite. The terrain morphology is slightly undulating plains with the Blood River occurring on the western border of the site. Bredenkamp & Van Rooyen in Low & Rebelo (1996) described the vegetation of the area further as Mixed Bushveld, the common vegetation of the Central Bushveld Region. The most recent classification done by Mucina & Rutherford indicates the site to be part of the Polokwane Plateau Bushveld.

The natural vegetation of the proposed development site is characterized by microphyllous woodland that varies in density and species composition. The natural woody layer of the area represents Umbrella-thorn, Silky-thorn and Red Spike-thorn woodland. Vegetation units were identified and can be divided into 4 distinct vegetation units according to soil types, topography and vegetation and include the following:

- Croplands
- Silky thorn – red spike-thorn open plateau woodland
- Umbrella thorn – silky-thorn lower plains
- Riverine woodland & floodplains

Croplands:

The vegetation map clearly indicates the area that is currently utilized for crop cultivation. The landscape and vegetation features of the croplands on the proposed development site include plains with a sparse woody cover (< 1%) and denser (80%) herbaceous layer.

Unlimited development could be supported in this area and the area has a low sensitivity.

Silky thorn – red spike thorn open plateau woodland:

This vegetation unit represents open *Vachellia* woodland dominated by microphyllous species and termitaria bushclumps. The vegetation can be considered as representative of the Polokwane Plateau Bushveld vegetation type. This vegetation type is mainly characterized by the presence of *Vachellia rehmanniana*, *Sclerocarya birrea* and *Gymnosporia senegalensis*.

No red data species occurs; probably as a result of the habitat being different compared to the potential red data species that could occur here. The protected tree species *Sclerocarya birrea* (marula) occur scattered through the woodlands and may be removed after a permit has been obtained from Department of Forestry.

The vegetation is classified as having a medium sensitivity and the following recommendations can be made regarding development in this plant community:

- The vegetation unit has a medium sensitivity due to the vegetation unit as an entity not occurring widespread through the Savanna Biome and the presence of protected marula trees. Development can therefore be supported in the area with minimal mitigation measures.
- Large indigenous trees such as marula and silky-thorn trees should be preserved to enhance the aesthetic value of the area.

Umbrella thorn – silky thorn lower plains:

This vegetation unit represent the lower-lying bottomlands adjacent to the Blood River and tributary and forms open woodland with a well- developed shrub layer and termitaria bush clumps. The vegetation is characterized by typical woody species associated with clayey soils in the Savanna Biome such as umbrella thorn, buffalo thorn and scented thorn. The grass layer has a medium density and dominated by the climax species such as curly leaf grass and red grass.

The township development of the stands could be done on these areas from a botanical point of view, although the stability of the soils and seasonal variation of the soil moisture content could provide challenges. A detailed geotechnical study should be done in the area to indicate suitability for developments. No red data species occurs; probably as a result of the habitat being different compared to the potential red data species that could occur. The protected tree species in the area include the marula tree. The vegetation is classified as having a medium sensitivity and the following recommendations can be made regarding the development in this plant community.

The area has a medium sensitivity and marula trees and other indigenous tree species taller than 3 meter should be preserved. A permit should be obtained from Department of Forestry for the removal of the marula trees.

Riverine woodland & floodplains:

This vegetation unit includes the drainage channels bisecting the proposed development site. The vegetation varies from being a completely closed woodland structure in certain sections along the drainage channels to a closed grassland marshy areas along the tributary. An earth dam occurs in the main drainage channel bisecting the property. No red data plant species were recorded from this community.

The following recommendations need to be adhered to considering this vegetation unit:

- The drainage channels should be considered a high sensitivity area. The development should not impact on the drainage channels and a flood line determination for the drainage channels would be sufficient to prevent peripheral impacts on this sensitive ecosystem.
- Peripheral impacts should be avoided.
- The drainage channels play an important role as corridors for fauna and should be preserved as part of the larger ecosystem of the area.

Plant species of special concern:

- The potential impact of the proposed development on the protected tree species would be **low** considering that the species occur as individuals on the property and contribute very little to the larger population in the area. The Marula trees will be incorporated into gardens.
- No red data species occur in the proposed development area. The proposed development can be supported without any limitations provided that protected species are preserved or alternatively a permit obtained for removal.
- Any potential red data species would be confined to the drainage channels and no development can be supported in these areas based on the sensitivity analysis.
- Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases. Large indigenous or protected tree species should be preserved on the residential sites to preserve most of the natural woodland surrounding residences and enhance the aesthetic value of the area.

The unnecessary removal of tall indigenous tree species (>3m) should be avoided as far as possible.

Invasive alien species

The following management measures should be implemented to prevent the spread of alien invasive plants during the development phases:

- Institute strict control over materials brought onto site, which should be inspected for potential invasive invertebrate species and steps taken to eradicate these before transport to the site.
- Routinely fumigate or spray all materials with appropriate low-residual insecticides prior to transport to or in a quarantine area on site. The Argentine ant is nearly impossible to eradicate once it has established itself.
- Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish.
- Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds.
- Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented.
- Eradicate any exotic tree species and plant indigenous trees species in the gardens of the proposed development area. This will ensure that birds are lured to gardens.

Fauna:**List of probable red data birds for the study area**

<i>Bird Species</i>	<i>Status</i>	<i>Probability of occurrence in general area</i>
BALD IBIS	Vulnerable	Low
SECRETARYBIRD	Near threatened	Medium
CAPE VULTURE	Vulnerable	Low
MARTIAL EAGLE	Vulnerable	Low
LESSER KESTREL	Vulnerable	Low
WHITEBELLIED KORHAAN	Vulnerable	Medium
SHORTCLAWED LARK	Near threatened	Medium

- Public open spaces should be created (preferably drainage channels) and large indigenous trees should be preserved on site.
- Other mitigating measures to be implemented will ensure that bird species still utilize the area both for breeding and foraging:

Mammals

<i>Scientific name</i>	<i>Vernacular name</i>	<i>Probability of occurrence</i>	<i>Status</i>
<i>Atelerix frontalis</i>	South African Hedgehog	Low	Near threatened
<i>Hyaena brunnea</i>	Brown hyena	Low	Near threatened
<i>Leptailurus serval</i>	Serval	Low	Near threatened
<i>Mellivora capensis</i>	Honey badger	Low	Near threatened
<i>Myotis tricolor</i>	Temminck's Hairy bat	Low	Near threatened

The following management measures are proposed regarding the conservation of the red data mammals and other mammal species which might occur on the property:

- The distribution of the rare mammal species will not be significantly affected by the development especially considering the degraded state of a large part of the development site and the close proximity to the urban area. Mammals have been displaced from the area by urban development and only low densities of smaller antelope (duiker, steenbok), carnivores (jackals, mongoose species) and rodents still occur in the area.
- No mammals may be captured or hunted before or during the construction phase. Construction workers and residents should be made aware through educational programmes on the possible occurrence of these species and the importance to protect them and other mammal species in the area.

Herpetofauna:

- The only red data amphibian that has a probability of occurring on site is the Giant Bullfrog (Conservation status: Near threatened). Considering the Blood River and associated drainage line on the site, the management of the species as part of the larger landscape should be considered a high priority to prevent exclusion of the species from the area.

Mitigation measures proposed to prevent negative impacts on herpetofauna of the area:

- A low diversity reptile and amphibian species might occur in the area as a result of the homogenous habitat types observed on the property, especially in the drainage channels and floodplains. These areas should preferably be minimally impacted on.
- The minimum number of trees should be removed to protect the habitat of arboreal reptiles.
- The giant bullfrog breeds in seasonal, shallow, grassy pans in flat, open areas but also utilizes non-permanent vleis and shallow waterholes and dams.
- The bullfrogs sometimes inhabit clay soils, although they prefer sandy substrates. Soils on the site are gravelly. The drainage lines represent optimal bullfrog habitat and should therefore be protected.
- No reptiles should be captured or intentionally killed during the construction phase. Construction workers and future residents should refrain from killing or capturing reptiles (especially snakes) within the development area.

Visual environment and noise

All structures and lights will cause a visual impact. However, the visual environment will be in line with the developments in the surrounding area.

During the construction and operational phases of the proposed development, noise may be a factor. Noise impacts can be mitigated to a large extent during the operational phase, but during the operational phase, noise will be according to normal suburban surroundings.

7.5. Surface drainage

The study area falls within the A 71A quaternary drainage region within the Limpopo Catchment Management area. A non-perennial stream bisects the site and runs roughly south to north, draining into the Blood River. The area is currently drained via overland flow to the Blood River west of the site and into the Seshego Dam approximately 1.8km north of the site.

Drainage takes place by means of sheet wash and infiltration. Excess surface runoff is destined to drain in accordance to the prevailing topography and ultimately either joins the Blood River or its above-mentioned non-perennial tributary.

7.6. Archaeological and historical attributes

A Phase 1 Archaeological Impact Assessment has been conducted to evaluate the archaeological sensitivity of the study area. **The heritage report is attached in appendix 6 of this report.**

The following conclusions can be made from the report:

- No areas designated for socio-religious activities were recorded on the site. However the area is clearly utilized by locals for crop raising and the locals will need to be consulted with regard to the future use of the area.
- No historical remains were recorded.
- No graves were recorded.
- No Iron Age remains were recorded on site.
- No Stone Age remains were noted.

8. PUBLIC PARTICIPATION PROCESS

8.1. Process Followed

8.1.1. Newspaper Advertisement

The proposed project was advertised in the 29 July – 4 August version of the Capricorn Voice local newspaper to inform people about the project and request them to register as I&APs and/or identify environmental issues of concern. It also contained an invitation to respond to environmental issues and concerns of the proposed development. An example of this advert is attached in Appendix 3.

8.1.2. Site Notice

A site advertisement in English and Sepedi (Northern Sotho) was placed at selective points. An example of this notice as well as photos of the notices is attached in Appendix 3.

8.1.3. Background Information Notices

- Background information documents were delivered by hand and via e-mail.
- An example of the background information document is included in Appendix 3.
- The manner in which Background Information Documents (BID's) were distributed as well as proof thereof is also attached in Appendix 2.

Background Information Documents were also sent to:

- Department of Water and Sanitation
- Department of Rural Development and Land Reform
- Department of Rural Development and Land Reform - Land Claims Commission
- The Ward Councillor – Ward 11 - Polokwane Local Municipality
- The Municipal Manager - Polokwane Local Municipality
- Director of Planning and Development - Polokwane Local Municipality
- Land use Management section – Polokwane Local Municipality
- Public Participation officer – Polokwane Local Municipality
- Municipal Manager – Capricorn District Municipality
- Department of Development, Planning and Environmental Management Services (Capricorn District Municipality)

- COGHSTA
- National Department of Agriculture
- Limpopo Department of Economic Development, Environment and Tourism (LEDET)
- Department of Mineral Resources
- Relevant contact person – Portion 1 of Bloedrivier 696 LS

8.2. Public Meeting

AGES attended a ward committee meeting on 13 August 2015 to inform ward committee members of the environmental impact assessment process which will be taking place. A community meeting was planned and to be held as soon as a date has been provided by the community.

The community meeting was attended by AGES on 2 October 2015 whereby background information documents were distributed amongst the attendants which described the project and EIA process. The document contains the contact details of the EAP to whom comments can be sent to regarding the project/EIA process (**See proof of public participation – meetings held – Appendix 3**).

8.3. Draft Scoping Report and Plan of Study for EIA

- The draft scoping report and plan of study for EIA was submitted to LEDET on 9 September 2015 and acknowledged on 5 October 2015.
- The draft scoping report and PoS for EIA was made available for comments to all registered I &AP's for a period of 30 days from 9 September 2015 until 9 October 2015.
- Comments on the draft scoping report were received from LEDET on the 5 October 2015 (Refer to Appendix E of this report).
- The environmental impact assessment process is based on the actions and findings of the scoping phase as well as the comments and reviews by authorities and from interested and affected parties.
- All documentation lists and proof of Public Participation is included in Appendix 3 of this report.

8.4. Final Scoping Report and Plan of Study for EIA

- The Final scoping report was submitted to LEDET on the 22 October 2015, acknowledged and accepted on 19 November 2015.
- All documentation lists and proof of Public Participation process is included in Appendix 3.
- The environmental impact assessment process is based on the actions and findings of the scoping phase as well as the comments and reviews by authorities and from interested and affected parties.

All documentation lists and proof of the Public Participation process are included in Appendix 3 of this report.

8.5. Draft Environmental Impact Report

- The consultation Environmental Impact report (EIAR) was made available for comments to all registered I&AP'S for a period of 30 days from the 3rd of February up and until the 7th of March 2016.
- All responses to comments (Draft EIA report) have been included in this Final Environmental Impact report.

9. ADVANTAGES AND DISADVANTAGES OF PROPOSED DEVELOPMENT AND ALTERNATIVES

In the EIA process, the consideration of alternatives is always important, should the proposed site not fit into the parameters of the EIA framework. The alternatives can be categorised as follows.

- Location alternatives
- Process alternatives
- No-Go alternative

9.1. Location alternative

9.1.1. Advantages

- There are no other property location alternatives as the land belongs to the municipality and they have no legal rights on any other properties in the area. However, the layout plan can be amended in order to minimize potential environmental impacts.
- By conducting an **ecological assessment**, prior to development, the best location was selected for the different elements of the proposed development.
- The ecological assessment and sensitivity study determined the proposed layout plan according to the sensitivity of the area. **See ecological report in appendix 4**
- By carrying out a **geo-technical study** prior to development, the positioning of certain parts of the development was based on the ideal or most suitable soil conditions. **See Initial geo-technical report in appendix 5.**
- By carrying out a **heritage assessment** prior to development, the re-positioning of certain parts of the development was based on the occurrence of heritage aspects. Areas can also be avoided if necessary due to the presence of heritage characteristics. The results of the Heritage assessment indicated that there were no areas designated for socio-religious activities. However the area is clearly utilized by locals for crops and the locals will need to be consulted with regard to the future use of the area. **See Phase 1 Heritage report attached in Appendix 6.**
- The socio-economic status of the area will be vastly improved due to the availability of jobs, new housing and properties.

9.1.2. Disadvantages

- The character of the landscape will change.
- Possible loss of heritage components.
- There will be a visual impact.
- Biodiversity and the environment will be affected.
- Possible air, water, soil and noise pollution.

The negative and positive impacts have been evaluated and are detailed on in this report.

Geo-Technical – (Geology and soils) – Loss of topsoil during removal of vegetation), Pollution (fuels, oils, hazardous materials, solid waste dumping).

Heritage - Possible loss of heritage material (construction activities)

Visual - Increase in number of erven and construction of new residences, increase in areal structures

Social - Possible conflict with current land users (use of land for agricultural and grazing purposes)

9.2. Process Alternative

The only processes involved are those for the establishment of a residential extension of Seshego in the Polokwane local municipal area. The development site is the farm Klipfontein 670 LS and the complete development will extend over the whole farm. Polokwane Local Municipality is the landowner of this farm and they have no legal standing on any of the other surrounding farms. As the farm belongs to the local municipality, the decision can be made by the local municipality on what the activities will be on the farm. In this case a need for housing and the formalization for areas for housing developments have been identified and a decision came forth from the local municipality, which lead to the application for environmental authorization for the demarcation of an area for a residential development.

9.3. No go alternative

This option would come into effect if the abovementioned assessments reveal fatal flaws in the process. To date no fatal flaws have been revealed.

The no-go alternative of not developing the proposed stands and township would leave the environment in the current state. The no-go alternative would result in the loss of much needed additional housing and job creation.

CIVIL SERVICES (Services Report - appendix 7)

Civil services will be designed and installed to comply with requirements as set out by the Polokwane Municipality. Once the Municipal services are available in the area owners/developers will connect the internal services to the bulk supply and enter into a service level agreement with the Local Municipality.

9.4. Water Supply

Water bulk supply for the proposed development will be done by the Polokwane Local Municipality.

Required demand:

- 3 050 – Residential Stands 1 525KI/day
- 1 Erf – Residential 3 erf – 4 559m² 10KI/day
- 7 736m² - Business 35KI/day
- 6 erven – Educational 102 KI/day
- 7 erven – Church 5.6 KI/day
- 4 erven – Crèche 27.5KI/day

Total demand including summer peak and losses = 2 301 KI/day. Storage reservoirs required is 5 000KI.

9.5. Sewer Reticulation:

Sewer effluent will be connected to the Municipal outfall sewer at Seshego extensions E and H. The effluent will be treated at the Blood River Purification Plant. An application should be submitted to the Local Municipality and the sewer reticulation system will be designed and installed according to the Municipality's requirements.

9.6. Roads:

Main access for the site is from Nelson Mandela road and 119th Road through Seshego extension H. Nelson Mandela road consists of a 4-lane surfaced road with 30m road reserve while 119th road consist of a 2-lane surfaced road. The conditions of both roads are fair with isolated potholes and the vertical- and horizontal alignments suitable for light and heavy vehicles. Both roads fall under the jurisdiction of the Municipality.

9.7. Storm Water:

The storm water is channelled on the internal road network, collected and let out in the flood line areas. The 1: 100 flood will not influence the layout and is indicated on the layout drawing and with exception of Municipal Erf 2416 will not influence the layout. All storm water designs will be according to the Polokwane Municipal standards as well as the Guidelines for Human Settlement Planning and Design,

9.8. Solid waste management:

Consent from the Polokwane Local Municipality should be obtained to dispose the solid waste at the Polokwane land fill site.

9.9. Electrical supply:

Electrical demand should be calculated by an Electrical Engineer. An electrical transformer is located on site. It is expected that the new ESKOM transformer dedicated to the development will be required. The developer should submit an application to ESKOM in this regard.

10. IMPACTS DETERMINATION AND EVALUATION

An environmental impact is defined as a change in the environment, be it the physical/chemical, biological, cultural and or socio-economic environment. Any impact can be related to certain aspects of human activities in this environment and this impact can be either positive or negative. It could also affect the environment directly or indirectly and the effect of it can be cumulative.

10.1. Methodology to assess the impacts

To assess the impacts on the environment, the process has been divided into two main phases namely the Construction phase and the Operational phase. The activities, products and services present in these two phases have been studied to identify and predict all possible impacts.

In any process of identifying and recognising impacts, one must recognise that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002, Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This has been done by using wherever possible, legal and scientific standards which are applicable.

The significance of the aspects/impacts of the process have been rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The *consequence matrix* use parameters like *severity*, *duration* and *extent* of impact as well as *compliance* to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the *likelihood* that consists of two parameters namely *frequency* and *probability*. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance. It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.

Table 1: Significance ratings (Plomp 2004)

Significance	Low	Low-Medium	Medium	Medium-High	High
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Description of the parameters used in the matrixes

SEVERITY:

Low:

Low cost/high potential to mitigate. Impacts easily reversible, non - harmful insignificant change/deterioration or disturbance to natural environments.

Low-medium:

Low cost to mitigate Small/ potentially harmful Moderate change/deterioration or disturbance to natural environment.

Medium:

Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful Significant change/ deterioration or disturbance to natural environment.

Medium-high:

High cost to mitigate. Possible to mitigate Great/Very Harmful Very significant change/deterioration or disturbance to natural environment.

High:

Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely Harmful Disastrous change/deterioration or disturbance to natural environment.

DURATION:

Low	Up to one month
Low-medium	One month to three months
Medium	Three months to one year
Medium-high	One to ten years
High	Beyond ten years

EXTENT:

Low	Project area
Low-medium	Surrounding areas (Neighbouring farms, Seshego H (Zone 8)
Medium	Within Polokwane Local Municipality area of jurisdiction
Medium-high	Within Capricorn District Municipality area
High	Regional, National and International

FREQUENCY:

Low	Once/more a year or once/more during operation
Low-medium	Once/more in 6 months
Medium	Once/more a month
Medium-high	Once/more a week
High	Daily

PROBABILITY:

Low	Almost never/almost impossible
Low-medium	Very seldom/highly unlikely
Medium	Infrequent/unlikely/seldom
Medium-high	Often/Regularly/Likely/Possible
High	Daily/Highly likely/definitely

COMPLIANCE:

The following criteria are used during the rating of possible impacts.

Low	Best Practise
Low-medium	Compliance
Medium	Non-compliance/conformance to Policies etc. - Internal
Medium-high	Non-compliance/conformance to Legislation etc. - External
High	Directive, prosecution of closure or potential for non-renewal of licences or rights

11. ENVIRONMENTAL IMPACTS

The following possible environmental impacts were identified:

ENVIRONMENTAL ISSUES	POSSIBLE CAUSE	POTENTIAL IMPACTS
Air Pollution and noise		
Smoke	<ul style="list-style-type: none"> • Vehicle emissions • Fires 	<ul style="list-style-type: none"> • Health problems • Air pollution • Public nuisance • Noise pollution
Dust	<ul style="list-style-type: none"> • During construction • vehicle operation on roads • Vegetation clearing 	
Fumes	<ul style="list-style-type: none"> • Fumes from vehicles • Fumes from machinery 	
Noise	<ul style="list-style-type: none"> • Construction machinery and vehicles. • Presence of construction camp (if applicable) 	
Water quality		
Pollution of water sources	<ul style="list-style-type: none"> • Spillage of fuel & oil from vehicles • Spillage of building material e.g. cement etc. • Migration of contaminants off the site • Solid waste in storm water • Littering 	<ul style="list-style-type: none"> • Pollution of surface and groundwater • Health risk • Lower water quality • Soil degradation • Erosion • Siltation
Silt deposition in surface water drainage line	<ul style="list-style-type: none"> • Erosion risk due to increased run-off from built up area • Erosion from cleared areas during construction 	
Pollution from sanitation system	<ul style="list-style-type: none"> • Leakages of system and incorrect management of sanitation system • Inadequate measures to prevent sewage spillages • Overflow of sewage to groundwater 	
Water quantity		
Impact on amount of water resources available	<ul style="list-style-type: none"> • Over-utilisation of available water 	<ul style="list-style-type: none"> • Loss scarce resource • Increased pressure on ground water supply sources
Land/Soil degradation		
Soil contamination and degradation	<ul style="list-style-type: none"> • Spillages of oil, chemicals from Machinery & vehicles • Removal of vegetation during clearing for construction • Sewerage spillages (Toilet system) • Erosion due to increased runoff from built-up areas • Increased erosion of drainage channels • Site clearing during construction 	<ul style="list-style-type: none"> • Soil degradation • Loss of topsoil • Dust formation • Erosion
Biodiversity		
Decline in fauna and flora diversity	<ul style="list-style-type: none"> • Cleaning of site for construction • Pollution of soil • Pollution of water resources • Physical establishment of development • Loss of habitat due to establishment of development 	<ul style="list-style-type: none"> • Loss of biodiversity • Loss of habitat • Negative impact on biodiversity
Cultural/Heritage		
Possible loss of heritage sites	<ul style="list-style-type: none"> • Damage / loss during construction • Damage / loss during operation 	<ul style="list-style-type: none"> • Possible loss of cultural heritage

ENVIRONMENTAL ISSUES	POSSIBLE CAUSE	POTENTIAL IMPACTS
Visual impact		
Impact of the proposed development of sense of place.	<ul style="list-style-type: none"> The physical existence of the development 	<ul style="list-style-type: none"> Negative impact on landscape quality character Negative impact on sense of place.
Visual impact	<ul style="list-style-type: none"> Construction site, buildings, Lights at night Presence of new development Overhead power lines 	<ul style="list-style-type: none"> Obstruction Visual intrusion Public nuisance
Health and Safety		
Security	<ul style="list-style-type: none"> Influx of people to area including construction workers and others after completion. 	<ul style="list-style-type: none"> Loss of safe and secure environment Threat to health Danger to human life
Fires	<ul style="list-style-type: none"> Accidental fires Burning of waste Cooking with fires 	
Socio-economic impacts		
Impact from change of land use from agriculture to township.	<ul style="list-style-type: none"> Change of land use to residential, business, institutional, educational, public open spaces and streets. 	<ul style="list-style-type: none"> Community conflict – existing use of land
Impact of the residential and other development on adjacent landowners	<ul style="list-style-type: none"> Noise from construction activities, Dust generated by construction vehicles and from site preparation, The visual impact of lights The visual impact of residential and other units (business, institutional etc.) located against the skyline. 	<ul style="list-style-type: none"> Nuisance and disruption Noise pollution Air pollution Negative visual impact
Job creation Ownership	<ul style="list-style-type: none"> Temporary jobs during Construction phase Permanent jobs during operation New housing New businesses New schools 	<p>Positive impact – job creation</p>

These key areas of impacts are further explored and described below to detail the impacts, the impact ratings and mitigation measures.

The following specialist investigations have been conducted and used in assessing the environmental impacts of the different activities that form part of the development:

- Ecological Assessment and sensitivity map (See appendix 4)
- Phase 1 Heritage Impact Assessment by Cultural Resource Consultants (See appendix 6)
- A Geo-technical Investigation.(See appendix 5)
- A 1:100 year flood line determination (See appendix 7)
- Engineering Services (roads, storm water, and sewage) (See appendix 7)

12. ASPECTS, RELATED IMPACTS, SIGNIFICANCE & PROPOSED MITIGATION MEASURES

In this section, all the possible impacts that can be predicted in both the construction and operational phases are addressed. Specific mitigation measures are proposed and the significance of these impacts given with and without mitigation measures.

12.1. Air quality

Planning Phase

No impact is envisaged.

Construction Phase

During this phase there will be a concentration of earthmoving equipment and construction vehicles that will level the area, clear vegetation for houses and infrastructure and in the process will create dust and exhaust smoke that will impact on air quality.

Burning of waste and fires at construction sites will also create smoke which will affect the air quality.

Operational phase

The increased traffic volumes and people will lead to increased levels of air pollution.

Project Phase	Environmental aspect: Air quality								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earthworks and vegetation clearance	Air Pollution by excessive dust formation	Low	Low-Medium	Low-Medium	Medium	Medium-high	Low	Low-medium
	Movement of construction vehicles	Air Pollution by excessive fumes/emissions (smoke and dust)	Low	Low-medium	Low-medium	Medium	Low-Medium	Low	Low-medium
	Burning of cleared vegetation	Air pollution by excessive smoke	Low-Medium	Low-Medium	Medium	Low-Medium	Medium-high	Low	Medium
	Accidental fires	Air pollution by excessive smoke	Low	Low	Low-Medium	Low	Medium	Low	Medium
	The use of fires for cooking	Air pollution by excessive smoke	Low	Medium	Low	Medium	High	Low	Medium

Project Phase	Environmental aspect: Air quality								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Operation	Burning of waste	Air pollution by excessive smoke	Medium	Low-medium	Low-Medium	Medium	Medium-high	Low	Medium
	Veld fires	Air pollution caused by smoke	High	Low	Medium	Low	Medium-High	Low	Medium

Mitigation measures - Construction Phase:

- Construction vehicles and machinery must be well serviced in order not to produce excessive smoke.
- Construction should only take place during office hours on weekdays and Saturdays.
- Construction personnel must comply with speed restriction of between 30-40 km per hour within the site boundaries as well as on the access roads to reduce the generation of dust.
- Where possible, veld fires must be prevented by means of fire breaks according to the National Veld and Forest Fire Act.
- Comply with Provincial noise regulations. Exhaust systems of construction machinery must be maintained.
- Construction areas must be damped to prevent excessive dust formation. The internal gravel roads must be maintained (grading or watering) on a regular basis during construction.
- The clearing of the construction sites should be done in phases as the construction progresses. The cleared topsoil should be stockpiled in such a way that transportation by wind or rain is limited.
- Removal of vegetation should be confined to construction sites.
- Solid waste generated by the construction teams may not be burned on site or the surrounding areas.
- Solid waste should be kept in animal proof bins from where it will be removed to the municipal waste disposal site operated by the local municipality on a regular basis e.g. weekly.
- Cleared vegetation may not be burned on site, but removed to a licensed waste disposal site regularly.
- No open fires or cooking fires are allowed at construction sites. Extra care should be taken to ensure to prevent veld fires from occurring. Cooking should preferably be done on gas stoves.

Mitigation Measures - Operational Phase:

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected.
- Solid waste should be removed by the local municipality on a weekly basis.

12.2. Noise

Planning Phase

No impact is envisaged.

Construction Phase

Noise can be expected from the construction vehicles, machines and construction labour during the construction.

Operational phase

The increased traffic volumes and people will lead to an increase in the noise levels.

Project Phase	Environmental aspect: Noise								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Presence of construction camp (if applicable) and construction workers	Increased noise level, nuisance & disturbance to surrounding public	Low	Medium	Low	Medium	Medium	Low	Low-Medium
Construction	Operation of construction vehicles and equipment	Disturbance & nuisance to surrounding land owners	Low	Medium	Medium	Medium-High	Medium	Low-Medium	Medium
Operation	Increased vehicle movement Increased noise levels due to increase in people on developed sites	Disturbance and nuisance to the surrounding residents	Low	High	Medium	High	Low-Medium	Low-Medium	Medium

Mitigation measures-Construction Phase:

- Construction vehicles, machinery and equipment must be well serviced so that they do not produce excessive noise.
- Construction should only take place during daylight hours. No construction on Sundays and public holidays.
- Construction personnel must comply with speed restrictions of 30-40 km per hour within the site boundaries and on the access road to reduce the generation of noise.
- Contractors must comply with Provincial noise regulations.
- Where construction machinery displays excessive noise levels, it must be fitted with noise mufflers and be maintained properly.

Mitigation measures-Operation Phase:

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected.
- The level of noise in a township is governed by Municipal by-laws.
- Speed limits are controlled by law.

12.3. Water quality

Planning Phase

No impact is envisaged.

Construction Phase

- ❖ Lack of temporary sanitation facilities and the regular maintenance thereof could result in subsurface- and surface water pollution and associated health risks.
- ❖ Temporary sanitation facilities must be correctly maintained to prevent spillages.
- ❖ Spillage of fuel and lubricants from construction vehicles could occur.
- ❖ Storm water contamination by solid waste could lead to groundwater and surface water pollution.
- ❖ In this phase the vegetation cover is removed at the construction sites, which intensifies the risk of erosion caused by storm water run-off over these areas. The construction material should be stockpiled in such a way that the risk of transportation into the drainage channels and areas are limited.

Operational Phase

- ❖ Pollution by sanitation leakages and solid waste may lead to water pollution.
- ❖ Storm water run-off over open areas can cause erosion as well as the washing of soil into on-site drainage lines and the Blood River.

Project Phase	Environmental Aspect: Water quality								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Spillage of fuel & lubricants from construction vehicles Spillage from temporary storage of fuel, oil & other chemicals	Chemical pollution of water resources Impact on the health of humans & bio-diversity	Medium	Medium	Medium	Low-Medium	Medium	Low-Medium	Medium
	The storage and disposal of building rubble, domestic waste and littering on site	Pollution of water resources Impact on the health of humans & bio-diversity	Low-medium	Medium	Medium	Medium	Medium	Low	Medium
	Sanitation seepage and spillage from temporary toilets	Pollution of water resources Impact on the health of humans & bio-diversity	Medium	Medium	Medium	Medium	Low-Medium	Low	Medium-high
	Storm water run-off over cleared areas, roads and trenches	Increased turbidity and decrease in water quality (drainages and River)	Low-Medium	Medium	Medium	Low-Medium	Medium	Low-Medium	Medium
	Stockpiling of construction & cleared material. Transportation of stockpiled material (construction & infill) by means of wind or rain.	Pollution of water resources Increased turbidity and decrease in water quality	Low-Medium	Medium	Medium	Low-Medium	Medium	Low-Medium	Medium
	Spillages and leaks from construction activities (e.g. bitumen, mixing of concrete, cement, paints etc.).	Pollution of water resources	Medium	Medium	Medium	Low-Medium	Medium	Low-Medium	Medium

Project Phase	Environmental Aspect: Water quality								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Operation	The disposal and storage of domestic waste	Pollution of water resources Impact on the health of humans & bio-diversity	Low-Medium	High	Medium	High	Low-Medium	Low-Medium	Medium
	Domestic use of water	Depletion of water resources: Water consumption	Low-medium	High	Low-medium	High	Medium-High	Low-Medium	Medium-high
	Watering of Gardens	Depletion of water resources: Water consumption	Low	High	Low	Low	Low	Low	Low-Medium
	Leaks from sanitation system	Biological pollution of water resources Impact on the health of humans & bio-diversity	High	High	Medium	Medium	Medium	Low-Medium	Medium-High
	Increased run-off contaminated with surface pollution being washed into streams	Pollution of water resources Degradation of aquatic eco-systems	Low-Medium	High	Medium	Low-Medium	Medium	Low-Medium	Medium

Mitigation measures - Construction Phase

- Removal of vegetation must be limited to the construction areas.
- Cleared areas should be rehabilitated by reintroducing indigenous vegetation or paved as soon as possible to limit the occurrence of erosion.
- Slopes produced by removing of soil must be kept to a minimum to reduce the chances of erosion damage.
- Trenches for pipes or cables must where possible be dug next to roads where it will have the smallest impact. Any trenches that are dug for the supply of services to the stands must be filled up and compacted well and slightly higher than the areas around it. This would allow for settling of the soil without trenches or erosion gullies forming again.
- Construction vehicles should be serviced on a regular basis to prevent or minimize the risk of spills or leakages. Vehicles should preferably be serviced at another location as opposed to the proposed development site.
- Drip pans should be used during re-fuelling and servicing of construction vehicles. Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.
- Drip pans can also be placed underneath stationary construction vehicles and equipment. The used or spilled oil should be taken to the nearest oil refiner or recycling plant for recycling.
- The temporary vehicle maintenance yard (if applicable) and storage area should be fenced off and placed at least 100 m away from the drainages on site and the Blood River.
- The mixing of cement, concrete, paints etc. must be done at designated areas within concrete aprons or on protected plastic linings to contain any possible spillages into surface or groundwater resources.

- Solid waste generated by the construction teams may not be burned on site or the surrounding areas. The solid waste should be kept in animal-proof bins at the construction camp (if applicable) and construction sites and be removed to the nearest available municipal waste disposal site on a regular basis e.g. weekly.
- Building rubble should be removed to the licensed dumping site as the development progresses.
- Regular clean-up programs should be put into effect throughout the premises to limit the impact of littering.
- Temporary sanitation facilities should not be placed along steep slopes or closer than 100 m from drainage lines and Blood River.
- It should be ensured that the ratio of one toilet for every 15 workers on site be maintained.
- Temporary sanitation systems must be maintained and serviced by a licenced operator.
- Promote the use of indigenous plants to be planted in gardens in order to minimize the use of water.
- Water consumption for construction and domestic purposes is a given, water should never be wasted.

Mitigation measures-Operational Phase

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected.
- The solid waste or garden refuse may not be burned on site.
- Solid waste should be kept in waste bins and collected once a week in accordance with the local municipality’s program for the removal of household waste.
- The detection of any leakages or malfunctioning of the sanitation system should be reported and repaired immediately.

12.4. Water quantity

Planning Phase

No impact is envisaged.

Construction phase

During this phase, water consumption will be minimal because it will be utilised for construction purposes only.

Operational phase

By using the rainwater harvested from the roofs of houses, pressure on water resources is reduced.

Project Phase	Environmental Aspect: Water quantity								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Over-use of water during construction activities and dust abatement along internal roads and at construction sites	Depletion of water resources used for domestic purposes	Low	Medium	Medium	Medium	Medium-High	Low-Medium	Medium
	Excessive water use by exotic invasive plant species	Depletion of surface and groundwater water resources	Low	Medium-High	Medium-Low	Medium-Low	Medium-Low	Low	Low-Medium

Project Phase	Environmental Aspect: Water quantity								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Operation	Excessive use of water for domestic purposes Excessive gardening	Reduction of water reserve necessary for functioning	Medium	Medium	Medium	Medium	Medium	Medium	Medium - high

Mitigation measures – Construction Phase

- Water should be used sparingly and it should be ensured that no water is wasted e.g. regular inspection of pipes to ensure that no leaks occur.
- If applicable, water tanks should be regularly inspected to ensure that no leaks occur.
- If applicable, any exotic weed / plant species should be eradicated.

Mitigation measures-Operational Phase

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected. Education to the local community will be important in this regard.
- Water consumption for domestic purposes is a given, but care must be taken not to waste any water.
- The gutters (if applicable) of the houses can be designed in such a way that rainwater could be diverted to water storage tanks/containers from where the water can be re-used in the gardens. This could minimize storm water runoff and pressure on water supply.
- The cleared areas around the houses and infrastructure should be re-vegetated or paved as soon as possible to limit erosion. The planting of vegetation indigenous to the area will minimize the impact on water resources.
- Indigenous grass species should be established at and around the different households and lawns should be limited.

12.5. Geology and soil

Planning Phase

No impact is envisaged.

Construction phase

- ❖ Clearing of the site will result in opening of previously inaccessible areas and topsoil being vulnerable to erosion by wind or runoff water.
- ❖ During construction, the vehicles and equipment used have the potential to spill fuel and lubricants that can pollute the soil. The improper handling of hazardous materials can cause contamination to the soil and surface water bodies.
- ❖ The storage of solid waste before it can be disposed of, has the potential to pollute the soil and be a public nuisance.
- ❖ Lack of temporary sanitation facilities and the regular maintenance thereof could result in subsurface- and surface water pollution and associated health risks.

- ❖ Temporary sanitation facilities must be correctly maintained to prevent spillages.
- ❖ Digging and trenching for the installation of water pipes and cables expose topsoil to erosion.
- ❖ Where needed, permanent erosion control plans should focus on the establishment of stable native vegetation communities.

Other mitigation measures needed to prevent soil erosion include:

- ❖ Ensure the amount of bare soil exposed, is minimized by staging earthworks in phases and leaving as much ground cover intact as possible during construction.
 - ❖ Protect all areas susceptible to erosion and ensure that there is no undue soil erosion from activities within and adjacent to the construction camp (if applicable) and work areas.
 - ❖ Repair all erosion damage as soon as possible and in any case not later than six months before the termination of the maintenance period to allow for sufficient rehabilitation growth.
 - ❖ Do not allow surface water or storm water to be concentrated, or to flow down cut or fill slopes or along pipeline routes without erosion protection measures being in place.
- **Conservation of topsoil during construction should be prioritized on site and done as follows:**
 - Topsoil should be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.
 - Stockpile topsoil separately from subsoil.
 - Stockpile topsoil in an area that is protected from storm water runoff and wind.
 - Maintain topsoil stockpiles in a weed free condition.
 - Topsoil should not be compacted in any way, nor should any object be placed or stockpiled on top of it.
 - Stockpile topsoil for the minimum time period possible i.e. strip just before the relevant activity commences and replace as soon as it is completed.

Operational phase

- ❖ Inadequate installation and management of storm water drainage systems can cause soil erosion.
- ❖ The potential spillage of oil and diesel from vehicles has the potential to pollute/degrade the soil.
- ❖ Solid waste can be a nuisance and has the potential to pollute the soil before disposal.
- ❖ The use of herbicides and insecticides at the site should be limited as far as possible.

Project Phase	Environmental Aspect: Geology and soils								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Leaks or spills from construction vehicles Spills from temporary storage area of fuel/oil/chemical	Contamination / pollution of soil	Low-medium	Medium	Low-Medium	Medium	Medium-high	Low	Low-Medium
	Spillage from temporary sanitation system	Contamination / pollution of soil	Medium-High	Low	Low	Medium	Low-Medium	Low-Medium	Medium High

Project Phase	Environmental Aspect: Geology and soils								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
	Inadequate storage and disposal of building rubble, domestic waste and littering on site	Soil pollution + nuisance	Low-medium	Low-Medium	Low-Medium	Medium	Medium	Low	Low-Medium
	Excessive storm water run-off on site, especially along slopes, roads & cleared areas.	Soil degradation / erosion and dongas forming along roads and steep slopes	Low-Medium	Medium	Low-Medium	Low-Medium	Medium	Low	Low-Medium
	Excessive damage during excavation for service trenches and foundations	Soil degradation / Erosion	Low-Medium	Low-Medium	Low	Low-Medium	Medium-High	Low	Low-Medium
	Specific adverse Geo-technical characteristics of soils at sites	Damage to structures and infrastructure	Medium-High	High	Low	Low	Medium-High	Low-Medium	Medium
	Incorrect disposal and storage of domestic waste and littering	Soil pollution + nuisance	Medium	Medium-high	Medium-high	Medium-high	Medium-high	Low-Medium	Medium
Operation	Leaks from sanitation system	Contamination / pollution of soil	High	High	Medium	Medium	Medium	Low-Medium	Medium-High
	Increased run-off after heavy precipitation events	Erosion of topsoil and damage to structures, especially along the steeper slopes	Medium	Low-medium	Low-medium	Low-Medium	Medium	Low-Medium	Medium

Mitigation measures-Construction Phase

- Clearing of vegetation must be restricted to the proposed site; unnecessary clearance of vegetation must be avoided to reduce soil erosion.
- Trenches must be rehabilitated immediately after construction to avoid loss of topsoil by wind or runoff waters.
- Construction vehicles must be well maintained and serviced to minimize leaks and spills. If any spills occur, spill sorbs should be applied.
- Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.
- Drip pans should be used when refuelling and servicing construction vehicles or equipment.

- Ideally refuelling and servicing of vehicles and equipment should take place at the building contractor's workshops and not on site.
- Drip pans must be placed underneath stationary construction vehicles and equipment.
- The used or spilled oil should be taken to the nearest oil refiner or recycling plant for recycling.
- The temporary vehicle maintenance yard (if applicable) and storage area should be fenced off and placed at least 100 m away from drainages and the Blood River.
- Solid waste must be kept in adequate animal proof waste bins at the construction camp (if applicable) and at the construction sites.
- Building rubble and domestic waste should be removed on a regular basis to the closest available landfill site.
- Regular clean-up programs should be put into effect through-out the premises to limit the impact of littering caused by construction activities.
- Any building rubble must be removed to a licensed disposal site after construction.
- Storm water channels should be designed to prevent erosion on the roads and cleared areas.
- Temporary sanitation facilities must regularly be serviced by appropriate companies to ensure that no spills or leaks from toilets to surface- and groundwater take place.
- Temporary toilets should not be placed closer than 100 m from drainages and the Blood River.
- It should be ensured that the ratio of one toilet for every 15 workers on site be maintained.
- Trenches for pipes or cables must where possible be dug next to roads where it will have the smallest impact. Any trenches that are dug for the supply of services to the stands must be filled up and compacted well and slightly higher than the areas around it.
- Cleared areas should be re-vegetated or paved as soon as possible to limit erosion. Berms to limit the flow of water over cleared areas will limit erosion.
- Indigenous vegetation must be used during the rehabilitation of cleared areas and around houses.
- The gravel roads used during construction must be constructed with storm water diversion channels to slow down the movement of water over the road surface. This will reduce erosion along steep slopes and the ponding of water at low lying areas.
- The clearing of the site should be done in phases as the construction progresses.

Mitigation measures-Operational Phase

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected. Education to the local community will be important in this regard.
- Cleared areas should be re-vegetated with indigenous vegetation after the construction phase to prevent possible erosion.
- Solid waste should be kept in waste bins and disposed of or collected once a week, by the local municipality.
- Storm water drainage systems must be well maintained regularly during the operation phase.
- The gutters of all building structures can be designed in such a way (if possible) for the rainwater to be diverted to water storage tanks/containers, from where the water can be reused in the gardens. This will minimize storm water runoff and the added pressure on the water supply.
- The detection of any leakages or malfunctioning of the sanitation system should be reported and repaired immediately.

12.6. Ecology (Fauna and Flora)

Planning Phase

No impact is envisaged.

Construction phase

- ❖ Any removal of natural vegetation and destruction of habitat will have a negative effect on the bio-diversity.
- ❖ Clearing of the site for construction purposes will result in the destruction of faunal habitats.
- ❖ The specific mitigation measures included in the Ecological report (**Refer to appendix 4**) should be adhered to, to insure that the impact on the vegetation and habitats are kept to the minimum.
- ❖ Veld fires caused by negligence on the part of the construction workers could have various negative impacts on the indigenous fauna and flora.
- ❖ The stockpiling of cleared exotic invasive vegetation species close to drainage areas and the Blood River could promote the spreading of these species.
- ❖ Lack of temporary sanitation facilities and the regular maintenance thereof could result in subsurface- and surface water pollution and associated health risks.
- ❖ Temporary sanitation facilities must be correctly maintained to prevent spillages.

Operational phase

- ❖ The operation of the development can have a negative impact on the bio-diversity if it is not managed correctly.
- ❖ Introduction of alien invasive vegetation will have a negative impact on the indigenous vegetation.
- ❖ Veld fires especially can have a major negative impact on fauna and flora as well as on the safety of people.
- ❖ The possible presence of any solid waste or toxic substances can be the cause of unnecessary animal deaths.
- ❖ Poisoning of problem animals can lead to deaths of birds of prey and other prey animals in the area.
- ❖ Pesticides and herbicides used during operation can cause pollution if not handled and applied correctly.

project Phase	Environmental Aspect: Ecology (Fauna and Flora)								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Irresponsible vegetation clearance & earthworks at construction site	Loss of indigenous plant & animal species. Disturbance to sensitive habitats	Medium	Medium	Low-Medium	Medium	Medium-High	Low-medium	Medium
	The occurrence of veld fires on site	Destruction of flora / habitats Loss of indigenous fauna	Medium-High	Medium	Medium-high	Low-Medium	Low-medium	Low	Medium
	Spillage from temporary sanitation system	Destruction of flora / habitats Loss of indigenous fauna Public nuisance	High	Low	Low	Medium	Low-Medium	Low-Medium	Medium High

project Phase	Environmental Aspect: Ecology (Fauna and Flora)								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
	Littering along roads & construction sites	Public nuisance Loss/death of indigenous fauna and flora	Low-Medium	Medium	Medium	Medium-High	Medium	Low	Medium
Operation	Planting indigenous vegetation in gardens	Improve bio-diversity	Medium+	High+	Medium+	High+	High+	Positive Medium High	Positive Medium-High
	Rehabilitation of cleared areas (indigenous)	Improve bio-diversity, supply habitat for indigenous species.	Medium+	High+	Medium+	High+	High+	Positive Medium High	Positive Medium-High
	Rehabilitation of cleared areas	The spreading of exotic invasive plant species Loss of habitat & indigenous flora	Medium	High	Medium	Low-Medium	Medium	Low-Medium	Medium
	Leaks from the sanitation system	Destruction of flora / habitats Loss of indigenous fauna Public nuisance	High	High	Medium	Medium	Medium	Low-Medium	Medium-High
	The occurrence of veld fires	The loss of indigenous fauna & flora	Medium-High	Medium	Medium	Low-Medium	Medium-High	Low-Medium	Medium
	Irresponsible control of pests and vermin in buildings	Killing & poisoning of fauna feeding on the poisoned vermin or pests	Low-Medium	High	Low-Medium	Medium-High	Medium	Low-Medium	Medium
	The erection of walls or fences	Fragmentation of available habitat Restriction of movement of small mammals, reptiles & amphibians	Low-Medium	High	Low-Medium	High	Medium	Low-Medium	Medium

Mitigation measures – Construction phase

- High sensitivity areas must be avoided.
- Removal of vegetation should be confined to construction areas.
- Care must be taken that unnecessary clearance of vegetation does not take place. Natural vegetation must be retained where possible; large trees must not be removed but as far as possible, but be incorporated into the design plan. The removal of protected trees (Marula) can only take place once a permit has been obtained.
- Cleared vegetation should be composted where possible to preserve nutrients in it and returned to the soil.

- If applicable, the herbicides used to control the invasive plant species should be chosen in consultation with an ecologist, as some of the agents might be detrimental to the surrounding indigenous fauna and flora.
- Fires should only be allowed in designated places within the construction camp (if applicable) and extra care should be taken to prevent veld fires of occurring.
- Firebreaks should comply with the National Veld and Forest Fire Act, 1998.
- Cleared vegetation should not be burned on site.
- The cleared vegetation should be stockpiled and taken to the closest available landfill site.
- Solid waste must be kept in adequate animal-proof waste bins at the construction camp and sites.
- Regular clean-up programs to be put into effect along the access road and through-out premises to limit impact of littering caused by construction activities.
- Building rubble and domestic waste should be removed on a regular basis to the closest landfill site.
- No animals may be killed, captured or hunted on site by construction workers.
- No poison should be used to control any animals without the input of an ecologist/zoologist.
- Temporary sanitation facilities must regularly be serviced by appropriate companies to ensure that no spills or leaks from toilets to surface- and groundwater take place.
- Temporary toilets should not be placed closer than 100 m from surface streams.
- It should be ensured that the ratio of one toilet for every 15 workers on site be maintained.

Mitigation measures – Operational phase

- This phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected. Education to the local community will be important in this regard.
- No snaring or hunting of animals unless permitted by the relevant authority.
- The use of eco-friendly products to control pests/vermin at buildings should be promoted and if necessary an ecologist/zoologist be consulted before use.
- Fires should only be allowed in designated places and extra care should be taken to prevent veld fires.
- Firebreaks should comply with the National Veld and Forest Fire Act, 1998 (Chapter 4: Duty to Prepare and maintain firebreaks).
- Residents should be encouraged to plant indigenous vegetation at and around their houses.
- Solid waste should be kept in waste bins and collected once a week by the local municipality.
- The sewage treatment system should be regularly inspected to ensure that no spills or leaks from sanitation system to ground- or surface water take place.

12.7. Archaeological, Cultural and Social Features

Planning Phase

No impact is envisaged.

Construction phase

The clearing of the site may have a negative impact on the archaeological features of the site. Care must be taken in the excavations and moving of soil to observe any archaeological feature or heritage remains of importance, which were not observed during the survey and assessment of the site. These finds must be left and reported to the archaeological consultant for comments.

Operational phase

Landowners may find/dig out some of this attributes during gardening, landscaping or extensions of their houses or buildings. These finds must be left and reported to the archaeological consultant.

Project Phase	Heritage								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Irresponsible earth moving and soil clearance	Destruction of archaeological and heritage remains	Medium-High	medium	Low	low	Low Medium	Low	Medium
Operation	Incorrect functioning and operational activities of the development	Destruction of archaeological and heritage remains	Medium-High	High	Low	Low	Low	Low	Low-Medium

Mitigation measures – Construction phase

- Care must be taken during the construction process that anything of heritage value that is unearthed must be recorded and the Heritage specialist or SAHRA informed of the find.

Mitigation measures – Operational phase

- During operation any finds of archaeological importance must be reported to the Heritage specialist. See Phase 1 Heritage Impact Assessment (**Appendix 6**).

12.8. Aesthetics

Planning Phase

No impact is envisaged.

Construction phase

Buildings of different colours, lights, electric and telephone lines are the major causes of visual impacts for residential developments.

The visual characteristics of the area will undergo changes through the added buildings and associated structures on the site. Buildings have a potential *visual impact* and lights at night can become a nuisance.

Operational phase

Buildings have a visual impact and lights at night can be a nuisance.

Project Phase	Environmental Aspect: Visual								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Irresponsible construction activities and temporary construction structures. Removal of vegetation	Visual disturbance	Low	Medium	low	High	high	Medium	Medium
Operation	Presence of buildings and infrastructure associated with the proposed development	Visual disturbance	Medium	High	Medium	High	High	Medium	Medium
	Luminescence caused by lights	Nuisance to surrounding residents	Low	High	Low-medium	High	High	Low-medium	Low-medium

Mitigation measures – Construction and Operation phases

- Cleared areas must be re-vegetated after construction to reduce the visual impact.
- No external floodlights/spotlights should be allowed. All external lighting should be covered to regulate the area of luminance.
- As far as feasible, the electricity must be distributed from existing power lines to the different development areas by means of underground cables.
- The Operation phase cannot be controlled by the developer, but each individual household is responsible to see that the environment is not adversely affected.

12.9. Health and Safety

Planning Phase

No impact is envisaged.

Construction phase

- ❖ Construction activities such as excavating of trenches, movement of construction vehicles, the use of equipment and the congregation of workers and staff on site increase the risk of injury.
- ❖ The activities of construction personnel on site may contribute to an increase in the level of crime in the area and may also contribute to an increase in the risk for fires.
- ❖ Lack of temporary sanitation facilities and the regular maintenance thereof could result in subsurface- and surface water pollution and associated health risks.
- ❖ Temporary sanitation facilities must be correctly maintained to prevent spillages and harm to people.

Operational phase

Movement of unauthorized individuals in the area could cause an increase in the crime rate.

Where people are present, there is an increase in the potential for veld fires during the operation phase.

Project phase	Environmental Aspect: Health and Safety								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Irresponsible construction activities – • Excavation of trenches etc. • construction vehicles • storage of poisonous goods	Loss or injury to human life accidents	Medium-High	low	Low	Medium-High	Medium	Low	Medium
	Unauthorized entrance to construction areas	Elevated crime levels	Low-Medium	low	Medium	Low-High	Medium	Low	Low-Medium
	Sanitation seepage and spillage from temporary toilets	Safety threat Threat to health of humans & bio-diversity	Medium-high	Low	Medium	Low	Low-Medium	Low	Medium-high
	The occurrence of veld fires caused by the negligence of construction workers	Loss of human life, biodiversity and construction equipment etc.	High	Low	Medium	Medium	Medium	Low-Medium	Medium
Operation	Irresponsible functioning of the proposed development	Elevated crime levels	Medium-High	High	Medium	Low-Medium	Low-Medium	Low-Medium	Medium
	Leaks from sanitation system	Impact on the health Safety of people	High	High	Medium	Medium	Medium	Low-Medium	Medium-High
	The increased movement of vehicles towards the site and at the proposed development	Increased safety risk	Medium	High	Medium	High	Low-Medium	Low-Medium	Medium
	The risk of veld fires caused by natural or human induced negligence	Loss of human life, bio-diversity, houses, infrastructure etc.	High	Medium	Medium	Medium	Medium	Medium	Medium

Mitigation measures – Construction phase

- The Contractor shall conform to all the stipulations of the Occupational Health and Safety act (Act 85 of 1993) and the Regulations applicable at the time of the tender. The Act requires the designation of a Health and Safety representative when more than 20 employees are employed.
- Only appointed personnel and security workers will be allowed to stay on site overnight.

- Proper access control (I.D. cards) should be enforced at the entrance gate to ensure that no unauthorised persons enter the site.
- Transportation should be pre-arranged for the construction workers. This should be done to ensure that the workers from the surrounding local communities have daily transportation available to and from the site.
- A temporary fence/barrier should be erected around the construction camp (if applicable) and storage area. The vegetation on and around the construction camp should be maintained to limit the risk of veld fires.
- Emergency plans to be in place in case of accidents or fires.
- Fire extinguishers to be available at construction camps (if applicable)
- No solid waste or vegetation may be burnt on the premises or surrounding areas. No fires will be allowed outside designated areas
- It must be ensured that the development complies with the requirements of the National Veld and Forest Fire Act, 1998 (Chapter 2: Fire Protection Associations and Chapter 4: Duty to Prepare and maintain firebreaks). The construction workers should be educated surrounding the risk of fires in the area and how to prevent it.
- Temporary sanitation facilities must regularly be serviced by appropriate companies to ensure that no spills or leaks from toilets to surface- and groundwater take place. Temporary toilets should not be placed closer than 100 m from drainages and the Blood River.
- It should be ensured that the ratio of one toilet for every 15 workers on site be maintained.

Mitigation measures – Operational Phase

- Each individual household is responsible to see that the environment is not adversely affected.
- The community should be educated on the dangers and risks of fires.
- Information to be available regarding prevention of fires, how to fight them and where to report or get assistance.
- Information about measures to prevent crime should be available as well as where to report crime.

12.10. Socio-economic aspects

Planning Phase

No impact is envisaged.

Construction phase and Operational phase

- ❖ The construction and operation phases of the development will have a positive impact on the socio-economic environment of beneficiary communities through employment opportunities and training and skills development.
- ❖ A number of temporary jobs will be created for local people during the construction phase.
- ❖ During the operational phase of this project it is intended to improve the local community morally, culturally and socially.

Project phase	Environmental Aspect: Socio-Economic								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	The employment of workers both long-term and short-term	Job creation both direct and indirect Skills development of local workforce	Positive High	Positive High	Medium- Positive High	Positive High	Positive High	N/A	High positive
Operation	Indirect impact of more people having a property to live on	Community security and social upliftment	Positive High	Positive High	Medium Positive High	Positive High	Positive High	N/A	High positive
	Presence of Business and Educational stands and related business and infrastructure	Community security and social upliftment	Positive High	Positive High	Positive High	Positive High	Positive High	N/A	High positive

Management measures – Construction Phase

- The Contractor’s must adhere to the District & Local Municipality’s guidelines, principles and policies.
- During construction jobs must be created for unemployed local people and skills must be transferred to them.
- Where viable, the work must be executed in a labour intensive manner to create as many jobs possible.

Management measures – Operation Phase

- During operational phase jobs can be created for unemployed local people & skills must be transferred to them.
- Where viable, the work must be executed in a labour intensive manner to create as many jobs possible.

13. POTENTIALLY SIGNIFICANT IMPACTS

Impacts with a rating of **Medium-high or High** are impacts which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment, the following impacts were regarded as potentially significant impacts:

- i. Impact of sewage spillage on environment.
- ii. Increased water use for domestic purposes
- iii. Planting indigenous, rare and endangered species and rehabilitation
- iv. The socio-economic impact for creating temporary and permanent jobs.
- v. The socio-economic impact of new housing and new business and educational opportunities

13.1. Cumulative impacts

- i. This impact is cumulative if the proposed mitigation measures in this report are not implemented
- ii. This impact is cumulative if the proposed mitigation measures in this report are not implemented.
- iii. This impact is positive and will be cumulative as more indigenous plants will seed new plants in the area.
- iv. This impact is positive and will be cumulative as communities will be uplifted and jobs will be created as well as skills development implemented.

- v. This impact is positive and will be cumulative as communities will be uplifted and jobs will be created as well as skills development implemented.

13.2. NATURE OF IMPACT

- i. This is a water-use soil, safety and health impact
- ii. This is a water-use impact.
- iii. This is a biodiversity impact.
- iv. This is a socio-economic impact.
- v. This is a socio-economic impact.

13.3. EXTENT AND DURATION OF IMPACT

- i. The extent could potentially be within the locality of the proposed development. The duration will be for the life of the development
- ii. The extent could potentially be within the locality of the proposed development. The duration will be for the life of the development.
- iii. The extent could potentially be within the locality of the proposed development. The duration is long term ongoing.
- iv. The extent could be with the local municipal area and is likely to occur from time to time.
- v. The extent could be with the local municipal area and is likely to occur in the beginning of the project where properties can be allocated.

13.4. PROBABILITY OF OCCURRENCE

- i. The probability is likely without mitigation.
- ii. The probability is definite.
- iii. The probability is likely.
- iv. The probability is definite.
- v. The probability is definite.

13.5. DEGREE TO WHICH IMPACT CAN BE REVERSED

- i. The impact (sewage spill) can be treated
- ii. The depletion of water cannot be reversed.
- iii. If this impact takes place over a very long time, the natural biodiversity will improve.
- iv. N/A.
- v. N/A.

13.6. DEGREE TO WHICH IMPACT CAN CAUSE IRREPLACABLE DAMAGE TO RESOURCES

- i. If not mitigated the water and soil resources will be permanently affected. Human health can be affected permanently and can cause death.
- ii. If not mitigated the water resources will be irreplaceable.
- iii. If this impact takes place over a very long time, the natural biodiversity will improve.
- iv. N/A.
- v. N/A.

13.7. DEGREE TO WHICH IMPACT CAN BE MITIGATED

- i. Successful mitigation is possible.
- ii. Successful mitigation is possible.
- iii. N/A.
- iv. Successful mitigation possible.
- v. N/A.

14. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

- In this report it is assumed that the contractor will act responsibly taking the environment into consideration at all times.
- It is assumed that the applicant will ensure that the mitigation measures in this report are complied with and that all monitoring and maintenance requirements will be followed closely.
- It is assumed that the development will stay within the ambit of the design of the development - it may be smaller with the result of fewer impacts.
- It is also assumed that this draft EIA Report will be sufficient to make an informed decision with regard to granting environmental authorization.
- All issues identified during the EIA process are addressed in the EIA Report and specialist studies.

15. AUTHORISATION OF ACTIVITY AND CONDITIONS

The purpose of this report is to provide the relevant authority with sufficient information regarding the potential impacts of the development to make an informed decision regarding the approval of the Environmental Impact Assessment report. Potential impacts were identified in consultation with I&AP's and technical specialists and were assessed using a matrix and by applying professional knowledge. The potentially significant negative and positive impacts that have been identified should be mitigated through the implementation of the mitigation measures contained in Section 13 of this report.

Impacts with a rating of *Medium-high* or *High* are impacts which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment, the following impacts were regarded as potentially significant impacts:

- i. Impact of sewage spillage on environment (medium high - Enviro-loo & high - other sanitation forms)
- ii. Increased water use for domestic purposes.
- iii. Planting indigenous, rare and endangered species and rehabilitation (POSITIVE).
- iv. The socio-economic impact for creating temporary and permanent jobs (POSITIVE).
- v. The socio-economic impact of new housing and new business and educational opportunities (POSITIVE).

It is submitted that the proposed mitigation measures, will effectively diminish the impacts to acceptable levels. Given the socio-economic imperatives of the development, the residual impacts are not of sufficient import to thwart the development.

It is the professional opinion of AGES that the proposed development does not present any fatal flaws in terms of negative impacts to the environment and therefore will not have any significant detrimental impacts to render the project unfeasible. The Department is therefore respectfully requested to evaluate this Impact Assessment Report, as part of an application that has been lodged in terms of Chapter 5 of the National Environment Management Act, 1998(Act no 107 of 1998), in respect of the activities identified in Government Notices R983 and R984.

It is proposed that the following conditions must be included in the Environmental Authorisation if the project is authorised:

- The mitigation measures contained in Section 12 of this report must be implemented.
- The management and or mitigation measures contained in the Environmental Management Programme must be implemented (See appendix 9 of this report).
- It is recommended that a groundwater study of the site be undertaken during the rainy season to establish the severity and extent of potential perched water tables.
- The responsibilities to obtain any further authorisations and/or licenses will rest on the proponent of the project, PRIOR to any activities on site.

Environmental impact statement - Summary of key findings

Ecology (Appendix 4)

- Croplands: Unlimited development could be supported in this area as the area has a low sensitivity.
- Silky thorn – red spike thorn open plateau woodland: Vegetation is classified as having a medium sensitivity. Protected Marula trees occur scattered through the woodlands and can be eradicated once a permit is obtained from Department of Forestry. No red data species occur here.
- Umbrella thorn – silky thorn lower plains: The area has a medium sensitivity and any indigenous tree species taller than 3 meter should be preserved. A permit should be obtained from Forestry for the removal of Marula trees.
- Riverine woodland & floodplains: This vegetation unit includes the drainage channels bisecting the proposed development site. Vegetation varies from closed woodland to closed grassland marshy areas along the tributary. An earth dam occurs in the main drainage channel bisecting the property. No red data plant species were recorded from this community.
- The drainage channels should be considered a high sensitivity area. The development should not impact on the drainage channels and a flood line determination for the drainage channels would be sufficient. This will be sufficient to prevent peripheral impacts on this sensitive ecosystem.
- Peripheral impacts should be avoided.
- The drainage channels serves as corridors for fauna and should be preserved as part of the larger ecosystem of the area.

Plant species of special concern:

- The potential impact of the proposed development on the protected tree species would be low considering that the species occur as individuals on the property and contribute very little to the larger population in the area. The Marula trees will be incorporated as part of individual gardens.

Invasive alien species:

- Strict control measures must be implemented over materials brought onto site, which should be inspected for potential invasive invertebrate species and steps taken to eradicate these before transport to the site.

FAUNA

Birds:

The following mitigating measures will ensure that bird species still utilize the area both for breeding and foraging:

- Eradicate any exotic tree species and plant indigenous trees species in the gardens of the proposed

development area. This will ensure that birds are lured to gardens.

- Public open spaces should be created (preferably drainage channels) and large indigenous trees should be preserved on site.

Mammals:

- The distribution of the rare mammal species will not be significantly affected by the development especially considering the degraded state of the development site and close proximity to an urban area. Mammals have been displaced from the area by urban development and only low densities of smaller antelope (duiker, steenbok), carnivores (jackals, mongoose species) and rodents still occur in the area.
- No mammals may be captured or hunted before or during the construction phase. Construction workers and residents should be made aware of the possible occurrence of these species and the importance to protect them and other mammal species in the area.

Herpetofauna:

- The only red data amphibian that has a probability of occurring on site is the Giant Bullfrog (Conservation status: Near threatened). Considering the Blood River and associated drainage line on the site, the management of the species as part of the larger landscape should be considered a high priority to prevent exclusion of the species from the area.

Heritage aspects (Appendix 6)

No areas designated for socio-religious activities were recorded on the site. However the area is clearly utilised by locals for crop raising and the locals will need to be consulted with regard to the future use of the area.

No historical remains, graves, Iron Age remains and/or Stone Age remains were recorded.

The discovery of previously undetected subterranean heritage remains on the terrain must be reported to the Limpopo Heritage Authority or the archaeologist, and may require further mitigation measures.

Visual:

There would be a significant visual impact that could be mitigated effectively by following the mitigation measures set out in the report.

Large positive socio-economic impacts are expected from this development, but an increase in human activity on the site and surrounding areas is anticipated.

Technical:

Services Report (Appendix 7)

- Bulk water supply for the proposed development will be provided by the Polokwane Local Municipality. Total demand including summer peak and losses is 2 256.8Kl/day and volume of storage reservoirs required is 5 000Kl.
- The sewer effluent will be connected to the Municipal outfall sewer at Seshego extensions E and H. The effluent will be treated at the Blood River Purification Plant. An application should be submitted to the

Polokwane Local Municipality.

- Electrical demand should be calculated by an Electrical Engineer. An electrical transformer is located on site. It is expected that a new ESKOM transformer dedicated to the development will be required. The Developer should submit an application to ESKOM in this regard.
- Polokwane Local Municipality will be responsible for disposal of solid waste at the municipal land fill site.

Services will be designed and installed to the satisfaction of the Polokwane Municipality. Once the Municipal services are available in the area owners/developers will connect the internal services to the bulk supply and enters into a service level agreement with the Polokwane Local Municipality.

Geo-Technical Report (Appendix 5)

The property investigated is considered to be of intermediate suitability for the proposed township establishment. The following issues must be taken into account:

- **Geology:** The site is underlain by granitic bedrock associated with the Hout River Gneiss and very localised diabase intrusions were encountered.
- **Soil Profiles:** The profiles on site are dominated by surficial colluvial materials overlying a pebble marker and residual granite horizons. Alluvial deposits occur close to the Blood River.
- **Groundwater:** Perched groundwater is expected to occur on site on a seasonal basis; however the extent and severity thereof cannot be estimated at this stage.
- **Founding Conditions:** The study area is divided into four zones, namely **C1/S1**, **C2/S2/H2**, **C/S/R** and **H1**. Detailed site and stand zoning must be verified during a phase two investigation. The delineation of flood lines will affect suitable development areas.
- **Conditions of Excavation:** All alluvial, colluvial and pebble marker materials proved excavatable by backhoe; however, residual granite and ferruginised residual granite materials are considered moderately difficult to difficult to excavate. Bedrock materials of granite and diabase will mostly constitute hard to extremely hard rock material.
- **Corrossivity:** Soil materials on site were comprehensively proven to be corrosive to extremely Corrosive.
- **Perched Water:** It is recommended that a groundwater study of the site be undertaken during the rainy season to establish the severity and extent of potential perched water tables.

16. COMPARATIVE ASSESSMENT OF THE IMPLICATIONS OF PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

- **Advantages of the proposed activity and alternatives:**
 - The proposed development will provide housing and services for the local community who are in need of these facilities.
 - The development will provide direct and indirect job opportunities.
 - The development will have direct benefits to the local economy during the construction and operation phases.

- **Disadvantages of the proposed activity and alternatives:**
 - The development may cause social conflict in terms of existing croplands and cattle grazing on site.
 - The cumulative impacts that the development will have in terms of water use, waste, sanitation and other impacts can lead to extra environmental degradation, especially if not managed correctly.
 - The cumulative impacts that the development will have in terms of pollution and other impacts can lead to extra environmental degradation, especially if not managed correctly.
 - Heritage – Damage to heritage findings could occur during excavations (buildings, houses etc.).

17. CONCLUDING RECOMMENDATION BY EAP

The purpose of this report is to provide LEDET with sufficient information regarding the potential impacts of the development to make an informed decision regarding the approval of the Environmental Impact Assessment report and ultimately giving Environmental Authorization.

The potentially significant negative impacts that have been identified should be mitigated through the implementation of the mitigation measures highlighted in this report. AGES believes that the proposed mitigation measures will effectively reduce the impacts to acceptable levels.

Given the socio-economic advantages of the development, the remaining impacts are not enough to put a stop to the development.

Potential impacts were identified in consultation with I&AP's and technical specialists (where applicable) and were assessed using a matrix and by applying professional knowledge.

All aspects of the environment are vulnerable to disturbance. Disturbance should be restricted to the proposed site only. The recommendation of all specialists' reports must be strictly implemented.

It is the professional opinion of AGES that the proposed development does not present any fatal flaws in terms of negative impacts to the environment and therefore will not have any significant detrimental impacts to render the project unfeasible.

The Department is therefore respectfully requested to evaluate this Impact Assessment Report, as part of an application that has been lodged in terms of Chapter 5 of the National Environment Management Act, 1998(Act no 107 of 1998), in respect of the activities identified in Government Notices R 983 and R 984.

It is proposed that the following conditions must be included in the Record of Decision if the project is authorised:

- The mitigation measures contained in this report must be implemented.
- The management and or mitigation measures contained in the Environmental Management Plan must be implemented.
- The responsibilities to obtain any further authorisations and/or licenses will rest on the proponent of the project, PRIOR to any activities on site.

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