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FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED RESIDENTIAL TOWNSHIP ESTABLISHMENT ON THE FARM BESTWOOD 459 RD

Ref. no.: NC/KGA/BEST1/12/2008

Prepared for:

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- EAP: P.N. van der Merwe
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SECTION A INTRODUCTION

A-1 DESCRIPTION OF PROPOSED ACTIVITY

The proposed activity is a residential development on a 200 ha portion of the farm BESTWOOD - 459 RD. The property is located on the farm BESTWOOD NO. 429 RD, and is located adjacent to the N14 National road diagonally opposite Kathu Motors (Shell). The proposed sewage treatment plant will be located directly east of the existing sewage treatment dam, along the R31 road. Please refer to Appendix 1. The proposed activity is situated on the Farm Bestwood 459 RD (Figure 1). The site itself covers part of the Farm on the western side of the Farm Bestwood.

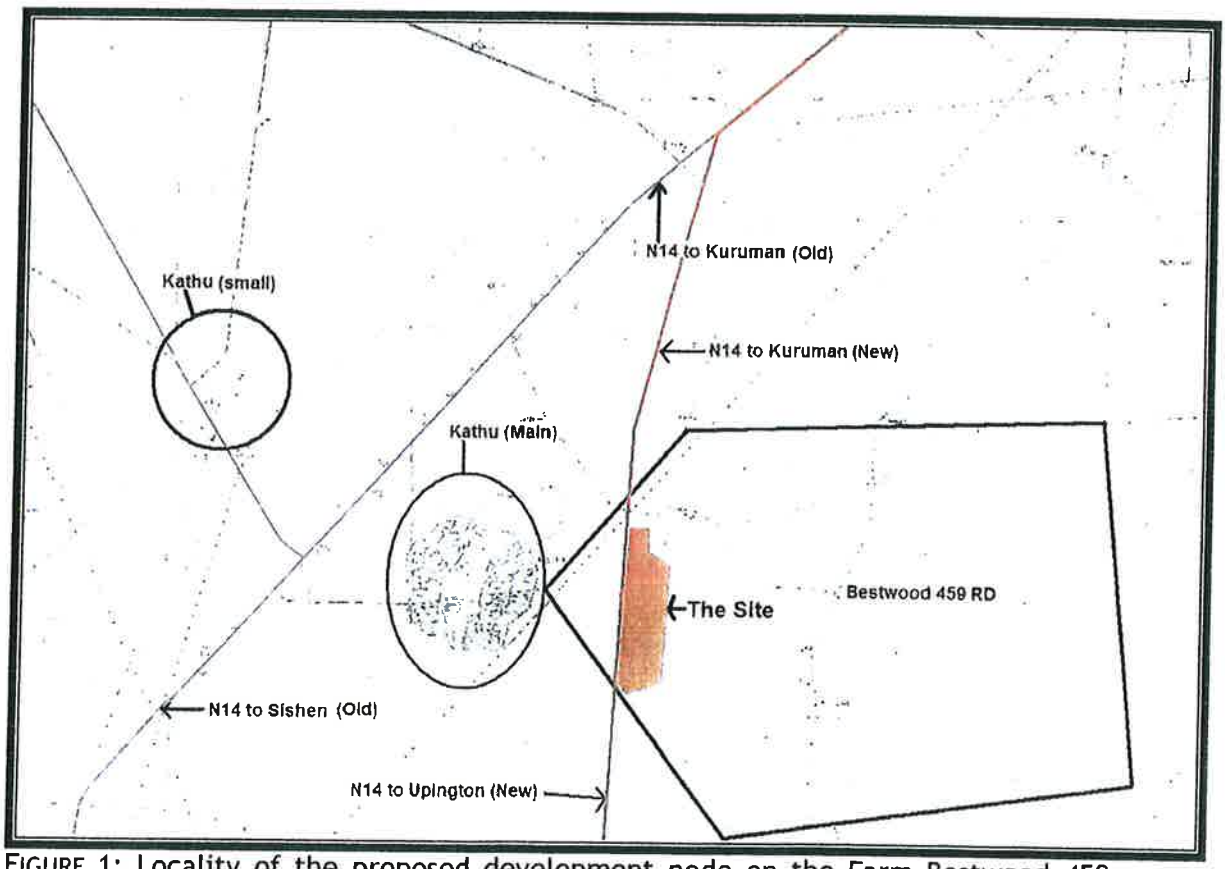


FIGURE 1: Locality of the proposed development node on the Farm Bestwood 459 RD. (a larger copy of the above site plan is available in Appendix 1 and a layout plan is also available in Appendix 2A).

A-2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

A-2.1 NEMA and Environmental Impact Assessment Regulations

- National Environmental Management Act (NEMA) (Act No. 107 of 27 November 1998), chapter 1 especially, which stipulates that Environmental Management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. But equally important, that developments must be socially, environmentally and economically sustainable.
- DEAT Guidelines of June 2006 (Guideline 3 in particular, Section 4.3).
- Government Notice No. R. 385 of 21 April 2006, Regulations 27 - 36 (regarding Full Scoping and Environmental Impact Assessments) and Regulation 56 (regarding the public participation process).
- Government Notice No. R. 387 of 21 April 2006, Activity Number 2:
    - Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.
- Conservation of Agricultural Resources Act No. 43 of 1983 (Regulation 15, promulgated on 30 March 2001).

A-3 DETAILS OF THE APPLICANT

The details of the project applicant are indicated below.

Name of Applicant	Postal Address	Relevant Numbers
Kathu Property Developers Contact: Mr. Annes de Bruyn	Suite 36 Private Bag X 2005 Menlyn Retail Pretoria 0063	Tel: +27 82 376 9592 Fax: +27 12 460 5734 Email: annes@vvconsult.co.za

A-4 MOTIVATION FOR THE PROJECT

The developers of the Bestwood Residential Township Development have done an intensive market research for the area. From this research, the following motivation for the project came to light:

A-4.1 Offer to Gamagara Municipality:

- The opportunity to be seen as the new regional centre of the 4 towns;

- To provide, in lieu of bulk contributions, the installation of bulk services such as:
  1. New reservoir site and reservoirs with bulk water supply augmentation by way of new field of boreholes and construction of two 5 Mℓ reservoirs;
  2. New site for sewage treatment works as existing works have reached its design capacity with no space for further extension; and
  3. Upgrade of power supply;
- Benefit of increase in Rates and Taxes;
- Compliments the 5 year action programme i.e.: Upgrading of bulk services; and
- Compliments integrated programme i.e.: New school by end 2009.

A-4.2 Offer to Community:

- Fully integrated town;
- Regional facilities
- Retail and industrial opportunities;
- Hospitality opportunities;
- Schools/ Churches;
- Medical Facilities;
- Sport Facilities
- Security; and
- Job opportunities.

A-4.3 Offer to Mining Industry:

- Providing an integrated township with fully serviced stands and all other amenities;
- Building of top structures to a variety of architectural designs to suite end-users' financial capabilities; and
- Making housing packages available to the mining industry to be leased in batches or to be bought by individuals on outright sale.

A-4.4 Offer to the upliftment of the local community:

- Local contactors will be involved;
- The development will help satisfy the need for job opportunities in the area;
- People will be taught new skills; and

- This will ultimately lead to social upliftment.

A-5 DESCRIPTION OF THE PROPOSED PROJECT

A-5.1 Location

The proposed activity is situated on the Farm Bestwood 459 RD (Figure 1). The site itself covers part of the Farm on the western side of the Farm Bestwood. The farm is east (adjacent) of the Town Kathu and approximately 12 km North-east of the Sishen Mine. The Farm Bestwood falls within the Northern Cape Province and the Gamagara Municipality. (Please refer also to the Topographical Locality Map in Appendix 1.)

Kathu, meaning "town under the trees", after the Camel Thorn forest it is situated in, is the iron ore capital of the Northern Cape Province.

Municipal status was allocated to the town of Kathu during July 1979. At present the municipal area consists of Kathu, Dingleton and Sesheng. Kathu is situated in the Kalahari Region of the Northern Cape - 47 km north of Postmasburg and approximately 45 km north east of Olifantshoek. The municipality originally consisted of 2 towns namely Sishen and Kathu. Yskor started developing the town of Sishen in 1953 - south of the mining area. In 1990 the name Sishen was changed to Dingleton. Development to the new town, Kathu, began in 1974 after proclamation was finalized in 1972.

Kathu Forest Natural Heritage Site:

In 1995, the Kathu Forest was proclaimed a Natural Heritage Site by the Department of Environment Affairs and included the Sishen Private Nature Reserve (Wildkamp), the farms Kathu, Sims, Hartnolls, Uitkoms, Kathu Town, Kathu Golf Course and Kathu Pan (Laan *et al.* 1995). The Natural Heritage Site covers an area of approximately 4672 ha (Figure 8). The Kathu Forest has been included on the NACOR list as an area of conservation importance in 1978. Currently the conservation status of the Kathu Forest is being addressed by DWAF and according to the Government Gazette of 6 July 2007 (Notice 810 of 2007) an invitation to submit comments on the declaration of Kathu Forest as a 'Protected Woodland' under section 12(1) (C) of the National Forests Act, 1998 (Act No. 84 of 1998) as amended has been published.

A survey of the vegetation of Kathu Forest was done by Macdonald in 1976 and he classified the woodlands into three categories, i.e. the dense stands of *Acacia erioloba* form category 1 dense woodland, while the intermediate dense stands of woodland form category 2, and the open woodlands form category 3. However, the area covered by the NHS includes two other structural types i.e. open to dense bushveld (category 4) and shrubland/thicket (category 5). The main forest, category 1 woodland, is stands of tall *Acacia erioloba* trees occurring in dense patches on deep Kalahari sand. This category appears to be less than 200 ha in size and occurs mainly on the farm Uitkoms and the Sishen Private Nature Reserve (Wildkamp) (Macdonald 1976).

The major part of the Kathu Forest consists of Category 2 *Acacia erioloba* woodland and covers approximately 600 ha of the Farm Uitkoms 463. Other patches of this woodland flank both sides of Vlermuisleegte on the farm Uitkoms and in the northwest of the farm Bestwood 459 (Figure 8). This woodland also forms part of Kathu town and the golf course.

The largest part of the *Acacia erioloba*, category 3, open woodland and shrubland is a more open community with a well established grass sward (Macdonald 1976). The sandy soils are shallow with calcrete outcrops in some areas. The dominant plant species are *Acacia mellifera* and the grass *Enneapogon desvauxii*.

Threats to the Kathu Forest mentioned by Van Hoven & Guldemond (1993) and Laan *et al.* (1995) include:

- Overstocking;
- Water extraction from the Kathu aquifers;
- Disturbance by the road network; and
- Chemical control of *Acacia mellifera*.

The current expansion of Kathu town also poses a threat to the Kathu Forest and environs. However, if residential development is only allowed to the south-east, south and west of the town, the Kathu Forest will be safeguarded.

Ecosystem status is based on how much of an ecosystem's original area remains intact, relative to certain thresholds (Driver *et al.* 2004). According to Mucina & Rutherford (2006) and also according to the criteria used in determining the status

of ecosystems (Driver *et al.* 2004), the Kathu Bushveld wherein the development is proposed is considered to be 'Least Threatened', therefore more than 80% of the natural habitat is still intact. Currently there is none of this vegetation type conserved in statutory conservation areas, except for the Kathu Forest which is conserved as a Natural Heritage Site, although it is intended to declare the Kathu Forest as a 'Protected Woodland' (NFA, 1998).

A-5.2 PROJECT DESCRIPTION

The Farm Bestwood encompasses 3 300 hectares of land. The proposed site will only cover an area of approximately 200 hectares.

The proposed residential development would make available single residential erven, group/cluster housing, retirement village, sport and recreational facilities, retail nodes, light industrial nodes, hotel/conference/lodge facilities, school/places of worship and hospital/clinic/medical facilities. (Layout Plan, Appendix 2A).

The total, cumulative footprint of the proposed township developments will be limited in extent to 6% of the total area of the farm. Please note that this footprint includes the Open Space Zone II (footprint size of approximately 7.2ha). The total, cumulative footprint of the proposed township development excluding the Open Space Zone II will be 5,8%. (See Appendix 2A).

TABLE 1: Areas of the proposed development, relative to the total area of the site.

USE ZONE	PERCENTAGE OF SITE (200HA) IN %	SIZE (Ha)
Residential Zone I @ 700m²	6.73	13.4595
Residential Zone I @ 640m²	15.13	30.2597
Residential Zone I @ 600m²	10.86	21.7145
Residential Zone I @ 500m²	20.60	41.1949

Residential Zone II	10.63	21.2719
Sub-Total (Residential Zone)	63.95	127.90
Business Zone I	3.10	6.2114
Business Zone II	0.30	0.6000
Sub-Total (Business Zone)	3.40	6.8114
Industrial Zone I	3.33	6.6587
Institutional Zone II	1.61	3.2142
Sub-Total (All Zones excluding Open Space)	4.94	9.8729
Open Space Zone I	3.60	7.2020
Sub-Total (All Zones)	78.89	151.7868
Infrastructure (Streets)	21.11	48.2132
Total	100.00	200.0000

A preliminary town ship lay-out has been prepared for the purposes of this Scoping Report. This lay-out is not final but provides a conceptual image of what is proposed at this stage. It is subject to alterations. (Refer to Appendix 2).

A-5.3 SERVICE PROVISION

A detailed services provision study was conducted by Mr A de Bruyn of V&V Consulting Engineers to assist in the process. The purpose of a Services Report is to provide the developer with guidelines regarding the provision and standard of services for the subdivision of farmland. This report would include the treatment, supply and management of water, sewerage system, roads, storm water, electricity, fire protection and solid waste. In all instances, the minimum standard of services is in accordance with the General Guidelines for the Provision of Engineering Services for "Residential Townships" ("Red Book"). During this integrated process, mitigation measures will be designed which will be described within the EIA Report. As per the new NEMA Regulations, all detailed investigations will be conducted prior to the submission of the EIA report.

The provision of services to the stands at each of the proposed development nodes is a factor that will be placed under intensive investigation during the EIA process in order to ensure the environmental sustainability and integrity of the project.

A-5.3.1 Water reticulation

Serious expansion programmes have been announced by all major mining houses operative in the Northern Cape due to Transnet's announcement that the export capacity of the Sishen-Saldanah railway line are receiving urgent attention. The strategic location of Kathu in relation to all envisaged expansions of mining activities make Kathu the preferred location to provide in the need for housing and other amenities which will be generated by the expected growth.

The expected growth will lead to increased pressure on the water sources. AT PRESENT, Kathu receives water from underground resources only, but in future it will be imperative for Gamagara Municipality to apply for an allocation of surface water available from the Vaal Gamagara Scheme.

Sufficient water is therefore available for the proposed development. A formal water licence application for the abstraction of groundwater is in process for submission to DWAF to supply in the water needs of this first phase of the development of Bestwood Estates. An application to Sedibeng Water will be submitted to provide for future expansion envisaged for Kathu and to ensure a water supply source with higher assurance of supply.

The water will have to be pumped from the production boreholes to a new ground level reservoir on the proposed development. This reservoir will have a volume of 1x5 Mℓ initially and 2x 5 Mℓ in the end. This system can possibly be linked to the existing Kathu water networks, thereby eliminating the need for water towers and associated energy cost savings. From the reservoir and trunk main line a reticulation network will be installed. The maximum diameter of these main water pipe lines will be 500 mm.

The mean volume to be extracted daily from the provision of the township will initially be 2400 Kℓ/day and eventually 4000 Kℓ/day. The mean quantity of water pumped will in the beginning be 33 ℓ/s and in the future be 55 ℓ/s.

5.3.1.1 Groundwater Resources

Local groundwater resources are available throughout D41J catchment. The Ghaap Plateau dolomite formations, banded iron formations and Kalahari Group sediments represent the significant aquifers of the area. The Kathu Ground Water Unit (GMU) is located adjacent and to the east of the existing open cast Sishen Iron Ore Mine, where groundwater abstraction by Sishen (13 Mm^3/a) in the process of de-watering the mine is recognized as being controlled mining of groundwater. Of the groundwater abstracted by Sishen approximately 0.6 Mm^3/a was delivered in 2007 to the Kalahari East Pipeline.

Summary of findings, conclusions and recommendations contained in the Report No: 10639 on the Assessment of Groundwater Resources for Water Supply to the Proposed Township development on the Farm Bestwood 495 RD (Appendix 5):

- Three production boreholes from seven existing boreholes tested on the Bestwood farm are proposed as production boreholes with a combined safe yield 24 hours/day of 1,230 Mm^3/year. This will suffice in the needs for the Bestwood development up to 2013.

- The chemical water quality for the proposed production boreholes is typical hard dolomite water of Class 0 or 1 DWAF quality class suitable for lifetime use.

- Subject to the total water use in the upper GMU's the Kathu-Main GMU has a maximum exploitation potential of 7.8 Mm^3/a. The proposed total future abstraction for the Kathu GU, inclusive of the water demand for the Bestwood Township, amounts to 4.358 M m^3/a.

- Increasing water abstraction from the Kathu Aquifer has the long term effect on the water balance of reduced outflow to the Sishen-Main GMU and reduced abstraction required by the mine to achieve and maintain dewatering levels. Monitoring of water levels in the Kathu GU by DWAF since 1981 indicate declining water levels at 0.75 to 0.65 m/a during periods of no or insignificant rainfall recharge. No increase in the rate of decline is evident. This supports the view that lowering of water levels in the Kathu aquifer is dominated by natural drainage losses during periods of no recharge.

- The Kathu GU covers an area of 321 km^2, and using a conservative storativity value of 0.73% the specific aquifer yield is 2.343 Mm^3 per metre water level drawdown. The storage potential for a 20 m water level drawdown in the GU is 46.866 Mm^3.

An in depth ecological water study was done on the water balance of the bore holes/aquifers and this was included in an Engineering Services Report that was sent to Gamagara Municipality on the 19th of April 2007. Gamagara is in agreement.

A-5.3.2 Sewerage reticulation

The type of sewage plant anticipated by Mr A de Bruyn of V&V Consulting Engineers will use activated sludge ponds with full biological nutrient removal (BNR plant) with ferric chloride dozing and reed beds to reach a 'Special Standard' effluent quality. The annually treated sewage/effluent will have a trough put, from the interim purification plant, of 1.5 Mℓ per day or 547.5 Mℓ a year. A possible future plant's through put will be 3 Mℓ per or 1095 Mℓ per year. The proposed position of the new sewage treatment plant was requested by Mr Lategan Botha, former manager technical services of Gamagara Municipality. The maximum diameter of these sewer pipe lines will be 400 mm.

A-5.3.3 Streets

A conceptual road network has been established for the development.

In general, all roads will be constructed to a width of 6,0 m to 7,4 m and designed with 2 - 3 % camber or crossfall and a 300 mm mountable kerb on both sides with an Asphalt surface seal.

The street's pavement structural design will be done in accordance with Draft UTG 3 and the "Redbook". The road classification for the development is class 4 UB.

A-5.3.4 Storm water system

Normally provision must be made for two storm water management systems. These are major and minor systems. The ruling grade of the development area is approximately 1:300 which is not sufficient slope to provide for the installation of storm water pipes which must be installed at a minimum grade of 1:150. Overland flows/storm water surface drainage will therefore be preferred as far as possible.

The encroachment of runoff from the 100 year frequency design storm on primary roads at the crown of the road should not exceed a depth of 150mm to allow the operation of emergency vehicles such as ambulances and fire tenders.

The encroachment on properties adjacent to roads by the runoff from the major design storm should not exceed the ground level at the back of the footway or boundary of road reserve as applicable. For flat areas and areas located below roads and areas of high runoff such as parking area, special precautions should be taken to protect buildings from flooding. These may include the zoning of such areas for buildings to have ground floor levels above the design flood levels and the flood-proofing of buildings.

A-5.3.5 Access

Three access points to the development area are proposed from the N14 national route. The northern access to the development is situated directly opposite the existing North Eastern access to Kathu from the N14 national route on the existing entrance to the Farm Bestwood. It is envisaged to link the southern most access also across the N14 with the future major street network of Kathu. Approval for these accesses will have to be obtained from the South African National Roads Agency Limited (SANRAL).

Infragen Consultants (Pty) Ltd have been appointed to undertake the Traffic Impact Study as part of a township application for a proposed new mixed use development located on the remaining portion of the farm BESTWOOD 459 RD. The proposed township will be known as Bestwood estate.

This study investigates the traffic impact of the proposed development onto the immediate surrounding road network and its accesses and determines whether it is necessary to implement any road net work and/or intersection improvements to mitigate the anticipated traffic impact. The study also comments on site access and public transport. For a detail description on the Traffic Impact Study please refer to Appendix 5.

A-5.3.6 Electrical supply

Gamagara has indicated that they do not have sufficient capacity to provide a supply to this development. At this stage an application has been submitted with ESKOM for a bulk supply to this development. There is a 400 kV/ 132 kV Eskom substation close to this site from which a bulk supply can be obtained if sufficient capacity exists. Currently electricity will be provided by the local municipality.

The demand for the township will be 12 MVA NMD, but temporary 4.8 MVA NMD will be sufficient. All distribution lines will be able to carry 11 kV.

The following energy saving measures can also be undertaken to reduce the load demand on the electric networks:

- All cooking to be done by gas; and
- Water heating to be done by solar heating systems.

The complete electrical reticulation of this development will be done by means of underground cable.

The network will consist of the following cables:

- Medium Voltage (MV) cables; and
- Low Voltage (LV) cables.

Miniature substations will be installed to transfer voltages from MV to LV eventually. Meter kiosks with meters will be installed on erf boundaries for individual house connections to be terminated and energy meters to be housed. Provision for street lighting has been made to enhance safety and visibility at night.

Alternative energy sources include the following:

- Solar energy to be utilized effectively for the heating of household water by means of solar power geysers as well as for heating swimming pools.
- Gas appliances could be used, especially for cooking and heating purposes.
- The use of power saving lamps could also help with a reduction on the electricity consumption.

A-5.4 Comparative Assessment - Alternatives Considered

It is difficult in terms of this project. An alternative land-use can be an industrial and commercial land-use. The potential impacts of such an alternative will be of higher significance if one considers aspects such as:

- Higher water-use volumes.
- Bigger potential for air pollution.
- Fewer opportunities for open-space developments.
- Limited opportunities for electricity generation.

- Higher run-off volumes to be generated from extensive hard surfaces such as roofs and parking areas, and;
- Bigger component of heavy vehicle movement to and from the site.

SECTION B THE RECEIVING ENVIRONMENT

B-1 BIOPHYSICAL ENVIRONMENT

In order to determine the environmental impacts and identify possible issues associated with the proposed development of the Residential Township Development, it is necessary to provide baseline environmental information. Following comprehensive site investigations and desk studies, as well as discussions with Interested and Affected Parties, the following section provides a description of the environmental conditions and important elements within the study area.

Strong emphasis was placed on the ecological assessment of floristic and faunal elements within the proposed area of development, such that sensitive elements that might adversely be affected by the proposed development could be highlighted. A general assessment of ecological elements does not require detailed floristic and faunal sampling. In the study conducted by Ekotrust CC, plant community descriptions were made based on physiognomic appearances and variations observed in the habitats within the study area, as well as dominant species composition. Focus was placed on the identification of any Red Data or rare species within the study area.

B-1.1 CLIMATE

Rainfall data for the study area was obtained from the Sishen Weather Station (0356/857AX) over a period of 19 years (please refer to Figure 2 below for the graphical representation of the precipitation information).

The area is defined as summer and autumn rainfall when approximately 89% of the annual rainfall occurs. The area has very dry winters, when approximately 14mm

(or approximately 4% of the total rainfall) of rain from July to August were recorded. This indicates an extreme variation in wet and dry cycles throughout the year. The Mean Annual Precipitation is approximately 220-380mm with frequent frost in the winter.

In terms of climate, the rainfall intensity is regarded as the most important element during construction phase, as it can potentially determine the risk of significant sheet and gulley erosion during the development stages. The rainfall intensity refers to the maximum precipitation recorded within a period of 24 hours. Within the study area, the highest rainfall intensity was measured in December (146 mm), which is at the beginning of the wet cycle. Other months with moderately high rainfall intensities are February (118 mm) and March (113 mm). Therefore, construction during these months should ideally be avoided.

Further, in terms of climate, the scarcity of precipitation is regarded as the most important element during the operational phase, as each dwelling to be built on the site will need water. Over the period of 19 years, 8 months had minimum rainfall of 0mm.

Temperature data for the study area was obtained from the Sishen Weather Station (0356/857AX) over a period of 20 years (please refer to Figure 3 below for the graphical representation of the temperature information).

The climate is very hot in summer (with mean monthly maximum temperatures of 26.7°C) and very cold in winter (mean monthly minimum temperatures are 11.8°C). The highest mean daily maximum temperatures are 39.7°C in December and 40.0°C in January. On average, these are also the hottest months of the year. The lowest mean daily minimum temperatures were recorded for June (-5.7°C) and July (-6.9°C). The coldest months, on average, are from June to August, during which time frost may occur.

Cloud cover is at its highest between January and March, with a mean cloud cover of 50% or more.

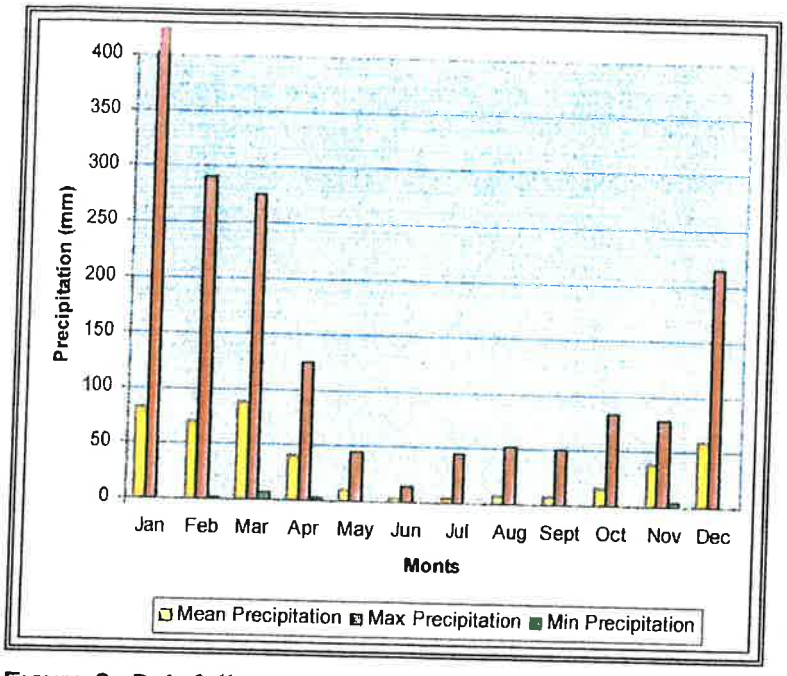


FIGURE 2: Rainfall graph for the Sishen Weather Station

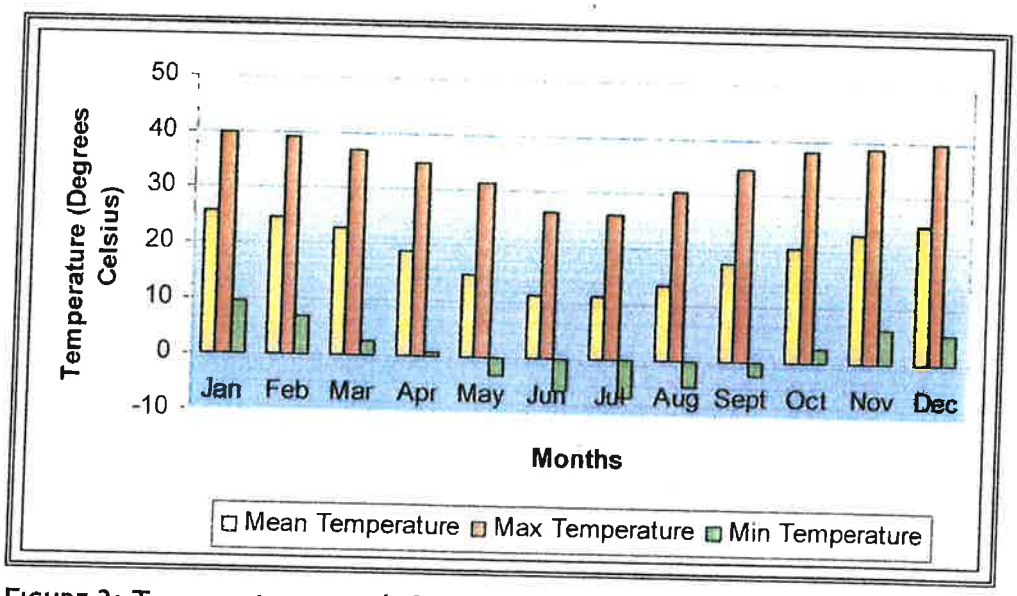


FIGURE 3: Temperature graph for the Sishen Weather Station

B-1.2 TOPOGRAPHY, SURFACE DRAINAGE AND GEOHYDROLOGY

The term topography refers to the "lay of the land". The topography of an area is determined by the geological history of that area. The topography of the study area is flat. North-east and east of the site are hills classified as Kuruman and Asbestos Hills, forming part of the Asbestos subgroup of the Griqualand West Supergroup (Vaalian).

There are no drainage lines on the site. North-west of the site is one poorly developed drainage line.

According to a geohydrological study conducted by Visser (2006), despite large scale abstractions of water from the Kathu Aquifer, there is a surplus of groundwater available. However, a geohydrological study will be done to further investigate the geohydrology of the area.

B-1.3 GEOLOGY, LAND TYPES AND SOIL CONDITIONS

The area is underlined by the **Griqualand West Supergroup** (Vaalian), with large areas containing deposits of the Kalahari Group Sediments.

The Griqualand West Supergroup (Vaalian), in this area is divided into two Subgroups, the Campbell Rand Subgroup and the Asbestos Hills Subgroup. These two Subgroups provide the sediment resources for the Iscor mines in the area.
The Campbell Rand Subgroup consists mainly of grey dolomite. It is over 2000m thick and contains the fossilized remains of some of the oldest life forms on earth. Lead deposits occur in places, and economically important limestone lenses are found near the top.

The Asbestos Hills Subgroup follows concordantly upon the Campbell Rand Subgroup. Its lower part, the Kuruman Formation, consists mainly of banded iron formation which contains the crocidolite asbestos deposits of Griqualand West. The upper part (Danielskuil Formation) comprises banded brown jaspilite with minor riebeeckite, amphibolite and shale.

The characteristics which define a land type, namely terrain form, soil pattern and climate, strongly correlate with the topography and geology of the area. There are four different types of land types in the area.

The site itself are characterised by two of these four Land Types. The land type on the northern part of the site is Ah land Type. This type is Red-yellow apedal (massive or single grained disturbing easily) soils (LP1) are freely drained and have a high base status (rich in Calcium). This Land Type further has usually a clay percentage of less than 15%, making it a very sandy soil.

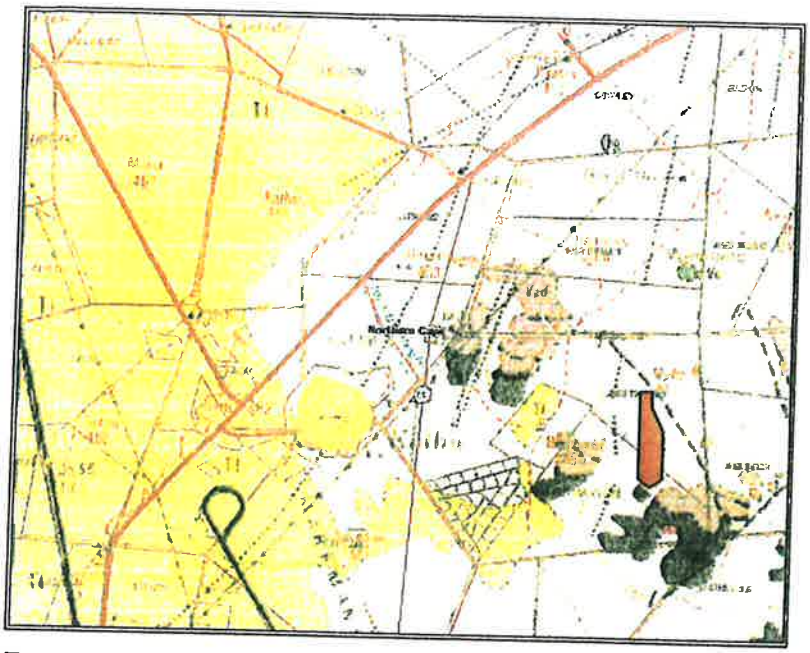


FIGURE 4: Map indicating the Geology of the area. Site locality is indicated in red.

To the southern parts of the site the Land Type is Ag, which is also Red-yellow freely drained apedal soils (LP2). These soils are further less than 300mm deep. These soils have a minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils.

To the east of the site (in the area of the Kuruman Thornveld), occurs of the Ae Land Type. This type has also red-yellow apedal soils, freely drained, but is however deeper than 300mm. These three land types obtain their characteristics mostly from the Kalahari Group deposits.

The fourth Land Type covers the Kuruman and Asbestos Hills (Falling under the Kuruman Mountain Bushveld). This is the Ib Land Type, which is classified as miscellaneous, rocky areas with limited soils.

B-1.4 AGRICULTURAL POTENTIAL OF THE STUDY AREA

The land potential, and specifically the agricultural potential of a site, is determined by the combination of climate, soil conditions and slope prevailing in that region or site, resulting in the classification of areas with similar agricultural land potential. These land potential classes range from "Very High Potential" to "Very Low Potential". The Department of Agriculture as mapped the agricultural potential of South Africa. Using this mapping (Agricultural Geo-Referenced

Information System [AGIS]) files, it can be seen that the site as well as surrounding the site, the agricultural potential Low. This potential has only reference to grazing as the area has No potential for arable agriculture.

There is however, according to AGIS a temporary irrigation site west of the road, which runs adjacent to the western side of the site. This site is under urban development construction at present.

B-1.5 FLORA OF THE STUDY AREA

The proposed area is situated in the Kathu Bushveld Vegetation Type. This vegetation type is characterized by the medium-tall tree layer consisting mostly of *Acacia erioloba* (Camel Thorn). The vegetation types on site is then further chatagorized into the *Acacia erioloba* (Camel Thorn)-*Acacia mellifera* (Blackthorn) - *Tarchonanthus camphorates* (Camphor Bush) open to dense woodland, Acacia erioloba - *Tarchonanthus camphorates* - *Eragrostis pallens* (Broom Grass) open woodland, and *Tarchonanthus camphorates* - *Acacia mellifera* shrubland. The Kuruman and Asbestos Hills are situated in the Kuruman Mountain Bushveld Vegetation Type. East of the site occurs the Kuruman Thornveld.

At this period in time, a Flora Specialist Study has already been done, however, the full Specialist study will be attached to this report (see Appendix 6). The information given below is a summary of the findings from the Specialist study.

Differences in geology, topography, rockiness, drainage, soil texture and soil depth, slope, as well as differences in past management, result in differences in plant communities:

1. *Acacia erioloba-Acacia mellifera-Tarchonanthus camphoratus* open to dense woodland

This woodland occurs in the north-eastern part of the site on the farm Bestwood. The community occurs on deep red aeolian sandy soils. The sand layer overlays a limestone layer. However, surface rocks are absent from this community. This community is a continuation of the *Acacia erioloba-Acacia mellifera-Tarchonanthus camphoratus* open to dense bushveld/woodland described by Van Rooyen (2006) for the Wildkamp on the farm Uitkoms 463, northwest of the site (Bestwood 459). This

association belongs to the Category 2 woodlands of the Kathu Forest, although it is not included in the Natural Heritage Site.

The dominant tall tree is *Acacia erioloba*, with *Ziziphus mucronata and Acacia mellifera*, occurring scattered in the community. The shrub species present include *Acacia mellifera, Grewia flava, Tarchonanthus camphoratus, Lycium cinereum and Acacia hebeclada*. The dwarf shrubs/bossies are represented by *Chrysocoma ciliata, Elephantorrhiza elephantina, Asparagus* spp., *Hermannia tomentosa, Gnidia polycephala, Monechma divaricatum* and *Plinthus karrooicus*.

The grass layer is poorly developed. The dominant grass species are *Stipagrostis uniplumis, Aristida stipitata, Aristida congesta* subsp. *congesta* and *Eragrostis lehmanniana*. Other grass species include *Eragrostis pallens, Aristida meridionalis, Triraphis andropogonoides* and *Schmidtia pappophoroides*. The most common forb species include *Anthospermum rigidum, Aptosimum decumbens* and *Pollichia campestris:*

2. *Acacia erioloba-Tarchonanthus camphoratus-Eragrostis pallens* open woodland

This open bushveld is a transitional community between the tall woodland on deep sand in the north (association 1), to the low shrubland on shallow limestone in the south (association 3). Surface rocks are mostly absent from this community. This community is related to the *Acacia erioloba-Tarchonanthus camphoratus-Eragrostis pallens* open woodland described by Van Rooyen (2006) for the southern parts of the Wildkamp on the farm Uitkoms, northwest of Bestwood.

The open tree layer is of medium height and includes species such as *Acacia erioloba* and *Ziziphus mucronata*. The shrub layer is characterized by open to dense stands of *Tarchonanthus camphoratus* with scattered individuals of *Acacia haematoxylon, Grewia flava, Acacia mellifera, Gymnosporia buxifolia* and *Dichrostachys cinerea*.

The dwarf shrubs/bossies are represented by *Gnidia polycephala, Elephantorrhiza elephantina, Pentzia incana, Plinthus sericeus, Hermannia tomentosa* and *Asparagus* spp. The most prominent forbs include *Aptosimum decumbens, Pollichia campestris, Aptosimum lineare* and *Geigeria ornativa*.

The most conspicuous grass species are *Aristida meridionalis, Aristida stipitata, Eragrostis trichophora, Eragrostis lehmanniana, Aristida congesta* subsp. *congesta, Eragrostis pallens, Stipagrostis uniplumis* and *Schmidtia pappophoroides.*

3. *Tarchonanthus camphoratus - Acacia mellifera* shrubland

This low shrubland covers most of the site to the south and is dominated by *Tarchonanthus camphoratus.* Small trees of *Acacia erioloba* and *Ziziphus mucronata* occur scattered, while other shrub species occurring on site are *Grewia flava, Acacia mellifera* and *Gymnosporia buxifolia.* This community is related to the *Acacia mellifera-Tarchonanthus camphoratus-Enneapogon desvauxii* shrubveld described by Van Rooyen (2006) for the Wildkamp on the farms Sims and Kathu in the west.

The dwarf shrubs/bossies include species such as *Gnidia polycephala, Asparagus* spp., *Hermannia tomentosa* and *Elephantorrhiza elephantina.* The forb species include *Chrysocoma ciliata, Aptosimum lineare, Geigeria ornativa, Selago dinteri, Aptosimum albomarginatum, Peliostomum leucorrhizum, Helichrysum argyrosphaerum, Lotononis* sp., *Dicoma schinzii* and *Plinthus cryptocarpus.*

Diagnostic grass species include *Enneapogon desvauxii, Heteropogon contortus, Eragrostis echinochloidea* and *Elionurus muticus.* The most prominent grasses are *Eragrostis lehmanniana, Aristida congesta* subsp. *congesta, Aristida meridionalis, Stipagrostis uniplumis, Aristida stipitata, Eragrostis trichophora, Schmidtia pappophoroides* and *Eragrostis pallens.*

B-1.5.1Sensitivity of the site:

The area was evaluated in terms of sensitivity and a sensitivity map compiled based on the vegetation types of the area (Figure 5). The parameters that are used to delineate the different categories of sensitivity (low, low-medium, medium-high and high) are the following (Driver *et al.* 2004; Mucina & Rutherford 2006; De Witt *et al.* 2006):

1. Threatened status of the ecosystem (area intact, or degree of transformation)

- If "Least Concern" or 'Least Threatened' e.g. the vegetation type have most of its habitat intact (more than 80%, or the vegetation type is adequately statutory or formally conserved in parks and reserves. **(low)**
- If "Vulnerable" e.g. from 60% to 80% of the vegetation type (ecosystem) is intact; the vegetation type is rich in plant species but are not pristine examples of a vegetation type, therefore some transformation or disturbance occurred, such as human structures, degraded veldt due to overgrazing and/or bush encroachment. **(medium).**
- If "Endangered" e.g. if about 40% to 60% of the ecosystem is intact, or 40% to 60% transformed due to disturbance, cultivation, alien species etc. or the ecosystem is statutory poorly conserved e.g. less than about 3% conserved. **(medium-high)**
- If "Critically Endangered" e.g. if only 16% to 36% of the ecosystem is intact. The more species-rich the ecosystem, the higher the percentage threshold. This threshold is also known as the biodiversity target: it represents the proportion of each ecosystem one would ideally like to see included in a formal protected area. **(high to very high)**

2. Red Data species

Presence of Red Data fauna and flora in a vegetation type, or the presence of suitable habitat for specific Red Data species **(low to high).**

3. Protected trees

The presence of protected tree species in a plant community should be considered as of **low to medium** conservation value depending on the availability of habitat in the broader region and the protection and management guidelines for these species.

4. Endemic plant species

The presence of endemic species should be considered as of **low to medium** conservation value depending on the availability of habitat in the broader region and the protection and management guidelines for these species.

5. Terrain type (topography)

The presence of e.g. ridges/outcrops/mountains. All ridges should be considered to have a **high** conservation value. However, this should be seen in the context of the presence of the same habitat in the broader region.

6. Plant community species richness

Species richness per community (number of species) and/or between-habitat diversity (beta-diversity or species turnover). This is also a subjective assessment where the number of species per vegetation type of a specific habitat, e.g. ridge, is compared relative to the number of species found in an unspoilt (pristine) vegetation type of the same habitat type. The species-richness (or number of species per plot or vegetation type will depend on the region, climate, topography, ecosystem and degree of transformation.

7. Nature of ecological processes (or constraints on the ecological processes), especially hydrological, e.g. drainage lines, migration routes; ridges: **high**.

8. Degree of connectivity and/or fragmentation of the ecosystem

Connectivity with surrounding or adjacent natural areas and/or fragmentation of plant communities, e.g. high connectivity with surrounding similar habitat, or low fragmentation of habitat is considered as **low**.

By using above, three communities were identified. These communities are described as the following (See figure 5 below):

Community 1:

Threatened status: Vulnerable - medium to high

Presence of Red Data species: medium

Protected trees: medium

Endemic species: low

Terrain type: low

Plant community species richness: low

Ecological processes: medium

Fragmentation/connectivity/offset areas: high

In summary, the sensitivity of community 1 is regarded as of **medium-high** significance.

Community 2:

Threatened status: Least Threatened - low

Presence of Red Data species: low

Protected trees: medium

Endemic species: low

Terrain type: low

Plant community species richness: low

Ecological processes: low

Degree of fragmentation/connectivity/offset areas: lov

In summary, the sensitivity of community 2 is regarded as of **low** significance.

Community 3:

Threatened status: Least Threatened - low

Presence of Red Data species: low

Protected trees: low

Endemic species: low

Terrain type: low

Plant community species richness: low

Ecological processes: low

Fragmentation/connectivity/offset areas: low

In summary, the sensitivity of community 2 is regarded as of **low** significance.

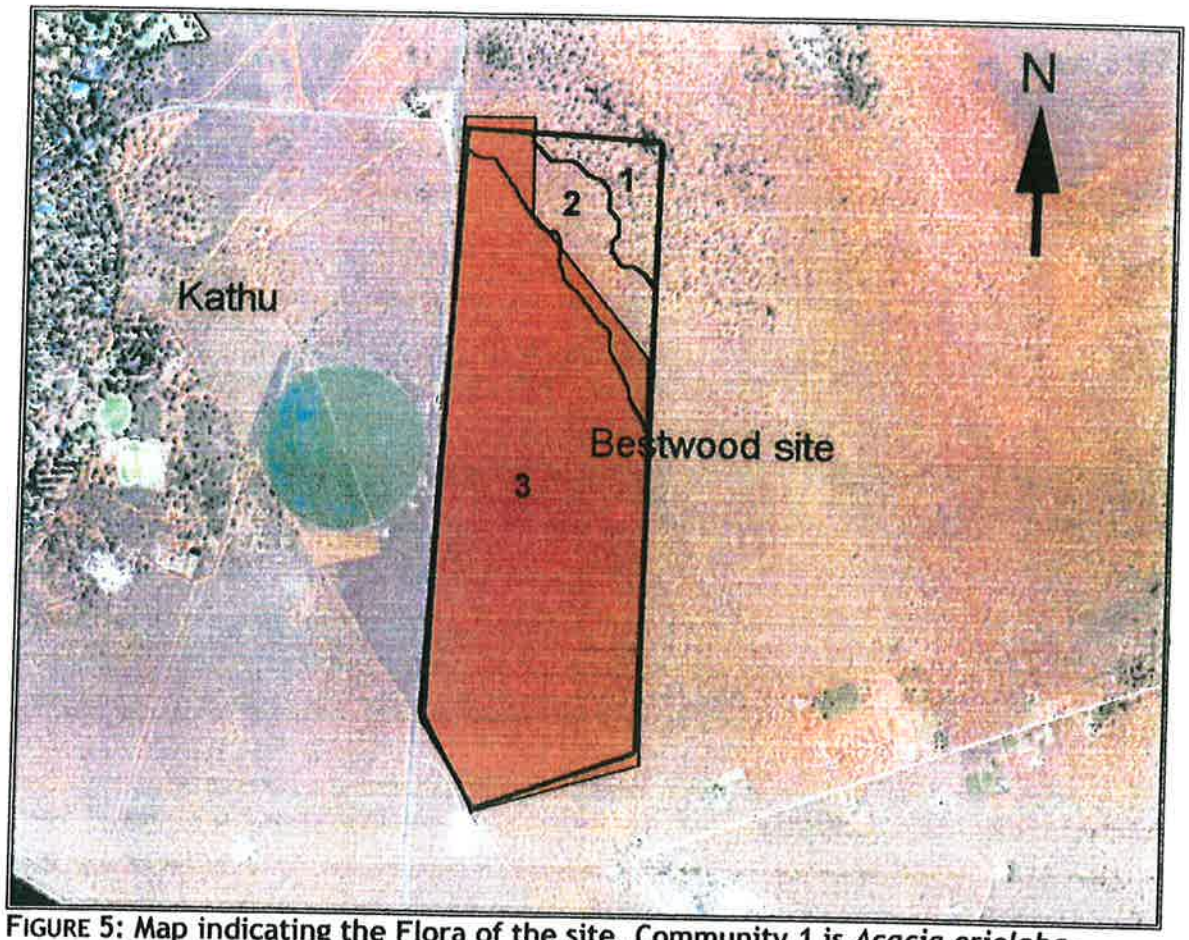


FIGURE 5: Map indicating the Flora of the site. Community 1 is *Acacia erioloba-Acacia mellifera-Tarchonanthus camphoratus* open to dense woodland , 2 is *Acacia erioloba-Tarchonanthus camphoratus-Eragrostis pallens* open woodland and 3 is *Tarchonanthus camphoratus - Acacia mellifera* shrubland. Site is indicated in red.

B-1.6 FAUNA OF THE STUDY AREA

The site is relatively small. Only 11mammal, 30 birds and two reptile species were recorded. No Red Data Book Species was encountered.

B-1.6.1Mamalifauna:

According to available literature, approximately 64 mammal species occur in the Kathu Bushveld. The current composition for Kathu and immediate surrounds indicate a diversity of 38 mammal species. In the site itself only 11 mammal species were identified. This makes 29% of the total mammal species in the Kathu Bushveld.

No Red Data Book species was recorded.

TABLE 2: List of mammalifauna encountered on site:

SCIENTIFIC NAME	COMMON NAME
Orycteropus afer	Aardvark
Sylivacapra grimmia	Common Duiker
Tatera leucogaster	Bushveld Gerbil
Lepus capensis	Cape Hare
Canis mesomelas	Black-backed Jackal
Cryptomus hottentotus	African Mole-rat
Cynictis penicillata	Yellow Mongoose
Hystrix africaeaustralis	Cape Porcupine
Pedetes capensis	Springhare
Xerus inauris	South African Ground Squirrel
Raphicerus campestris	Steenbok

B-1.6.2Avifauna:

According to available literature, approximately 204 bird species occur in the Kalahari Thornveld complex. The current composition for Kathu and immediate surrounds indicate a diversity of 164 bird species. In the site itself only 30 bird species were identified. This makes 18% of the total bird species of the Kathu biodiversity.

No Red Data Book species was recorded.

TABLE 3: List of avifauna encountered on site:

SCIENTIFIC NAME	COMMON NAME
Merops apiaster	European Bee-eater
Merops hirundineus	Swallow-tailed Bee-eater
Cuculus clamosus	Black Cuckoo
Nilaus afer	Brubru
Emberiza flaviventris	Golden-breasted Bunting
Serinus atrogularis	Black-throated Canary
Serinus flaviventris	Yellow Canary
Cisticola aridulus	Desert Cisticola
Chrysococcyx caprius	Diderick Cuckoo
Streptopelia capicola	Cape Turtle Dove
Streptopelia senegalensis	Laughing Dove

SCIENTIFIC NAME	COMMON NAME
Oena capensis	Namaqua Dove
Sporopipes squamifrons	Scaly-feathered Finch
Melierax gabar	Gabar Goshawk
Numida meleagris	Helmeted Guinea fowl
Upupa africana	African Hoopoe
Lophotis ruficrista	Red-crested Korhaan
Mirafra africanoides	Fawn-coloured Lark
Ploceus velatus	Southern Masked-weaver
Struthio camelus	Common Ostrich
Prinia flavicans	Black-chested Prinia
Rhinopomastus cyanomelas	Common Scimitarbill
Cerocotrichas paean	Kalahari Scrub-robin
Laniarius atrococcineus	Crimson-breasted Shrike
Plocepasser mahali	White-browed Sparrow-weaver
Lamprotornis nitens	Cape Glossy Starling
Hirundo rustica	Barn (European) Swallow
Psophocichla litsitsirupa	Ground Scraper Thrush
Parisoma subcaeruleum	Chestnut-vented Tit-babbler
Granatina granatina	Violet-eared Waxbill

B-1.6.3 Herpetofauna:

According to available literature, approximately 40 reptile and 6 amphibian species occur in the Kalahari Thornveld complex. The current composition for Kathu and immediate surrounds indicate a diversity of 16 reptile and two amphibian species. In the site itself only 2 reptile species were identified. This makes for 13% of the total herpetofauna species of the Kathu biodiversity.

No Red Data Book species was recorded. And no amphibians were encountered on site.

TABLE 4: List of herpetofauna encountered on site:

SCIENTIFIC NAME	COMMON NAME
Agama agama aculeata	Ground Agama

SCIENTIFIC NAME	COMMON NAME
Pedioplanis lineoocellata pulchella	Spotted Sand Lizard

B-1.6.4 Sensitivity of the site:

The Red Data status of each species can be one of the following:

- **Least Concern**: Widespread and abundant taxa are included in this category, which has been evaluated against the criteria and does not qualify for any of the other categories;
- **Data Deficient**: There is inadequate information available to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat;
- **Near Threatened**: A taxon is Near Threatened when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future;
- **Vulnerable**: Such a taxon is not Critically Endangered or Endangered but the best available evidence indicates that it is facing a high risk of extinction in the wild in the medium-term future;
- **Endangered**: When a taxon is not Critically Endangered but is facing a *very high* risk of extinction in the wild in the near future;
- **Critically Endangered**: When the best available evidence indicates that the taxon is facing an *extremely high* risk of extinction in the wild in the immediate future, based on an assessment of the criteria.

No Red Data Species occurred on site during the Faunal Survey.

B-1.7 ELEMENTS OF CULTURE HISTORICAL IMPORTANCE

During the site investigations for the Scoping stage, focus was also placed on the presence of any stone built structure, ruins, grave sites, complete built structures and the presence of artefacts. Based on preliminary observations no such features occur within the proposed area of development. It is therefore not identified as an issue at this stage.

A Heritage Impact Assessment, as part of the Environmental Impact Assessment stage of the application process, was conducted in accordance with the National Heritage Resources Act (Act 25 of 1999) by Dr R. C. de Jong of Cultmatrix cc.

The aim of the full HIA investigation was to identify and assess, if any, heritage features and to recommend heritage management mitigation measures and monitoring programmes aimed at reducing the risks of adverse impacts. This input to be evaluated by SAHRA is included in the EIA stage. However, the Scoping report was made available to SAHRA for comments.

However, the assessment up to now of the terrain did not reveal issues related to heritage significance or impact on elements of historical or heritage value. For further recommendations please refer to Appendix 8, because it is in the best interest of the project that:

1. A final HIA report that will be submitted to both SAHRA and the Northern Cape Provincial Heritage Resources Authority for authorising the proposed development should only be prepared once palaeontological and archaeological investigations by specialists have been completed in order to confirm and assess the presence or absence of palaeontological and archaeological deposits. This was done (See Appendix 8).

2. The developer appoints an accredited archaeologist familiar with the region to either undertake test excavations on both sites prior to development, or to be present when test pits for sampling the soil formations in connection with foundations are made; the objective being to establish the presence and significance of any fossils and artefacts. This was done (See Appendix 8).

3. No construction work should be allowed to start before the final HIA report has been authorised.

B-1.8 THE SOCIO-ECONOMIC ENVIRONMENT

The Bestwood Project would have a positive impact on the regional socio-economic structure through its support of the development industry, better local services support, job creation and the skills development of its employees and local community.

This fully **integrated development** offers the shareholders the opportunity to assist in local upliftment through the following:

- Involvement of local contractors,
- Job opportunities,
- Skills training and development,
- Social upliftment (see Appendix 9).

SECTION C ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

C-1 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way. The term "environment" is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

The EIA for this project complies with the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the NEMA EIA Regulations of the Department of Environmental Affairs and Tourism (DEAT). The guiding principles of an EIA are listed below.

C-2 GUIDING PRINCIPLES FOR AN EIA

- The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and transparency by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.
- There should be ongoing consultation with all interested and affected parties. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis.
- There should be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

C-3 EIA TECHNICAL PROCESS

An EIA typically has four phases, as illustrated in Figure 4 below.

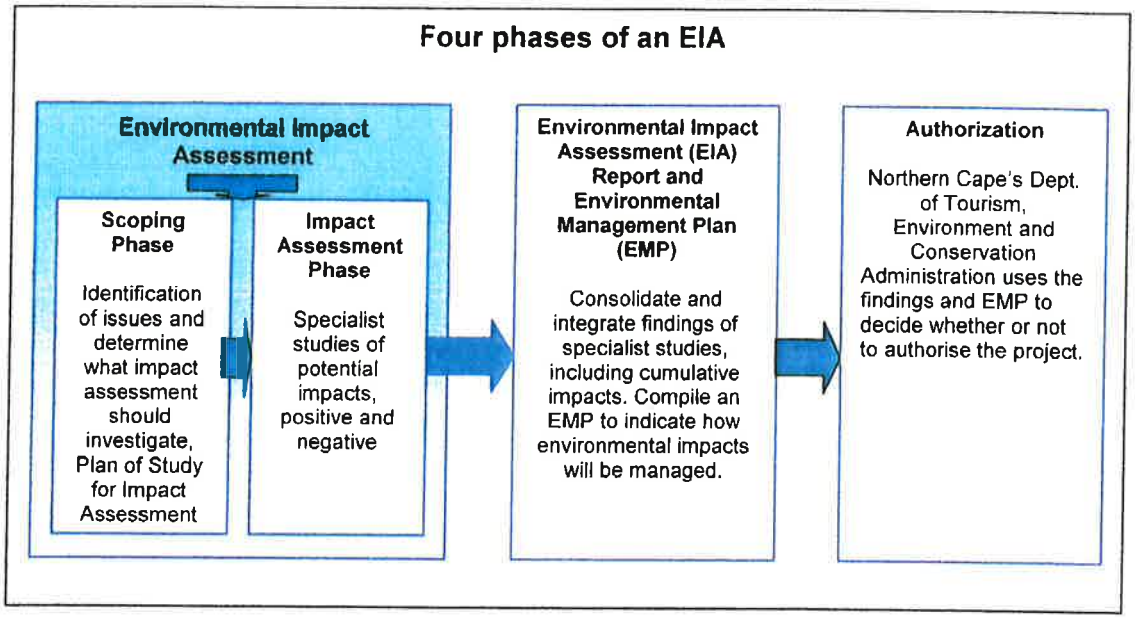


Figure 6: Phases of the EIA process

C-3.1 Application for authorization

An application for authorization, together with Rock Environmental Consulting's declaration of independence, was submitted to the Department of Minerals and Energy on 28 September 2006. This resulted in the registration of the project with this Department and the allocation of the following reference number: NC/KGA/BEST1/12/2008.

C-3.2 Information gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data were obtained. Additionally, the specialists sourced available information about the site and receiving environment from reliable sources, including Topographical Series Maps, Geological Series Maps, Interested and Affected Parties, previous documented studies in the area and previous EIA Reports, Sishen Weather Station, City of Tshwane Metropolitan Municipality as well as several other sources that were utilised during the extensive desk studies conducted, including AGIS information. The EIA team and specialists then visited the site to gain first-hand information and an understanding of the existing operations and the proposed project.

C-3.3 Specialist studies

The following specialist studies were identified as necessary requirements for the proposed activity and have already been undertaken. The information from these specialist studies has been incorporated into the EIA Report:

- Specialist Heritage Scoping Study
- Vegetation Survey
- Vertebrate Fauna Survey
- Geohydrology Report
- Traffic Impact Study Report
- Civil engineering services

C-4 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of EIAs, including consultation with Interested and Affected Parties (I&APs). These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, in order to allow them to comment on the proposed activity.

C-4.1 Identification of interested and affected parties

The following Interested and Affected Parties (I&APs) were identified and consulted during the Full Scoping Process:

- C Joachim - Municipal Manager of Gamagara Local Municipality;
- Mr L Botha - Technical Manager of Gamagara Local Municipality;
- Q Hinana - HOD, Community Service Gamagara Local Municipality;
- Mr G van Dyk of DWAF;
- Mr A Olivier - Ward councillor; and
- Dr JE Drewes - Erioloba Consulting, Housing Consultant to Assmang Ltd (Khumani Mine).
- Adjacent Landowners

C-4.2 Public announcement of the project

The project was announced as follows:

- Publication of a media advertisement in the local newspaper called the Kathu Gazette dated 03/11/2007 and Kuruman Bulletin dated 01/11/2007 (please see Appendix 6A).
- On-site notices advertising the EIA were erected on site on 27/10/2007. One site notice was placed at the current access to the premises and another on the

fence approximately 300m to the south along the N14. One at the South African Police Department in Kathu; One on the notice board at Shoprite in Kathu

- A Background Information Document (BID) was delivered (please refer to Appendix 3A for a copy of the BID) by hand to I&APs on 15/11/2006 (see Appendix 3B). The Background Information Documents (please refer to Appendix 6B for a copy of the BID) for the proposed Residential Township Developments was either hand delivered, faxed or e-mailed to the surrounding land owners and other I&AP's in the study area on 27/10/2007, 08/11/2007 and 09/11/2007. BID's were also placed at the entrance to the Local Municipality Offices (see Appendix 3D). Two Comment and Registration sheets were received from I&APs (please see Appendix 3E).

C-4.3 Meetings with I&APs

Two public open days were held on the property at the Kathu Primary School. The purpose of the public meetings was to inform all I&AP's of the proposed development by means of an information session on the project. As the Kathu Primary School is a well-known, accessible and central feature of the town and community, it was a favourable location for the public open day. The open days were held on 12/11/2007 & 13/11/2007, from 14:00 - 20:00. I&AP's were invited to attend these public open days any time between the time frames given, during which time they had the opportunity to ask questions concerning the development, view the layout plans and proposed building style images, sign a form to register as an I&AP as well as submit the Comment and Registration Sheet that was attached to the BID. This would then serve to qualify them as Registered I&AP's. The EIA process was explained and all the comments received were collected, to be addressed in the EIA process.

The public open days were advertised in the local newspapers (The Kathu Gazette and The Kuruman Bulletin), the background information document and on the site notices.

Please refer to Appendix 3F for a copy of the attendance register of the public open days. The additional I&AP's who registered, as per the submission of the Registration and Comment Sheets completed and returned to Rock Environmental Consulting OR via their email and/or fax requests are included in Appendix 5E.

It was requested by the landowners of the Reitz Small Holdings to have a meeting with Rock Environmental Consulting (Pty)Ltd to discuss further matters regarding the proposed development. This meeting, which was accompanied by the civil engineer on the project, was held on the Reitz Small Holdings on the 19/11/2007. Please refer to Appendix 3G for a

copy of the attendance register of the Land owners meeting. Refer also to appendix 3I for Minutes of the Meeting with Reitz Small Holdings.

C-4.4 Feedback from I&AP's

The closing date for registration and comment delivery from I&AP's during the first public participation phase was within 30 days from the date of publication of the last advertisement, which was the 03/01/2007. This period has lapsed, however, comments were still accepted long after this date and REC will continue to do so throughout the duration of the project up to the final submission of the Environmental Impact Assessment Report. The challenge is to address comments and concerns to the best practical means and details available at that time.

The complete list of comments received from I&AP's can be viewed in Appendix 3H. The questions and comments received are addressed in Appendix 3H. Rock Environmental Consulting has ensured that copies of this Scoping Report is available to all I&AP's and Authorities for Comments.

C-4.5 Addressing the comments and questions received from the I&AP's

Answers to questions and feedback to I&AP's comments' are provided in Appendix 3H (original comments on Registration and Comment Sheets, attached in Appendix 3E). Comments and questions that have not been fully addressed during the scoping phase have been included in the Terms of Reference for the subsequent phase of the EIA process. The objective of the scoping process is mainly to identify the issues for addressing in the second phase of the EIA process. It is the opinion of the consultant that no issues were identified during the scoping process that could potentially constitute a fatal flaw in the development of the proposed Residential Development.

C-4.6 Conclusions of the public participation exercise

The proposed development has generally been met with a positive attitude from the community at large. Some negative concerns were noted from the Reitz Agricultural Holdings. These have mainly been raised out of concern that there will not be enough water for the proposed residential development. These concerns have been noted but it is concluded at this stage that they can be mitigated in a sustainable manner. This Scoping Report, and the EIA report to follow will serve to clarify, consider and sustainably mitigate remaining and significant concerns that the participating I&AP's might have.

In conclusion, the public participation exercise has provided adequate information to enable an understanding of what the proposed development would entail and also to list and address the concerns and comments together with local information in the specialist reports compiled for this Scoping Report. Through addressing all comments and questions

received from the I&AP's, and through the compilation of a detailed Scoping Report for Comments, the consultant has attempted to promote a better understanding of the activities of the proposed development and to provide as much information concerning technical aspects of the development; especially where water availability and similar such aspects are concerned. Please refer to the comments and responses report in Appendix 3!.

In conclusion, it is regarded by the EAP that the scoping exercise undertaken for the proposed Residential Township Development on the Farm Bestwood has satisfied the requirements for Public Participation Process.

SECTION D ASSESSMENT OF IMPACTS

D-1 IDENTIFICATION OF IMPORTANT ENVIRONMENTAL ISSUES

This section provides a list of the biophysical and social issues and impacts that can be expected as a result of the proposed development. Some of the issues are localised in their effects, whilst others are more generally applicable.

The identification and brief descriptions of the relevant physical and biological issues were conducted under the following headings in Table 5:

- Environmental aspects: defined as those actions on site that may potentially have an environmental impact;
- Environmental component to be impacted upon;
- Locality / applicable zone of the impact; and
- Nature and description of the impact.

Significant environmental issues have also been identified by means of the relevant environmental legislation, the opinions of specialist consultants and the views of interested and affected parties.

The interested and affected parties expressed the following concerns regarding the proposed activity:

- What type of sewerage system will be used?
- Where will water be sourced from?
- Will labour be housed on site, and the security of the construction site?
- Position and construction of surrounding wall, if there is to be a surrounding wall.
- Will water be from boreholes, or will water be pumped directly from the river?
- Where will the power lines go?
- How many units will there be?

The specialist consultants have the following concerns regarding construction on the proposed site:

- No heritage sites and objects were identified on the development site. Before construction a few trenches will be dug to see if any archaeological objects of interest will be found. However, if during site clearing and/or construction on the site any archaeological and historical sites and objects (including foundations, graves or old waste disposal sites etc) are exposed, it must immediately be reported so that an investigation and evaluation of the finds can be made (See Section B. 1-7 pg. 30).

- Alternative Energy Sources

  The engineering company strongly support and advise the use of alternative energy sources and power savings lamps, which includes the following:

  - Solar Energy

  Solar energy could be utilized very effectively for the heating of household water by means of solar power geysers as well as for heating of swimming pools.

  - Gas Appliances

  The use of gas appliances, especially for cooking and heating purposes, can have a substantial influence on the electricity consumption. We would therefore strongly suggest to the developers/homeowners to consider gas cooking appliances and gas heaters.

  - The use of power saving lamps could also help with a reduction on the electricity consumption.

The description and identification of anticipated impacts is based on the listing of so called **environmental aspects**, which is the term used to describe the actions during the construction and operational stages of the project that may have a degree of impact on one or several of the environmental components listed. The list of environmental aspects that might be evaluated is practically infinite because *any* characteristic of the environment is an attribute. Therefore, it is necessary to reduce the number of aspects to be examined. Therefore, duplicative, redundant, difficult to measure, and obscure aspects may be eliminated in favour of those that are more definite.

An impact can be defined as *any change in the physical-chemical, biological, cultural, and/or socio-economic environmental system that can be attributed to human activities relative to alternatives under study for meeting a project need.* Therefore, the identified

environmental aspects are said to have an impact on the components listed above. One of the most important aspects of conducting an Environmental Impact Assessment is to evaluate these aspects and impacts because there are proposed mitigation and management options for the identified impacts that must be provided within this EIA report, in the Section to follow.

The environmental aspect can be effective during the **construction phase** (c) and/or the **operational phase (o)**, which is the stage when the proposed residential development on BESTWOOD 459-RD is complete and fully functional. The largest impacts resulting from the environmental aspects are anticipated during the construction phase. Therefore, the mitigation measures that are implemented during the construction phase especially should serve to sufficiently alleviate the temporary, negative impacts caused by the construction activities.

A list of activities (environmental aspects) that will occur on site is indicated in Table 5 below and it provides an outline of the potential impacts that these actions will have on the environment (especially on the vegetation and soil surfaces of the site), as well as the anticipated effects on the visual character of the site, biophysical and also social aspects.

Table 5: List of activities (environmental aspects) that will occur on site, the potential impacts that these activities may have on the environment and a description of the nature of the impact

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
Vegetation clearance for the footprint/foundation of the ential unit on each stand	Soil layers, soil surface, indigenous vegetation cover.	2310 erven and 37 public open spaces as indicated on the Conceptual Layout Plan (Appendix 2A). Each zone comprises a minimum size of 300m^2 up to 700m^2.	The removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in certain areas. The existing vegetation will be permanently removed to accommodate the footprint of the residential unit on each stand. Where the removal of surface vegetation is of a temporary nature only, the establishment of weeds is a threat. The topsoil layer is required to rehabilitate the area (i.e. for landscaping the area).
Vegetation clearance for the footprints/foundations of all other buildings/structures on site. (c)	Soil layers, soil surface, indigenous vegetation cover.	Refer to Appendix 2A.	The impacts are the same as described above.
Excavations for the foundations of the residential units and all other building structures, as listed above (c)	Soil layers, vegetation and faunal habitats.	Development areas, as indicated on the Conceptual Layout Plan in Appendix 2A.	The existing vegetation will be permanently removed to accommodate the foundations of the building structures. The total extent of the excavations for foundations will be finalised during the EIA

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
			process to follow. A specialist geo-technical report, to be compiled for the EIA process, will give indications as to the suitability of the underlying geological material for construction purposes at each proposed development node.
Vegetation clearance for the establishment of the internal road network on site (c and o)	Soil surfaces, vegetation cover, aesthetic quality, surface water runoff and storm water drainage.	The detailed road layout map is not yet available. Roads will be established within the residential Extension and all other project infrastructure. A conceptual road network has been formulated at this early stage. The Environmental Impact Assessment to follow will result in detailed road layout through further consideration of important environmental planning principles.	The removal of surface vegetation cover can lead to increased soil erosion, especially during the rainy season. Therefore, these areas will need to be surfaced as soon after vegetation stripping as possible. Incorrect design of access and internal roads can be problematic in terms of surface water runoff (can lead to erosion at outlet areas) and storm water drainage (damming and ponding of the surface water may occur). The internal road network will have a negative impact on the aesthetic quality of the site, in the form of above-ground scars across the landscape. Gravel roads will be implemented to the greatest extent possible.
Construction of steeper sections of the internal road network (c).	Surface vegetation soil and air quality.	The detailed road layout map is not yet available. Roads will be established within the residential Extension and all other project infrastructure. Steep inclines may require the construction of "surfaced" road sections.	As mentioned, permanent removal of the surface vegetation will occur for the establishment of certain sections of steeply placed roads. Road construction generates dust, which will need to be suppressed. Roads constructed on the development terrain may negatively impact on the visual and aesthetic character of the site. Storm water run-off from road surfaces will need to be properly managed in order to limit the potential erosion that may result from such run-off.
Provision of street/house lighting and electricity to the residential Extension (c and o)	Illumination will affect the visual character of the site at night.	Along the internal road network, and at each of the proposed houses.	Street lights will be provided along the road network within the development area; the spacing and type to be provided will fit the theme/ethos of the proposed development. The site falls within the Eskom Supply region and electrical engineers have been appointed to oversee the installation of electrical services. The illumination from the street lights will cause a light intrusion to the area, negatively impacting on the aesthetic quality of the site.
Stockpiling of excavated material (c)	Soil and vegetation cover.	Precise location still to be determined; the impacts on soil and vegetation will occur	Stockpiles cause compaction of the soil, which promotes the establishment of weed species. The establishment of weeds greatly

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
		wherever stockpiles are established. Wherever possible, the stockpiles should be placed in the Buffer Area, as described below.	reduces the pristine quality of the natural vegetation on site. Stockpiles should not be situated within 200 m from any water bodies or water courses, as sedimentation transport into such systems is undesirable.
Stockpiling building materials (c)	Soil and vegetation cover.	It is recommended that a 15 m width perimeter around the footprints of building structures is established. This is called the "Buffer Area", in which stockpiling and vegetation modifications may occur.	Stockpiles will need to be established for the storage of aggregate, bricks and cement. As mentioned, stockpiles cause compaction of the soil surface, which leads to the growth of unwanted weed species.
er reticulation installation, including excavation of service trenches (c)	Soil layers and vegetation cover.	Along the length of the route of the underground water piping. (The layout of the water reticulation on site is still to be determined - All possibilities, in terms of design and boreholes to be used, will be evaluated during the EIA process.	Where the removal of vegetation is of a temporary nature only (as is the case with the installation of a water reticulation network) the establishment of weed/invasive species is a threat. The topsoil layer is required to rehabilitate the vegetation in these areas, where vegetation has been temporarily removed. The Geotechnical Study revealed that excavation difficulty can be expected when excavating service trenches.
Installation and operation of sewerage reticulation systems.	Soil layers, vegetation cover and groundwater.	Final designs and layouts yet to be determined.	Vegetation removal and soil excavations will take place where underground sewage tanks are installed. The temporary exposed soil surface that will result will be susceptible to erosion and pioneering exotics. However, the exposed areas can be re-vegetated and rehabilitated. If the chosen sewage system does not take the geological conditions of the site into account, or if systems aren't constructed and installed according to applicable standards, there is a risk of groundwater contamination.
Maintenance of sewerage reticulation system (o)	Groundwater quality.	In the immediate vicinity of any sewage treatment tanks.	Leaking or faulty sewerage systems, or systems not correctly installed could contaminate the groundwater resources, which will affect the entire study area. Regular maintenance and inspection of the chosen sewerage systems will prevent the risk of contamination of the environment.
Provisions for storm water i.e. storm water drainage (c)	Soil surfaces, vegetation cover and drainage patterns.	Areas where surface water run-off is collected i.e. like from	Correct and efficient storm water drainage systems must be installed. Poorly designed storm water outlets

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
		roof gutters and roof structures, as well as road surfaces.	will result in increased surface run-off volume and speed, which could lead to the creation of erosion gullies. All road surfaces generate storm water, which should be controlled by preventing the storm water from crossing the road. Storm water must be allowed to spread out gradually over a large surface area to protect the soil surface against erosion.
Maintenance of storm water management systems (o)	Soil surfaces, drainage patterns and surface water.	In all areas where storm water management systems have been created.	Maintenance of storm water outlets is required to ensure that they don't get blocked (i.e. no longer fulfil their function) or result in erosion.
Construction of all building structures associated with the ' ıosed development (c)	Soil surfaces, vegetation, faunal component and aesthetic character.	Refer to the Layout Plan (Appendix 2A).	All demarcated Zones' units will in total have approximately 2347 units, covering an area of approximately 200 ha. These structures will be erected according to the specified design parameters, concerning the building materials, design and colours allowed etc. The construction of the houses and other infrastructure in the rural setting of the proposed development area will negatively impact on the aesthetic character of the site.
Generation of construction waste (c)	Soil, vegetation, aesthetic quality of the site and surface water run-off, water and ground water resources.	All construction sites.	Waste, such as building rubble and empty cement bags can be a negative visual impact if not collected and disposed of correctly. Further to littering the site and adjacent areas, poor control and illegal dumping of construction waste can pollute surface water run-off, contaminate wetlands / streams and groundwater, as well as lead to the promulgation of weed species.
General building maintenance (o)	Visual and aesthetic quality, also surface water quality and vegetation cover.	The study area at large.	The design and nature of buildings and their general finishing will determine the impact of the proposed development on the visual quality of the study area. The proposed building structures will be aesthetically pleasing and will be of colours that are as complimentary to their natural surroundings i.e. only natural colours will be allowed). Maintenance of the estate as a whole will prevent a further negative impact on the visual quality of the study area. The disposal of building rubble (both during construction and maintenance) causes impacts on the natural environment (including faunal ecology, surface water and vegetation) if disposed of illegally. Compaction of soil surfaces and the

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
			propagation of weeds are typical impacts.
Road maintenance (o)	Vegetation and soil surface conditions, as well as social well-being of the residents of the residential development on BESTWOOD 459-RD.	No specific locality. The road network throughout the development will need to be maintained.	Poorly maintained roads cause abnormal soil erosion, especially on the steeper slopes; roads that become too badly eroded are no longer usable. This aspect is of particular concern given the undulating landscape of the site. Therefore, road maintenance is essential to ensure an effective and usable road network within the estate.
Collection and disposal of solid domestic waste (c and o)	Aesthetic quality, surface water run-off, subsurface and groundwater quality, vegetation and fauna.	The site and directly adjacent areas.	Poor waste collection and handling will pollute the environment (affecting fauna, groundwater, surface water and aesthetic environment). No illegal dumping of domestic waste will be tolerated. Practical design and layout of waste collection/storage facilities is essential. Untidy collection facilities and wind blown refuse can cause human / animal conflicts, as foul odours from such areas will attract wild animals and cause other problems (pests / diseases), as well as water pollution.
Collection and disposal of construction waste (c)	Aesthetic quality, subsurface and ground water quality, vegetation and fauna.	Any locality at which construction activities are to occur.	No construction waste may be illegally dumped into the surrounding areas, as the effects of illegal dumping on the environment are devastating. Poor waste collection and handling will have a negative impact on several environmental aspects. A waste collection agreement will be essential.
porary employment created during the construction phases of the proposed development(c)	Social aspects	All sites where construction related activities are to take place.	There will be positive impacts in terms of social upliftment and job creation within the broader region.
Long term employment opportunities and wealth to be generated by the proposed development (o)	Social aspects	Extension 69 as a whole.	There will be positive impacts in terms of social upliftment and job creation within the broader region.
Transportation of workers to and from the development site (c)	Air quality, soil surface and social aspects (including traffic and worker safety).	The road network within Kathu, and the provincial Highway N14 and the proposed development area.	Vehicles used to transport workers must never be overloaded; worker safety is of utmost importance. Vehicles used to transport workers must not exceed the speed limit and no vehicle may deviate from the existing routes on the farm Bestwood 459 RD, to ensure safety of the workers and conservation of the area. Poorly maintained vehicles will have a large negative impact on air quality.

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
Construction camp establishment (c)	Aesthetic impacts, social aspects, subsurface and groundwater quality, generation of domestic waste, vegetation removal, soil surface compaction and faunal impacts.	Location still to be determined.	The generation of domestic waste, as well as the provision of sewage facilities, within the construction camp could potential impact on the aesthetics of the site as well as the quality of subsurface and groundwater if not properly managed and implemented. The removal of sections of natural vegetation would most likely be needed for the establishment of the camp, and soil surfaces would become compacted as a result of activities within the camp.
Sanitation provision to workers during the working day (c)	Subsurface soil, surface water and subsurface water quality.	Sufficient chemical toilets should be provided for workers within walking distance of all construction activities.	Subsurface soil contamination and contamination of surface/subsurface water quality could occur if the ablution facilities provided are not according to standard. A temporary impact is possible; however, it can easily be prevented.
Movement of construction vehicles on site (c)	Air quality, soil and vegetation cover.	Potential impacts will be restricted predominantly to existing roads on the site.	Movement will cause limited or localised disturbances and temporary soil compaction, which promotes the establishment of weed species. Dust will be generated by vehicular movements on site.
Maintenance of construction vehicles (c)	Soil, vegetation and surface water.	Within the construction camp(s).	In the event of on-site repairs and servicing, soil surfaces, vegetation, and run-off may be locally contaminated. Spillage of fuel through faulty bowsers is a possibility, if not controlled. It is anticipated that no fuel storage facilities will occur on the site other than temporary storage of diesel in 44gal drums. The possibility does however exist that larger temporary fuel storage tanks (23 000l) will be brought to site and effectively bunded.
Traffic safety on the main road (c and o)	Social aspects.	The provincial Highway N14	The access point to the site is via this N14; therefore motorists using the main road may be negatively impacted on by slow moving construction vehicles.
Noise generation by operating air compressors, excavators and other heavy machinery. Noise is also generated by the construction workers (c)	Impacts on faunal species and surrounding land owners.	Areas on site at which construction activities take place.	Excessive noise levels on site may negatively impact upon the behaviour and movements of site fauna. The significance rating and mitigation of this potential impact will need to be dealt with effectively in the EIA report. Surrounding land owners may also potentially be negatively impacted upon by excessive noise levels on site during construction.
Impact of the proposed development on Red Data	Red data flora on site.	Each of the residential houses and the	It is not anticipated that red data floral species will be adversely

ENVIRONMENTAL ASPECT AND PROJECT STAGE c: construction stage o: operational phase	ENVIRONMENTAL COMPONENT THAT MAY BE AFFECTED	LOCALITY / APPLICABLE ZONE OF THE IMPACT	NATURE AND DESCRIPTION OF THE IMPACT
floral species (c and o)		associated service provisions.	affected by construction activities on site. All proposed development nodes have been chosen to minimise the potential impact on sensitive environmental areas and the associated red data floral species on the site.
Impact of the proposed development on Red Data faunal species (c and o)	Red data fauna on site.	The site at large.	Construction activities on site could potentially affect the natural behaviour/movements of red data faunal species on site. All proposed development nodes have been chosen to minimise the potential impact on sensitive environmental areas and the associated red data faunal species on the site.

D-1.1 Cumulative Impacts

According to the definition in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. The potential cumulative impact identified is the use of ground water resource. This has been identified during scoping as an important issue to asses and address. According to the geo-hydrological study there is a suffiecient water supply available. The results show that the Kathu-Main GMU has a maximum exploitation potential of 7.8 Mm^3/a; where the proposed total future abstraction for the Kathu GU, inclusive of the water demand for the Bestwood Town, amounts to 4.358 Mm^3/a (See Appendix 5). Significance of the impact on ground water resource is of such a nature that the expected growth will lead to increased pressure on the ground water resource. At present Kathu receives water from underground resources only, but in future it will be imperative for Gamagara Municipality to apply for an allocation of surface water available from the Vaal Gamagara Scheme.

Cumulative impact on other physical components such as natural vegetation and animal life, air quality and visual impact is not regarded at this stage as of high significance, due to the out stretched and spacious nature of the landscape.

D-2 ASSESSMENT METHODOLOGY

There are numerous assessment methodologies and approaches within the international sphere of assessing the potential impact of development activities on the environment.

When a particular method for environmental impact analysis is selected or used certain general principles must be kept in mind to avoid the mystique and pseudo-science, which

cloud many planning procedures. In general terms an environmental assessment evaluation comprises four main tasks:

1. Collection of data;
2. Analysis and interpretation of this data;
3. Identification of significant environmental impacts;
4. Communication of the findings.

Further to the above the proposed mitigation and management options for the identified impacts must be provided. The selected impact evaluation method must enable these four tasks. Impact methodologies provide an organised approach for predicting and assessing these impacts. Any one methodology and approach will have opportunities and constraints, as well as resource and skill demands, and no one method is appropriate for all South African circumstances. The selected methodologies proposed by this document are appropriate for most South African situations, taking the above criteria into account. Methods whose approach to considering environmental factors is systematic are desirable in an EIA.

Impact assessment methodology should comply with the following set of criteria:

a. *Be comprehensive:* The environment consists of intricate systems of biotic and abiotic factors, bound together by complex relationships. The methodology must consider the impact on these factors.
b. *Be flexible:* Flexibility must be contained in the methodology, as projects of different size and scale result in different types of impacts.
c. *Detect true impact:* The actual impact that institutes environmental change, as opposed to natural existing conditional changes. Long-term and short-term changes should be quantified.
d. *Be objective:* The methodology must be objective and unbiased, without interference from external decision-making.
e. *Ensure input of required expertise:* Sound, professional judgement must be assured by a methodology.
f. *Utilize the state of the art:* Draw upon the best available analytical techniques.
g. *Employ explicitly defined criteria:* Evaluation criteria used to assess the magnitude of environmental impacts should not be arbitrarily assigned. The methodology should provide explicitly defined criteria and explicitly stated procedures regarding the use of these criteria, including the documented rational.
h. *Assess actual magnitude of impacts:* A method must be provided for an assessment based on specific levels of impact for each environmental concern.

i. *Provide for overall assessment of total impact:* Aggregation of multiple individual impacts is necessary to provide an evaluation of overall total environmental impact.

j. *Pinpoint critical impacts:* The methodology must identify and emphasize particularly hazardous impacts.

The evaluation of the severity (or significance) of the identified impacts has been done according to a set and objective Significance Rating Methodology, which uses both **quantitative** and **subjective** measures. The framework of this methodology is included as Appendix 4B, which fully explains the rating procedure used and how the construction and operation values given in Table 6 below were derived.

The identified impacts are rated in terms of their significance during the construction phase and the operational phase of the proposed Residential Township. The identified impacts on the physical, ecological and social components of the site are discussed in terms of:

- Vegetation component of the site;
- Faunal component of the site;
- Impact on Red Data Fauna and Flora;
- Soil surface (stability);
- Topsoil layer (disturbance and compaction);
- Subsurface soil quality;
- Topography;
- Geology;
- Surface drainage (stormwater systems) and existing water bodies (streams within the study area);
- Surface water run-off (quality);
- Groundwater resources (quality);
- Air quality (due to dust generation);
- Ambient noise levels;
- Cultural historical elements;
- Social environment (of adjacent landowners);
- Traffic safety aspects (safety of the community);
- Land use options and agricultural potential of the site;
- Visual and aesthetic quality;
- Local economy (due to job creation); and
- Impact on the community (due to provision of affordable housing).

D-3 IMPACT ASSESSMENT

It should be noted that the impact significance rating is given presuming that **no mitigation measures** are to be implemented during the construction or operational phase of the project (this would imply a worst case scenario).

Table 6: Significance rating of the anticipated impacts

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED C = relevant to construction stage O = relevant to operational phase	Probability value	Intensity value	Duration value	Severity value	Significance rating
Impact on the vegetation component of the site	C: 5 O: 4	2 4	2 4	2 4	10: Moderate (negative) 16: High (negative)
Impact on the faunal component of the site	C: 4 O: 4	2 4	2 4	2 4	8: Moderate (negative) 16: High (negative)
›act on Red Data Fauna and Flora	C: 0 O: 0	0 0	0 0	0 0	0 0
Impact on soil (surface stability)	C: 3 O: 2	2 1	2 4	2 2	6: Low (negative) 4: Low (negative)
Impact on soil (topsoil layer - disturbance and compaction)	C: 3 O: 2	2 1	2 4	2 2	6: Low (negative) 4: Low (negative)
Impact on subsurface soil quality	C: 2 O: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on topography	C: 2 O: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on geology	C: 2 O: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on surface drainage and existing water bodies	C: 3 O: 2	2 2	2 4	2 3	6: Low (negative) 6: Low (negative)
Impact on surface water run-off ›ty	C: 3 O: 2	2 2	2 4	2 3	6: Low (negative) 6: Low (negative)
Impact on groundwater resources	C: 3 O: 2	2 2	2 4	2 3	6: Low (negative) 6: Low (negative)
Impact on air quality	C: 4 O: 2	2 2	2 4	2 3	8: Moderate (negative) 6: Low (negative)
Impact on ambient noise levels	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)
Impact on cultural historical elements	C: 0 O: 0	0 0	0 0	0 0	0 0
Impact on the social environment of the adjacent landowners	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)
Impact on traffic safety aspects	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)
Impact on land use & agricultural potential	C: 3 O: 3	2 2	1 4	2 3	6: Low (negative) 9: Moderate (negative)
Impact on visual and aesthetic	C: 3	2	2	2	6: Low (negative)

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED C = relevant to construction stage O = relevant to operational phase	Probability value	Intensity value	Duration value	Severity value	Significance rating
quality	O: 4	2	4	3	12: Moderate (negative)
Impact on local economy (due to temporary job creation)	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (positive) 12: Moderate (positive)
Impact on community (due to provision of affordable housing)	C: 2 O: 4	1 2	2 4	2 3	4: Low (positive) 12: Moderate (positive)

The predominant range of impacts caused by activities during the construction phase, which are of a temporary nature only, are in the **low negative significance rating** bracket. During the operational phase of the proposed activity the predominant range of impacts is in the **low negative significance rating** bracket. The impact of the development on the faunal and floral component of the site has the highest significance rating, namely moderately negative during the construction phase and highly negative during the operational phase due to the nature of the activity (which is high density residential, requiring the removal of the surface vegetation, which subsequently affects the limited faunal component of the site). Moderately significant positive impacts are expected during the construction and operation phases of the proposed development in terms of the local economy and community as a result of temporary job creation during the construction phase and the provision of much needed housing in the Kathu area.

SECTION E ALTERNATIVES

E-1 IDENTIFICATION OF ALTERNATIVES

The concept of Integrated Environmental Management suggests that an Environmental Assessment, to determine the possible impact of the proposed activity, should incorporate the consideration of feasible alternatives. Reasonable number of possible proposals or alternatives, to accompany the same objective should be assessed. In accordance with guideline 5 (DEAT, 2006) "assessment of alternatives and impacts" the identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental impact assessment. In the context of the site, which already enjoys an appropriate zoning and is not classified as a "green field" development, the consideration of similar-minded alternatives has been considered. Furthermore, the proposed activity preferred by the client - which is the development of a residential township - is in line with the requirements of Kgalagadi District Municipality, given the need for an increased residential component within Kathu and its surrounds.

E-2 FEASIBIBILITY AND COMPARISON OF ALTERNATIVES

E-2.1 Alternative 1: The Alternative

Given that the site and its immediate surrounds are visually and aesthetically very attractive due to the proximity of the Kathu Forest Natural Heritage Site, and also given the surrounding land uses (the Sishen Iron Ore Mine southwest of the farm Bestwood), the Alternative suggests an alternative layout plan for the proposed development. The alternative layout plan cuts into a part of these dense *Acacia erioloba* tree stands, which renders this option unfeasible. This is due to the fact that these trees are protected and a permit from Dept. of water affairs and forestry is need for each tree that needs to be removed.

The alternative proposes a far higher number of Residential Zone 2 units and less of Residential Zone 1 units on the site (Portion Remainder of the farm BESTWOOD 459 RD), but the total erven set aside for Residential units is more than the proposed development. This is favourable, given the ever increasing demand for housing in the rapidly expanding Kathu area, as well as growing mining activity in the Hotazel, Postmasburg and Sishen region. Please refer to Appendix 2B for the proposed layout of the Alternative. The proposed housing development for the alternative will incorporate 1800 Res. 1 units, 600 Res. 2 units and seven public open spaces, covering a total of 135.1 ha. The size of the stands will be between 500m^2 and 700m^2. These stands are too uniform in size for the needs of this development and for the Kathu area, thus, a wide range of erven sizes is needed to cover a greater range of the market spectrum. Therefore, the original proposed development layout is favourable over the Alternative, as the majority of the stands range in size from 300m^2 to 900m^2 and covers a very similar area in total (129.27 ha). The benefits gained, the impacts and financial outlay of the Alternative and the original proposed development will be almost identical.

E-2.2 Alternative 2: The no-go alternative

The do-nothing or no-go alternative implies that the status quo remains unchanged, with no further planning or development of the proposed residential development. As mentioned, the proposed development will provide for much needed housing in the Kathu area, given the incredible rate of increase in mineral values, as confirmed by televised news and news papers, which clearly revealed that there is an increase in value over the last few months on all mineral, such as gold, platinum, iron ore, diamonds, etc. and the growing mining activity in the Hotazel, Postmasburg and Sishen region. In addition to the fact that Kathu's small and medium sized enterprises (especially among the lower to middle income group sections of the community) have expanded substantially, resulting in positive economic incentives and net increase of land required for development. The proposed development

is aiming to target the middle income group sections specifically, who are in need of housing. If the no-go alternative is implemented, the above mentioned benefits will not be gained and the ever increasing housing need in the Kathu area will not be met.

SECTION F KNOWLEDGE GAPS, UNCERTAINTIES AND ASSUMPTIONS

There was no knowledge gaps identified due to the fact that all relevant parties (I & APs and Specialists) were consulted and valuable information was received and recommendations made.

No assumptions were made also because the necessary studies were conducted and the information was made available to relevant stakeholders and these studies were incorporated into the planning and design of this development.

Uncertainties will always be part of any developments when it comes to the actual degree of impact it will have on the immediate environment, because no project is identical any and real results can only be recorded after the development has started and finished.

SECTION G ENVIRONMENTAL IMPACT STATEMENT

G-1 SERVICE PROVISION

G-1.1 Water reticulation

Serious expansion programmes have been announced by all major mining houses operative in the Northern Cape due to Transnet's announcement that the export capacity of the Sishen-Saldanah railway line are receiving urgent attention. The strategic location of Kathu in relation to all envisaged expansions of mining activities make Kathu the preferred location to provide in the need for housing and other amenities which will be generated by the expected growth.

The expected growth will lead to increased pressure on the water sources. AT PRESENT, Kathu receives water from underground resources only, but in future it will be imperative for Gamagara Municipality to apply for an allocation of surface water available from the Vaal Gamagara Scheme.

Sufficient water is therefore available for the proposed development. A formal water licence application for the abstraction of groundwater is in process for submission to DWAF to supply in the water needs of this first phase of the development of Bestwood Estates. An

application to Sedibeng Water will be submitted to provide for future expansion envisaged for Kathu and to ensure a water supply source with higher assurance of supply.

G-1.2 Traffic Impact

The accesses' specifications to the development are within the SANRAL requirements. Two traffic scenarios are considered for the possible 6 years of the project (see Appendix 5).

No capacity problems are expected for the main internal routes of the proposed development, but the provision of on-site public transportation facilities is recommended.

Pedestrians crossing the N14 are to be accommodated.

G-1.3 Electrical supply

Gamagara has indicated that they do not have sufficient capacity to provide a supply to this development. At this stage an application has been submitted with ESKOM for a bulk supply to this development. There is a 400 kV/ 132 kV Eskom substation close to this site from which a bulk supply can be obtained if sufficient capacity exists. Currently electricity will be provided by the local municipality. The demand for the township will be 12 MVA NMD, but temporary 4.8 MVA NMD will be sufficient. All distribution lines will be able to carry 11 kV.

G-2 BIOPHYSICAL- and SOCIOECONOMIC ENVIRONMENT

G-2.1 Flora

All impacts of the development were rated as low to medium significance. Recommendations from the specialist should be adhered to.

No red data species were recorded on site. This could partly be due to the time of year the study was conducted (September 2007), when it is particularly dry. There are two protected species for example *Acacia erioloba* and *Acacia haematoxylon* on site that may not be removed without a permit given from the relevant authorities. These trees also provide shelter and wood to many vertebrates and invertebrates. The indigenous trees and shrubs should be retained as far as possible. See appendix 6 for an in-depth explanation.

G-2.2 Fauna

All impacts of the development were rated as low to medium significance. The proposed area of development does not support a unique faunal composition. Development of the proposed area, with regards to the mammalifauna, avifauna and herpetofauna, should not impact negatively on the ultimate survival or dynamics of the encountered taxa and can proceed as planned.

G-2.3 Historical Value

The assessment up to now of the terrain did not reveal issues related to heritage significance or impact on elements of historical or heritage value. For further recommendations please refer to Appendix 8, because it is in the best interest of the project that:

4. A final HIA report that will be submitted to both SAHRA and the Northern Cape Provincial Heritage Resources Authority for authorising the proposed development should only be prepared once palaeontological and archaeological investigations by specialists have been completed in order to confirm and assess the presence or absence of palaeontological and archaeological deposits.

5. The developer appoints an accredited archaeologist familiar with the region to either undertake test excavations on both sites prior to development, or to be present when test pits for sampling the soil formations in connection with foundations are made; the objective being to establish the presence and significance of any fossils and artefacts.

6. No construction work should be allowed to start before the final HIA report has been authorised.

Table 7: Comparative assessment of alternative land uses and developments

Environments Affected	Residential Development (Bestwood)	Industrial Development
Geology	No Impact.	No impact.
Topography	No Impact.	No impact.
Soil, Land Capability and Land Use	Soil compaction. Possible soil erosion due to removed vegetation. Surface disturbance and topsoil removal.	Surface disturbance and topsoil removal. Depending on type of industrial development, potential soil contamination due to spillage or leakage of hazardous materials and contaminated run-off.
Flora	Stripping of surface vegetation during construction.	Stripping of surface vegetation during construction. Depending on type of industrial development, potential impact from contaminated run-off, soil contamination, and dust emissions and fumes.
Fauna	Removal of surface vegetation thereby	Eradication of the natural

Environments Affected	Residential Development (Bestwood)	Industrial Development
	depleting food sources. Human presence and noise emissions resulting in emigration of animals. The disturbances of the vegetation cover and natural habitat will have a limited impact on the wildlife. However, it should be viewed against the background of the disturbances by human movement and activities through the area.	vegetation, human presence, potential dust, fumes and noise emissions, resulting in emigration of animals.
Surface Water	A small restriction of natural drainage. Possible surface water contamination due to oil and fuel leakage form vehicles.	Depending on type of industrial development, potential surface water contamination due to dust emissions, general site activities, contaminated run-off from site and spillage or leakage of hazardous materials. Quantity of surface water could also be impacted upon i.t.o. water consumption required for industrial purposes.
Ground Water	No potential environmental impact Fuel /oil spillages may seep through to the groundwater. However, the probability is very small even without mitigation measures. No impact on ground water quantity will occur.	No potential environmental impact on ground water if proper spillage clean-up procedures are in place.
Air Quality	No potential environmental impact. Vehicle emission will have a low to medium impact on air quality.	Depending on the type of industrial development, air quality could be affected by dust and fume emissions.
Noise	No significant impact, but noise could make faunal species migrate.	Depending on the type of industrial development, noise generation above the acceptable levels could be possible.
Visual	No significant impact if proper municipal services are in place. Illegal dumping of waste may lead to an eye-sore.	Depending on the type of industrial development, the visual quality of the area could be impacted upon.
Sensitive Landscapes	No impact.	No impact.
Sites of Archaeological and Cultural Interest	There were no cultural or historical sites/artefacts found. In the case of any other cultural or historical site being uncovered, activities should be stopped and SAHRA must be	Currently no cultural or historical site was found. But investigations before construction have to be done.

Environments Affected	Residential Development (Bestwood)	Industrial Development
	contacted.	in the case of any other cultural or historical site being uncovered, activities should be stopped and SAHRA must be contacted.
Socio-economic	Positive impact on the regional socio-economic structure through its support to the community, like: - Fully integrated town; - Regional facilities - Retail and industrial opportunities; - Hospitality opportunities; - Schools/ Churches; - Medical Facilities; - Sport Facilities - Security; and - Job opportunities. For more information see section A-4.	Positive impact on the regional socio-economic structure through its support of the development industry, profit generation contributing to tax revenue, job creation and the skills development of its employees.
Interested and Affected Parties	Burdens on local supplies of consumables and services. Dust, noise and other air emissions (fumes and gases). Support of the development industry and job creation leading to an improved local economy through the multiplier effect.	Burdens on local supplies of consumables and services. Depending on the type of industrial development, potential dust, noise and other air emissions (fumes and gases).
Cumulative	The potential cumulative impact identified is the use of ground water resource. This has been identified during scoping as an important issue to asses and address. According to the geo-hydrological study there is a sufficient water supply available. The cumulative impact of the development on the social environment is positive. Cumulative impact on other physical components such as natural vegetation and animal life, air quality and visual impact is not regarded at this stage as of high significance, due to the out stretched and spacious nature of the landscape.	The cumulative impact of industrial activity on the biophysical environment would initially be positive due to the performing of the required rehabilitation, but the operation of the industry would result in negative environmental impacts that would need to be prevented, minimised, mitigated or managed. Once again this impact is negligible due to surrounding activities being mostly of a mining or industrial nature. The cumulative impact of industrial activities on the social environment would be positive but once again negligible due

Environments Affected	Residential Development (Bestwood)	Industrial Development
		to the large unemployment figures for the area. The impact of industrial activities on the legal environment would be positive, as the rehabilitation would ensure the remediation of impacts resulting from historical illegal activities. This has no cumulative impact.

SECTION H CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment (EIA) Process for the proposed residential township of Kathu on the farm BESTWOOD 459-RD has been undertaken in accordance with the EIA Regulations published in Government Notice R385 of 21 April 2006 in terms of the National Environmental Management Act (Act No. 107 of 1998).

The essence of any EIA process is aimed at ensuring informed decision-making and environmental accountability, as well as to assist in achieving environmentally sound and sustainable development. This is achieved by conducting an analysis of the potential impacts that a proposed development may have on the physical, environmental and social aspects of the concerned area. In order to minimise the potential impacts associated with the proposed development, an Environmental Management Plan (EMP) is compiled, which must be implemented in order to sufficiently mitigate the anticipated impacts to an acceptable level.

H-1 Authorization of Project

The identification and description of the potential or anticipated impacts (herein referred to as environmental aspects) was the result of an assessment of the relevant environmental conditions and the issues identified during the public participation exercise, terrain assessments, specialist studies and desk research. An objective rating of the SIGNIFICANCE of the potential impacts resultant of the proposed development revealed that impacts were predominantly LOW (negative) and MODERATE (negative) - with no high negative impacts anticipated - during the construction and operational phases respectively. This means that it is possible for the project to proceed, providing that the impact mitigation measures provided are strictly implemented in the design, construction and operational phases of the development.

The scoping and EIA processes revealed that no fatal environmental flaws were identified that should prevent the approval of the proposed development. In summary, the **main environmental aspects** that need to be addressed during project implementation are:

- **Design stage:** The proposed township layout should be well thought out, in terms of providing safe access to the site, a secure complex for residents, efficient storm water and waste management and effective provision of services such as water and electricity.
- **Construction stage:** Addressing general social and traffic safety, air quality, noise generated, waste management consturction and restoration/landscaping of the site.
- **Operational stage:** Managing and addressing the potential of noise generated by the operation of the residential complex, proper maintenance of all buildings and fences, correct access to the complex (traffic safety) as well as correct waste disposal and management should ensure the smooth running of the proposed development.

The ultimate approval of this project lies with the ruling of Northern Cape Department of Tourism, Environment and Conservation (NCDTEC) - along with other bodies, such as the Department of Water Affairs and Forestry (DWAF), for example. However, this EAP. (Rock Environmental Consulting) is of the independent opinion that the EIA process has determined that there are no fatal environmental flaws that would constitute the refusal of Authorisation of the project and that there is sufficient need and desirability shown by the Local Municipality in support of a development of this nature. It is trusted that this Environmental Impact Assessment Report gives a balanced view of the anticipated environmental impacts associated with the proposed development and that the Environmental Management Plan attached herewith will adequately mitigate the impacts ▫

SECTION I ANNEXURES

Appendix 1: Locality Map

Appendix 2A: Conceptual Layout Plan (Proposed)

Appendix 2B: Conceptual Layout Plan (Alternative)

Appendix 3A: Background Information Document

Appendix 3B: Acknowledgement of Receipt of BID

Appendix 3C: Copy of press advertisement

Appendix 3D: Site Notice and Supporting Photographs

Appendix 3E: Comments and Registration Sheets Received from I&APs

Appendix 3F: Public Meeting Attendance Register

Appendix 3G: Land Owners Meeting Attendance Register

Appendix 3H: Comment and Response Report

Appendix 3I: Minutes of Meeting Held

Appendix 3J: Service Agreement Conformation from the Municipality

Appendix 3K: EIA Public Participation

Appendix 4A: Plan of Study for an EIA

Appendix 4B: Significance Rating Methodology

Appendix 5: Engineer Service Report

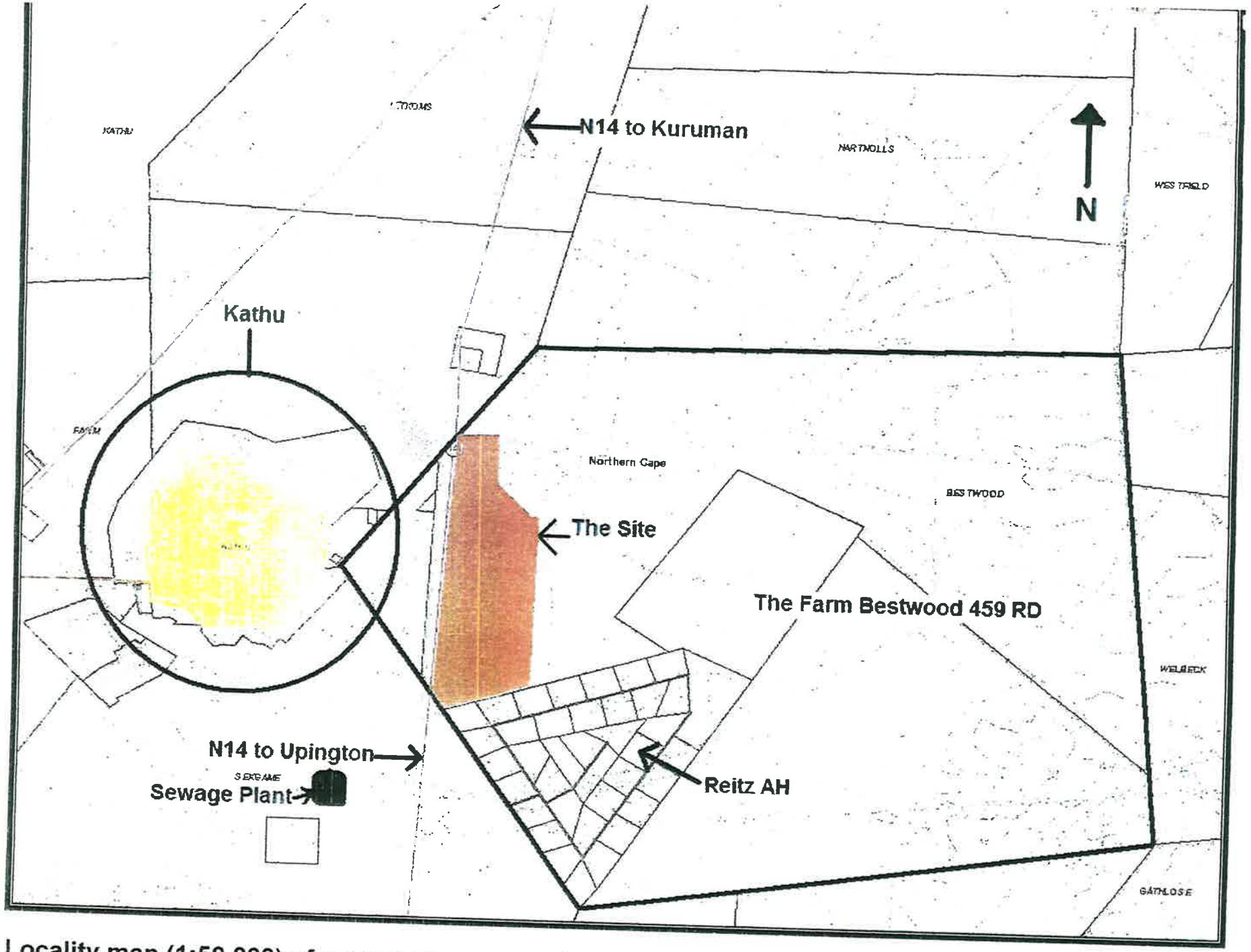
Appendix 6: Vegetation Survey

Appendix 7: Ecological Impact Assessment: Vertebrate Fauna

Appendix 8: Heritage Impact Assessment Report / Archaeological Report

Appendix 9: Motivational Memorandum

Appendix 10: Environmental Management Plan

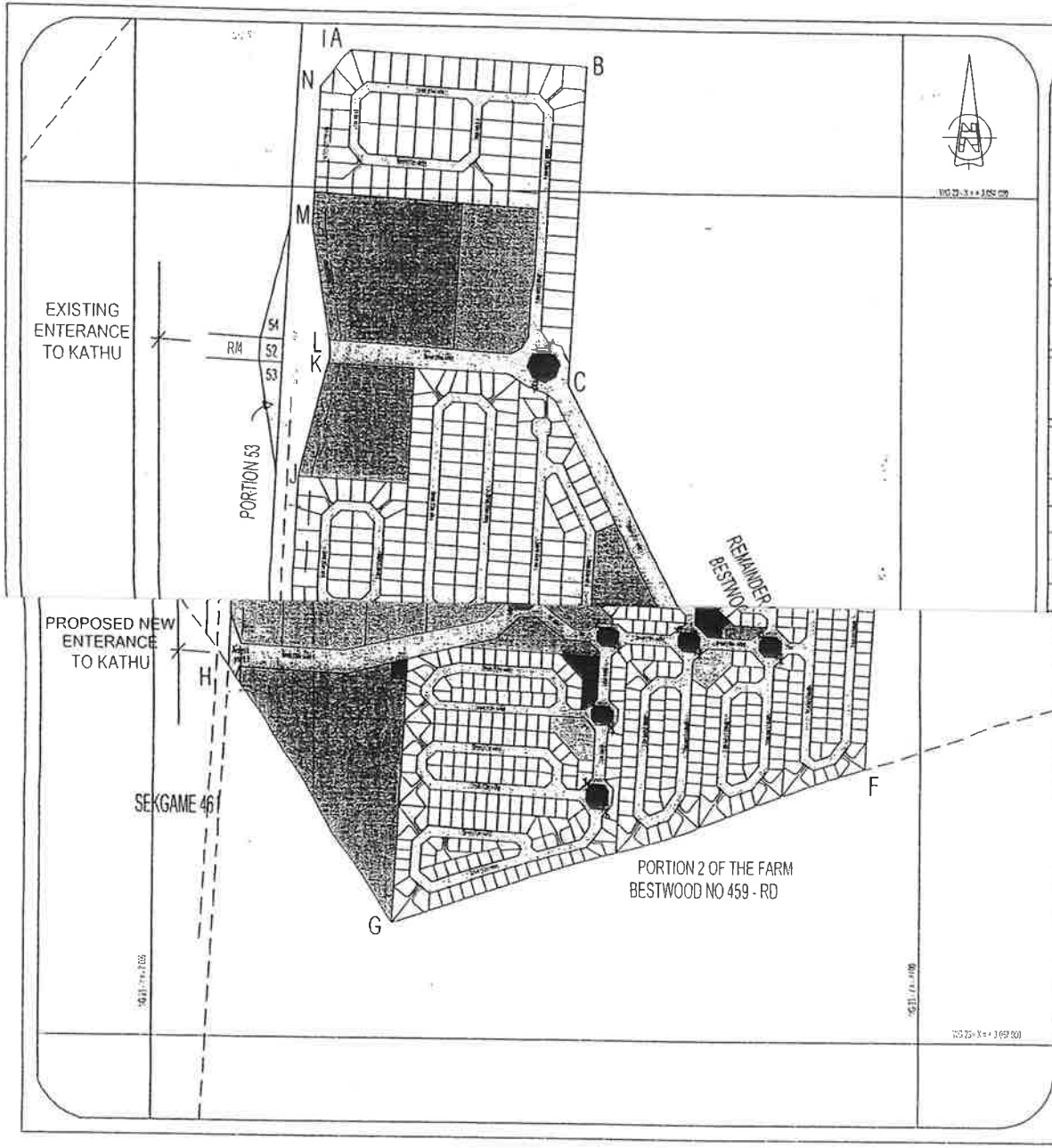


Locality map (1:50 000) of proposed residential township establishment on the farm Bestwood 459 RD

APPENDIX 2A

CONCEPTUAL LAYOUT PLAN (PROPOSED)

ROCK ENVIRONMENTAL CONSULTING (PTY) LTD



PROPOSED TOWNSHIP

PART OF THE REMAINING PORTION OF THE FARM BESTWOOD NO 459 RD

AUTHORITY: GAMAGARA MUNICIPALITY
REFERENCE NUMBER: ...

REGISTERED OWNER:
MAGDALENA JOHANNA ELIZABETH CAWOOD

USE ZONE	NR. OF ERVEN	AREA (ha)	% OF TOWN	LEGEND
Res. Zone I @ 900m²	66	6.108398ha	3.05%	
Res. Zone I @ 700m²	40	2.879942ha	1.44%	
Res. Zone I @ 640m²	235	15.621723ha	7.81%	
Res. Zone I @ 500m²	1183	63.235852ha	31.62%	
Res. Zone I @ 300m²	746	23.523780ha	11.76%	

FLOODLINE CERTIFICATE:
This is to certify that the township is not affected by floodwaters (1:50 and 1:100 years flood lines) in terms of the specifications of Section 144 of the Water Act (36/1998).

V&V Consulting Engineers
V&V Project Nr ...
V&V Drawing Nr ...

Drawing No: KAT3	DESIGNED & DRAWN: HK
SCALE 1:8 500	Copyright reserved

APPLICANT:

NAME: G.H. de Graaff

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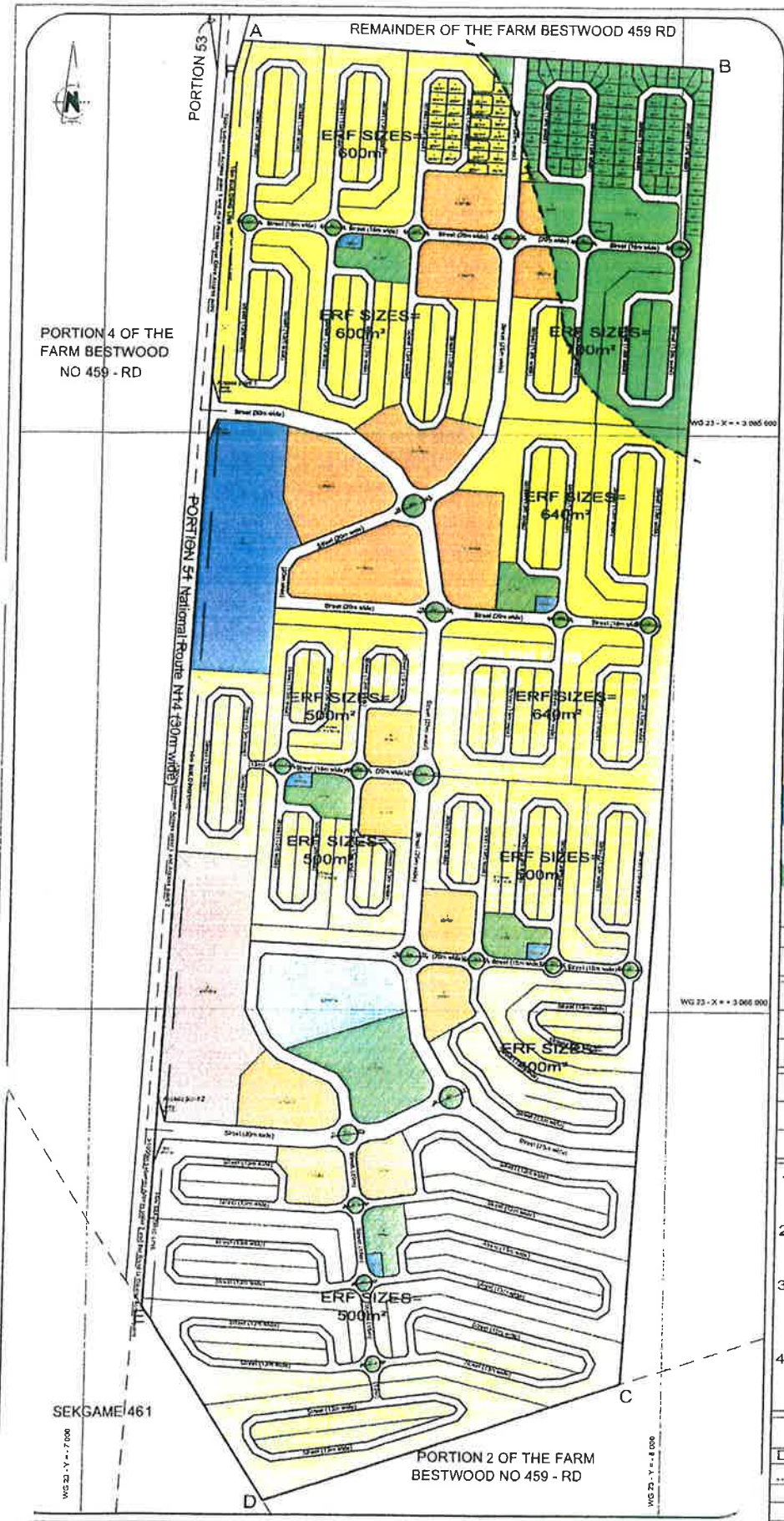
54B VAN WOUW STREET;
GROENKLOOF
TEL/FAX: (012) 346 0283
E-MAIL:
degraaff@absamail.co.za

APPENDIX 2B

CONCEPTUAL LAYOUT PLAN (ALTERNATIVE)

ROCK ENVIRONMENTAL CONSULTING (PTY) LTD



PROPOSED TOWNSHIP

PART OF THE REMAINING PORTION OF THE FARM BESTWOOD NO 459 RD

AUTHORITY: GAMAGARA MUNICIPALITY
REFERENCE NUMBER: ...

REGISTERED OWNER:
MAGDALENA JOHANNA ELIZABETH CAWOOD

USE ZONE	NR. OF ERVEN	AREA (ha)
Res. Zone I @ 700m²	±185	13.4595ha
Res. Zone I @ 640m²	±460	30.2597ha
Res. Zone I @ 600m²	±355	21.7145ha
Res. Zone I @ 500m²	±800	41.1949ha
Residential Zone II	±600	21.2719ha
Business Zone I	1	6.2114ha
Business Zone II	6	0.6000ha
Industrial Zone I	1	6.6587ha
Institutional Zone I	1	3.2142ha
Open Space Zone II	7	7.2020ha
Streets	-.	48.2132ha
TOTAL	±2416	200.0000ha

USE ZONE	% OF TOWN	ERF NRS
Res. Zone I @ 700m²	6.73%	...
Res. Zone I @ 640m²	15.13%	...
Res. Zone I @ 600m²	10.86%	...
Res. Zone I @ 500m²	20.60%	...
Residential Zone II	10.63%	...
Business Zone I	3.10%	...
Business Zone II	0.30%	...
Industrial Zone I	3.33%	...
Institutional Zone I	1.61%	...
Open Space Zone II	3.60%	...
Streets	21.11%	...
TOTAL	100.00%	-.

STREET INFORMATION	
Street length	±24.6km
Gradient of terrain	±1:...

SIZE OF RESIDENTIAL I ERVEN	
Minimum	Ruling
500m²	592m²

1. Proposed ..... Extension ... is denoted by Fig. ABCDEFA and measures 200 ha.
2. All distances & areas are measured in m² or hectares and are approximate pending final survey.
3. Contours conform to the standards laid down in the Townships Ordinance, 1934 and obtained from the Orthophoto Map Series 1:10000.
4. Access to all portions shall be to the satisfaction of the Local Authority.

.....1530

	AMENDMENTS
DATE	NOTES
.... 07	Submission of township application

TOWN AND REGIONAL PLANNERS ENVIRONMENTAL CONSULTANTS
PLAN

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GROENKLOOF; 0027
54B VAN WOUW STREET;
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TEL/FAX: (012) 346 0283
E-MAIL:
degraaff@absamail.co.za

NAME: G.H. de Graaff

This is to certify that the township is not affected \by flood-waters (1:50 & 1:100 years flood lines) in terms of the specifications of Section 144 of the Water Act (36/1998).

PR. NO:

Name:
Company:

DESIGNED & DRAWN: HK

Drawing No: KAT2

SCALE 1:7 500

APPENDIX 3A

BACKGROUND INFORMATION DOCUMENT

ROCK ENVIRONMENTAL CONSULTING (PTY) LTD