

**THE PROPOSED MIXED-USE RESIDENTIAL
DEVELOPMENT ON PORTION 1 AND THE
REMAINDER OF FARM SIMS NO.462,
KURUMAN RD, KATHU, NORTHERN CAPE**

D:E&NC reference number: NC/EIA/10/JTG/GAM/KAT2/2014



DRAFT (for comment)
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

JULY 2017

SISHEN IRON ORE COMPANY (PTY) LTD

MIXED-USE RESIDENTIAL DEVELOPMENT ON PORTION 1 AND THE REMAINDER OF FARM SIMS NO.462, KURUMAN RD

Kathu, Northern Cape

D:E&NC Ref No.: NC/EIA/10/JTG/GAM/KAT2/2014

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ACRONYMS

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DENC	Department of Environment and Nature Conservation (Northern Cape)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
PIA	Palaeontological Impact Assessment
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
TIA	Traffic Impact Assessment

1. INTRODUCTION

1.1 BACKGROUND

Consideration is being given to the construction of a mixed-use residential development, and associated infrastructure, on Portion 1 and the Remainder of the Farm Sims No. 462, Kuruman RD., Kathu, Northern Cape. It is estimated that up to 1439 properties will be developed, which includes 538 single residential properties, 851 group housing properties, 4 properties for the development of flats, 6 commercial properties, 29 open space properties, places of worship, education, municipal use, roads and associated infrastructure.

The applicant is Sishen Iron Ore Company (Pty) Ltd who will undertake the activity should it be approved. EnviroAfrica CC has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the relevant EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environment and Nature Conservation (DENC). The Scoping Report and Plan of Study for EIA were approved by DENC on the 13 June 2016 and EnviroAfrica were advised to proceed with the EIA process (**Appendix 1B**).

1.2 SCOPE OF WORK

There has been no particular brief given to the consultants to undertake this study. However, the scope of the study has been determined with reference to the requirements of the relevant legislation and undertaken in terms of the Integrated Environmental Management Information Series on Environmental Impact Reporting (2004) issued by DEAT and the Information Document on Requirements with respect to the EIA Process (January 2003), issued by the Department of Environmental Affairs and Development Planning of the Western Cape.

The basic scope of work will include the following:

- Review of all information.
- Participating in the progress of the development proposal.
- Scoping (identification of significant issues).
- Assessment of anticipated impacts.
- Identification of suitable mitigation measures to reduce negative impacts and enhance positive impacts.
- Submission for decision.

One of the crucial aims of an EIA is to ensure that the demands of sustainable development are met on a project level, within the context of the greater area. The most common definition of sustainable development is development that meets the needs of the present while not compromising the needs of future generations.

This EIA is therefore being undertaken with sustainable development as a goal. The assessment will look at the impacts of the proposals on the environment and assess the significance of these, as well as propose mitigation measures, as required, to reduce anticipated impacts to acceptable levels.

1.3 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which the report is based (i.e. specialist studies and project information) is correct.

Future management of the site is essential and the assumption is made that the mitigation measures recommended by the specialists will be implemented on a long-term basis. This has a major bearing on the reliability of the predictions of significance of impact.

1.4 DESCRIPTION OF THE PROPOSED ACTIVITY

Consideration is being given to the rezoning and subdivision of Portion 1 and the Remainder of the Farm Sims No. 462, Kuruman RD, Kathu from Agricultural Zone I for the development of a mixed use residential development.

The property is located to the west of the town of Kathu, adjacent to the Kathu Village Mall, and east of Mapoteng. The R380 runs through the development.

Approximately 1274 properties are proposed to be developed. This includes 534 single residential properties, 686 group housing properties, 4 properties for the development of flats, 6 commercial properties, 31 open space properties, 6 sites for places of worship, 2 sites for education and 4 properties for municipal use

The proposed activity will also include the construction of internal roads, and associated services infrastructure.

The total area of the site (both properties) is approximately 168.9ha.

The property is undeveloped, but is zoned as Agricultural Zone I in terms of the Gamagara Scheme, indicative of the past agricultural nature thereof. The site is however not being used for agriculture as it has been encroached upon by the urban development of Kathu.

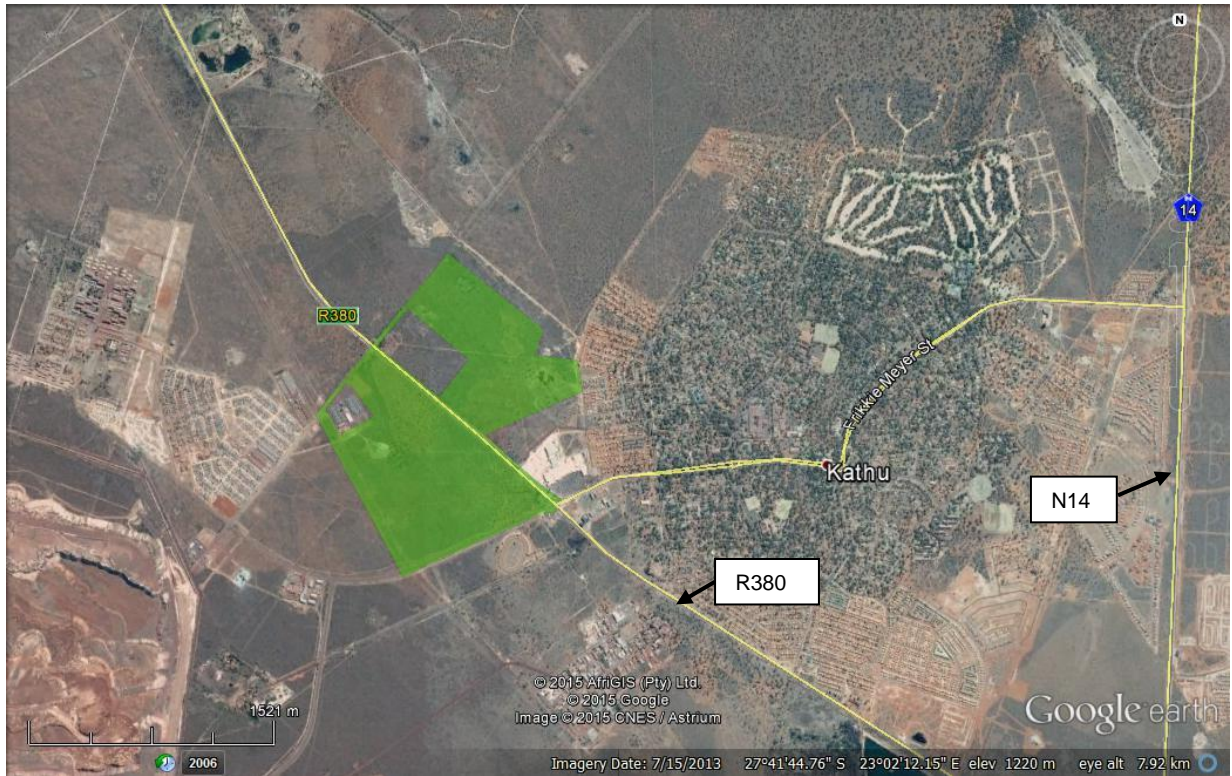


Figure 1: Locality Plan. Google earth view of the proposed site (green polygon)



Figure 2: Locality Plan. Close-up Google Earth view of the proposed site.

2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, as amended, EIA 2014 regulations the Scoping/EIA report must provide a description of the need and desirability of the proposed activity. The consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

While the concept of need and desirability relates to the *type* of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which *need* refers to *time* and *desirability* to *place* – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to *wise use of land* – i.e. the question of what is the most sustainable use of land. The impact of development on people’s health and well-being, as well as its impact on natural and cultural areas, and therefore its desirability, will also be assessed during the Environmental Impact Report phase.

2.1 NEED

Kathu falls within the jurisdiction of the Gamagara Local Municipality and within the John Taolo Gaetsewe District Municipality in the Northern Cape Province.

Currently, there is a significant housing need in Kathu, due to the population growth and mining activities in the town. The Applicant, as a major housing supplier in Kathu, has considered the development in-line with their need estimations in-line with the current expansion plans of the mine.

According to the Socio-economic Impact Assessment (**Appendix 6D**), the Gamagara Local Municipality Spatial Development Framework (SDF) notes that Kathu is the largest urban centre within Gamagara Municipality. The town is still expanding, and is expected to persist in its growth, as the mining operations continue to expand and intensify. Kathu can therefore be viewed as the Primary Urban Node within the Gamagara Municipality and should be considered the preferred growth point in the area.

As stated above, the town is expected to experience significant growth over the next few years due to the expansion of the mining sector in the area. However, due to the decrease in the price of iron ore there is likely to be a delay in this future growth. The SDF also notes that expansion to the east has been relatively stagnant, due to the difficulty of providing services. The majority of the future growth of the town will take place towards the west, further enforcing the integration of Kathu and Sesheng as part of the spatial objectives in the area. The proposed Sims Mixed Use Development supports this vision and the spatial objective of integrating Kathu and Sesheng.

According to the Socio-economic Impact Assessment (**Appendix 6D**), the residential density in Sesheng is significantly higher than the density in Kathu. The SDF also notes that Sesheng has experienced extremely fast growth in the direction of the older parts of Kathu. This growth forms part of the integration objective aimed at previously segregated urban units. The trend is set to continue and is encouraged by public investment into this segment of the Kathu area. The proposed Sims Mixed Use Development is designed to support the integration of Sesheng and Kathu.

2.2 DESIRABILITY

The following factors determine the desirability of the area for the proposed Sims residential development.

2.2.1 LOCATION AND ACCESSIBILITY

The proposed housing development site is located on Farm Sims No. 462, Portion 1, Kuruman RD, Kathu, Northern Cape, which is located to the west of the town.

The site is located in close proximity to major transport arteries, including the R380 (which links directly to the N14) and Hendrik van Eck Way, and has direct access from a number of major routes in the area. No constraints with regards to accessibility have been identified, however, the Traffic Impact Assessment concluded development will have an impact on all of the analysed intersections and some improvements are required to the relevant intersections.

The Department of Roads and Public Works has approved the relaxation of building lines along the R380 (Please refer to Appendix 1C).

The site is also relatively near the mine, as well as other employment opportunities such as commercial developments and malls. According to the Socio-economic Impact Assessment (**Appendix 6D**), a large business node is forming around the intersection of Hendrik van Eck Way and the R380. The recently developed Kathu Village Mall has played a significant role as catalyst for development in the area. The Kathu Village Mall and other commercial developments are thus in close proximity to the proposed development.

The development is located within the urban edge of Kathu, and can therefore also be considered to be infill development. Infill planning are contemporary principles to promote integration and to ensure optimum utilisation of available land. The desirability of the proposed development is further founded on the principle that it will ensure feasible residential development that could effectively be linked to the existing services infrastructure.

According to the Socio-economic Impact Assessment (**Appendix 6D**), the Gamagara Local Municipality SDF indicates that the urban edge can be defined as the urban growth boundary, which indicates the interface between urban and rural environments. In effect, the urban edge indicates the boundary beyond which urban growth should not be allowed. The urban edge has significance as it curbs the uncontrolled expansion of urban settlements into surrounding rural areas (urban sprawl). The proposed Sims Residential Development is located within the urban edge (please refer to **Appendix 5** and Figure 2.4 of the **Appendix 6D**). The site has therefore been identified as suitable for development.

The area is thus deemed to be ideally situated within the local context for the envisaged housing project. The criteria that determined the desirability of the applicable location are based on the principles of integration by means of infill planning and the optimum utilisation of available land and resources, availability of bulk services, accessibility and proximity of employment opportunities.

According to the preliminary Bulk Services and Infrastructure Status Report, the proposed mixed-use development cannot come into operation before the proposed upgrades have been implemented. This is especially the case of bulk water and sewer infrastructures.

2.2.2 COMPATIBILITY WITH THE SURROUNDING AREA

The site is bound by commercial/business developments to the east, which fall between the proposed site and the lower density residential development further to the east. A high density residential area (Mapoteng) is located to the west of the site.

The site is thus located between Mapoteng and the main town of Kathu, previously segregated communities. The development of the site will have an integrative objective in terms of correcting previous era segregation planning.

The proposed site is classified as “mixed-use development” and “lower density residential in the Kathu Spatial Development Framework (**Appendix 5**) and has been earmarked for the planned urban expansion.

The overall character of the area will be maintained and the use proposal of the Kathu Spatial Development Framework will be maintained.

3. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 24 (5): NEMA EIA Regulations 2010. However, the provisions of various other Acts must also be considered within this EIA.

The legislation that is relevant to this study is briefly outlined below.

3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Northern Cape to the Department of Environment and Nature Conservation (DE&NC).

On the 18 June 2010 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2010 (GN No. R. 543, R. 544 (Listing Notice 1), R. 545 (Listing Notice 2), R. 546 (Listing Notice 3) and R. 547 in Government Gazette No. 33306 of 18 June 2010). These regulations came into effect on the 2 August 2010. Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities for the proposed housing development on Farm Sims:

Government Notice R544 (Listing Notice 1) listed activities:

- 9** The **construction** of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water, sewage or storm water –
 - (i) With internal diameter of 0.36 meters or more; or
 - (ii) With a peak throughput of 120 liters per second or more,

- 11** The construction of infrastructure or buildings covering 50 square meters or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

- 18** The infilling or depositing of any material of more the 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from a watercourse
- 22** The **construction** of a road, outside urban areas,
- (i) With a reserve wider than 13,5 meters or,
 - (ii) Where no reserve exists where the road is wider than 8 meters, or
 - (iii) For which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.

Government Notice R545 (Listing notice 2) listed activities:

- 15** Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more:

Government Notice R546 (Listing notice 3) listed activities:

- 4** The **construction** of a road wider than 4 metres with a reserve less than 13.5 metres.
- 13** The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation
- 14** The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:
- (1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes;
 - (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list;
 - (3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.
- 16** The **construction** of:
- (i) jetties exceeding 10 square metres in size;
 - (ii) slipways exceeding 10 square metres in size;
 - (iii) **buildings** with a footprint exceeding 10 square metres in size; or
 - (iv) **infrastructure** covering 10 square metres or more
- where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.

In terms of the NEMA EIA Regulations 2014, and the Transitional Arrangements in Regulation 53 of GN No. R 326 of 07 April 2017, it must be noted that the following listed activities will be triggered:

Government Notice R327 (Listing Notice 1) listed activities:

- 12** The **development** of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres;
 - (ii) infrastructure or structures with a physical footprint of 100 square metres or more;**

where such development occurs;

- (a) within a watercourse;
- (b) in front of a development setback; or
- (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;**

- 19:** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;

- 24:** The development of;
- (i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or
 - (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;**

but excluding;

- (a) which are identified and included in activity 27 in Listing Notice 2 of 2014; or
 - (b) where the entire road falls within an urban area.
 - (c) which is 1 kilometer or shorter
- 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R325 (Listing Notice 2) listed activities:

- 15:** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;
- (i) the undertaking of a linear activity; or
 - (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Government Notice R324 (Listing Notice 3) listed activities:

- 12:** The clearance of an area of 300 square metres or more of **indigenous vegetation** except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

- 14** The **development** of;
- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10 square metres;
 - (ii) infrastructure or structures with a physical footprint of 10 square metres or more;**
- where such development occurs;
- (a) within a watercourse;
 - (b) in front of a development setback; or
 - (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;**

The environmental process is being undertaken in distinct phases, refer to **Figure 3**.

An Application Form has been submitted to Department of Environment and Nature Conservation (DE&NC). On acknowledgment from DE&NC (**Appendix 1A**), the Scoping Process was undertaken to identify potential issues.

The Final Scoping Report and Plan of Study for EIA were submitted to the Department of Environment and Nature Conservation (DE&NC). The Scoping Report and Plan of Study for EIA were approved by DE&NC and EnviroAfrica was advised to proceed with the EIA process (**Appendix 1B**).

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this activity include:

- People and their needs will be placed at the forefront while serving their physical, psychological, developmental, cultural and social interests. The activity seeks to provide additional employment and economic development opportunities, which are a local and national need – *the proposed activity is expected to have a beneficial impact on people, especially developmental and social benefits, as well providing additional employment and economic development opportunities.*
- Development will be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. The impact that the activity will potentially have on these will be considered, and mitigation measures will be put in place - *potential impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP.*
- Where waste cannot be avoided, it will be minimised and remedied through the implementation and adherence of the Environmental Management Programme (EMP) – *the EMP is included in the EIR.*
- The use of non-renewable natural resources will be responsible and equitable.
- The negative impacts on the environment and on people's environmental rights will be anticipated, investigated and prevented, and where they cannot be prevented, will be minimised and remedied – *potential negative impacts have been identified and considered, and any further potential impacts will be identified during the public participation process. Mitigation measures have been recommended by the various specialist assessment, and are included in the EMP.*

- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process – *refer to Section 7.2 below and Appendix 2.*
- The social, economic and environmental impacts of the activity will be considered, assessed and evaluated, including the disadvantages and benefits - *refer to Section 10 below*
- The effects of decisions on all aspects of the environment and all people in the environment will be taken into account, by pursuing what is considered the best practicable environmental option.

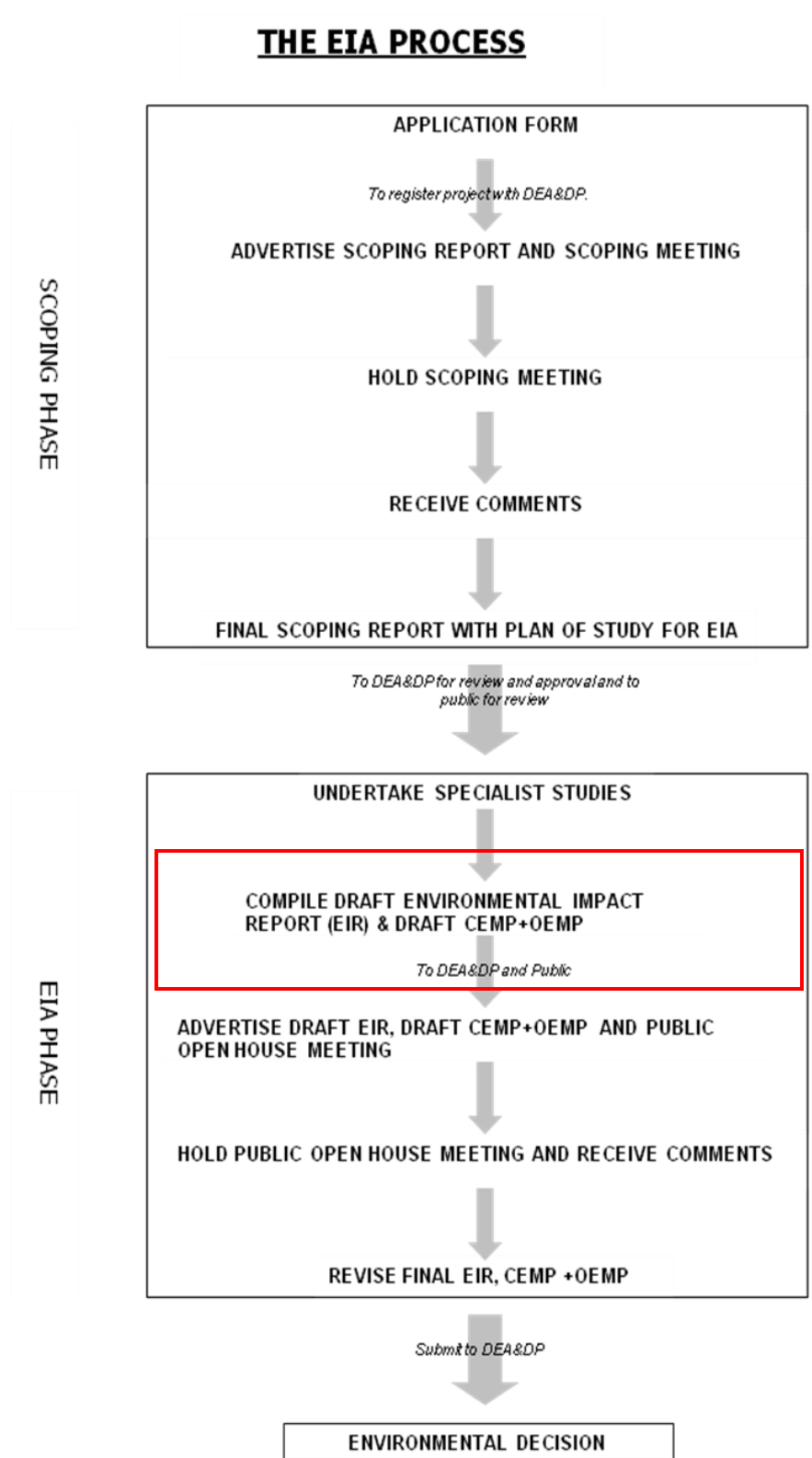


Figure 3: The EIA Process. Currently, this process is in the ‘EIA Phase – Compile draft Environmental Impact Report (EIR) and draft CEMP and OEMP’, as indicated in red.

3.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

3.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEA&DP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
 - ✓ *Guideline on Transitional Arrangements*
 - ✓ *Generic Terms of Reference for EAPs and Project Schedules*
 - ✓ *Guideline on Alternatives*
 - ✓ *Guideline on Public Participation*
 - ✓ *Guideline on Exemption Applications*
 - ✓ *Guideline on Appeals*
 - ✓ *Guideline on Need and Desirability*
- Department of Environmental Affairs and Tourism (DEAT) *Integrated Environmental Management Information Series*.

3.5 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities. The need to protect listed ecosystems is addressed (*Section 54*).

3.6 NATIONAL FORESTS ACT

The National Forests Act, 1998 (Act 84 of 1998) (NFA) makes provisions for the management and conservation of public forests.

The proposed property has a number of mature Camelthorn Trees, *Acacia erioloba*, protected trees in terms of the National Forest Act. Although great care will be taken to incorporate as many Camelthorn Trees into the development layout, some trees may need to be removed.

In terms of section 15(1) of the National Forests Act, 1998, no person may -

- (a) cut, disturb, damage or destroy any protected tree; or
- (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except-
 - (i) under a license granted by the Minister; or
 - (ii) in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

3.7 NORTHERN CAPE CONSERVATION ACT, ACT 09 OF 2009

On the 12th of December 2011, the new Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) came into effect, which provides for the sustainable utilization of wild animals, aquatic biota and plants. Schedule 1 and 2 of the act give extensive lists of specially protected and protected fauna and flora species in accordance with this act. The NCNCA is a very important Act in that it put a whole new emphasis on a number of species not previously protected in terms of legislation.

It also put a new emphasis on the importance of species, even within vegetation classified as "Least Threatened" (in accordance with GN 1002 of 9 December 20011, promulgated in terms of the National Environmental Management Biodiversity Act 10 of 2004). Thus, even though a project may be located within a vegetation type or habitat previously not considered under immediate threat, special care must still be taken to ensure that listed species (fauna & flora) are managed correctly.

3.8 SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, ACT 16 OF 2013

The Spatial Planning and Land Use Management Act 16 of 2013 (**SPLUMA**) is a national law that was passed by Parliament in 2013. SPLUMA provides a framework for spatial planning and land use management in South Africa.

The property Portion 1 and remainder of Farm Sims No. 462 will need to be rezoned and subdivided. The subject area falls under the jurisdiction of the local municipality and the appropriate zoning and subdivision would need to be allocated in order to permit the development of the land for the intended purpose.

4. ALTERNATIVES

Various layout alternatives were proposed and have been considered during the Scoping phase and these are described below.

4.1 ALTERNATIVE 1

Alternative 1 (**Appendix 2A**) is the first concept layout proposed. This layout included 1275 properties, which included:

- 1227 residential properties
- Institutional Zone II properties (Worship)
- Institutional Zone I property (Education)
- Business sites (Commercial)
- 24 Public Open Spaces (Parks)
- Authority Zones (Municipal use)
- Public Streets (Transport Zone II)

This alternative is considered a viable option as it provides a sufficient number of housing opportunities, as well as sites for commercial, education, worship, public open space and municipal use.

However, this site is not preferred as it did not take the location of sensitive areas, such as the wetland to the north of the site, and botanical sensitive (Camelthorn Trees (*Acacia erioloba*)) into consideration.

4.2 ALTERNATIVE 2

Alternative 2 (**Appendix 2B**) is the second concept layout proposed. This layout included 1751 properties, which included:

- 1692 residential properties
- 7 Institutional Zone II properties (Worship)
- Institutional Zone I property (Education)
- 13 Business sites (Commercial)
- 32 Public Open Spaces (Parks)
- Public Streets (Transport Zone II)

This alternative is also considered a viable option, and as with Alternative 2 above, it provides a sufficient number of housing opportunities. This layout, however, provides more Residential Zone II housing, and therefore more housing opportunities, than Alternative 1. It also provides more commercial properties than Alternative 1, but the properties are significantly smaller.

However, it is not preferred, as this layout (as well as Alternative 1) did not take any of the sensitive areas (wetlands and botanical features) into account.

4.3 ALTERNATIVE 3

Alternative 3 (**Appendix 2C**) is the third concept layout proposed during the Scoping Phase. This layout included 1439 erven, which included:

- 1393 residential properties (538 single homes, 851 group housing, and 4 flats).
- Institutional II (Worship) property
- Institutional I (Education) property
- Business properties (Commercial)
- 29 Open Space I (Park) properties
- Authority Zones (Municipal use)
- Public Streets (Transport Zone II)

This alternative is also considered as a viable option. Although it does not provide as many housing opportunities as Alternatives 2, it still provides sufficient housing opportunities, and conforms more to the mixed-use development envisaged.

It has importantly taken the sensitive natural features such as wetlands and the sensitive botanical areas into consideration when it has come to the placement of open spaces and roads.

Final placement of the buildings on the Residential I and II properties will be done taking any Camelthorn trees into account, to avoid damaging or having to remove them.

Table 1: A breakdown of the proposed land-uses on the development (Alternative 3).

Zoning	Description	Land Units	Total Area (m ²)	Avg.	%
RES I	Single Home	538	351362.0	653.1	20.8
RES II	Group Housing	851	389334.0	457.5	23.1
RES III	Flats	4	40376.6	10094.2	2.4
BUS I	Commercial	6	62141.0	10356.8	3.7
OPEN I	Park	29	258905.0	8927.8	15.3
INST II	Worship	6	25103.9	4184.0	1.5
INST I	Education	2	69843.8	34921.9	4.1
AUTH	Municipal Use	2	3940.2	1970.1	0.2
TRANS II	Public Street	1	488011.5	488011.5	28.9
					100
Total			1689018.0		

4.4 ALTERNATIVE 4 – PREFERRED ALTERNATIVE

Alternative 4 (**Appendix 2D**) is the final concept layout proposed during the Scoping Phase. This layout included 1274 erven, which included:

- 1224 residential properties (534 single homes, 686 group housing, and 4 flats).
- Institutional II (Worship) property
- Institutional I (Education) property
- Business properties (Commercial)
- 31 Open Space I (Park) properties
- Authority Zones (Municipal use)
- Public Streets (Transport Zone II)

This alternative is also considered as a viable option, and is the Applicants preferred layout. Although it does not provide as many housing opportunities as Alternatives 2 and 3, it still provides sufficient housing opportunities, and conforms more to the mixed-use development envisaged. It differs from Alternative 3 in that it includes an Eskom Servitude.

It has importantly taken the sensitive natural features such as wetlands and the sensitive botanical areas into consideration when it has come to the placement of open spaces and roads.

Final placement of the buildings on the Residential I and II properties will be done taking any Camelthorn trees into account, to avoid damaging or having to remove them.

Table 2: A breakdown of the proposed land-uses on the development (Preferred Alternative).

Zoning	Description	Land Units	Total Area (m ²)	Avg.	%
RES I	Single Home	534	351362,0	658,0	20,8
RES II	Group Housing	686	339390,0	494,7	20,1
RES III	Flats	4	39391,0	9847,8	2,3
BUS I	Commercial	6	62141,0	10356,8	3,7
OPEN I	Park	31	309867,0	9995,7	18,3
INST II	Worship	6	22623,0	3770,5	1,3
INST I	Education	2	68449,0	34224,5	4,1
AUTH	Municipal Use	4	9585,0	2396,3	0,6
TRANS I	Public Street	1	486212,0	486212,0	28,8
					100
		Total	1689020,0		

The various zones mentioned above are described below.

Residential Zone I - a building consisting of only one residential unit – a self-contained interlinking group of rooms for the accommodation and housing of a single family, or a maximum of four persons who do not satisfy the definition of a “family”, together with such outbuildings as are ordinarily used therewith.

Residential Zone II - a group of separate and/or connected individual residential units which were planned, designed and built as a harmonious architectural entity with a medium density character and with units that may vary between single and double storeys and of which each unit has a ground floor, irrespective whether such units are cadastrally divided or not.

Open Space Zone I - any land which falls under, or is intended to come under the ownership of the local authority, which is not leased or intended to be leased on a long-term basis, and which is utilised by the public as an open space, park, garden, picnic site, square, playground or recreational site, whether it appears on an approved general plan or not. Restrictions - No structure shall be erected or use practised other than those included in the definition of a “public open space”.

Open Space Zone II - any land which has been set aside in this scheme for use as a private site for sport, playing, rest and recreation facilities or as an ornamental garden or pleasure-garden, provided that the land is under the long-term management of a private person or authority, and also a cemetery or show grounds, whether public or private. Consent uses – racecourses.

Open Space Zone III - a premise or area indicated in this scheme to be used by Council, a person or an institution, exclusively for the conservation of the natural environment, land, historical buildings, fauna and/or flora and include tourist facilities that forms an integral part. Restrictions - No structure shall be erected or use practised else than those included in the definition of a “conservation area” or as specifically approved by Council. The land use restrictions and additional provisions relevant to this zone are applicable as for each site or use or type of building approved by the Council.

Institutional Zone II – Place of Worship. A church, synagogue, mosque, temple, chapel or other place for practising religion. It also includes any building in connection therewith, for instance a hall, Sunday school classes, creche or parsonage, but does not include funeral parlours, including chapels forming part of such parlours.

Transport Zone II – Public street. Any land indicated on a plan or diagram or is specified within this zoning scheme, reserved for street purposes and where the ownership as such vests in a competent authority and includes facilities for public transport.

4.5 OTHER ALTERNATIVES

Site Alternatives

This is the only site alternative considered. Property within the urban edge of Kathu is becoming a scarce commodity, especially tracts of land large enough for township expansion. The Applicant is the owner of the land, and if alternative sites suitable in terms of the Spatial Development Framework were to be considered, this property would need to be purchased or acquired from other land owners.

The proposed site is situated within the urban edge of Kathu, and also conforms to the SDF in being a mixed-use development.

Activity Alternatives

No Activity Alternatives have been considered. The Applicant wants to develop the property to provide housing for its employees. Due to the need for housing in the Kathu area, the housing development, with additional land uses (commercial, education etc.) and associated infrastructure on the property is therefore the only activity considered.

4.6 NO-GO ALTERNATIVE

This is the option of not developing the proposed mixed-use residential development.

Currently no Agricultural activities are taking place on this site although it is zoned as Agricultural Zone I. However, the site is located adjacent to established residential and commercial areas.

Although the no-go development might result in no potential negative environmental impacts, the direct and indirect socio-economic benefits of not constructing the residential development will not be realised. The need for additional housing opportunities in Kathu will not be realised.

According to the Socio-economic Impact Assessment (**Appendix 6D**), the no-development option would result in the lost opportunity for the local economy the Gamagara Local Municipality and residents who would benefit from the development. The no-development alternative would result in a lost opportunity for Sishen Iron Ore to provide quality, affordable accommodation for its employees and to create a well-planned new development that includes the establishment of schools, places of worship, public open spaces and sports fields and shops. The no-development option would also result in a lost opportunity for Sishen Iron Ore employees to purchase houses at a significantly discounted price. The employment and business opportunities associated with the construction and operational phase would also be forgone, as would the rates and taxes generated for the Gamagara Local Municipality. The no-development option is therefore not supported.

According to the Botanical Impact Assessment (**Appendix 6A**), in the case of the 'No Go' option the residential development would not be pursued and the *status quo* would persist. The vegetation would remain much as it is. The No-Go alternative would result in a **Low negative** impact (it cannot be **Neutral** because there is a low level of negative use of the area by pedestrians and illegal informal residents that could continue if the area is not developed).

5. SITE DESCRIPTION

5.1 LOCATION

The site of the proposed development is located on Portion 1 and the Remainder of the Farm Sims No. 462, Kuruman RD, Kathu.

The property is located to the west of the town of Kathu, adjacent to the Kathu Village Mall, and east of Mapoteng. The R380 runs through the development.

The site coordinates of the property are as follows (refer to map below):

Point 1 -	S 27° 41' 49.83",	E23° 01' 02.83".
Point 2 -	S 27° 41' 46.14",	E23° 01' 30.59".
Point 3 -	S 27° 41' 38.38",	E23° 01' 37.46".
Point 4 -	S 27° 41' 16.60",	E23° 01' 32.73".
Point 5 -	S 27° 41' 44.96",	E23° 02' 24.25".
Point 6 -	S 27° 41' 54.00",	E23° 01' 41.61".
Point 7 -	S 27° 42' 07.03",	E23° 01' 58.64".
Point 8 -	S 27° 42' 23.00",	E23° 01' 22.66".



Figure 4: Google Earth image of the site showing co-ordinate locations.



Figure 5: General view of the proposed site. Camel Thorn Trees (*Acacia erioloba*) are evident in this image.

5.2 VEGETATION

Kathu has become known as the “town under the trees” due to location within the Kathu Forest, an unique woodland of exceptionally large Camelthorn Trees (*Acacia erioloba*), north of the town. The Kathu woodland is approximately 4 000ha.

In 2009, the Kathu Forest was declared as the first Protected Woodland in the country in terms of Section 12 (1) (c) of the National Forests Act, Act 84 of 1998 as amended

The proposed property does not fall within, or adjacent to, the declared Kathu Forest. The site is located at least 1.8km south-west of the Kathu Forest. Please also refer to Figure 6 below.

From the vegetation map (Figure 7 - SANBI BGIS), the site is located within the Kathu Bushveld, which is characterised by a medium-tall tree layer with *Acacia erioloba* in places, but mostly open and including *Boscia albitrunca* as the prominent trees

According to the National list of ecosystems that are threatened and in need of protection (GN. 1002 of 9 Dec. 2011), this vegetation type is classified as Least Threatened.

However, the Camelthorn (*Acacia erioloba*) is a protected tree in terms of the National Forest Act of 1998, and these trees are found on the property. According to the Botanical Impact Assessment (**Appendix 6A**), observations during the field investigation at the SIMS study site verified the classification of the vegetation as Kathu Bushveld and revealed that this area is more typically

bushveld than the area in Kathu town where there are many old and well-established camel thorn trees (*Acacia erioloba*) and the vegetation is more forest-like. The vegetation is Least Threatened and does not harbour any endemic species. However, as noted above, *Acacia erioloba* (camel thorn) trees are scattered over the site and where possible these trees should be preserved.

A population of the widespread *Aloe grandidentata* was found at S 27° 41' 37.1" E 23° 01' 43.0". This aloe is not threatened but since all aloes in the Northern Cape Province are protected species, these plants should be rescued and transplanted at a safe location. A permit would be required for this purpose.

The site is generally covered in thick vegetation, but is also severely degraded in areas due to illegal public dumping, diggings, an abandoned limestone quarry, ruins of old buildings and a reservoir, footpaths and de-proclaimed tar road.

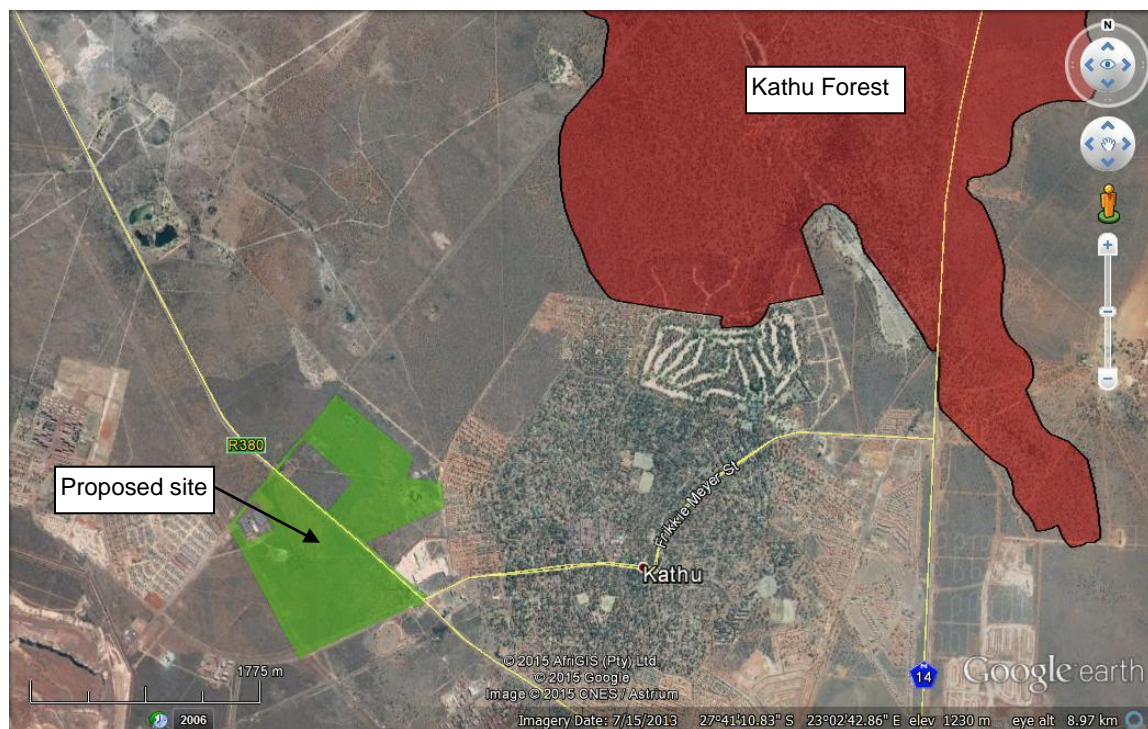


Figure 6: Google Earth image showing the site (green polygon) in relation to the Kathu Forest (red polygon)

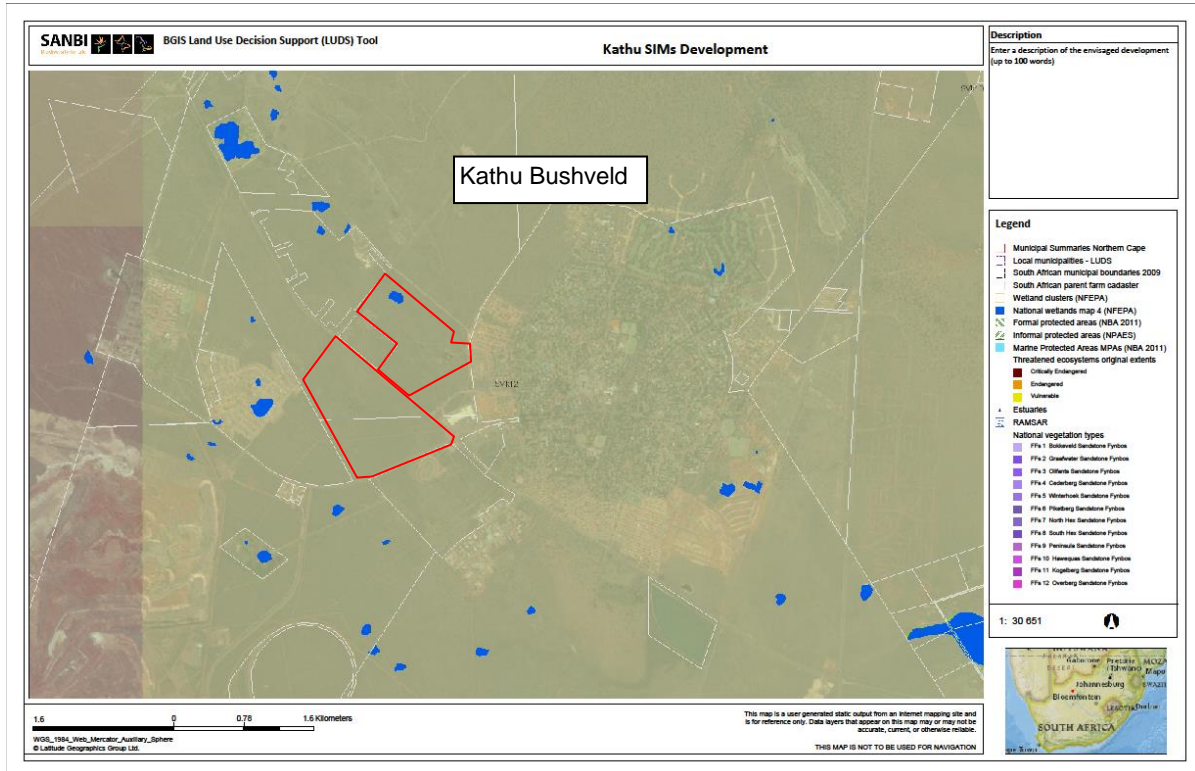


Figure 7: SANBI Vegetation map of the area. The proposed site is indicated by the red polygon.

5.3 FRESHWATER

No above ground freshwater resources were found on the site, besides a small seasonal pan located in the northern corner of the site. This has also been identified in the National Freshwater Ecosystem Priority Areas (NFEPA) layer on the SANBI BGIS maps (see Figure 7 above and Figure 8 below) as a natural wetland (Eastern Kalahari Bushveld Group 1 Depression).

According to the Botanical Impact Assessment (**Appendix 6A**), the pan is a seasonal pan or endorheic pan. Inflow is through runoff and groundwater but it has no outflow. It has a core area (depression) and then zones in a concentric pattern from the centre. The central zone is grassy with *Eragrostis* sp. (fine) and then *Setaria* sp. forms a second outer zone. On the perimeter is bushy thicket with a few large *Acacia karoo* trees. At the waypoint SIMS24 (see Figure 2 and 3 of the Botanical Impact Assessment) is a prominent thicket of *Diospyros lycioides*, *Ziziphus mucronata* and *Searsia pendulina*. A small amount of water was found in the pan.

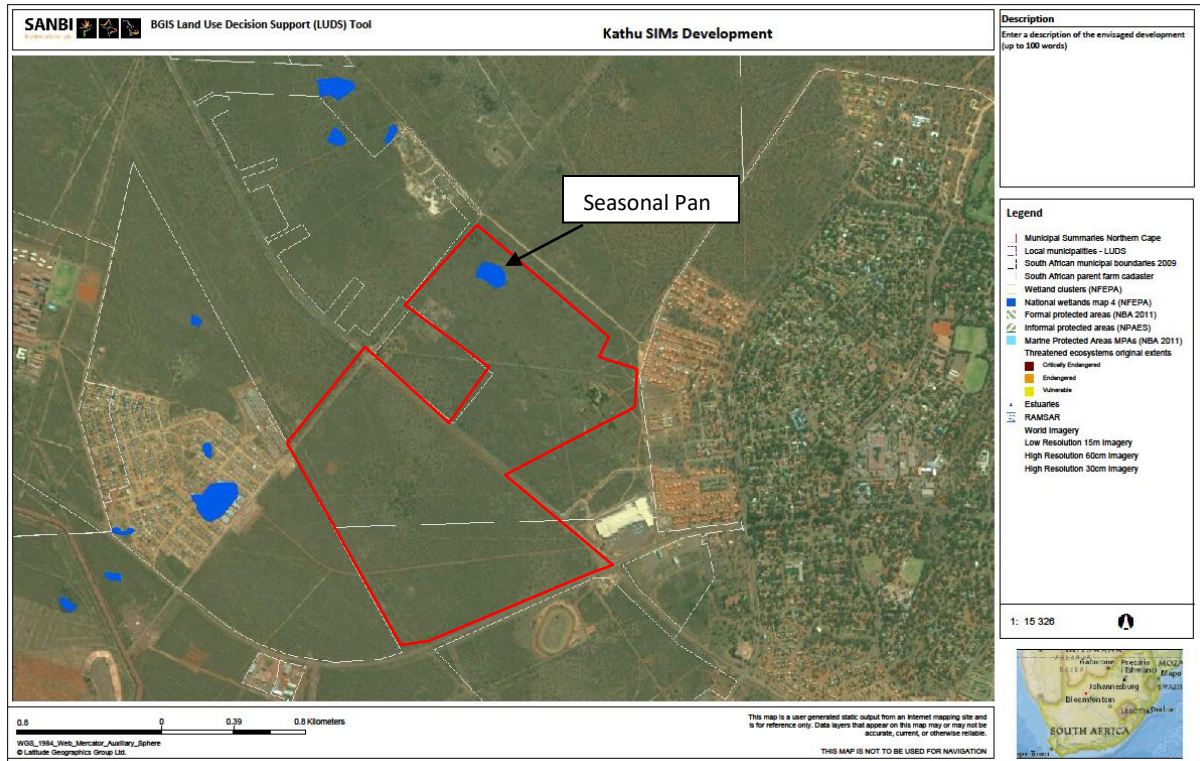


Figure 8: SANBI BGIS map of the area indicating the location of the seasonal pan on the proposed site

5.4 GEOLOGY

The Sishen Iron Ore Mine (including the town of Kathu) is situated on the Maremane Dome. The Dome consists of carbonate rocks (predominantly stromatolitic and crinkle laminated dolomite and limestone) of the Campbell Rand Subgroup, Ghaap Group, Transvaal Supergroup.

According to the Geo-technical Assessment (**Appendix 6E**), existing information indicates that the site is underlain by very thick (57-117m) Kalahari Group material (calcrete, clay, pebble layers), overlying Gamagara Formation shale to 121->234m). No known/confirmed faults are indicated to transect the site. Most of the Sims site is located within the area significantly impacted by groundwater abstraction. The current groundwater elevation range is 1080m AMSL to 1120m AMSL, i.e. 80m to 120m below the OWL. The site is not judged to be on dolomite land.

According to the Botanical Impact Assessment (**Appendix 6A**), the soils at Kathu are shallow to very shallow with calcrete cropping out at the surface in many places. The soils are therefore generally of the Mispah form in the study area but may be deeper Hutton form where the sand is deeper and the calcrete is not near or at the surface.

5.5 GEOHYDROLOGY

According to the Geo-technical Assessment (**Appendix 6E**) across the town of Kathu the original groundwater level elevation (OWL) varies by about 10m, from 1200m to 1210m AMSL. Based on

current piezometric and groundwater level information, three water level conditions have been identified:

1. Areas where the groundwater conditions have not yet been impacted by the large-scale groundwater abstraction.
2. A triangular shaped area between the Kathu and Sekgame dykes where groundwater conditions have been partially impacted by groundwater abstraction activities. This condition is present below the north-eastern part of the original town development and to the south of the golf course.
3. An area in the southern and south-western portion where groundwater conditions have been significantly impacted by the groundwater abstraction.

Most of the Sims site is located within the area significantly impacted by groundwater abstraction. The current groundwater elevation range is 1080m AMSL to 1120m AMSL, i.e. 80m to 120m below the OWL.

5.6 CLIMATE

Kathu normally receives about 240mm of rain per year, with most of the rainfall occurring mainly during the summer. It receives the lowest rainfall (0mm) in June and the highest (55mm) in February.

The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Kathu range from 18°C in June to 33°C in January.

The region is the coldest during July when temperatures drop to 0.2°C on average during the night.

Wind is generally North north-westerly to Northerly in direction, with wind speeds averaging between 8 and 23 knots through the year. The strongest winds occur between August and December (between 21 and 23 knots).

5.7 SOCIO-ECONOMIC CONTEXT

Kathu is the largest town within the Gamagara Local Municipality and is also the administrative centre of the Gamagara Municipality. The town was developed because of the iron ore mining activity in the area.

According to StatsSA, the single largest factor that has guided the development of the Gamagara area is the iron ore mine at Sishen. Not only does the mine provide jobs to thousands of people, but it was also the reason for the establishment of the town of Kathu.

According to the Socio-economic Impact Assessment (**Appendix 6D**), the mining sector is the largest contributor to the provincial GDP, contributing 28.9% to the GDP in 2002 and 27.6% in 2008. The mining sector is also important at a national level. In this regard the Northern Cape produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 140% of its iron-ore, 93% of its lead and 99% of its manganese.

Mining is also the dominant economic sector in Gamagara Local Municipality and contributed to more than 83.20% of the GVA of the municipality. The sector also employs more than 46.69% of the economically active population in the Gamagara Local Municipality.

The population of Kathu is 11 510 (2011 census), with a growth rate of 5.84% between 2001 and 2011.

The unemployment rate for Gamagara Municipality is 17.7%. 71.9% of the population of Gamagara Municipality is within the 'working age' group (15-64). According to the Socio-economic Impact Assessment (**Appendix 6D**), the official unemployment rate in both the John Taolo Gaetsewe District Municipality (JTGDM) and Gamagara Local Municipality decreased for the ten year period between 2001 and 2011. In the JTGDM the rate fell from 42.5% to 29.7%, a decrease of 12.8%. In the Gamagara Local Municipality the unemployment rate decreased from 27.1% to 17.7%, a decrease of 9.4%. Youth unemployment in both the JTGDM and Gamagara Local Municipality also dropped over the same period. Youth unemployment in the both the JTGDM is still high however (~ 37.2%) compared to the Gamagara Local Municipality (22.4%). However, the 2015-2016 unemployment levels in the JTGDM and Gamagara Local Municipality are likely to be higher than the figure recorded in the 2011 Census. This is due to the significant decrease in the iron ore price over the last 6 months and the associated job losses in the mining sector.

According to the Gamagara Local Municipality 4th Reviewed Integrated Development Plan (IDP) Review 2011/12 - 2013/14, unskilled occupations account for the largest share of employment (54%) followed by skilled (26%) and semi-skilled (20%) in Gamagara.

According to the Socio-economic Assessment (**Appendix 6D**), the municipal service levels in the JTGDM and Gamagara Local Municipality all improved over the period 2001 to 2011. This represents a socio-economic improvement. However, the service levels in the JTGDM are significantly lower than both the national and provincial averages. The national averages for each of the relevant indicators are 57% (access to flush toilet), 62% (weekly waste removal), 46.3% (piped water inside dwelling) and 84.7% for electricity. The figures for the Gamagara Local Municipality are all higher than the national and provincial averages. This reflects the contribution of the mining sector to the provision of services and socio-economic development of the area.

5.8 HERITAGE FEATURES

According to the Heritage Impact Assessment (**Appendix 6B**), a very small number of Middle Stone Age (MSA) and Later Stone Age (LSA) implements were encountered over the proposed development site, which is mostly devoid of archaeological heritage. A dispersed scatter of MSA tools was recorded in the north east of the proposed development site, alongside the old Kuruman Road, but these remains occur in a highly degraded context.

There are no visible graves on the proposed development site. A ruined concrete reservoir and the foundations of a modern structure/building were found among a stand of large Kameeldoring trees, and are probably the remains of an 'old' cattle station.

The proposed development of Remainder & Portion 1 of the Farm Sims 462 in Kathu will not impact on any significant archaeological heritage. The small number, isolated and disturbed context in which they were found means that the archaeological remains have been rated as having low (Grade 3C) significance.

The receiving environment is not a sensitive or vulnerable archaeological landscape.

According to the Palaeontological Impact Assessment (**Appendix 6C**), according to geological maps, satellite images and recent palaeontological assessments in the Kathu area the flat-lying Sims mixed-development study area is underlain by a considerable thickness of Plio-Pleistocene to Recent sediments of the Kalahari Group. The underlying Precambrian bedrocks – viz. dolomites, cherts and iron formations of the Transvaal Supergroup – are too deeply buried (c. 70-80 m) to be directly affected by the proposed development. The Kalahari Group succession near Kathu mainly comprises well-developed calcretes or surface limestones (Mokolanen Formation) that may total 30 m or more in thickness in the region, locally with a thin (probably < 1 m) surface veneer of aeolian sands (Gordonia Formation), alluvial deposits and sparse near-surface gravels. In general the Kalahari Group calcretes and sands are of low palaeontological sensitivity, mainly featuring widely-occurring plant and animal trace fossils (e.g. invertebrate burrows, plant root casts). Recent palaeontological field assessments in the Sishen – Hotazel region have not recorded significant fossil material within these near-surface Kalahari sediments.

A very important fossil assemblage of Pleistocene to Holocene mammal remains - predominantly teeth with scarce bone material associated with Earlier, Middle and Later Stone Age artefacts, well-preserved peats and pollens - is recorded from unconsolidated doline (solution hollow) sediments at the well-known Kathu Pan site, located some 5.5 km northwest of Kathu and close to the present study area. There are at present no obvious indications of comparable fossiliferous, tool-bearing solution hollow infills exposed at present within the study area, but such sediments might conceivably be present but hidden beneath cover sands and calcretes along hidden drainage lines.

6. SERVICES

Due to the level of development that is occurring within Kathu, the availability of bulk services for the development will need to be investigated. The Gamagara Municipality has confirmed that they will be the service provider for the bulk services (**Appendix 4C**)

MVD Kalahari Consulting Engineers prepared the preliminary Engineering Services Reports (attached as **Appendix 4A**) on the external services for the proposed development.

According to the preliminary Bulk Services and Infrastructure Status Report (**Appendix 4A**), the proposed mixed-use development cannot come into operation before the proposed upgrades have been implemented. This is especially the case of bulk water and sewer infrastructures.

A brief description of the bulk services is given below.

6.1 WATER

According to the Bulk Services and Infrastructure Status Report (**Appendix 4A**), an additional storage capacity of 3.6MI per day is required. This will be jointly accommodated in the new proposed Kathu West and Sesheng South reservoirs.

The main water supply line required to the reservoir will be a 355mm uPVC Class 12 pipe (based on a maximum flow velocity of 1.2m/s).

6.2 SEWER

According to the Bulk Services and Infrastructure Status Report (**Appendix 4A**), an additional 1.4MI per day of additional Waste Water Treatment Capacity will be required by the development, to be accommodated at

The minimum diameter outfall sewer required is 315mm Class 34 uPVC pipe with a design capacity of 1.130m/s.

Additional sewer pump station capacity of 55l/s will also be required. A new pump station is required

According to the Bulk Services and Infrastructure Status Report (**Appendix 4A**), the Average Annual Dry Weather Flow (AADWF) of 1.MI/day cannot be accommodated within the existing WWTW, and will need to be accommodated in the Phase 2 upgrade of the WWTW.

6.3 ROADS

Access to the site will primarily be from the R380 from the Kathu Village mall intersection, from the road towards the Kathu mine from the same intersection, and the old road to the north of the site. According to the Bulk Services and Infrastructure Status Report (**Appendix 4A**), all three roads need to be upgraded.

6.4 STORMWATER

According to the Bulk Services and Infrastructure Status Report (**Appendix 4A**), traditionally all storm water in the greater Kathu area has been allowed to run off road surfaces and to drain into the highly permeable sands.

Little or no formal bulk storm water infrastructure is in place and all storm water run-off eventually finds its way towards the mining area via small localised channels, open shallow trenches and the odd box culvert.

Therefore, there are no plans for any bulk storm water infrastructure. However, the Gamagara Municipality is busy with the procurement of consultants to do a complete Storm Water Master Plan for the greater Kathu.

6.5 SOLID WASTE (REFUSE) REMOVAL

Refuse removal will be via the Municipal waste stream and disposed of at the nearest municipal bulk solid waste disposal site.

6.6 ELECTRICITY

According to the Electrical Services Report (**Appendix 4B**) proposed development falls within the new Kathu West Intake Substation feeding area. According to the latest available information, this Intake Substation will be completed by November 2016.

The development will have a total load of approximately 9 000kVa.

One new 11 kV ring from Kathu West Intake Substation to the proposed site, through the development and back, will need to be installed for each property (Farm 462/0 and 462/1).

Please refer to the Electrical Services Report (**Appendix 4B**) for more details.

7. PROCESS TO DATE

The section below outlines the various tasks undertaken to date, the members of the team involved in the project, as well as the Public Participation Process.

7.1 TASKS UNDERTAKEN TO DATE

Table 3: Tasks undertaken in the EIA to date

DATE	TASK
<u>SCOPING PHASE</u>	
24 January 2014	Submit Application Form to DE&NC
29 January 2014	Received acknowledgement from DE&NC
15 February 2014 – 16 March 2014	Initial public participation, including newspaper advertisements, posters, letter drops and notification letters to identified interested and affected parties.
18 March 2015 to 04 May 2015.	Distribution of notification letters and the Draft Scoping Report to Registered Interested and Affected Parties
04 May 2015	40-day comment period ends.
	Compile the Final Scoping Report and make available for comment to registered Interested and Affected Parties.
11 May 2016 to 10 June 2016.	Distribution of Notification Letter and Comments and Response Report to all registered I&APs.
10 June 2016	21-day comment period ends
13 June 2016	Acceptance of Scoping report and Plan of Study for EIA (Appendix 1B)
	Undertake Specialist Studies where required

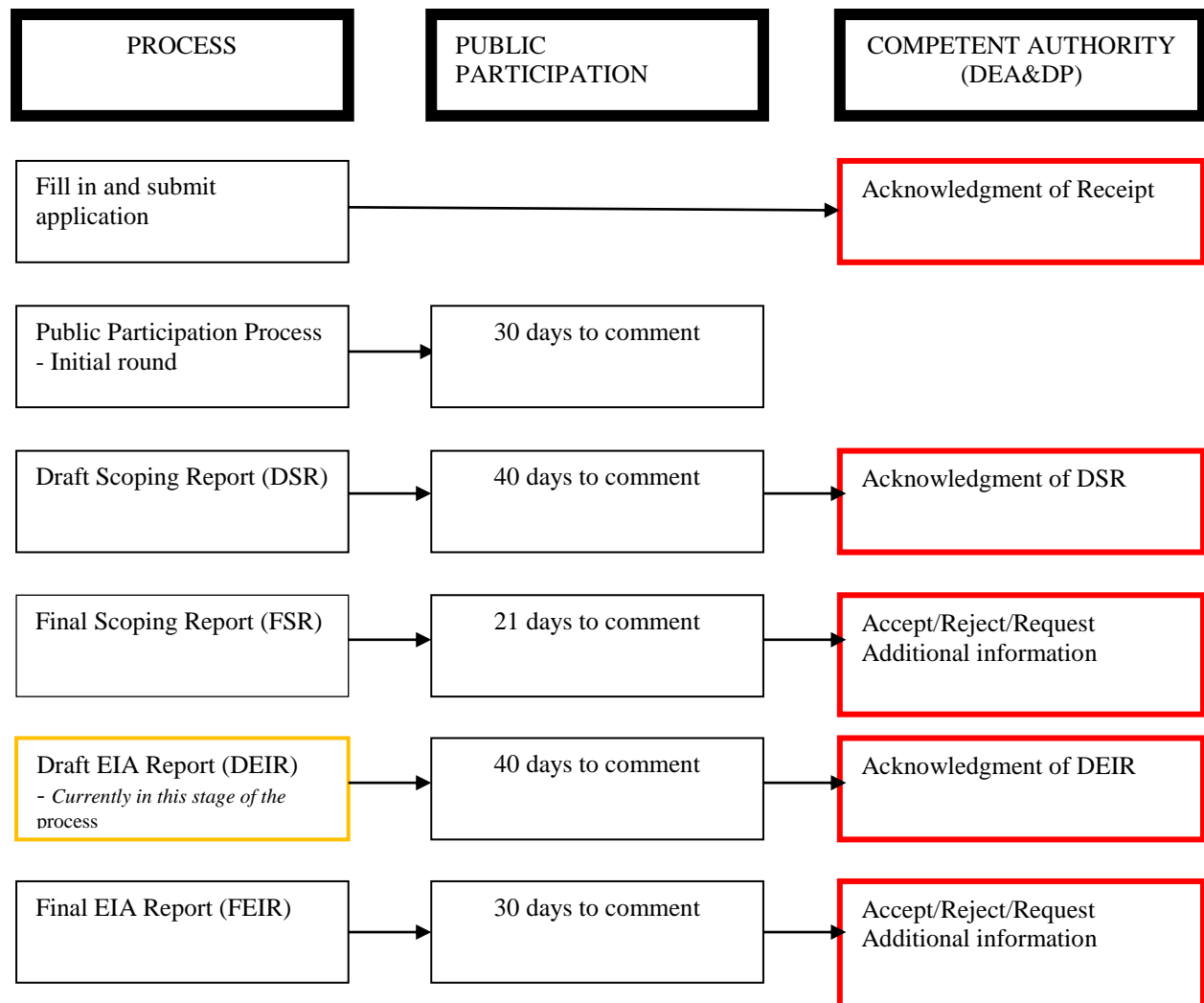


Figure 9. Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

7.2 TASKS TO BE UNDERTAKEN DURING THE EIA PHASE

The following tasks must still be undertaken during the EIA phase of the process:

- Compile Draft Environmental Impact Report (EIR) for public comment based on specialist information (THIS DOCUMENT).
- Advertise Draft EIR for public comment
- Distribute and/or make the Draft EIR available for viewing and comment
- Receive comments on Draft EIR. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR).
- Preparation of a FINAL EIR for submission to DE&NC for consideration and decision-making.

Please refer to Figure 9 to see where the public participation process is present in the environmental impact assessment. The Interested and Affected Parties will have a chance to view and comment on all the reports that are submitted. The figures also indicated what timeframes are applicable to what stage in the process. If required, meetings with key stakeholders will be held.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (EIR). The Final EIR will then be submitted to DE&NC for consideration and decision-making.

Correspondence with I&APs will be via post, fax, telephone, email and newspaper advertisements.

Should it be required, this process may be adapted depending on input received during the on-going process and as a result of public input. DE&NC will be informed of any changes in the process.

7.3 PROFESSIONAL TEAM

The following professionals are part of the project team.

Table 4: Members of the professional team

DISCIPLINE	SPECIALIST	ORGANISATION
Environmental Consultants	Clinton Geyser / Bernard de Witt	EnviroAfrica
Consulting Engineers		MVD Kalahari Consulting Engineers
Town Planners	Len Fourie	MacroPlan Town and Regional Planners
Botanist	Dr David McDonald	Bergwind Botanical Surveys and Tours
Heritage	Jonathan Kaplin	Agency for Cultural Resource Management
Palaeontology	Dr John Almond	Natura Viva
Socio-economic	Tony Barbour	Tony Barbour Environmental Consulting and Research
Geo-technical		VGIconsult Projects
Traffic	Koot Marais	KMA Consulting Engineers

7.4 PUBLIC PARTICIPATION

A Public Participation Process was undertaken in accordance with the requirements of the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series. *Guidelines on Public Participation 2013* and the NEMA EIA Regulations 2014 (amended). Issues and concerns raised during the Scoping phase are dealt within this report.

7.4.1 PUBLIC PARTICIPATION UNDERTAKEN DURING SCOPING PHASE:

Interested and Affected Parties (I&APs) have been and will be identified throughout the process. Landowners/occupiers adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 3A**.

Public Participation will be conducted for this proposed residential development in accordance with the requirements outlined in Regulation 54 and 55 and 56 of the NEMA EIA Regulations. The issues and concerns raised during the scoping phase will be dealt with in the EIA phase of this application.

As such each subsection of Regulation 54 contained in Chapter 6 of the NEMA EIA Regulations will be addressed separately to thereby demonstrate that all potential Interested and Affected Parties (I&AP's) were notified of the proposed development.

R54 (2) (a):

R54 (2) (a) (i): A poster was displayed on the property fence at the main entrance of the proposed site. Posters were also placed at conspicuous sites, such as shopping centres, petrol stations and other such sites in and around Kathu (Proof of posters will be included as **Appendix 3D**)

The posters contained all details as prescribed by R56 (3) (a) & (b) and the size of the on-site poster was 60cm by 42cm as prescribed by section 56 (4) (a).

R54 (2) (a) (ii): N/A. There is no alternative site.

R54 (2) b):

R54 (2) (b) (i): N/A. The Applicant is the land-owner.

R54 (2) (b) (iii): Initial notification letters were hand-delivered to landowners and occupiers adjacent to the site where possible.

R54 (2) (b) (iv): An initial notification letter was sent to the municipal Ward councillor at the Gamagara Local Municipality, for the ward in which the site is situated (please refer to **Appendix 3C** for proof of notification letters sent).

R54 (2) (b) (v): An initial notification letter was sent to the Municipal Manager of John Taolo Gaetsewe District Municipality and Gamagara Local Municipality (please refer to **Appendix 3C** for proof of notification letters sent).

R54 (2) (b) (vi): An Initial notification letter, as well as the Draft and Final Scoping Reports (please refer to **Appendix 3C**), was sent to the following organs of state having jurisdiction in respect of any aspect of the activity:

- Department of Water and Sanitation
- South African Heritage Resources Agency
- Department of Agriculture and Land Reform
- Department of Roads and Public Works
- Department of Cooperative Governance, Human Settlements and Traditional Affairs
- Department of Agriculture, Forestry and Fisheries
- SANRAL

R54 (2) (c) (i): An advertisement was placed in the local newspaper, Kathu Gazette, on 15 February 2014 (please refer to **Appendix 3B** of the Scoping Report for proof of advertisement).

R54 (2) (d): N/A

R54 (7):

R54 (7) (a): All relevant facts in respect of the application were made available to potential I&AP's.

R54 (7) (b): Registered I&AP's were given a 40-day comment period on the proposed application during the first round of public participation for the Draft Scoping Report and a 21-day comment period on the Final Scoping Report.

R55 (1) (a), (b), (c) and R56(2): A register of interested and affected parties was opened, maintained and is available to any person requesting access to the register in writing (please refer to **Appendix 3A** for the list of Interested and Affected Parties).

Please find attached in **Appendix 3:**

- Proof of Notice boards, advertisements and notices that were sent out
- List of potential interested and affected parties
- Summary of issues raised by interested and affected parties

7.4.2 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of groups and individuals were identified as Interested and Affected Parties during the initial Public Participation Process. A complete list of organisations and individual groups identified to date, as well as those I&APs that have registered are shown in **Appendix 3A**.

Full copies of the Environmental Impact Assessment Report (EIR) will be sent to all Registered I&APs, and will be notified of the Environmental Impact Report (EIR) by means of notification letters (via preferred method of communication), informing them of the availability of the Draft EIR and will be invited to comment. The EIR will be made available for a 40-day comment period.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (Final EIR) in the form of a Comments and Response Table. The Final

EIR will be made available for a further 30-day comment period. The Final EIR will then be submitted to DEA&DP for decision.

Should it be required, this process may be adapted depending on input received during the ongoing process and as a result of public input. Both DENC and registered I&APs will be informed of any changes in the process.

7.4.3 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) have been notified by means of advertisements in regional and local newspapers, site notices and letters and/or emails to registered I&APs on the project database.

A list of I&APs is included as **Appendix 3A**.

8. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Environmental issues were raised through informal discussions with the project team, specialists and authorities, as well as by Interested and Affected Parties during the public participation period of the Scoping Report. All issues raised will be assessed in the specialist reports and will form part of the Environmental Impact Report. Any additional issues raised during the public participation will be listed in the Final Environmental Impact Report.

The following potential issues have been identified:

8.1 BIODIVERSITY

8.1.1 BOTANICAL

Due to the size of the development and the expectant loss of vegetation during the construction phase of the project, and the presence of Camelthorn Trees (*Acacia erioloba*) on the property, a Botanical Impact Assessment (**Appendix 6A**), has been conducted. This will also determine if there is any sensitive or endangered vegetation on the proposed site, beside *Acacia erioloba*.

The botanical assessment will include the following:

- The significance of the potential impact of the proposed project, alternatives and related activities – with and without mitigation – on biodiversity pattern and process at the site, landscape and regional scales.
- Recommended actions that should be taken to prevent or, if prevention is not feasible, to mitigate impacts.

8.1.2 FAUNA

Mammal and bird species was not regarded as the proposed activity is not expected to have any significant, permanent impact on these species. Most fauna and avi-fauna species of importance will be associated with the Camelthorns on the property, and as such, the impact of the proposed development on the Camelthorn trees will be assessed in the Botanical Impact Assessment.

8.2 HERITAGE

The possible impact on heritage resources has been identified as a possible environmental impact as a result of the construction of the residential development and associated infrastructure.

A Heritage Impact Assessment (**Appendix 6B**) and a Palaeontological Impact Assessment (**Appendix 6C**) has been conducted on the site.

The terms of reference for the Heritage and Palaeontological studies are as follows:

- To determine whether there are likely to be any important archaeological and palaeontological sites or remains that might be impacted by the proposed development;
- To identify and map archaeological sites/remains that might be impacted by the proposed development;
- To assess the sensitivity and conservation significance of archaeological sites/remains in the inundation area;

- To assess the status and significance of any impacts resulting from the proposed development, and;
- To identify measures to protect any valuable archaeological sites/remains that may exist within the estimated area.

8.3 SOCIO-ECONOMIC IMPACT ASSESSMENT

Due to the scale and location of the proposed development, a socio-economic impact assessment (SIA) will need to be conducted.

The terms of reference for the SIA are as follows:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
- A description and assessment of the potential social issues associated with the proposed facility.
- identification of enhancement and mitigation aimed at maximizing opportunities and avoiding and or reducing negative impacts.

8.4 GEO-TECHNICAL ASSESSMENT

A Geo-technical assessment will be required to provide information related to the soil types, soil potential, soil stability, subsoil structure, suitability of the area to support the proposed structures and recommendation for foundations.

The Geo-technical assessment is included as **Appendix 6E**.

8.5 TRAFFIC IMPACT ASSESSMENT

The potential impact of the new development on the current and projected traffic levels of the surrounding road network will need to be assessed, and recommendations made on external road upgrades and suggested mitigation regarding the proposed access route.

A Traffic Impact Assessment (**Appendix 6F**) has been conducted.

8.6 VISUAL IMPACT

The potential impact on the sense of place of the proposed residential development has also been considered. However, due to the nature of the activity, the surrounding land-uses and the proximity to other residential developments, and that the sense of place is not expected to be significantly altered by the proposed residential development, no further studies were suggested.

8.7 DUST IMPACT

The potential impact of dust, especially during the construction phase of the development, has also been considered. Wind direction is generally North north-westerly to Northerly in direction during the year (except during September when the average wind is Southerly. Wind speeds average between 8

and 23 knots through the year. The strongest winds occur between August and December (between 21 and 23 knots).

Therefore, the potential impact of dust on the surrounding area is very low, is not considered to be significant, and can be mitigated through specific dust mitigation measures in the construction phase EMP.

8.8 OTHER ISSUES AND IMPACTS

The proposed Sims housing development has the following additional impacts:

8.8.1 ENERGY REQUIREMENTS

Construction energy requirements:

The initial energy requirements of the project will basically be limited to the use of small power tools typically to be powered by a portable on-site generator. Typically, the size of such a generator would not exceed 15KVA.

Operational phase energy requirements:

According to the Electrical Services Report (**Appendix 4B**), the After Diversity Maximum Load (ADMD) is approximately 6343kVA.

The development will adhere to the latest applicable version of SANS 204 – Energy Efficiency in Buildings with Par 4.5.2 Hot Water Services as a specific example:

- A minimum of 50% by volume of the annual average hot water heating requirement shall be provided by means other than electrical resistance heating, including, but not limited to, solar heating, heat pumps, heat recovery from other systems or processes.

The development will adhere to the latest applicable version of SANS 10142 Part 1 & 2.

8.8.2 WATER REQUIREMENTS

Construction water requirements:

It is estimated that an amount in the order of 100 kiloliter per day will be required for construction purposes.

Operational phase water requirements:

According to preliminary Bulk Services Report (**Appendix 4A**), during the operational phase, the Average Annual Daily Demand will be approximately 1 924 730l per day.

8.8.3 NATURE AND QUANTITY OF RAW MATERIALS

This project comprises the construction of approximately 1280 residential, commercial, institutional and places of worship structures. Subsequently several thousand cubic meters of crushed stone, sand and cement will be utilized together with reinforcing steel, wood and other material used in the construction of residential homes, as input materials during construction.

Exact quantities can only be determined once detailed designs of the structures have been completed.

This development is not expected to utilize any raw materials during the operational phase.

8.8.4 WASTE TYPES, QUANTITIES AND DISPOSAL METHODS

Construction Phase

As this is a “greenfields” project, there are no existing structures to be demolished. It is therefore envisaged that very little building rubble and waste will be generated during construction. Typically, losses of raw materials due to transport, stockpiling on site and conveyance losses amount to approximately 5% of the volumes required. It is not known how much solid waste will be generated during the construction period. This waste will typically be builder’s rubble, concrete debris, timber from used shutters, etc. The waste will be stockpiled on site and periodically disposed of at the nearest licensed landfill site by the contractor.

Operational Phase

Since the development is a mixed-use residential and commercial development, general residential household waste will be generated. Refuse removal will be via the Municipal waste stream and disposed of at the nearest municipal bulk solid waste disposal site.

There will be no industrial or manufacturing activities in the development, and as such, no hazardous waste or emissions is expected to be generated.

8.8.5 EMPLOYMENT OPPORTUNITIES

Construction Phase

According to the Socio-economic Impact Assessment (**Appendix 6D**), the total number of employment opportunities created by the residential component of the development would be ~ 1 907 over the first five years and ~ 891 for the final three years. The total number of employment opportunities over the total eight year period will therefore be in the region of 2 800. Of this total ~ 1 120 (40%) would be available to low skilled workers, ~ 1 120 (40%) to semi-skilled workers and 560 (20%) to skilled workers.

In addition to the residential components the proposed development will also include the development of six commercial properties, twenty nine open space properties, six sites for places of worship, two sites for education and two properties for municipal use. The establishment of each of these components will also create employment opportunities over and above the estimated ~ 2 800 employment opportunities created by the residential component. The majority of the employment opportunities are likely to benefit local Historically Disadvantaged (HD) members of the community. This would represent a significant opportunity for the local building sector and members of the local community.

The total wage bill over the assumed eight year construction phase for the residential component is estimated to be in the region of R 1.4 billion (2016 rand values). Of this total ~ R 298 million (20%) would be earned by low skilled workers, R 498 (33%) million by semi-skilled workers, and R 705 million (47%) by skilled workers. Low and semi-skilled workers would therefore earn ~ R 796 million (2016 rand values)(53%) of the total wage bill over the assumed eight year construction phase. The employment opportunities associated with the establishment of the components associated with the proposed development will generate additional wage incomes.

As indicated above, the majority of the employment opportunities are likely to benefit local Historically Disadvantaged (HD) members of the local community. A significant portion of the total wage bill will therefore be earned by HD members from the local area. The majority of the wage bill will be spent in the local economy and will create significant opportunities for local businesses in Kathu and surrounding towns. This benefit will extend over the assumed 8 year construction phase.

Operational Phase

According to the Socio-economic Impact Assessment (**Appendix 6D**), the operational phase is estimated to create in the region of 800-1 000 employment opportunities. These opportunities are linked to the two schools, six commercial units and residential component. The majority of these opportunities will benefit HD members of the community. A percentage of the wage bill earned by these workers will be spent in the local economy which, in turn, will benefit local companies and businesses in Kathu. The operational phase of the proposed SIMS Mixed Use Development will therefore create significant socio-economic benefits and opportunities for the local community and Gamagara Local Municipality economy.

9. SPECIALIST STUDIES

Based on the issues raised by the I&APs and the project team, specialist studies were undertaken to provide information to address the concerns and assess the impacts of the proposed development alternatives on the environment.

The specialists are provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

9.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989.

These criteria include:

- **Nature of the impact**
This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**
The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Accumulative impact**
Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.
- **Degree of confidence in predictions**
The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should at least include the following sections:

- Executive Summary
- Introduction and Description of Study
- Methodology
- Results
- Assessment of Impacts (including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Discussion
- Recommendations (Pre-Construction, Construction and Operational Phases)
- Conclusion

9.2 BRIEFS FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA

9.2.1 BOTANICAL ASSESSMENT

Dr David McDonald (Bergwind Botanical Surveys) was appointed and undertook the Botanical Assessment on the proposed site – **Appendix 6A**.

The terms of reference for this study include the following:

- Undertake the requisite field work and compile a report that considers the following:
 - The local and regional context of the vegetation communities within the affected areas, taking the relevant biodiversity plans and bioregional planning documents into consideration;
 - The vegetation communities occurring on the proposed development site;

-
- species of special concern (rare or endangered species), endemic to the area or threatened species encountered or likely to be present;
 - Investigate ecological / biodiversity processes that could be affected (positively and/or negatively) by the proposed project.
 - Assess the anticipated impacts of the proposed development on the vegetation.

9.2.2 HERITAGE IMPACT ASSESSMENT

Jonathan Kaplan of the Agency of Cultural Resource Management was appointed to compile the Heritage Impact Assessment (HIA) – **Appendix 6B**.

The terms of reference for the heritage impact study were:

- Determine whether there are likely to be any archaeological resources that may be impacted by the proposed development;
- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

Dr John Almond has been appointed to conduct the Desktop Palaeontological Assessment (**Appendix 6C**), which forms part of the Heritage Impact Assessment.

The approach to this desktop palaeontological heritage study is briefly as follows:

- Determination of fossil bearing rock units occurring within the broader study area from geological maps and satellite images;
- Known fossil heritage in each rock unit is inventoried from scientific literature, previous assessments of the broader study region, and the author's field experience and palaeontological database;
- Based on this data as well as field examination of representative exposures of all major sedimentary rock units present, the impact significance of the proposed development is assessed,
- Recommendations for any further studies or mitigation are to be made.

9.2.3 SOCIO-ECONOMIC IMPACT ASSESSMENT

Tony Barbour (Tony Barbour Environmental Consulting and Research) has been appointed to undertake the Socio-economic Impact Assessment (SIA) for the proposed development – **Appendix 6D**.

The terms of reference for the SIA require:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
- A description and assessment of the potential social issues associated with the proposed facility.
- Identification of enhancement and mitigation aimed at maximizing opportunities and avoiding and or reducing negative impacts.

9.2.4 GEO-TECHNICAL ASSESSMENT

VGIconsult Projects was appointed to conduct a Feasibility Stage Geo-technical Assessment of the proposed site - **Appendix 6E**.

The primary objective of this study is to provide information related to the soil types, soil potential, soil stability, subsoil structure, suitability of the area to support the proposed structures and recommendation for foundations.

9.2.5 TRAFFIC ASSESSMENT

KMA Consulting Engineers have been appointed to conduct the Traffic Impact Assessment (TIA) for the proposed development. This is included as **Appendix 6F**.

The aim of this study is to determine the traffic impact of a proposed rezoning and subdivision of the Remainder and Portion 1 of the Farm Sims No. 462, Kuruman. This will include:

- An assessment of the potential impact of the new development on the current and projected traffic levels of the surrounding road network, and
- recommendations made on external road upgrades and suggested mitigation regarding the proposed access route.

10. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in Section 8 and 9 were undertaken to determine significance of the impacts that may arise from the proposed development. The findings of the specialist studies are summarised here. Full copies of the studies are included in **Appendices 6A – 6F**.

The following specialist studies were undertaken:

10.1 BOTANICAL ASSESSMENT

Dr David McDonald (Bergwind Botanical Surveys) undertook the Botanical Impact Assessment – The Botanical Impact Assessment is included as **Appendix 6A**.

10.1.1 KEY FINDINGS

According to the Botanical Impact Assessment (**Appendix 6A**), the vegetation map of South Africa, Lesotho and Swaziland (Mucina, Rutherford & Powrie, 2005 and updated in 2009) indicates that the entire area of the study site falls within the widespread vegetation type known as Kathu Bushveld. Kathu Bushveld does not harbour any threatened plant species although it does have protected trees such as *Acacia erioloba* and *Boscia albitrunca*. This vegetation type is classified as Least Threatened in the National Biodiversity Assessment of 2011 and the national conservation target is 16% of the original extent with 98% still remaining.

Over almost the entire area of the SIMS study area, both west and east of the R380, the vegetation consists of a tall shrubland dominated by *T. camphoratus* and *A. mellifera* subsp. *detinens* and *Grewia flava* less conspicuous. Low to mid-high *Searsia* sp. shrubs are found and cucurbit creepers (cf. *Trochomeria debilis*) are found climbing in the shrubs. An open to often dense stratum of grasses occurs that includes species such as the typical Kalahari Bushveld grasses, *Aristida meridionalis*, *Eragrostis lehmanniana*, *Eragrostis chloromelas*, *Schmidtia pappaphoroides*, *Schmidtia kalahariensis*, *Stipagrostis ciliata*, *Stipagrostis uniplumis*, *Aristida congesta*, *Melinis repens* and *Tragus berteronianus* in more disturbed places.

Acacia erioloba (camel thorn) was noted as occurring mostly on the western part (i.e. west for R308) of the SIM site. Please refer to Table 1 of the Botanical Impact Assessment (**Appendix 6A**) for the locations of the *Acacia erioloba*.

The following important botanical/landscape features were observed:

- Reservoir Thicket

An old, broken reservoir is found at waypoint SIMS13 (see figure 2 and 3 of the Botanical Impact Assessment). The surrounding area has a number of mature *Acacia erioloba* trees that should be conserved where possible (this area appears to be incorporated into an area that has been left undeveloped in an area zoned for Open Space I). The vegetation under the tall trees consists of *Ziziphus mucronata*–*Diospyros lycioides* thicket with verdant grasses in the gaps.

- Aloe population

A population of the widespread *Aloe grandidentata* was found at waypoint SIMS22 (S 27° 41' 37.1" E 23° 01' 43.0"). This aloe is not threatened but since all aloes in the Northern Cape Province are protected species, these plants should be rescued and transplanted at a safe location. A permit would be required for this purpose.

- Seasonal Pan

In the northeast part of the SIMS study area, east of the R308 is a seasonal pan or endorheic pan found at waypoint SIMS24 (S 27° 41' 23.1" E 23° 01' 36.6"). Inflow is through runoff and groundwater but it has no outflow. It has a core area (depression) and then zones in a concentric pattern from the centre. The central zone is grassy with *Eragrostis* sp. (fine) and then *Setaria* sp. forms a second outer zone. On the perimeter is bushy thicket with a few large *Acacia karoo* trees. At the waypoint SIMS24 is a prominent thicket of *Diospyros lycioides*, *Ziziphus mucronata* and *Searsia pendulina*. A small amount of water was found in the pan at the time of the survey (13 March 2014).

According to the Botanical Impact Assessment (**Appendix 6A**), the pan should be preserved and buffered. Ideally it should form the central feature of an open space area. Of importance is that it is seasonal and requires runoff from the surrounding area. This has been incorporated into the preferred layout, and is located within an area designated for Open Space I zoning.

- Wooded thicket

An impenetrable wooded thicket is found at waypoint SIM26 (S 27° 41' 18.3" E 23° 01' 33.7"). The central part of this area has exposed calcrete boulders and it may be that these boulders were dumped here in the past, encouraging development of thicket that is taller in stature and much denser than the surrounding shrubland. Species recorded in the thicket include *Acacia erioloba*, *Acacia karoo*, *Acacia mellifera subsp. detinens*, *Diospyros lycioides*, *Grewia cf. flava*, *Lycium* sp., *Searsia pendulina* and *Ziziphus mucronata*.

Observations during the field investigation at the SIMS study site verified the classification of the vegetation as Kathu Bushveld and revealed that this area is more typically bushveld than the area in Kathu town where there are many old and well-established camel thorn trees (*Acacia erioloba*) and the vegetation is more forest-like.

The vegetation is Least Threatened and does not harbour any endemic species. However *Acacia erioloba* (camel thorn) trees are scattered over the site and where possible these trees should be preserved. Where removal of the camel thorn trees would be necessary, a permit would be required from the Department of Agriculture Fisheries and Forestry, since these trees are protected under the National Forests Act, 1998 (Act No. 84 of 1998).

10.1.2 IMPACT ASSESSMENT

Direct impacts

According to the Botanical Impact Assessment (**Appendix 6A**), the impacts on the vegetation and habitat for the proposed housing development at Sims, Kathu are considered according for two identified potential impacts that are:

- Loss of vegetation type and habitat including plant species due to construction and operational activities.

- Loss of ecological processes found within the original or currently existing habitat

- Loss of Kathu Bushveld and habitat including plant species

At the local scale of the SIMS site, the impact would be dramatic i.e. all the vegetation would be removed including at least some of the *Acacia erioloba* (camelthorn) trees. The result would be a **High negative impact** at a local scale both during the construction and operational phases. Regionally, however, the impact would be **Low negative**

- Loss of Ecological Processes

Ecological processes vary in condition across the study site largely in relation to the condition of the habitat. The habitat at SIMS is ecologically functional across the whole site and this functionality would be entirely lost due to the proposed development. The impact would thus be **High negative** on ecological processes.

Indirect impacts

According to the Botanical Impact Assessment (Appendix 6A), no indirect impacts were identified for the proposed development.

Cumulative impacts

The proposed development of the SIMS residential area at Kathu would contribute to the loss of Kathu Bushveld in the local area around the town of Kathu. However, Kathu Bushveld is regionally widespread and Least Threatened so the cumulative impact of the loss of natural vegetation and habitat, as well as ecological processes would be limited and is rated as Low negative.

10.1.3 MITIGATION MEASURES

The following mitigation measures have been proposed by the Botanical Impact Assessment:

- Opportunities for mitigation would be very limited due to the intense scale of the proposed development. Small mitigation measures can and should be implemented such as preservation of areas of open space e.g. around the seasonal pan but these would not necessarily conserve the nature of the Kathu Bushveld. For this reason, any mitigation measures applied would not greatly reduce the negative impact hence the impacts would remain High negative even after mitigation.
- No mitigation would be possible for the loss of ecological processes due to construction and operational activities on the SIMS housing development site.
- *Acacia erioloba* (camelthorn) trees should be observed as a protected tree species. A permit would be required for any disturbance of these trees. In addition, *Aloe grandidentata* was found in the eastern part of the site. These aloes should be collected and relocated to a safe site. This would also require a permit from the Department of Environment and Nature Conservation, Northern Cape Province.
- The seasonal pan in the north-eastern sector of the site should be conserved and well-buffered to allow for seasonal collections of water. Ideally this pan should be within an open space area as depicted and proposed in the Preferred Layout. This open space would also accommodate the wooded thicket described above (waypoint SIMS26).
- In the western part of the SIMS site the area around the old reservoir should also be conserved as 'open space' with as many as possible of the mature *Acacia erioloba* trees in this area conserved as well (around waypoint SIMS13).

10.1.4 CONCLUSION

The Botanical Impact Assessment concluded that the investigation of the proposed area for the SIMS housing development at Kathu revealed that viable, well-developed Kathu Bushveld vegetation occurs throughout the site. This vegetation is generally shrubland with scattered trees, some of which are the protected species *Acacia erioloba* (camelthorn). Development of the site would result in **High negative** impacts both in terms of loss of vegetation and habitat as well as ecological processes at a local scale. However, at a regional scale the impact would be limited and so cumulative impacts are rated as **Low negative**.

The Kathu Bushveld in the SIMS study area is Least Threatened and although there would be local loss of intact natural veld due to the proposed development, the housing development is supported without major constraints or need for cumbersome mitigation measures.

10.2 HERITAGE IMPACT ASSESSMENT

Jonathan Kaplan of the Agency of Cultural Resource Management was appointed to undertake a Heritage Impact Assessment (HIA) of the proposed site. The HIA is included as **Appendix 6B**.

10.2.1 KEY FINDINGS

For ease of reference, the proposed site has been divided into 2 sites: Site A is the area west of the R380, and Site B is the area east of the R380.

Site A:

A few banded ironstone flakes and chunks were encountered among piles of road gravel and litter alongside the deproclaimed tarred road that cuts right across the property west of the R380. A thick, step retouched MSA ironstone flake, a possible core/chunk, a small weathered banded ironstone flake, and a banded ironstone chunk were also found between the old tar road and Hendrik van Ek Street. Several ironstone flakes and chunks were found among gravel/tailings alongside an old gravel road near the limestone quarry in the north western portion of the proposed site. A, small LSA retouched ironstone flake was found in a small footpath alongside the R380, while a miscellaneous retouched and utilized flake and chunk in banded ironstone were encountered on a large patch of gravel and calcrete alongside the R380. A diffuse scatter of tools (in a highly degraded context), including several large chunks/minimal cores and flakes were found among road gravels and a surface scrape alongside the old Kuruman Road in the north east of the site.

The remains of a concrete reservoir and the foundations of a building were located among a dense stand of large Kameeldoring/Camelthorn trees immediately south of the calcrete quarry, and are probably the remains on an abandoned cattle station.

Site B:

A handful of ESA ironstone flakes and chunks were found among excavated limestone at the small pan in the north eastern corner of the proposed site alongside the old Kuruman road, while similar tools, including an ESA biface were found among road gravels/tailings directly alongside the road. It is suspected that much of this material has been introduced onto the site during construction of the road.

A translucent, utilized chalcedony LSA flake, a small limestone flake and a banded ironstone flake were found near the natural pan in the north eastern corner of the site. A retouched ironstone flake was also found about 50m north of the edge of the pan. A dispersed scatter of MSA and LSA tools, including chunks, flakes, a core, and a blade in ironstone, quartzite and silcrete was found among the limestone quarry/diggings just outside the proposed development site.

10.2.2 IMPACT ASSESSMENT

According to the Heritage Impact Assessment (**Appendix 6B**), The very small numbers, isolated and disturbed context in which they were found means that the archaeological remains documented during the study have been rated as having low (Grade 3 C) significance.

The overall impact of the proposed development on archaeological heritage will be **very low**.

The Kathu Pan complex of archaeological sites, nominated as a Grade 1 National Heritage Site, is located 2.5kms north of the proposed development site and will not be impacted by the proposed development activities.

10.2.3 MITIGATION MEASURES

With regard to the proposed development, the following recommendations are made:

- No archaeological mitigation is required.
- Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Jenna Lavin at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

10.2.4 CONCLUSION

The Heritage Impact Assessment (**Appendix 6B**), concluded that no significant impacts to pre-colonial archaeological material have been identified.

The study has shown that the receiving environment is not a sensitive or threatened archaeological landscape.

Previous studies adjacent the proposed development site have encountered very little archaeological heritage.

10.3 PALAEOLOGICAL IMPACT ASSESSMENT

Dr John Almond (Natura Viva cc) has been appointed to undertake the Palaeontological Impact Assessment (PIA) of the proposed site – The PIA is included as **Appendix 6C**.

10.3.1 KEY FINDINGS

According to the Palaeontological Impact Assessment, according to geological maps, satellite images and recent palaeontological assessments in the Kathu area (e.g. Almond 2013a, 2014), the flat-lying Sims mixed-development study area is underlain by a considerable thickness of Plio-Pleistocene to Recent sediments of the Kalahari Group. The underlying Precambrian bedrocks – viz. dolomites, cherts and iron formations of the Transvaal Supergroup – are too deeply buried (c. 70-80 m) to be directly affected by the proposed development. The Kalahari Group succession near Kathu mainly comprises well-developed calcretes or surface limestones (Mokolanen Formation) that may total 30 m or more in thickness in the region, locally with a thin (probably < 1 m) surface veneer of aeolian sands (Gordonia Formation), alluvial deposits and sparse near-surface gravels. In general the Kalahari Group calcretes and sands are of low palaeontological sensitivity, mainly featuring widely-occurring plant and animal trace fossils (e.g. invertebrate burrows, plant root casts). Recent palaeontological field assessments in the Sishen – Hotazel region have not recorded significant fossil material within these near-surface Kalahari sediments.

A very important fossil assemblage of Pleistocene to Holocene mammal remains - predominantly teeth with scarce bone material associated with Earlier, Middle and Later Stone Age artefacts, well-preserved peats and pollens - is recorded from unconsolidated doline (solution hollow) sediments at the well-known Kathu Pan site, located some 5.5 km northwest of Kathu and close to the present study area. There are at present no obvious indications of comparable fossiliferous, tool-bearing solution hollow infills exposed at present within the study area, but such sediments might conceivably be present but hidden beneath cover sands and calcretes along hidden drainage lines.

10.3.2 IMPACT ASSESSMENT

The overall impact significance of the proposed Sims mixed-use development is rated as LOW as far as palaeontological heritage is concerned. Likewise, cumulative impacts are likely to be of LOW significance, given the scarcity of important fossils (especially vertebrate remains) within the sedimentary rock units concerned as well as the huge outcrop area of the Kalahari Group as a whole. The degree of confidence for this assessment is rated as medium because of the uncertainty surrounding the presence or absence of potentially fossiliferous buried doline infill deposits within the study area.

10.3.3 MITIGATION MEASURES

The following mitigation measures to safeguard fossils exposed on site during the construction phase of the development are recommended:

- The ECO and / or the Site Engineer responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he / she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains. If any substantial fossil remains (e.g. vertebrate bones, teeth, horn cores) are found during construction SAHRA should be notified immediately (Contact details: SAHRA, 111 Harrington Street, Cape Town.

PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that appropriate mitigation (*i.e.* recording, sampling or collection) by a palaeontological specialist can be considered and implemented, at the developer's expense.

- A chance-find procedure should be implemented so that, in the event of fossils being uncovered, the ECO / Site Engineer will take the appropriate action, which includes:
 - Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access; Reporting the discovery to the provincial heritage agency and/or SAHRA;
 - Appointing a palaeontological specialist to inspect, record and (if warranted) sample or collect the fossil remains;
 - Implementing further mitigation measures proposed by the palaeontologist; and
 - Allowing work to resume only once clearance is given in writing by the relevant authorities.

If the mitigation measures outlined above are adhered to, the residual impact significance of any construction phase impacts on local palaeontological resources is considered to be **low**.

The mitigation measures proposed here should be incorporated into the Environmental Management Programme (EMP) for the Sims mixed-use residential development project. The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies recently published by SAHRA (2013).

10.3.4 CONCLUSION

Due to the inferred low impact significance of the proposed housing development, as far as fossil heritage resources are concerned, no further specialist palaeontological studies or monitoring are recommended at this stage.

10.4 SOCIO-ECONOMIC IMPACT ASSESSMENT

Tony Barbour of Tony Barbour Environmental Consulting and Research was appointed to undertake a Socio-economic Impact Assessment as part of the EIA process, and is included as **Appendix 6D**.

10.4.1 KEY FINDINGS AND IMPACT ASSESSMENT

The Socio-economic Impact Assessment (SIA) (**Appendix 6D**) has identified the following key social issues associated with the construction and operational phases of the development.

Construction phase:

Potential Positive Impacts:

- ❖ Creation of local business and employment and business opportunities

According to the Socio-economic Impact Assessment (SIA) (**Appendix 6D**) based on provided information, the capital expenditure associated with residential component of the development would be ~ R2.5 billion (2016 rand values). This total would be made up of:

- R1 billion, associated with 538 middle income units at an average cost of R 2 million per unit;
- R 1.5 billion, associated with 851 middle-to-lower income units at an average cost of R 650 000 per unit;

The cost of establishing the bulk services, including roads, is estimated to be in the region of R 150 million. The total capital expenditure associated with the residential component of the development is therefore estimated to be in the region of R 2.6 billion (2016 rand values). This total does not include the costs associated with the development of 6 commercial properties, 29 open space properties, 6 sites for places of worship, 2 sites for education and 2 properties for municipal use. At this stage in the project it is not possible to provide an accurate estimate of the capital expenditure costs associated with these components. However, when these costs are included the total capital expenditure associated with the fully developed SIMS Mixed Use Development is likely to exceed 3 billion (2016 rand values).

The majority of work during the construction phase is likely to be undertaken by contractors who will employ local builders. The proposed development will therefore represent a positive benefit for the local construction and building sector in Kathu and the Gamagara Local Municipality (GLM). The majority of the building materials associated with the construction phase is likely to be sourced from locally based suppliers in Kathu and the GLM. This will represent a positive injection of capital into the local economy of the GLM and the Northern Cape as a whole.

The project should also be viewed within the context of the slump in the construction and building sector in the wake of the 2008 global financial crisis and the drop on the iron ore price over the last 12 months. The proposed development would therefore represent a significant opportunity for the local construction and building sector in the GLM and the Northern Cape Province.

Employment Opportunities

The total number of employment opportunities created will therefore be ~ 1 634 per annum over a five year period. Of this total 654 (40%) would be low skilled workers, 654 (40%) semi-skilled artisans and 326 (20%) would be skilled builders and sub-contractors.

The number of employment opportunities for the remaining three years associated with the completion of the middle to lower income component would be ~ 742 per annum (assuming that 30% of the workers employed will work on more than one residential unit at a time). Of this total 297 (40%) would be low skilled workers, 297 (40%) semi-skilled artisans and 148 (20%) would be skilled builders and sub-contractors.

The total number of employment opportunities created by the residential component of the development would be ~ 1 907 over the first five years and 891 for the final three years. The total number of employment opportunities over the total eight year period will therefore be in the region of 2 800. Of this total ~ 1 120 (40%) would be available to low skilled workers, ~ 1 120 (40%) to semi-skilled workers and 560 (20%) to skilled workers.

The majority of the employment opportunities are likely to benefit local Historically Disadvantaged (HD) members of the community. This would represent a significant opportunity for members of the local community. In addition to the residential components the proposed development will also include the development of 6 commercial properties, 29 open space properties, 6 sites for places of worship, 2 sites for education and 2 properties for municipal use. All of these components will create employment and wage opportunities over and above the estimated ~ 2 800 employment opportunities created by the residential component.

The majority of employment opportunities associated with the construction phase is frequently regarded as temporary employment. However, while these jobs may be classified as “temporary” it is worth noting that the people employed in the construction industry by its very nature rely on “temporary” jobs for their survival. In this regard “permanent” employment in the construction sector is linked to the ability of construction companies to secure a series of temporary projects over a period of time. Each development, such as the proposed development, therefore contributes to creating “permanent” employment in the construction sector.

Wage Bill

The annual wage bill over the first five year period would be in the region of R 222 million (rand values). The annual wage bill for the final three year period would be in the region of R 101 million (2016 rand values). This is based on a monthly wage of R 6 000 for low-skilled workers, R 10 000 for semi-skilled workers and R 25 000 for skilled workers. The total wage bill over eight years would therefore be in the region of R 1.4 billion (2016 rand values). Of this total ~ R 298 million (20%) would be earned by low skilled workers, R 498 (33%) million by semi-skilled workers, and R 705 million (47%) by skilled workers. Low and semi-skilled workers would therefore earn ~ R 796 million (2016 rand values)(53%) of the total wage bill over the assumed eight year construction phase.

Business opportunities

As indicated above, the proposed development will represent a positive benefit for the local construction and building sector in Kathu and the GLM. The sector of the local economy that will also benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, etc. associated with the meeting the needs of both local and non-local construction workers over a period of eight years. The hospitality industry in the area will also likely to benefit from the provision of

accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other large construction projects indicates that the potential opportunities are not limited to on-site construction

The proposed development will have a Medium Positive impact (without mitigation/enhancement measures) and a **High Positive impact** (with enhancement measures) on the creation of employment and business opportunities during the construction phase.

Potential Negative Impacts:

❖ Risk posed to family and social networks

According to the SIA, experience for other, typically large construction projects is that the presence of construction workers can pose a potential risk to local communities located in the vicinity of the site. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can affect the local community. In the case of local communities the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

- An increase in alcohol and drug use;
- An increase in crime levels;
- An increase in teenage and unwanted pregnancies;
- An increase in prostitution; and
- An increase in sexually transmitted diseases (STDs).

The impact on individual members of the community who are affected by the behaviour of construction workers has the potential to be high, specifically if they are affected by crime and STDs etc. The potential risk posed by construction workers to individuals cannot be completely eliminated. The focus of the assessment is therefore on the potential impact on the community as whole.

Based on the experience of the consultants the potential impacts on local communities associated with construction workers are typically associated with projects located in rural areas or small towns where large numbers of construction workers from outside the area are employed. Given the location of the proposed development the majority, if not all, of the low and semi-skilled workers are likely to reside locally. As such they will return to their houses on a daily basis. Based on this the overall impact of construction workers on the local community with mitigation is likely to be low. In addition, the presence of construction and contract workers in Kathu is not a new phenomenon. Local communities in the area are therefore used to the presence of workers from outside the town. While the potential threat posed by construction workers to the community as a whole is likely to be low, the impact on individual members who are affected by the behaviour of construction workers has the potential to be high, specifically if they are affected by STDs etc.

The proposed development will have a Low Negative impact (without mitigation) and a **Low Negative impact** (with mitigation) on family structures and social networks associated with the presence of construction workers.

❖ Safety, security and potential for increased crime

The presence of construction workers in the area has the potential to impact on the safety and security of local residents in the area, specifically the residents of Mapoteng and the residential area located to the north of the Kathu Village Mall. Based on experience the presence of construction workers can result in an increase in petty crime and theft. This is linked to the ability of the construction workers to monitor the movements of local residents and take advantage of their absence from the property. The majority of the crime is therefore opportunistic and linked to theft and house break-ins.

Access to the site for workers and construction vehicles is likely to be from the south and west for both the northern and southern section of the site. Access is also likely to be via the R 380 which bisects the site. Based on the findings of the SIA the significance of the potential safety and security risks with mitigation is rated as low negative.

The proposed development will have a Medium Negative impact (without mitigation) and a **Low Negative impact** (with mitigation) with regards to potential safety and security risk posed by presence of construction workers on site.

❖ Impact of construction related activities

Construction related activities can impact negatively on adjacent landowners and communities. The typical impacts include dust, noise and safety. As indicated above access to the site for workers and construction vehicles is likely to be from the south and west for both the northern and southern section of the site. Access is also likely to be via the R 380 which bisects the site. The movement of construction vehicles along the R 380 and the access road to Mapoteng will create potential dust and safety impacts for other road users, specifically pedestrians, including school children walking to and from school.

Site clearing for the development will also increase the risk of dust, specifically during dry, windy summer months. In this regard Mapoteng, which is located to the south west of the site, the Kathu Village Mall and residential areas to the north of the mall, and the business and industrial node located to the south of the mall, would potentially be impacted by dust and noise impacts associated with construction related activities. The recommended mitigation measures listed below should be implemented to address these impacts. With mitigation the impact is rated as **low negative**.

Operational Phase:

Potential Positive Impacts:

❖ Provision of housing, community facilities and open spaces

The proposed SIMS Mixed Use Development will consist of 538 middle-to-upper income units and 851 middle-to-lower income units. In addition to the residential component six sites for worship, two schools, two community facilities and public open spaces, including sports fields, will be developed.

Sishen Iron Ore are committed to providing quality, affordable housing for its staff and has developed 1 793 houses over the last 5 years. Due to accommodation shortages and the high property prices and rental costs in Kathu in recent years many employees have been forced to commute on a daily basis from towns in the area, including as far afield as Kuruman. Kuruman is located ~ 50 km north east of Kathu.

Despite the recent down turn in the mining sector and the associated retrenchments, Sishen Iron Ore have indicated that the future expansion of mining activities in the area will create the need for additional housing. The aim of the SIMS Mixed Used Development is to ensure that adequate accommodation is available in Kathu for employees and contractors when the need arises. As indicated above, there has been a significant increase in the population of the GLM between the 2001 and 2011 census years, which has resulted in an increase in the number of informal houses to the extent that informal constituted 24.4% of the total households in the GLM in 2011. There has also been a significant increase in the number of backyard shacks. The GIHSSP indicates that 9.5% of the total households are backyard shacks which grew by 797% in the past ten years. As a result the Integrated Human Settlement Sector Plan has identified a housing backlog to be 2 590 houses (Gamagara IDP, 2015-2017).

The company is also committed to maximising the opportunity for employees to become homeowners as opposed to renting. To achieve this, houses are made available to employees as below cost. The cost of developing a 120m² middle to lower income unit is ~ R 980 000. This includes the land acquisition and building costs. These units would be made available to employees for ~ R 700 000, a discount of ~ 30%. The housing developed by Sishen Iron Ore that is made available to employees to purchase is referred to as Facilitated Stock. Approximately 972 (70%) of the 1 389 units will be made available for employees to purchase at discounted costs. The remaining 417 (30%), will be made available to employees and contractors to rent. This component is referred to as Strategic Stock.

This creation of an opportunity for Sishen Iron Ore employees to become homeowners at a substantially discount of ~ 30 % of the market value represents a significant socio-economic benefit. In so doing employees can become owners of a fixed asset that will increase in value over time, as opposed to renting a property. International and local research indicates that psychological and socio-economic well-being is closely linked to the stability provided by owning one's home. Political stability is also closely linked to home ownership. People that have something of value to lose are more inclined to work towards looking for peaceful, constructive solutions as opposed to resorting to social unrest and protests.

The provision of housing and community facilities by Sishen Iron Ore therefore represents a long term investment in the well-being of its employees and the community of Kathu as a whole. This represents a significant socio-economic benefit for the employees, the town of Kathu and the GLM. The provision of affordable housing and rental stock in Kathu also ensures that workers do not have to commute over long distances in order to access their place of work. This represents a positive social benefit for both the workers and their families.

The proposed development will also provide six sites for worship, two schools, two community facilities and public open spaces, including sports fields. Sishen Iron Ore are therefore committed to creating more than just accommodation, but also to providing the community with the facilities required to create a suburb that caters for the needs of its residents. Establishing schools, places of worship, open spaces and shops within easy access to residential areas enhance the quality of the area and the overall well-being of the communities that live there. This represents a positive social benefit for members of the community that will be accommodated in the residential component of the SIMS Mixed Use Development.

In addition, as indicated above, the proposed development area is located within the Kathu Urban Edge. The area has therefore been identified as suitable for urban development. The SIMS Mixed Use

Development will also assist to address the historical, spatial planning legacies associated with Apartheid planning by facilitating and supporting the integration of Kathu and Seshen.

The proposed development will have a High Negative impact (without mitigation) and a **High Positive** impact (with enhancement) with regards to potential provision of housing and community facilities.

❖ Creation of employment and business opportunities

The establishment of 538 middle-to-upper income units and 851 middle-to-lower income units, two schools, two community facilities and public open spaces, including sports fields, will create employment opportunities for local residents, specifically domestic workers and gardeners etc. Based on the assumption that every third middle income house will employ a domestic worker and or gardener the proposed development will create ~ 180 employment opportunities for members from the local community. The majority, it not all of these community members are likely to be Historically Disadvantaged Individuals (HDIs). Given the high unemployment levels in the surrounding areas, coupled with the low income and education levels, this would represent a positive social impact. The lower-to-middle class households are less likely to employ domestic workers and or gardeners.

The number of employment opportunities associated the schools and commercial components will depend on their size. Based on information from other studies undertaken by the author a school that accommodates ~ 1 000 learners would employ approximately 60-80 staff members. This total would include teachers, administrators, cleaning, maintenance and security staff etc. Two schools with the capacity to accommodate ~ 1 000 learners would therefore create ~ 120-160 permanent employment opportunities.

The number of employment opportunities associated with the six commercial sites to be developed will depend on the type and size of the developments. Given the proximity of the southern section of the site to Mapoteng, one of the commercial developments is likely to be a supermarket. Based on information from other assessments undertaken by the author, the total number of people employed at 2 500-3 000 m² GLA supermarket, such as a Shoprite or Pick and Pay supermarket, is in the region of 160-180 full time employees. Large supermarkets are more labour intensive when compared to other retail operations. The other commercial activities are therefore likely to employ less people. However, it would be reasonable to assume that the total number of employment opportunities created by the development of all six commercial sites would be in the region of 500. The majority, it not all, of the employment opportunities are likely to benefit Historically Disadvantaged Individuals (HDIs) from the local community. This would represent a significant positive social impact.

The operational phase will also create downstream opportunities for local businesses, such as local maintenance and building companies, garden services and security companies, petrol stations, shops and restaurants etc., and create opportunities for new businesses to develop. This in turn will create additional employment opportunities. The local estate agencies in the area and legal firms would also benefit from the sale and resale of properties associated with the new development. The increase in the number of residential units is also likely to create the need to employ additional staff at the GLM.

The operational phase of the proposed SIMS Mixed Use Development will therefore create significant socio-economic benefits and opportunities for the local community and local GLM economy. In this regard, the development will create in the region of 800-1 000 employment opportunities. The majority of these opportunities will benefit HD members of the community. A percentage of the wage bill earned by these workers will be spent in the local economy which will benefit local companies and

businesses. The significance of the overall socio-economic benefits associated with the operational phase will be high.

The proposed development will have a Medium Positive impact (without mitigation/enhancement measures) and a **High Positive impact** (with enhancement measures) on the creation of employment and business opportunities during the operational phase.

- ❖ Increase rates and tax revenue for the GLM which can be used to address some of the socio-economic challenges facing the GLM

Based on the information provided by the developer the total market value of each component will be:

- R1 billion (538 middle income units); and
- R1.5 billion (851 middle-to-lower income units).

Assuming full development, the estimated monthly property rates for each of the above components would be:

- R322 800, for 538 middle income units (based on assumption of rates of R 600/month);
- R255 300, for 851 middle-to-lower income units (based on assumption of rates of R 300/month).

The monthly rates bill for the residential component of the proposed SIMS Mixed Used Development would be in the region of R 7 million (2015 rand values) per annum. In addition the proposed development would also generate revenue for the GLM from the consumption of water and electricity. However, it should be noted that the lower income households may find it difficult to pay municipal rates and taxes on a monthly basis. This may become an issue.

The proposed development will have a Medium Negative impact (without mitigation/enhancement measures) and a **Medium Positive impact** (with enhancement measures) with regards to broadening the rates base.

No Development Alternative

The no-development alternative would result in a lost opportunity for Sishen Iron Ore to provide quality, affordable accommodation for its employees and to create a well-planned new development that includes the establishment of schools, places of worship, public open spaces and sports fields and shops. The no-development option would also result in a lost opportunity for Sishen Iron Ore employees to purchase houses at a significantly discounted price. The employment and business opportunities associated with the construction and operational phase would also be forgone, as would the rates and taxes generated for the GLM. The no-development option is therefore not supported. However, the recommendations listed in the SIA should be implemented.

10.4.2 MITIGATION MEASURES

Enhancement measures:

In order to enhance local employment and business opportunities associated with the construction phase of the project the following measures should be implemented:

- Where reasonable and practical the proponent should appoint local contractors, and implement a “locals first” policy, especially for semi and low-skilled job categories. Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;
- The proponent should liaise with the GLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction. These companies should be notified of the tender process and invited to bid for project-related work;
- Where feasible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information. While preference to appointing local companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of companies for the construction phase.
- An accredited training and skills development programme aimed at maximising to opportunity for local workers to be employed for the low and semi-skilled positions should be initiated prior to the initiation of the construction phase. The aim of the programme should be to maximise employment opportunities for members of the local community. In this regard, the programme should be aimed at community members from Kathu and other towns in the GLM. The programme should be developed in consultation with the Department of Labour and the GLM. The recommended targets are 80% and 60% of low and semi-skilled positions respectively should be taken up by local community members;
- The recruitment selection process for the training and skills development programme should seek to promote gender equality and the employment of women wherever possible;
- The GLM and relevant community representatives should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project;
- The GLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

The development of the proposed SIMS Mixed Use Development represents an enhancement measure in itself. In addition, the following recommendations should be implemented:

- The proposed development should ensure that the community facilities include the establishment of sufficient number of crèches, primary schools and community sports facilities;
- A landscaping plan should be developed that makes provision for tree planting and creation of green open spaces as part of the urban design plan;
- A Management and Maintenance Plan and programme for the public open spaces and play areas should be developed and implemented;
- The proponent should assist the GLM with ensuring that funding and resources are made available to implement the Management and Maintenance Plan.

The recommended enhancement measure is for the proposed SIMS Mixed Use Development to proceed as planned. In addition, in order to enhance local employment and business opportunities associated with the operational phase of the project the following measures should be implemented:

- The proponent and the GLM should inform local community leaders, organizations and councillors of the potential job opportunities associated with the different components associated with the operational phase of the development;
- The proponent, in consultation with the GLM, should establish a database of local service providers in the area, specifically SMME"s owned and run by HDI"s. These companies should be notified of the potential opportunities associated with the operational phase of the development.
- The proponent in consultation with the GLM should look to identify measures to maximize employment opportunities for members from the local HD communities.

The recommended enhancement measure for the broadening of the rates base is for the proposed SIMS Mixed Used Development to proceed as planned.

Mitigations Measures:

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- The developer should seek as far as is possible to appoint a local or regional contractor/s from the local area for the bulk services and housing contracts;
- The developer in consultation with the appointed contractor/s should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard, the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;
- No construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.

The developer and or contractors cannot be held responsible for the off-site, after-hours behaviour of all construction employees. However, the contractors appointed by the developer should ensure that all workers employed on the project are informed at the outset of the construction phase that any construction workers found guilty of theft will be dismissed and charged. All dismissals must be in accordance with South African labour legislation. In addition, the following mitigation measures are recommended. These recommendations apply to the construction of the bulk infrastructure on the site and the establishment of housing:

- No construction workers, with the exception of security personnel, should be allowed to stay on site overnight;
- Building contractors appointed by the developer must ensure that workers are transported to and from the site on a daily basis;
- Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07h00 and 18h00 during weekdays and 08h00 and 13h00 on Saturdays;
- No work should be permitted on Sundays and Public Holidays.

The potential impacts associated with construction related activities and heavy vehicles can be effectively mitigated. The aspects that should be covered include:

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- The proposed development should be phased and site clearing confined to the specific areas under construction;
 - Dust suppression measures must be implemented when site clearing takes place, such as wetting of exposed areas;
 - Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07h00 and 18h00 during weekdays and 08h00 and 13h00 on Saturdays. No work should be permitted after 13h00 on Saturdays and on Sundays or Public Holidays;
 - Drivers should be made aware of the potential risk posed to school children and other road users along the access road linking Mapoteng and Kathu and the R 380. All drivers must ensure that speed limit of 60 km per hour is enforced;
 - The movement of heavy construction vehicles along the Mapoteng and Kathu access road and the R 380 should be timed to avoid peak traffic hours;
 - Dust suppression measures must be implemented to reduce impacts associated with the movement of construction vehicles, including wetting of gravel roads and ensuring that
 - vehicles used to transport sand and building materials are fitted with tarpaulins or covers;
 - All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits.

10.4.3 CONCLUSION

The findings of the SIA indicate that the Preferred Alternative of the proposed SIMS Mixed Use Development is located inside the Kathu Urban Edge. The proposed development therefore complies with and is supported by the local land use planning proposals for the area. The construction and operational phase of the proposed development will create a number of positive socio-economic benefits for the local community and the area as a whole. The development will also provide quality, affordable accommodation for the employees of Sishen Iron Ore and create a well-planned new development that includes the establishment of schools, places of worship, public open spaces and sports fields and shops. In addition, the development will assist to address the historical, spatial planning legacies associated with Apartheid planning by facilitating and supporting the integration of Kathu and Sishen. The establishment of Preferred Alternative of the proposed SIMS Mixed Use Development is therefore supported by the findings of the SIA.

The findings of the SIA indicate that Preferred Alternative of the proposed SIMS Mixed Use Development complies with and is supported by the local land use planning proposals for the site. The findings of the SIA also indicate that the socio-economic benefits associated with the proposed development outweigh the negative impacts. All of the negative impacts can also be effectively mitigated.

It is therefore recommended that Preferred Alternative of the proposed SIMS Mixed Use Development be supported, subject to the implementation of the recommended enhancement and mitigation measures contained in the SIA report.

10.5 GEO-TECHNICAL ASSESSMENT

VGIconsult Projects was appointed to undertake the Geo-technical Feasibility Assessment, which is included as **Appendix 6E**.

10.5.1 KEY FINDINGS

According to the Geo-technical Assessment, According to Sishen Iron Ore Mine data five boreholes were drilled on the site and an additional two boreholes on/near to the site boundary.

This site is blanketed by 57m to 117m thick Kalahari Group material comprising calcrete, clay and pebbles. The calcrete is 19m to 64m in thickness. The Kalahari deposits are underlain by shale and siltstone of the Gamagara Formation to very great depth (121m to in excess of 234m).

Borehole KM17 is described to intercept Karoo age shale, but considering the borehole logs of the Mine database in the area, this material may in fact be of the Gamagara Formation. Locally the Gamagara shales are underlain by chert breccia of the Wolhaarkop Formation. In Borehole KU1E the chert breccia is overlain by Banded Iron Formation. Exploration Borehole SW410E intercepts a cavity at very great depth below the Kalahari Group. The anticipated Formation is Gamagara Group shale or BIF/Wolhaarkop breccia. The reason for cavity formation during the drilling process is unknown. Only one of the seven boreholes (Borehole SIM430E) intercepted dolomite rock. The depth to dolomite is 121m.

According to the Sishen Mine structural data set no faults transect the site.

As this site is predominantly located in the area of significant impact of groundwater drawdown the 100m depth to dolomite rock cut off applies. Notwithstanding this, dolomite rock is greater than 121m, and as no major faults of significance are indicated to transect the site, the site is not judged to be on dolomite land.

Most of the Sims site is located within the area significantly impacted by groundwater abstraction. The current groundwater elevation range is 1080m AMSL to 1120m AMSL, i.e. 80m to 120m below the OWL.

Existing information indicates that the **Sims site** is underlain by very thick (57-117m) Kalahari Group material (calcrete, clay, pebble layers), overlying Gamagara Formation shale to 121- >234m). No known/confirmed faults are indicated to transect the site. Most of the Sims site is located within the area significantly impacted by groundwater abstraction. The current groundwater elevation range is 1080m AMSL to 1120m AMSL, i.e. 80m to 120m below the OWL. The site is not judged to be on dolomite land.

10.5.2 RECOMMENDATIONS

- Foundation Design Requirements

The loose colluvial layer and medium dense nodular calcrete encountered in majority of the Test Pits from natural ground level to an anticipated maximum depth of 0.9m are not suitable for the founding.

Refusal of the TLB was encountered at a depth of 0.1m and 1.2m on honeycomb tending to hardpan calcrete (pedogenic) in all the test pits.

The Foundation Design/ building procedures allowed for the identified design soil classes/single storey residential structures in terms of the 1999 Home Building Manual are identified in pages 18 – 20 of the Geo-technical Feasibility Assessment (**Appendix 6E**).

Where very dense honeycomb tending to hardpan calcrete is encountered within the standard footing depth, the structure can be placed directly on this material.

Where such material is not encountered within the standard footing depth, an engineered soil mattress should be constructed (on the very dense honeycomb tending to hardpan calcrete) to the required founding level as follows:

1. Remove all excavatable material (with an excavator) to a maximum depth of between 0.1m to 1.0m in the footprint area of the structure and up to 1m beyond the edge of the proposed foundation area.
2. Rip and compact the excavated floor area to 95% of Modified AASHTO maximum dry density at optimum moisture content.
3. Backfill in maximum 150mm thick layers with imported G5-quality material; each layer is to be compacted to at least 98% of Modified AASHTO maximum dry density at optimum moisture content.
4. This should also include the (minimum) 150mm freeboard, i.e. top of floor slab to top of natural ground level, as required by the NHBRC Guidelines.

- Excavatability

It should be noted that if a backactor will be used for the excavation of services, excavatability problems may be experienced in both Soil Zones 1 and 2 from 0.1m depth (which is within the general excavation depth for services [1.5m]) due to the presence of shallow calcrete.

- Trench Sidewall Stability

In the event that there is uncertainty with respect to shoring requirements in trenches deeper than 1m, a competent person should be consulted.

All excavation slopes must be inspected by a competent person during construction to assess stability and recommended stabilizing measures, where required.

- Pipe Bedding Material and Backfill and Compaction Characteristics

- The materials tested in this investigation do not comply with the SABS 1200LB criteria for selected granular fill or selected fill. Selected granular fill and/or selected fill is not available on this site and will need to be imported.
- Selected Granular Bedding – i.e. naturally occurring non-cohesive, free draining, singularly graded gravel-soils between 0.6mm and 19.0mm particle size are not available on this site and will need to be imported.
- Selected Fill – the laboratory tests results confirm that natural soils with a PI less than 6% and/or a stones content of <30mm are not available on this site and will need to be imported.
- General Backfill – materials recovered from trench excavation works may be considered for general backfill purposes after removal or reduction of all the larger cobble and boulder size fractions.

- The selected calccrete materials, G5 and G6 quality materials are suitable for the construction of earth mattresses

- Corrosivity

The selection of materials to be used for wet services placed below ground surface should take cognisance of a possible corrosive nature of the environment.

- Road Construction

Calccrete classifying as G5 quality materials is suitable for the use for base layer. G6 quality material is suitable for sub base in road construction. However, G6 quality material can be improved to G5 quality by adding 20% to 30% gravels.

- Groundwater Conditions

No seepage was indicated in the test pits excavated. However, the soil/rock interface may give rise to water seepage during wet season.

Water runoff into open works may also occur during excavation and construction work, particularly in the wet season due natural slope. A pump should therefore be available during such work. Structures could be impacted on by 'rising damp'. Special attention to membrane/dampcourse measures is required (for example, the use of 'waterproof' concretes in slab/raft foundation designs).

A complete stormwater system that provides for drainage as well as the provision of drainage to control runoff from major stormwater events will need to be constructed on the site, according to Municipal specifications.

10.6 TRAFFIC IMPACT ASSESSMENT

KMA Consulting Engineers was appointed to undertake the Traffic Impact Assessment, which is included as **Appendix 6F**.

10.6.1 KEY FINDINGS AND RECOMMENDATIONS

The following are the key findings of the Traffic Impact Assessment:

❖ Capacity Analysis

Capacity analyses were performed by means of the SIDRA program. Levels of Service (LOS) give an indication of operational characteristics in a traffic stream and their perception by motorists and passengers. Levels of service A to D are usually assumed to be acceptable, with LOS E regarded as the maximum flow rate, or capacity of the facility.

The following intersection were analysed:

- R380 / Hendrik van Eck Street Intersection (Intersection A)
- Ian Fleming Street / Hendrik van Eck Street Intersection (Intersection B)
- Access 1 on R380 (Intersection C)
- Access 2 on R380 (Intersection D)
- Access on Extension of Hendrik van Eck Street (Intersection E)
- Sishen Mine / Extension of Hendrik van Eck Street Intersection (Intersection F)

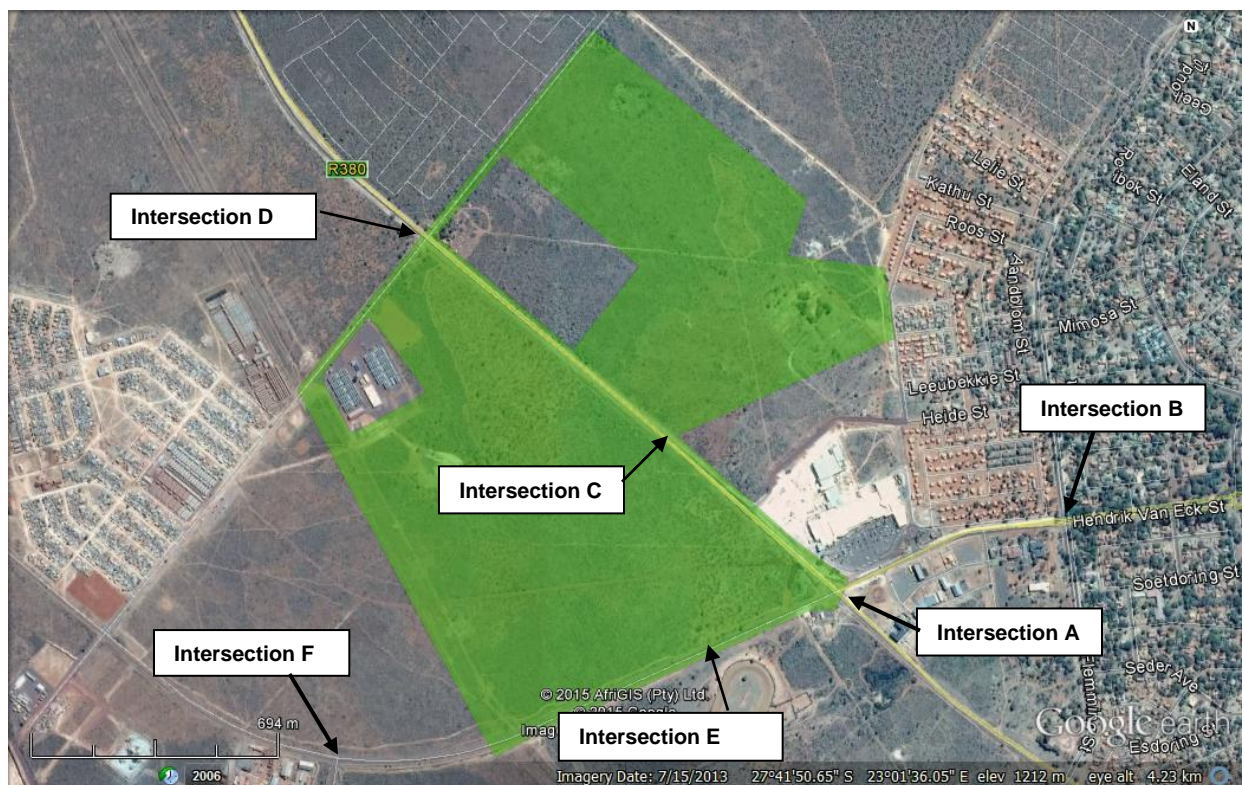


Figure 10: Google Earth image showing the intersections analysed

Intersection A:

The intersection is expected to experience capacity problems with the latent rights; even before implementation of the development under consideration. To ensure acceptable levels of service the intersection will have to be upgraded

Intersection B:

The intersection should continue to operate acceptably with the latent rights and the development under consideration during the morning peak, but capacity problems are expected during the afternoon peak, mainly due to the higher traffic volumes in this area as a result of the nearby Kathu Village Mall.

To ensure acceptable levels of service the intersection will have to be upgraded with right turning lanes. Apart from the increased capacity road safety will also improve with the provision of right turning lanes.

Intersection C:

As an intersection on a major road, the intersection should preferably be developed with turning lanes on the main road.

Side road traffic is expected to experience capacity problems with the implementation of a priority controlled access. With provision of proper turning lanes capacity problems are expected to be restricted to side road traffic, whilst traffic on the R380 will operate at acceptable levels of service. Although not ideal, this could be acceptable based on the principle contained in the Manual for Traffic Impact Studies, namely "It may, however be acceptable if individual movements are operating at LOS E or even F, if the traffic volumes affected are low" It is not possible to implement all way stop control at this intersection due to the following principles as contained in the South African Road Traffic Signs Manual (SARTSM). The manual prescribes the conditions under which all-way stop control is allowable, namely:

- a) All-way stop control should not be implemented on a trunk road or major arterial road*
- b) It should not be implemented on a public passenger transport route*
- c) The traffic flow on one road should not exceed the traffic flow on the other road by more than 20% of the total traffic through the junction.*
- d) It should not be implemented if any approach road to the junction has more than one lane for traffic.*

Although the intersection will not initially warrant signalisation, it is possible that installation of traffic lights could be warranted at some stage. It is therefore necessary to monitor the intersection at regular times to determine when signalisation is warranted. Initially, the intersection should however be implemented as a priority controlled intersection with auxiliary lanes.

Intersection D:

As an intersection on a major road, the intersection should preferably be developed with turning lanes on the main road, with the result that the current layout is not acceptable for the purposes of providing access to the new development.

The western approach is closed at this stage. This road will have to be reopened when the development is implemented.

As in the case of Access 1, side road traffic is expected to experience capacity problems with the implementation of a priority controlled access. With provision of proper turning lanes capacity problems are expected to be restricted to side road traffic, whilst traffic on the R380 will operate at acceptable levels of service. A priority controlled intersection might be acceptable and should initially be implemented, although the installation of traffic lights could be warranted at some stage. It is therefore necessary to monitor the intersection at regular intervals to determine if and when signalisation is warranted.

Intersection E:

As an intersection on a major road, the intersection should preferably be developed with turning lanes on the main road.

As in the case of Accesses 1 and 2 on the R380, all way stop control is not appropriate, whilst a priority controlled intersection is expected to experience capacity problems, although the implementation of a priority controlled access with auxiliary lanes could be acceptable for some time. With higher traffic volumes and the establishment of significant shops in the area, it is however expected that signalisation of the intersection will sooner be warranted than in the case of the accesses on the R380. Given the expected traffic volumes it is also recommended that the section of the road between Intersection A and Intersection F be widened to a four lane undivided road.

Intersection F:

Analysis shows that even with the improved signal settings, the intersection is expected to experience capacity problems during the afternoon peak. To ensure longer term acceptable levels of service the intersection should be improved. The road section should be widened to a four-lane road. The additional lanes can be terminated to the west of the intersection.

❖ Trip Generation during construction

Detail regarding planned construction was not available but considering the expected significant trip generation, it is believed that the worst-case scenario will be when the development is fully implemented. During construction, heavy vehicle volumes will be relatively higher than during the operational stages. As the development site is located in an area served by main roads such as the R380, and is mostly surrounded by vacant land, it is not expected that any community will be significantly affected by heavy vehicle operations during construction. There will obviously be periods when there will be combination of construction - and operational trips. A significant portion of trip generation will however be by apartments / flats and shops, which will not necessarily be developed at the early stages of the project, with the result that no combination of trips is expected to exceed the full trip generation as analysed.

❖ Public Transportation

In assuming a low vehicle ownership, it is assumed that significant public transport operations can be expected, although a very low vehicle ownership was not assumed, which would have implied that resident would mostly be dependent on public transport. To ensure effective public transport operations, provision should preferably be made for public transport lay-bys in the final street layout in such positions that people do not walk more than 500m to reach public transport. Provision should be made for more public transport bays at schools, shops and possibly at apartments/flats.

❖ Pedestrian activities

During traffic counting limited pedestrian activity was observed. With existing work opportunities, some distance away from the area, no significant home - work pedestrian movement is expected. Most

pedestrian activity is expected to be internal movements. A concern is that a school will only be located to the west of the R380 with the result that some pedestrian movement across the mentioned road can be expected. Mid-block pedestrian crossings are not recommended due to the inherent road safety concerns with these facilities. Pedestrian crossing should be facilitated at the intersections, especially once the intersections are signalised. As a result, it might be prudent to construct fencing that will prevent pedestrian crossing at other locations along the main roads and thus channelize movement at the intersections. Some pedestrian movement between the area and the Kathu Village Mall can be expected and this should also be accommodated at the signalised intersections.

Although the main roads have gravel shoulders, the shoulders are not pedestrian friendly. The fact that the main roads in the area have a relatively rural character rather than a street character encourages speeding, thus increases the hazardousness of pedestrian activities. With possible upgrading of the roads, provision should preferably be made for proper sidewalks to facilitate pedestrians as well as street lighting. This should enhance the establishment of a more urban environment, which should also reduce speeding.

❖ **Road condition**

The relevant road surfaces are in a reasonable condition, but the lack of sidewalks with kerbs and formal lay-bys result in vehicles such as taxis stopping at various positions along the roads, resulting in significant edge breaking,

With the development under consideration, heavy vehicle volumes ratios are not expected to change, except during construction. Repair of the road edges and shoulders is essential in the shorter term to prevent further edge break, but also to decrease the road safety implications of a significant edge drop and reduced lane widths. In the longer term proper sidewalks with kerbs should preferably be constructed.

10.6.2 CONCLUSION

The following conclusions can be made from the Traffic Impact Assessment:

- The development is of significant size and can potentially generate 2046 trips during the morning peak and 2749 trips during the afternoon peak.
- The development will have an impact on all of the analysed intersections and with normal traffic growth, the expected trip generation of latent rights as well as the additional trip generation, some improvements are required to the relevant intersections.

Based on the conclusions it is recommended that the development be approved from a traffic point of view.

11. SUMMARY OF IMPACTS

Please refer to Appendix 7 for a summary of the project impact assessment and significance, including a summary of mitigation measures.

Table 4 is a summary of all the impacts assessed in the specialists reports that are associated with the construction and operational phase for the preferred alternative.

Table 4: Summary of all impacts

Study	Impact	Significance No Mitigation	Significance With Mitigation
Botanical	Loss of Kathu Bushveld	High (Negative impact)	High (Negative impact)
	Loss of Ecological Processes	High (Negative impact)	High (Negative impact)
Heritage	Loss of archaeological resources	Low (Negative impact)	Very Low (Negative impact)
Palaeontology	Loss of Palaeontological heritage resources	Low (Negative impact)	Low (Negative impact)
Socio-economic	Creation of employment and business opportunities during the construction phase	Medium (Positive impact)	High (Positive impact)
	Potential impacts on family structures and social networks associated with the presence of construction workers	Low (Negative impact)	Low (Negative impact)
	Safety and security risk posed by presence of construction workers on site	Medium (Negative impact)	Low (Negative impact)
	Potential noise, dust and safety impacts associated with construction related activities and the movement of construction traffic to and from the site	Medium (Negative impact)	Low (Negative impact)
	Provision of housing, community facilities and open spaces	High (Negative impact)	High (Positive impact)
	Creation of employment and business opportunities	Medium (Positive impact)	High (Positive impact)

	Broadening the rates base	Medium (Negative impact)	Medium (Positive impact)
	No-go development	High (Negative impact)	High (Positive impact)

12. RECOMMENDATIONS

The following mitigation measures must be enforced if the proposed development were approved. These are also included in the Environmental Management Programme (**Appendix 7**).

Construction Phase:

The following mitigation measures have been proposed by the Botanical Impact Assessment:

- Opportunities for mitigation would be very limited due to the intense scale of the proposed development. Small mitigation measures can and should be implemented such as preservation of areas of open space e.g. around the seasonal pan but these would not necessarily conserve the nature of the Kathu Bushveld. For this reason, any mitigation measures applied would not greatly reduce the negative impact hence the impacts would remain High negative even after mitigation.
- No mitigation would be possible for the loss of ecological processes due to construction and operational activities on the SIMS housing development site.
- *Acacia erioloba* (camelthorn) trees should be observed as a protected tree species. A permit would be required for any disturbance of these trees. In addition, *Aloe grandidentata* was found in the eastern part of the site. These aloes should be collected and relocated to a safe site. This would also require a permit from the Department of Environment and Nature Conservation, Northern Cape Province.
- The seasonal pan in the north-eastern sector of the site should be conserved and well-buffered to allow for seasonal collections of water. Ideally this pan should be within an open space area as depicted and proposed in the Preferred Layout. This open space would also accommodate the wooded thicket described above (waypoint SIMS26).
- In the western part of the SIMS site the area around the old reservoir should also be conserved as 'open space' with as many as possible of the mature *Acacia erioloba* trees in this area conserved as well (around waypoint SIMS13).

According to the Heritage Impact Assessment, the following recommendations are made:

- No archaeological mitigation is required.
- Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 321 0172), or Ms Jenna Lavin at the South African Heritage Resources Agency (021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

The following mitigation measures have been identified in the Palaeontological Impact Assessment to safeguard fossils exposed on site during the construction phase of the development are recommended:

- The ECO and / or the Site Engineer responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he / she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains. If any substantial fossil remains (e.g. vertebrate bones, teeth, horn cores) are found during construction SAHRA should be notified immediately (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that appropriate mitigation (i.e. recording, sampling or

collection) by a palaeontological specialist can be considered and implemented, at the developer's expense.

- A chance-find procedure should be implemented so that, in the event of fossils being uncovered, the ECO / Site Engineer will take the appropriate action, which includes:
 - Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access; Reporting the discovery to the provincial heritage agency and/or SAHRA;
 - Appointing a palaeontological specialist to inspect, record and (if warranted) sample or collect the fossil remains;
 - Implementing further mitigation measures proposed by the palaeontologist; and
 - Allowing work to resume only once clearance is given in writing by the relevant authorities.

The mitigation measures proposed here should be incorporated into the Environmental Management Programme (EMP) for the Sims mixed-use residential development project. The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies recently published by SAHRA (2013).

The following enhancement and mitigation measures have been proposed by the Socio-Economic Impact Assessment:

❖ Enhancement measures:

In order to enhance local employment and business opportunities associated with the construction phase of the project the following measures should be implemented:

- Where reasonable and practical the proponent should appoint local contractors, and implement a "locals first" policy, especially for semi and low-skilled job categories. Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;
- The proponent should liaise with the GLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction. These companies should be notified of the tender process and invited to bid for project-related work;
- Where feasible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information. While preference to appointing local companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of companies for the construction phase.
- An accredited training and skills development programme aimed at maximising to opportunity for local workers to be employed for the low and semi-skilled positions should be initiated prior to the initiation of the construction phase. The aim of the programme should be to maximise employment opportunities for members of the local community. In this regard, the programme should be aimed at community members from Kathu and other towns in the GLM. The programme should be developed in consultation with the Department of Labour and the GLM. The recommended targets are 80% and 60% of low and semi-skilled positions respectively should be taken up by local community members;

- The recruitment selection process for the training and skills development programme should seek to promote gender equality and the employment of women wherever possible;
- The GLM and relevant community representatives should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project;
- The GLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

❖ Mitigations Measures:

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- The developer should seek as far as is possible to appoint a local or regional contractor/s from the local area for the bulk services and housing contracts;
- The developer in consultation with the appointed contractor/s should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard, the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;
- No construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.

The developer and or contractors cannot be held responsible for the off-site, after-hours behaviour of all construction employees. However, the contractors appointed by the developer should ensure that all workers employed on the project are informed at the outset of the construction phase that any construction workers found guilty of theft will be dismissed and charged. All dismissals must be in accordance with South African labour legislation. In addition, the following mitigation measures are recommended. These recommendations apply to the construction of the bulk infrastructure on the site and the establishment of housing:

- No construction workers, with the exception of security personnel, should be allowed to stay on site overnight;
- Building contractors appointed by the developer must ensure that workers are transported to and from the site on a daily basis;
- Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07h00 and 18h00 during weekdays and 08h00 and 13h00 on Saturdays;
- No work should be permitted on Sundays and Public Holidays.

The potential impacts associated with construction related activities and heavy vehicles can be effectively mitigated. The aspects that should be covered include:

- The proposed development should be phased and site clearing confined to the specific areas under construction;
- Dust suppression measures must be implemented when site clearing takes place, such as wetting of exposed areas;
- Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07h00 and 18h00 during weekdays

and 08h00 and 13h00 on Saturdays. No work should be permitted after 13h00 on Saturdays and on Sundays or Public Holidays;

- Drivers should be made aware of the potential risk posed to school children and other road users along the access road linking Mapoteng and Kathu and the R 380. All drivers must ensure that speed limit of 60 km per hour is enforced;
- The movement of heavy construction vehicles along the Mapoteng and Kathu access road and the R 380 should be timed to avoid peak traffic hours;
- Dust suppression measures must be implemented to reduce impacts associated with the movement of construction vehicles, including wetting of gravel roads and ensuring that
- vehicles used to transport sand and building materials are fitted with tarpaulins or covers;
- All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits.

Operational Phase:

The development of the proposed SIMS Mixed Use Development represents an enhancement measure in itself. In addition, the following recommendations should be implemented:

- The proposed development should ensure that the community facilities include the establishment of sufficient number of crèches, primary schools and community sports facilities;
- A landscaping plan should be developed that makes provision for tree planting and creation of green open spaces as part of the urban design plan;
- A Management and Maintenance Plan and programme for the public open spaces and play areas should be developed and implemented;
- The proponent should assist the GLM with ensuring that funding and resources are made available to implement the Management and Maintenance Plan.

The recommended enhancement measure is for the proposed SIMS Mixed Use Development to proceed as planned. In addition, in order to enhance local employment and business opportunities associated with the operational phase of the project the following measures should be implemented:

- The proponent and the GLM should inform local community leaders, organizations and councillors of the potential job opportunities associated with the different components associated with the operational phase of the development;
- The proponent, in consultation with the GLM, should establish a database of local service providers in the area, specifically SMME"s owned and run by HDI"s. These companies should be notified of the potential opportunities associated with the operational phase of the development.
- The proponent in consultation with the GLM should look to identify measures to maximize employment opportunities for members from the local HD communities.

The recommended enhancement measure for the broadening of the rates base is for the proposed SIMS Mixed Used Development to proceed as planned.

13. CONCLUSIONS

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- ❖ Botanical Impact Assessment
- ❖ Heritage Impact Assessment
- ❖ Palaeontological Impact Assessment
- ❖ Socio-economic Impact Assessment
- ❖ Traffic Impact Assessment
- ❖ Geo-technical Assessment

The specialist studies and the information provided within the EIA Report, indicates that the proposed Sims Housing development does not pose any significant impacts and can be implemented with appropriate mitigation.

In terms of the need and desirability of the proposed residential development, there is currently a significant housing need in Kathu, due to the population growth and mining activities in the town. The Applicant, as a major housing supplier in Kathu, has considered the development in-line with their need estimations in-line with the current expansion plans of the mine.

According to the Socio-economic Impact Assessment, the SDF notes that the town is expected to experience significant growth over the next few years due to the expansion of the mining sector in the area. However, due to the decrease in the price of iron ore there is likely to be a delay in this future growth.

The proposed Sims Residential Development is located within the urban edge as identified in the Gamagara Local Municipality SDF. The site has therefore been identified as suitable for development. The proposed site is classified as “mixed-use development” and “lower density residential in the Kathu Spatial Development Framework and has been earmarked for the planned urban expansion.

The site is located in close proximity to major transport arteries, including the R380 (which links directly to the N14) and Hendrik van Eck Way, and has direct access from a number of major routes in the area.

The site is also relatively near the mine, as well as other employment opportunities such as commercial developments and malls. According to the Socio-economic Impact Assessment (**Appendix 6D**), a large business node is forming around the intersection of Hendrik van Eck Way and the R380. The recently developed Kathu Village Mall has played a significant role as catalyst for development in the area. The Kathu Village Mall and other commercial developments are thus in close proximity to the proposed development.

The site is bound by commercial/business developments to the east, which fall between the proposed site and the lower density residential development further to the east. A high density residential area (Mapoteng) is located to the west of the site. The site is thus located between Mapoteng and the main town of Kathu, previously segregated communities. The development of the site will have an integrative objective in terms of correcting previous era segregation planning.

The area is thus deemed to be ideally situated within the local context for the envisaged housing project. The criteria that determined the desirability of the applicable location are based on the principles of integration by means of infill planning and the optimum utilisation of available land and resources, availability of bulk services, accessibility and proximity of employment opportunities.

In terms of alternatives, **Alternative 4** is the preferred alternative. This alternative is also considered as a viable option, and is the Applicants preferred layout. Although it does not provide as many housing opportunities as Alternatives 2 and 3, it still provides sufficient housing opportunities, and conforms more to the mixed-use development envisaged. It has importantly taken the sensitive natural features such as wetlands and the sensitive botanical areas into consideration when it has come to the placement of open spaces and roads.

The “no-go” option, which is the option of not developing the proposed housing development on the property. Although the no-go development might result in no potential negative environmental impacts, especially on the vegetation on the development site, the direct and indirect socio-economic benefits of not constructing the residential development will not be realised. The need for additional housing opportunities in Kathu will not be realised.

According to the Socio-economic Impact Assessment, the no-development option would result in the lost opportunity for the local economy the Gamagara Local Municipality and residents who would benefit from the development. The no-development alternative would result in a lost opportunity for Sishen Iron Ore to provide quality, affordable accommodation for its employees and to create a well-planned new development that includes the establishment of schools, places of worship, public open spaces and sports fields and shops. The no-development option would also result in a lost opportunity for Sishen Iron Ore employees to purchase houses at a significantly discounted price. The employment and business opportunities associated with the construction and operational phase would also be forgone, as would the rates and taxes generated for the Gamagara Local Municipality. The no-development option is therefore not supported.

According to the Botanical Impact Assessment, in the case of the ‘No Go’ option the residential development would not be pursued and the *status quo* would persist. The vegetation would remain much as it is. The No-Go alternative would result in a **Low negative** impact (it cannot be **Neutral** because there is a low level of negative use of the area by pedestrians and illegal informal residents that could continue if the area is not developed).

According to the Botanical Impact Assessment, the investigation of the proposed area for the SIMS housing development at Kathu revealed that viable, well-developed Kathu Bushveld vegetation occurs throughout the site. This vegetation is generally shrubland with scattered trees, some of which are the protected species *Acacia erioloba* (camelthorn). Development of the site would result in **High negative** impacts both in terms of loss of vegetation and habitat as well as ecological processes at a local scale. However, at a regional scale the impact would be limited and so cumulative impacts are rated as **Low negative**.

The Kathu Bushveld in the SIMS study area is Least Threatened and although there would be local loss of intact natural veld due to the proposed development, the housing development is supported without major constraints or need for cumbersome mitigation measures.

According to the Socio-economic Impact Assessment, the findings indicate that the Preferred Alternative complies with and is supported by the local land use planning proposals for the site. The findings of the SIA also indicate that the socio-economic benefits associated with the proposed development outweigh the negative impacts. All of the negative impacts can also be effectively mitigated.

It is therefore recommended that Preferred Alternative of the proposed SIMS Mixed Use Development be supported, subject to the implementation of the recommended enhancement and mitigation measures contained in the SIA report.

The Heritage Impact Assessment identified no significant impacts to pre-colonial archaeological material and showed that the receiving environment is not a sensitive or threatened archaeological landscape.

According to the Palaeontological Impact Assessment, the overall impact significance of the proposed Sims mixed-use development is rated as Low as far as palaeontological heritage is concerned. Likewise, cumulative impacts are likely to be of Low significance, given the scarcity of important fossils (especially vertebrate remains) within the sedimentary rock units concerned as well as the huge outcrop area of the Kalahari Group as a whole.

The Geo-technical Assessment found no limiting conditions of the site and is suitable to support the proposed structures with recommendations for foundations. The Sims site is underlain by very thick Kalahari Group material (calcrete, clay, pebble layers), overlying Gamagara Formation shale. No known/confirmed faults are indicated to transect the site. Most of the Sims site is located within the area significantly impacted by groundwater abstraction. The site is not judged to be on dolomite land.

The Traffic Impact Assessment the development will have an impact on traffic in the area and therefore some improvements are required to the relevant intersections. However, based on the conclusions it is recommended that the development be approved from a traffic point of view.

However, according to the preliminary Bulk Services and Infrastructure Status Report, the proposed mixed-use development cannot come into operation before the proposed upgrades have been implemented. This is especially the case of bulk water and sewer infrastructures.

Considering all the information, it is not envisaged that this proposed Sims residential development will have a significant negative impact on the environment, and the socio-economic benefits are expected to greatly outweigh any negative impacts.

It is therefore recommended that the proposed Sims Development (**Alternative 4**) be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended enhancement and mitigation measures contained in Section 12.

14. DETAILS AND EXPERTISE OF THE EAP

Details of Environmental Assessment Practitioner, expertise and Curriculum Vitae

This Draft Environmental Impact Report was prepared by Clinton Geysler who has a MSc. Degree in Environmental Management. He has been working as an Environmental Assessment Practitioner since 2009 and is currently employed at EnviroAfrica CC.

Report compiled by Clinton Geysler -

Qualifications:

- BSc. Earth Sciences, Majors in Geology and Geography and Environmental Management (1998 – 2000) and;
- BSc. (hons): Geography and Environmental Management (2001) and;
- MSc. Geography and Environmental Management (2002), all from the University of Johannesburg.

Expertise:

Clinton Geysler has over seven years' experience in the environmental management field as an Environmental Assessment Practitioner and as an Environmental Control Officer, having worked on a variety of projects in the Western, Eastern and Northern Cape. Previous completed applications include, but not limited to:

- Civil engineering infrastructure including pipelines, Waste Water Treatment Works, and roads in the Western and Northern Cape.
- Agricultural developments, including reservoirs and dams, in the Western and Northern Cape.
- Telecommunications masts in the Western and Eastern Cape
- Housing Developments in the Western and Northern Cape.
- Resort developments in the Western and Northern Cape.
- Cemeteries in the Western Cape
- Waste Management Licences in the Western Cape

Employment:

Previous employment as an EAP: Doug Jeffery Environmental Consultants (2009 – 2012)

Current employment: EnviroAfrica cc (2012 – present).

The whole process and report was supervised by Bernard de Witt who has more than 20 years' experience in environmental management and environmental impact assessments.

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