



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

for the

THE PROPOSED OLIPHANT ESTATE TOWNSHIP DEVELOPMENT IN KIMBERLEY, NORTHERN CAPE PROVINCE

(Ref: NC/EIA/14/FB/SOL/KIM1/202)

DRAFT EIA REPORT

PUBLIC REVIEW

26 April 2023 to 29 May 2023

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PROJECT DETAILS

- Reference No.** : NC/EIA/14/FB/SOL/KIM1/2021
- Title** : The Proposed Oliphant Estate Township Development on the
Remainder of Portion 18 of The Farm Roode Pan 70, Kimberley,
Northern Cape Province
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- Client** : **Oliphants Housing Estate (Pty) Ltd**
- Status** : Draft EIA Report for public review
- Date** : **26 April 2023 to 29 May 2023**

INVITATION TO COMMENT ON THE DRAFT EIA REPORT

The **Draft EIA Report** was made available for public review and comment at the following locations from **26 April 2023 to 29 May 2023**:

- **Kimberley Public Library**
34 Sidney Street
Kimberley
8300

I&APs are requested to submit comments by 29 May 2023 to:

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ABBREVIATIONS AND ACRONYMS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and the Environment
DAERL	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
DENC	Northern Cape Department of Environment & Nature Conservation
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme Report
EIA	Environmental Impact Assessment
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
HV	High Voltage
I&APs	Interested and Affected Parties

kV	Kilo Volt
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)
PAOI	Project areas of influence
SAHRA	South African Heritage Resources Agency
SCC	Species of conservation concern
SDF	Spatial Development Framework

EXECUTIVE SUMMARY

INTRODUCTION

Oliphants Housing Estate (Pty) Ltd is proposing the construction of a mixed use residential development on the Remainder of Portion 18 of the Farm Rood Pan 70 in Kimberley in the Sol Plaatjie Local Municipality, Northern Cape Province. The property lies approximately 10km to the north of Kimberley between the Kamfers Dam and the Midlands Road, the total study area proposed for development is approximately 150 hectares. (Figure 1).

The Oliphant Estate Township Development entails the construction of 96 mixed use units, the proposed development is primarily comprised of mixed uses, with a mix of various typologies, including 12 High density residential erven (8 erven, developed at 80 du/ha); and 4 erven, to be developed at 60 dwelling units per hectare); 81 single residential erven, with a minimum of erf size of 260m²; Business purposes; a taxi ranks; and 1 erf as a Public Open Space (this is explored in more details in Chapter 2). Based on a pre-feasibility analysis, site identification, environmental screening process and market research studies undertaken, a favourable site has been identified for consideration and evaluation through an Environmental Impact Assessment (EIA) process.

The overarching objective for the Oliphant Estate Township Development is to drive economic growth within the northern section of Kimberley while minimising social and environmental impacts. The current housing backlog in the Sol Plaatjie Local Municipality is estimated at 4 000 units. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA through site-specific studies in order to delineate areas of sensitivity within the broader site; this will serve to inform the "developable area" of the site.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this EIA Report..

REQUIREMENT FOR A BASIC ASSESSMENT PROCESS

The construction and operation of the proposed Oliphant Estate Township Development is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project. NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent

authority that has been charged by NEMA with the responsibility of granting environmental authorisations

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Oliphants Housing Estate (Pty) Ltd requires authorisation from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform for the construction and operation of the proposed mixed-use development. Alley Roads has appointed Envirovolution Consulting as the independent Environmental Assessment Practitioner (EAP) to conduct an EIA process for the proposed project.

PROJECT NEED AND DESIRABILITY

The idea of the Oliphant Estate residential development was born from the need of an all-inclusive socio-economic mixed-use development to the north of the Bloemfontein CBD. Kimberley is under great pressure for development, the idea of creating a new economic hub to the north of Kimberley is a new possibility. The following is noted according to the market study undertaken for the project:

"The current housing backlog is estimated at 4 000 units in the Sol Plaatjie Local Municipality. However, based on the number of informal dwellers (17%) and the number of households in Sol Plaatjie (66 000) the housing backlog is approximately 10 000 units; the Kimberly economy will continue to grow and the main focus of the market should be on creating a stronger regional hub for the whole of the Northern Cape Province; the Kimberley residential market is expected to grow however mainly in the low to middle income segments. The growth will be dominated by urbanisation which is generally associated with low income market growth. Roodepan (10km – Kimberley CBD) is located further from the majority of the job opportunities than Olifants Estate (6km – Kimberley CBD). The Roodepan market has experienced good growth in the number of dwellings sold as well as the average price over the past decade, the Olifants Estate will drive economic growth within the northern section of Kimberley.

According to the Frances Baard District Municipality Spatial Development Framework, 2014 - 2019 of which the Sol Plaatjie Municipality is part of, the site was excluded from the urban development boundary and was earmarked as a conservation area. An application was brought to include the site in the urban development boundary and to develop the site as a mixed-use development.

The Sol Plaatjie Municipality approved this application during a Council Meeting held on 7 December 2017, based on the Spatial Planning and Land Use Management Act, 2013

objectives, the approval is subject to a number of conditions (i.e. the undertaking of the EIA studies).

ENVIRONMENTAL SENSITIVITIES MAPPING

From the conclusions of the detailed studies undertaken, sensitive areas within the development 500m corridor were identified and flagged for consideration and avoidance (where possible) by the Preferred Layout Plan. The following **highly sensitive areas/environmental features** as shown in **Figure 31** have been identified on the site:

- **No-go area:** Sensitive features present within this area include the waterbodies and their associated wetland areas;
- **Pan:** The Kamfersdam is a significant water bird habitat within the greater arid region. Many significant congregatory species and water birds utilise the dam. Furthermore, the Kamfersdam is the only breeding site for the Lesser Flamingo (*Phoenicopterus minor*) in South Africa and one of four regular sites in sub-Saharan Africa. The Maccua Duck (*Oxyura maccoa*) may also be a potential breeder in the dam;
- **Critical Biodiversity Areas (CBAs):** The development plan as depicted in the 2018 report (Appendix E1) is still considered relevant and valid and has been incorporated as a No-Go zone. In addition, it is proposed to exclude the northern-most CBA2 area as part of the No-Go zone. A second CBA2 (yellow shaded area, which was not excluded from the 2018 development zone, occupies an area with secondary grassland and a highly transformed habitat in the savanna bushveld setting and high-density development should be avoided
- **500m buffer zone:** From an avifauna point of view, the 500m buffer zone must be retained as a no-go zone and the feasible development areas
- **1000m buffer zone:** The remaining area between the 500m and 1000m buffer zone should preferably be low density development

CONCLUSION (IMPACT STATEMENT)

The principles of NEMA have been considered in this assessment through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided. In addition, the successful implementation and appropriate management of this proposed project will aid in achieving the principles of minimisation of pollution and environmental degradation at a national scale.

The EIA process has been undertaken in accordance with the requirements of the EIA Regulations and all effort has been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the project can be made by the

Regulating Authority. The general objectives of Integrated Environmental Management have been taken into account for this EIA report by means of identifying, predicting and evaluating the actual and potential impacts on the biophysical environment, socio-economic conditions and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles of sustainable environmental management.

The technical viability of establishing a mixed-use residential development on the Remainder of Portion 18 of the Farm Roode Pan 70 has been established by Oliphants Housing Estate (Pty) Ltd. The positive implications of establishing the mixed-use residential development on the identified site include the following:

- The said portion of land is now included in the urban edge for earmarked for development. The amendment of the SDF would enable the applicant to submit a township establishment to the requirements of the Municipality. The municipality will be able to approve development applications based on the capacity of available services.
- The project will assist the district and local municipalities in reducing levels of unemployment through the creation of jobs, skills development opportunities and support of local business.
- This development is imperative to the Sol Plaatje Local Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the municipality;

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, "provided that the recommended mitigation and management measures are implemented accordingly". As demonstrated on Table 12 (Impact Summary), the significance levels of the majority of identified negative impacts have been reduced to acceptable levels by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of an alternative layout plan in relation to site-specific sensitivities identified.

The mitigation hierarchy principle was implemented towards limiting as far as possible the negative impacts on biodiversity from the development whereby the avoidance of areas of sensitivity is illustrated by the facility layout drawing overlain on the sensitivity map included as Figure 31. The developer undertook different studies, with the outcome that two buffer zones were identified i.e., the 500m buffer within which no development is recommended, and the 1000m buffer within which development can be undertaken with mitigatory factors. The proposed layout is an amendment from a previously submitted layout as it

takes into consideration the buffer zones. The current layout has taken into considerations all environmental constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) included within Appendix F.

With reference to the information available at this planning approval stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable provided all measures are taken to protect and preserve surrounding environment.

RECOMMENDATIONS

The **Layout Plan Alternative 2** as presented in Figure 31 has been designed to avoid the majority of the sensitive environments on the site as discussed in section 10.3. Therefore, this layout as presented is considered acceptable and is **recommended as the preferred** layout for the Oliphant Estate Township Development.

The EAP however concurs with the Avifaunal specialist's opinion that *the construction and operation of the proposed residential estate can only occur with acceptable levels of impact on the resident avifauna subject to the development of a robust integrated management plan and partnership with key stakeholders, to address the multitude of human-induced impacts, for the entire projected life span of the residential development*. Commitment to this process is critical to the survival of the SCC within the PAOI and the sustainability of Kamfers Dam as an IBA, CBA and premier tourist attraction. However, should this development proceed through to construction, the anticipated impacts can be reduced through the commitment to and application of adaptive mitigation measures that will need to be implemented throughout the project's life span.

Based on the anticipated impacts described above, the following recommendations are provided regarding practical mitigation measures for potentially significant impacts to be included in the Environmental Authorisation and the subsequent Environmental Management Programme (EMPr):

1 INTRODUCTION

1.1 Project Background

Oliphants Housing Estate (Pty) Ltd is proposing the construction of a mixed use residential development on the Remainder of Portion 18 of the Farm Roode Pan 70 in Kimberley in the Sol Plaatjie Local Municipality, Northern Cape Province. The property lies approximately 10km to the north of Kimberley between the Kamfers Dam and the Midlands Road, the total study area proposed for development is approximately 150 hectares. (**Figure 1**).

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The overarching objective for the Oliphant Estate Township Development is to drive economic growth within the northern section of Kimberley while minimising social and environmental impacts. The current housing backlog in the Sol Plaatjie Local Municipality is estimated at 4 000 units. In order to meet these objectives, local level environmental and planning issues will be assessed through the EIA through site-specific studies in order to delineate areas of sensitivity within the broader site; this will serve to inform the “developable area” of the site.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this EIA Report.

1.2 Conclusions from the Scoping Phase

At the scoping stage it was recommended that the identified sensitive areas as depicted on **Figure 2** should be avoided as far as reasonably possible. While observing these constraints to the available area for development, the extent of these demarcated areas far exceeds the required development and therefore it is possible to accommodate the housing development at the site with low impact on sensitive features. Within the highlighted focus areas, impacts on fauna (particularly) and flora would be relatively low and with mitigation, it is considered unlikely that the development would result in any highly significant ecological impacts. There are, however, some protected plant species present within these areas for which permits would be required to be obtained should these need to be disturbed.

The portion of the site which is proposed to be used for development, and particularly these areas if impacted, were subjected to survey and ground-truthing during the EIA phase of the project. The sensitivity map (**Figure 3**) outlines potentially sensitive areas identified through scoping within which more detailed investigation is required. These potentially sensitive areas will, therefore, be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase of the process (refer to Chapter 8 for more details). The sensitivity map will be further refined in the EIA phase on the basis of these specialist studies, in order to inform the final design of the facility. In order to assess potential impacts within sensitive areas, the preliminary layout will be based on sensitivities identified in the scoping phase, and provided for consideration in the EIA phase.

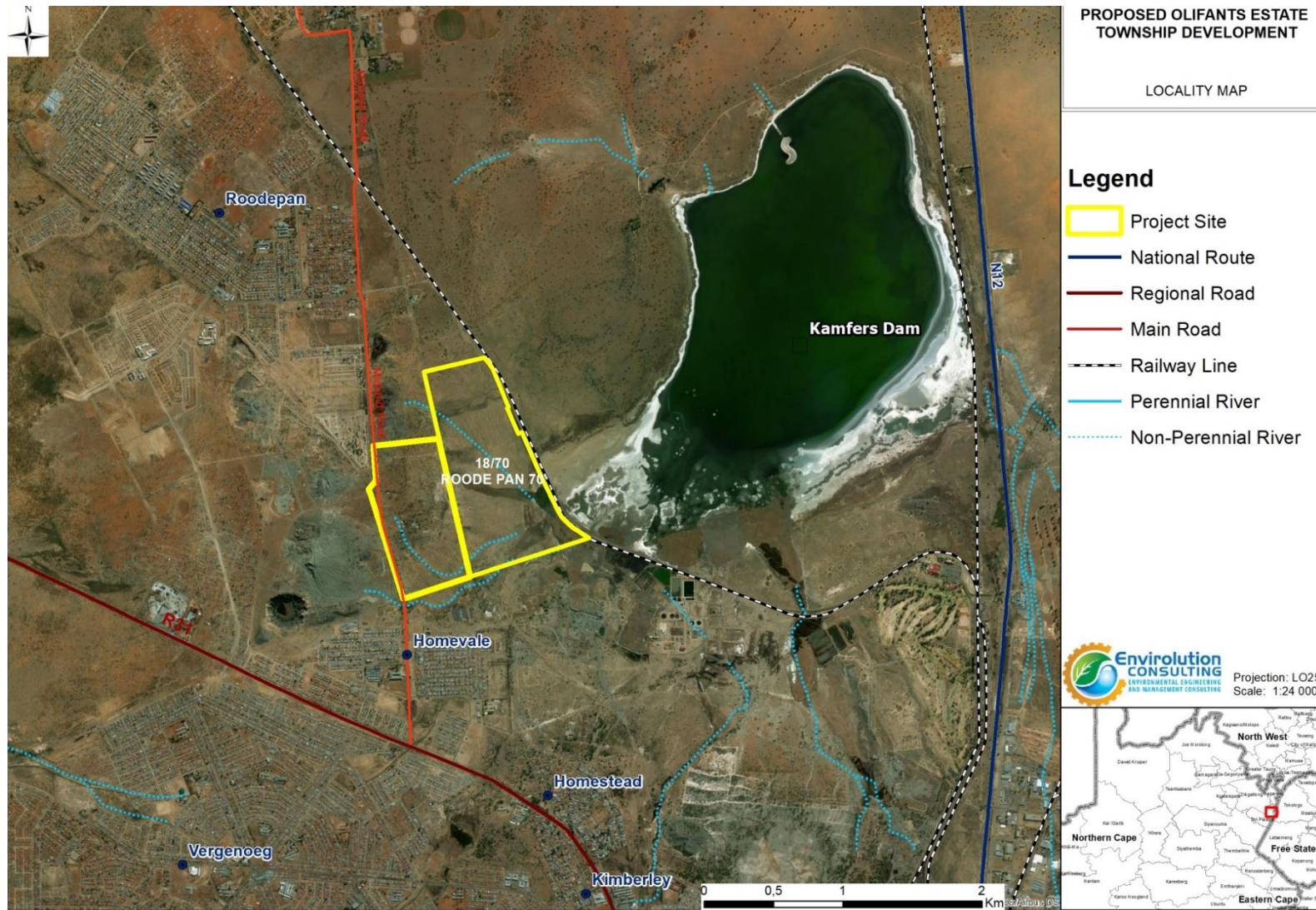


Figure 1: Locality Map

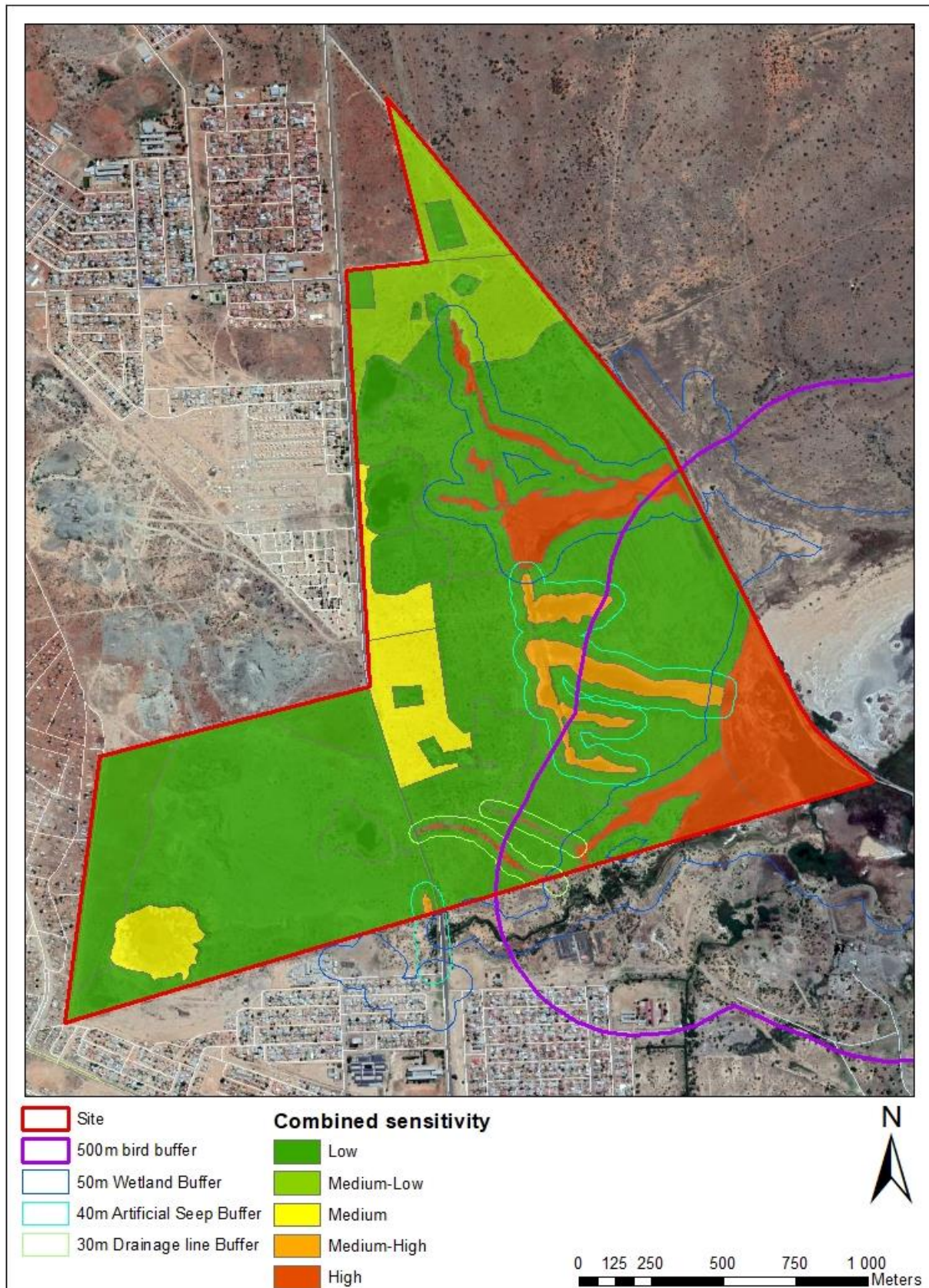


Figure 2: Desktop environmental sensitivity map of the proposed development site showing highly sensitive ecological areas

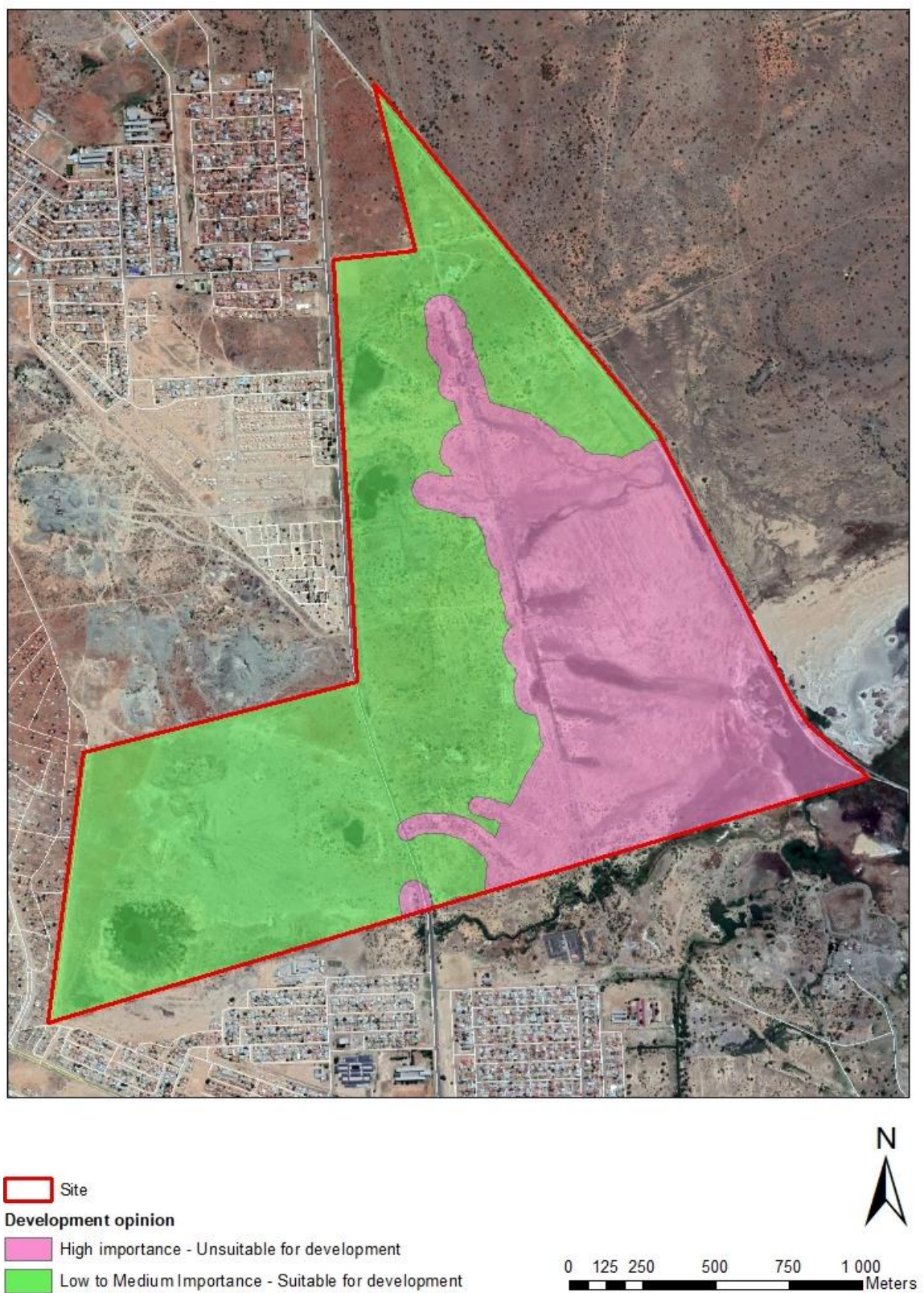


Figure 3: Desktop environmental sensitivity map showing developable and unsuitable areas for development.

1.3 Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Oliphant Estate Township Development is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project. NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Oliphants Housing Estate (Pty) Ltd requires authorisation from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL) - hereafter "The Department" for the construction and operation of the proposed mixed-use development. Alley Roads has appointed Envirolution Consulting as the independent Environmental Assessment Practitioner (EAP) to conduct an EIA process for the proposed project.

The proposed Oliphant Estate Township Development triggers a Full Scoping and EIA Process due to the following triggers:

Activity 15 of Listing Notice 2 of GN R 325: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— The proposed development will occur on an area of 1000 hectares of previously undeveloped land.

1.4 Objective of the EIA Phase

The scoping phase included desk-top studies and served to identify potential impacts associated with the proposed project and to define the extent of studies required within the EIA Phase. Input from the project proponent, specialists with experience in the study area and in EIAs for similar projects, as well as a public consultation process with key stakeholders, which included both government authorities and interested and affected parties (I&APs), was included in the evaluation of impacts.

The EIA Phase aimed to address those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project including design, construction, operation, and decommissioning, and recommend appropriate mitigation measures for potentially significant environmental impacts. The purpose of this EIA report is to consider the impacts associated with the proposed powerline. This EIA report aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

The release of a draft EIA for a 30-day period will provide stakeholders with an opportunity to verify that issues that they raised through the EIA Process have been captured and adequately considered. The

final EIA Report for submission to the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL) will incorporate all issues and responses raised during the public review period of the draft report.

This EIA Report represents the findings of the EIA process and contains the following sections:

- **Chapter 1:** provides background to the proposed development and the environmental impact assessment process.
- **Chapter 2:** describes the components of the proposed project.
- **Chapter 3:** the need and desirability of the project
- **Chapter 4:** outlines the process which was followed during the Scoping Phase of the EIA process.
- **Chapter 5:** the description of the policy and legislative context within which the development is proposed
- **Chapter 6:** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 7:** description of issues and potential impacts
- **Chapter 8:** Identification of environmental issues and potential impacts
- **Chapter 9:** assessment of the potential environmental and social impacts associated with development phases of the proposed project.
- **Chapter 10:** presents the conclusions of the evaluation.

1.5 Environmental Impact Assessment Process

An EIA is also an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issues reported on in the Scoping and EIA Reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises two phases as shown in **Figure 4** (i.e. Scoping and Impact Assessment) - and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation.

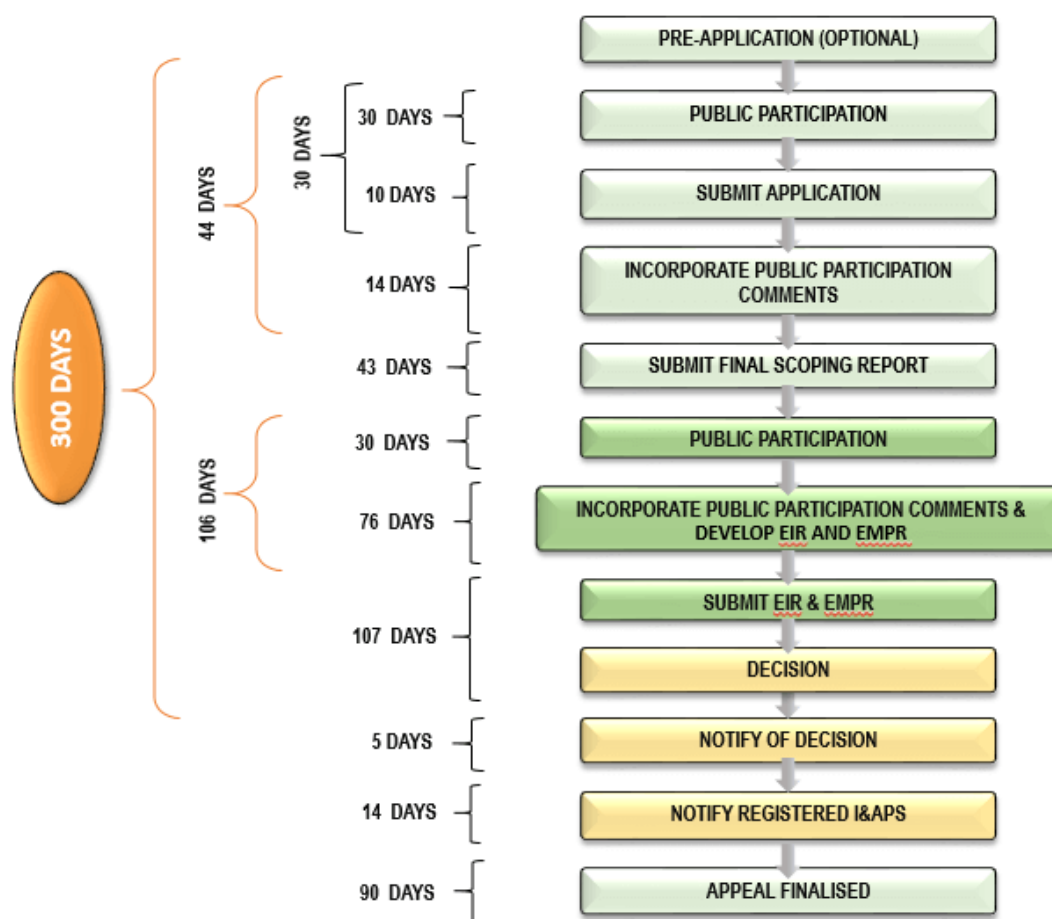


Figure 4: Full Scoping and EIA Process flow chart

The process followed in these two phases is as follows:

- » The **Scoping Phase** includes the identification of potential issues associated with the proposed project through a desktop study and consultation with affected parties and key stakeholders. Areas of sensitivity within the broader site are identified and delineated in order to identify any environmental fatal flaws, and sensitive or no-go areas. Following a public review period of the draft report, this phase culminates in the submission of a Final EIA Report and Plan of Study for EIA to the competent authority for acceptance.
- » The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations and public consultation. Following a public review period of the draft report, this phase culminates in the submission of a Final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the competent authority for review and decision-making.

1.6 Details of the Environmental Assessment Practitioner (EAP)

In terms of APPENDIX 3(3)(1) of the EIA Regulations 2017 (as amended), a Scoping Report must include -

(a) details of—

- (i) the EAP who prepared the report; and
- (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae

- (j) an undertaking under oath or affirmation by the EAP in relation to—
 - i) the correctness of the information provided in the report;
 - ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
- (k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;

Envirolution Consulting (Pty) Ltd was contracted by Alley Roads Mega Projects (on behalf of Oliphants Housing Estate (Pty) Ltd) as the independent environmental consultants to undertake the Environmental Impact Assessment (EIA) Process for the proposed project. Envirolution is not a subsidiary or affiliated with neither Alley Roads Mega Projects nor Oliphants Housing Estate (Pty) Ltd. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project. Envirolution Consulting is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance with environmental legislation and evaluate the risk of development; and the development and implementation of environmental management tools. Envirolution Consulting benefits from the pooled resources, diverse skills and experience in environmental field held by its team. We offer solutions to environmental issues that are key during our clients' planning and decision-making processes. The Envirolution Consulting team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects in South Africa, including those associated with linear developments.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the EIA is detailed below and Curriculum Vitae provided in **Appendix G1**.

Expertise of the EAP to carry out the EIA procedures

- **Project manager:** Sheila Bolingo, the principle author of this Basic Assessment holds an Msc degree in Environmental Management with 10 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- **Project Reviewer:** Gesan Govender is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 17 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Both authors of the report are EAPASA registered, the Curricula vitae for the consultants are included in **Appendix G1**.

Other team members include (External Specialists):

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Envirolution Consulting has appointed the following specialists to conduct specialist impact assessments:

- **Avifauna Assessment** – Megan Diamond of Feathers Environmental Services
- **Aquatic and wetland Impact Assessment** – Antoinette Bootsman of Limosella Consulting
- **Terrestrial Ecological Assessment** – Antoinette Eyssell of Dimella EcoConsulting
- **Fauna Assessment** - Barbara Kasl
- **Heritage and Cultural Assessment** - Johan van Schalkwyk of Johan Heritage Consultant
- **Palaeontology** - Heidi Fourie
- **Air Quality Assessment**- Gertrude Mafusire of Rayten Engineering Solutions (Pty) Ltd
- **Noise Impact Assessment**- Steve Kalule of USK Consulting
- **Health Risk Assessment**- Elizabeth Masekoameng of ZABCOR Pty Ltd
- **Hydrology Assessment & Stormwater Management Plan**- Sivan Dhaver of SD Hydrological Services (Pty) Ltd

1.7 Assumptions and Limitations

This EIA Report is based on currently available information and, as a result, the following limitations and assumptions are implicit:

- This report fulfils the requirement of the EIA Regulations 2017 (as amended), for the documentation of the EIR phase. The structure of this report is based on Appendix 3 of GNR No. 326, of the EIA Regulations (2017) (as amended 2017), which clearly specifies the required content of an Environmental Impact Assessment Report.
- The report is based on project information provided by the client.
- Descriptions of the natural and social environments are based on limited fieldwork, relevant specialist studies and available literature
- All wetlands within 500 m and riparian areas within 100m of any developmental activities should be identified as per the DWS Water Use Licence Application regulations. Wetlands and riparian areas presented in EcoAgent (2018) were verified based on detailed soil and vegetation sampling. Wetlands presented in EcoAgent (2018) that fall outside of the site, but that fall within 500 m of the proposed activities were delineated based on desktop analysis of vegetation gradients visible from aerial imagery.
- 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.

2 PROJECT DESCRIPTION

In terms of APPENDIX 3(3)(1) of the EIA Regulations (2014)(as amended 2017), an Environmental Impact Assessment Report must include –

b) The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including –

- (i) The 21 digit Surveyor General code of each cadastral land parcel;
- (ii) Where available, the physical address and farm name;
- (iii) Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

c) A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure and appropriate scale, or, if it is-

- (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;
- (ii) On land where the property has

d) A description of the scope of the proposed activity, including –

- (i) All listed and specified activities triggered and being applied for;
- (ii) A description of the associated structures and infrastructure related to the development.

2.1 Property Description

The land on which the township is to be established is known as the Remainder of Portion 18 of the farm Roodepan No.70, District of Kimberley. The land is currently largely vacant, with Kamfers Dam situated to the eastern edge of the property. The property is known as the remainder of Portion 18 (Spare Camp) of the farm Roode Pan No. 70 and is situated in the District of Kimberley, Northern Cape and is approx. 150 hectares in extent with a centre coordinate: 28°41'11.72"S; 24°44'15.34"E.

Surrounding properties are also largely vacant, with Jacksonville and Roodepan townships situated to the north-west of the property. The property falls within the urban development boundary and is covered by the Sol Plaatjie Land Use Scheme. The current zoning of the property is Agricultural.

Table 1: Property description/Physical address

Province	Northern Cape
Municipality	Frances Baard DM, Sol Plaatjie LM (Ward 30)
Farm details	Portion 18 of Roode Pan No.70
SD 21 Digit Code	C03700000000070000018
Size	approx. 150 hectares
Physical Address	Direct access to Midlands Road
Site Coordinates	North-west:28°40'54.54"S; 24°43'53.73"E North east: 28°40'34.27"S; 24°44'23.25"E South-east: 28°41'16.12"S; 24°44'50.37"E South west: 28°41'29.92"S; 24°44'1.88"E

2.2 Description of Proposed Activity

The proposed development is primarily comprised of mixed uses, with a mix of various typologies, as summarised below:

- 12 High density residential erven (8 erven, developed at 80 du/ha); and 4 erven, to be developed at 60 dwelling units per hectare).
- 81 single residential erven, with a minimum of erf size of 260m²
- Business purposes
- A taxi ranks
- 1 erf as a Public Open Space

The entire development is envisaged to consist of 96 mixed use units, as outlined in the layout plan (Figure 5).

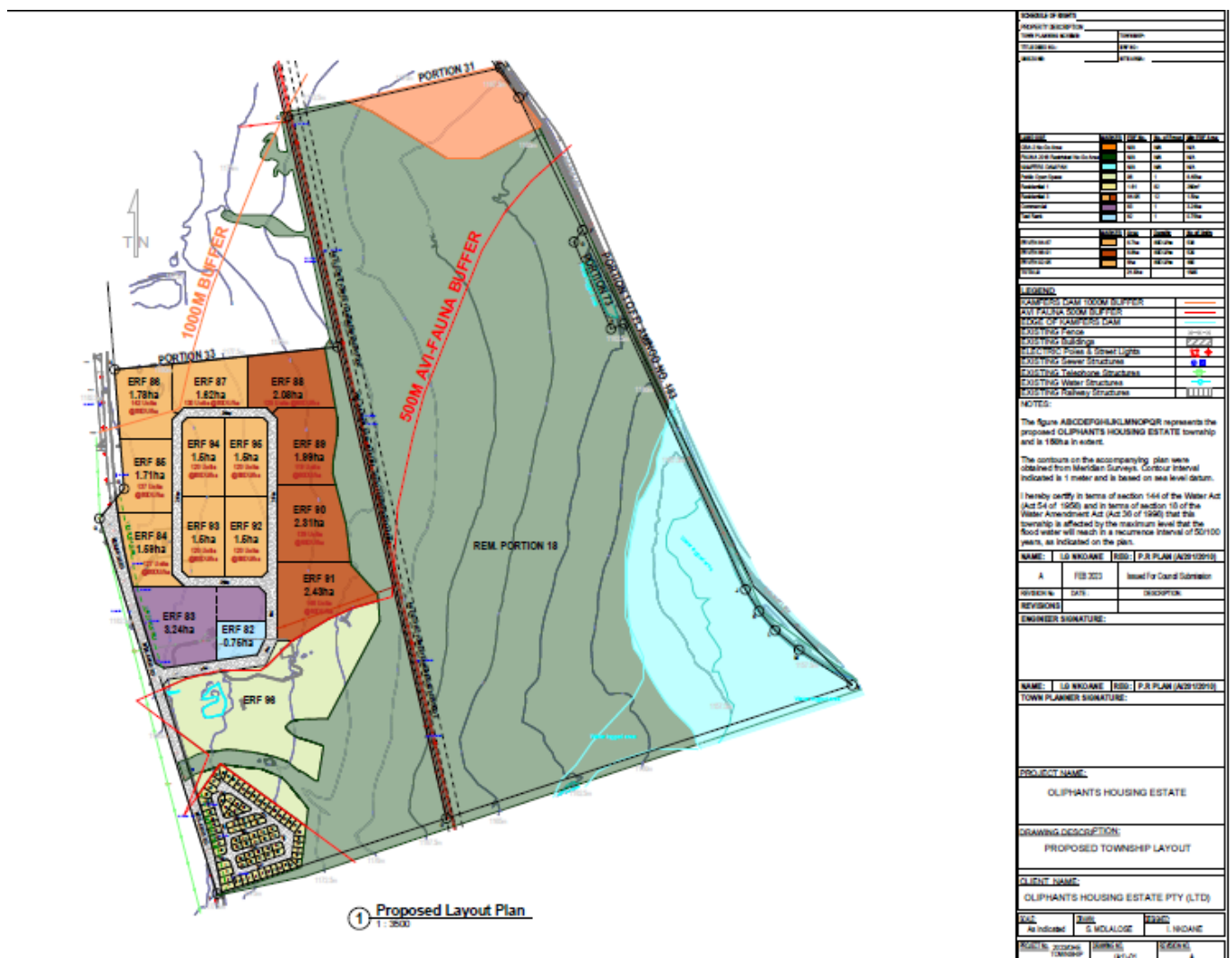


Figure 5: Proposed Layout

2.2.1 Open Space System

The open space system is mainly the result of the environmental impact assessment (EIA) process to accommodate all biodiversity and wetland elements on the property considered worthy to preserve.

Approximately 90 hectares or 60 percent of the site will be dedicated to conservation and will be excluded from the proposed township. This area will form part of the open space system of the greater Kimberley area.

Approximately 7.1 hectares or nearly 12 percent of the township will be zoned "Public Open Space" and transferred to the Sol Plaatje Municipality. This area will be accessible to the public.

The open space system also played a significant role in the placement of the various residential zones within the proposed township. Lower densities were placed closer to the conservation area in order to minimize the impact of human interaction on the sensitive biodiversity and wetland areas.

2.2.2 Mobility System

Midlands Road is the spine of the mobility system of the proposed development and represents the highest order road within the development. Access to the development will exclusively be obtained from Midlands Road only.

The higher density areas will be served by a 20-meter ring road and the lower density areas by 10 to 16-meter collector roads. The 13 and 16-meter roads will also function as collector roads and the 10-meter roads merely as residential access roads.

No direct access to individual properties along Midlands Road is allowed, and lines of no access is applicable to this route. Two access points to Midlands Road are proposed. The primary access point will provide exclusive access to most of the development including the business zone. A second access point is necessary because of the proposed conservation area. By providing access to the isolated area in the south-east corner of the property through roads internal to the township, would fragment the sensitive conservation area and place unnecessary pressure on this fragile eco-system.

2.2.3 Residential Development

The residential component depicted in **Table 2**, is primarily based on the principle that the provision of different housing typologies prevents large mono-functional residential areas that do not address the principles of sustainability, efficiency and accessibility

Table 2: Proposed Housing Typologies.

Housing Typology	Number of erven	Erf No:	Density (u/ha)
Single Residential	81	1-81	1 dwelling per erf
Taxi Rank	1	82	-
Commercial	1	83	-
High Density	8	84-87 and 92-95	80 Dwelling Units per hectare
Medium Density	4	88-91	60 Dwelling Units per hectare
Public Open Space	1	96	
Total	96		

High Density Residential: Due consideration was given to the placement of the higher density residential development, such as accessibility, access management, potential impact on transport mobility and the potential impact on and interface with the environmentally sensitive conservation area.

These erven were primarily placed on the western end of the proposed development to allow for greater access to public transport and within walking distance of the business node and convenience shops, community facilities and schools.

No direct vehicular access to individual properties will be allowed from Midlands Road. Vehicular traffic from these high-density residential areas will only be allowed onto internal collector roads within the proposed development. This is done to minimize the potential impact on transport mobility of Midlands Road and the impact on and the interface with the lower density surrounding residential developments.

It is suggested that these erven be zoned "Residential 3", subject to the normal development parameters for this zoning in terms of the Sol Plaatje Municipality Land Use Management Scheme, 2012 including:

- o A maximum density of 80 dwelling units per hectare.
- o Maximum height of 3 storeys for buildings.
- o FAR (As per scheme)
- o Parking Requirements (As per scheme)
- o Height (As per scheme)
- o Building Lines (As per scheme)

The development will consist of walk-up flats with two bedrooms, one bathroom and an open area living room each, of approximately 52 m² in extent. Shaded parking will be provided separate from the flats. These properties will mostly, be developed for the rental market.

Lower Density Residential Nodes: The lower density residential development will consist of "Residential 1" stands with a minimum erf size of 260m².

The "Residential 1" zoned development consists of full title stands with a dwelling house of between 42m² and 72 m² in extent on a 260 m² stand. This will primarily serve the affordable housing market. The normal zoning parameters in terms of the Land Use Management Scheme, 2008 will apply.

The “Residential 1 erven will be provided on the periphery of the township in close proximity to the open space system as a transition between the higher density residential development and the environmentally sensitive conservation area.

Business Node: A small shopping centre is proposed at the primary access point with Midlands Road. This centre will consist of the following:

- A small local convenience centre, with a supermarket and between 5 and 15 stores.
- A taxi ranks.

The shopping centre and taxi rank will be clustered together and zoned “Business 1”. The normal parameters for the “Business 1” zoning in terms of the Land Use Management Scheme, 2008 are applicable.

This shopping Centre will not compete with other existing and approved business nodes in the area and will only function as a small neighborhood centre that provides convenience shopping for commuters and residents of the proposed township within walking distance.

2.2.4 Exclusions

The following areas in **Figure 6** of the site are excluded from the proposed township:

1. The areas of the property encumbered by environmental constraints including the demarcated wetlands, areas within the flood lines and the areas that form part of the Kamfers Dam FLD are excluded from the township. This specific exclusion area will be utilised for conservation purposes and will not be accessible to the public.
2. Midlands Road, which is an existing provincial road is also excluded from the township in order not to confuse this road with the roads within the township, which will also be public roads but will be transferred to the Sol Plaatje Municipality.

Although the approval of the Sol Plaatje Municipality with regard to the inclusion of the site into the urban development boundary provided for a mixed-use development that includes industrial activities, *if was decided that due to the large area loss of the township because of the environmental constraints and the potential impact of such industrial activities on the sensitive nature of the proposed conservation area, to abandon the industrial component of the approved mixed-use area.*



Figure 6: Areas to be excluded from the development

The focus will be instead on a residential development with a wide range of housing typologies with limited business activities, which are more compatible with the sensitive nature of the Kamfers Dam conservation area.

2.3 Provision of bulk services

2.3.1 Roads

The main access to the development is anticipated to be obtained from Midlands Roads. All other internal roads, will connect with the main access road, as indicated in the layout attached.

A secondary access road is catered for in the south-western part of the development, along Midlands Road, to cater for the single residential erven, as outlined in the Traffic Impact Study.

2.3.2 Storm water

The outline scheme report notes that the site is 150 ha, with only 30% of the site being developed. With the proximity of the development site to Kamfers Dam, stormwater effluent will be discharged into Kamfers Dam. The proposed development will have a minimal effect on water levels in Kamfers Dam. However, steps will be undertaken to attenuate the small additional stormwater input to the Kamfers Dam to minimise any rise in water levels.

Sections of the site are affected by the 1:100-year Floodline. Floodline considerations were made in the design of the layout, and areas affected as such are excluded from any part of the development to be constructed.

2.3.3 Water

The proposed development is anticipated to result in a daily demand of 1804kl/d, with the anticipated peak flow at 93.96 l/sec.

2.3.4 Electricity

As the electrical engineers for the developer we herewith confirm that the capacity of 1000kVA will be needed from the local authority network for the development of the anticipated first phase of 400 units. Energy saving measures will be used to comply with the authority standards.

After discussions with the Sol Plaatje Municipality, infrastructure Services, it was confirmed that capacity for the whole development, in particular the first phase of 400 units, can be made available from the local network, from the H.A. Morris Main 66/11kV sub-station. The infrastructure upgrade will be for the cost of the developer. Depending on where the development will start, the costs will be calculated, council also requires this information to price.

2.3.5 Sewers

The proposed development is intended to have 97 erven, with a total housing output of 1651 (comprised from 1569 units and 82 single residential erven). It is understood that the municipality currently has challenges with capacity at the nearest bulk sewer facility, being the Homevale Water Treatment Works

The proposed development is planned to have 82 freehold stands and 1569 high density units. Within these limits, the peak flow for the development has been determined to be 31.27l/sec. The timeframe for the municipality to upgrade the capacity of the Homevale Water Treatment Works is unknown. In order to mitigate the capacity challenges with regards to sewer effluent, the developer proposes to have an on-site package plant, which is modular and thus can be sized and upgraded as more development takes place.

Please refer to the full-service report in **Appendix G2**.

2.4 Requirement for an EIA Process

In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GNR 324, 325, 326 and 327 (07 April 2017) Government Gazette 40772, an Environmental Impact Assessment process is required for the proposed project. **Table 3** contains the listed activities in terms of the EIA Regulations (as amended) and includes a description of those project activities which relate to the applicable listed activities.

Table 3: BA Listed Activities Applicable applied for to be authorise

The number and date of the relevant notice: e.g. Listing Notice 1 of GNR 327 (7 April 2017)	Description of each listed activity as per project description
Listing Notice 1 of GNR 327 (7 April 2017):	
<p>Activity 12</p> <p>The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs; (a) within a watercourse;</p>	<p>Access roads will be located within drainage lines.</p>
<p>Activity 19</p> <p>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 (i)] a watercourse;</p>	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging within a watercourse (drainage lines) will be required for the associated infrastructures ie access roads</p>
<p>Activity 27</p> <p>The clearance of an area of 1 hectare 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</p>	<p>The clearing of more than 1 hectares of indigenous vegetation will be undertaken during the construction of the facility.</p>
<p>Activity 28</p> <p>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares;</p>	<p>A residential development is proposed on a previously used agricultural land, the total area of land to be developed for the facility is 60 hectares.</p>
Listing Notice 2 of GN 325 (7 April 2017):	
<p>Activity 15</p> <p>The clearing of more than 20 hectares of indigenous vegetation will be undertaken during construction of the facility.</p>	<p>The proposed total development footprint is approximately 40 hectares and the clearance of an area of 20 hectares or more of indigenous vegetation will occur prior to initiating construction.</p>
Listing Notice 3 of GN 324 (7 April 2017):	
<p>Activity 4</p> <p>The development of a road wider than 4 metres with a reserve less than 13,5 metres. g. Northern Cape iii. Inside urban areas: (aa) Areas zoned for use as public open space;</p>	<p>A road wider than 4 metres with a reserve less than 13,5 metres will be constructed for the development located inside urban areas zoned for use as public open space</p>

<p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose</p>	
<p>Activity 12</p> <p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The clearing of more than 300 square metres of indigenous vegetation will be undertaken during construction of the facility.</p>
<p>Activity 14</p> <p>The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs — (a) within a watercourse.</p> <p>g. Northern Cape</p> <p>iii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose</p>	<p>The facility and/or associated infrastructure are located within a watercourse (drainage lines) located inside urban areas zoned for use as public open space</p>

3 THE NEED AND DESIRABILITY OF THE PROJECT

In terms of APPENDIX 3(3)(1) of the EIA Regulations 2017 (as amended), an Environmental Impact Assessment Report must include –

f) A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.

3.1 Introduction

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.

The need for and the desirability of a proposed development forms a key component of any EIA application. The consideration of proposed developments in context of the various spatial planning tools and policy applicable to the study area forms an integral part of the present environmental processes. The “need and desirability” will be determined by considering the broader community’s needs and interests as reflected in a credible IDP, SDF and EMF for the area.

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.

A development of this nature and size invariably affects many facets of the physical and socio-economic environment. In addition to this, the fact that the layout attached was created through a multi-disciplinary approach of needs determination, environmental scoping, and urban design, resulting in the opportunity to motivate the establishment of the land development area on several levels.

The primary goal of this need and desirability report is to ensure that the proposed development is necessary for development purposes and desirable in the public interest. The proposed development will be publicly acceptable and relevant in terms of the overall economic growth and development of the Sol Plaatjie municipal area.

3.2 The Need of the Project

There is a need to promote development of a residential township with a mix of commercial and open spaces for conservation purpose in strategically located land parcels, such as the application site, within the urban development boundary to meet the growing demand of access to housing close to opportunities.

The proposed development aims to provide about 1600 housing units. With government focused on providing housing for the low end of the market, there is a need for the markets to provide affordable

housing for the gap market. The proposed development aims to provide social housing units that are not only affordable but will enhance the urban fabric of the Sol Plaatjie Municipal area.

There is a need to continuously identify properties that are ideally located and/ or earmarked for residential developments as cities and urban areas continue to evolve with the times and also adjust to meet the needs of different groups. The site falls within urban development boundary of the Sol Plaatjie Municipality. There is a need to promote various residential typologies in areas identified for urban development. The proposed development seeks to promote various housing typologies in application area.

The application site is ideally located and meet the criteria required for an ideal residential location as it is located in close proximity to the Kimberly CBD, and thus close to economic opportunities.

Application site is within an urban development boundary, in an area where there's bulk services available to support the development as submitted. This means that providing required bulk to the property will not stretch the engineering infrastructure and thus will not have a detrimental effect from a financial point of view. In addition to the above, the proposed development seeks to contain urban sprawl.

The area is largely vacant and is characterised by lower density developments, with the application site forming part of the Kamfers Dam development area. The proposal is for various typologies with varying densities. The varying typologies allow for different types of tenure to be applied. With the provision of over 2000 residential erven of different types, the development will contribute in making an impact in reducing the housing backlog in the Sol Plaatjie Municipality.

It is thus evident from the above that there is a need to promote development of application site as submit.

3.3 The Desirability of the Project

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

3.3.1 Location and Accessibility

The application property is easily accessible through Midland Road, and is situated within 7 kilometres to the north of the Kimberley CBD and 10 kilometres from the Kimberley airport. Developments of dwelling units are desirable in areas close to opportunities within urban development boundary as they seek to curtailing urban sprawl; while maximising development potential of areas. The development of this nature will ensure the optimal utilisation of existing infrastructure and services.

3.3.2 Compatibility with the Surrounding Area

Development of this nature need to be promoted as they will address a range of issues, which the city needs to adopt in order to keep up with the changing landscape and growing population along with their changing needs and choices:

- To achieve a more compact city, which will in-turn lower servicing costs and travel time and / or distances to and from opportunities;
- It will promote the optimal use of existing infrastructure.
- It will go a long way in creating a more user-friendly city, which serves the needs of all its residents along with their changing needs and trends.

One of development guidelines for urban development is to provide a variety of erf sizes and housing types to cater for the diverse housing needs of the community. Densification presented in terms of this proposal is desirable for the area as it seeks to promote development of variety housing typologies in the application area. This provides an opportunity to intensify developments within urban development boundary.

The development of the application site would result in a great improvement in both the aesthetical and financial value of the site, which in turn would benefit both the surrounding properties as well as the council due to increased revenue collections from the site - while at the same time ensuring the most optimal use of these strategically located properties.

The proposed development would create much needed jobs during both the construction phase as well as post construction in terms of support and related services (security, maintenance, plumbing and electrician work and related support services).

3.4 Sol Plaatjie Spatial Development Framework

The area around which the site is situated was initially earmarked for a mixed use development, in terms of the Draft Spatial Development Framework (2020), Although this is still the intention, upon completion of an avi-faunal study, the area was designed to be less intense, and incorporate recommendations of the study, which include

the exclusion of the areas within the 500m buffer, and have less intense developments in areas outside of the 500m buffer zone (as depicted in the proposed layout).

3.4.1 Compliance with SPLUMA Principles

The application is in line with SPLUMA Principles in the following manner:

a) "To promote the Principles of Spatial justice"

Past spatial and other development imbalances must be redressed through improved access to and use of land. The proposed development of mixed uses will provide access to housing and business opportunities for families in application property. The proposal presents an opportunity for more people to have access to housing in areas close to opportunities.

b) "To promote the Principles of Spatial Sustainability"

Promote land development that is within the fiscal, institutional and administrative means of the Republic. The proposed development area is in an area close with bulk engineering service capacity

available, thus discouraging stretching bulk infrastructure outside the urban development boundary. The property is located within the urban development boundary.

Promote and stimulate the effective and equitable functioning of land markets. The proposal seeks to maximise development potential of a property within the urban development boundary, where engineering services capacity (i.e. water, sewer & electricity) is available. This contributes to the containment of urban sprawl.

Consider all current and future costs to all parties for the provision of infrastructure and social services in land developments. Bulk contributions for the proposed development will be by the municipality after consideration of the application.

Promote land development in locations that are sustainable and limit urban sprawl and result in communities that are viable. The application property is located within the urban development boundary.

c) "To Promote the principle of Efficiency"

Land development optimises the use of existing resources and infrastructure. The proposed rights will ensure the property is correctly zoned for proposed development. The proposed development will make use of existing resources and infrastructure in the area.

Decision-making procedures are designed to minimise negative financial, social, economic or environmental impacts. The application has considered financial and social impact of the development in the area. Development application procedures are efficient and streamlined and time frames re adhered to by all parties.

d) To promote Spatial Resilience

Flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impact of economic and environmental shocks. The township establishment application comply with section 25(1) of Spluma whereby it promotes economic growth, efficient land development and it has a minimum impact on public health, environment and natural resources.

e) To Promote Good Administration

All spheres of government ensure an integrated approach to land use and land development that is guided by "spatial planning" and land use management systems as embodied in the Act. The application is for varying densities which are permitted within the area. The proposed development seeks to provide diverse housing needs in the application area.

Policies, legislation and procedures must be clearly set in order to inform and empower members of the public. The proposed application will be adequately advertised in the prescribed manner, which includes, inter alia, a site notice and notices to adjoining property owners in terms of applicable legislation.

4 PROJECT ALTERNATIVES

In terms of APPENDIX 3(3)(1) of the EIA Regulations (2014) (as amended 2017), an Environmental Impact Assessment Report must include –
g) A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;
h) A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including –

- (i) Details of the development footprint alternatives considered;
- (ix) If no alternative development footprints for the activity were investigated, the motivation for not considering such; and
- (x) A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report

4.1 Site Alternatives

No site alternatives are proposed for this project as the proposed site has been identified by Oliphants Housing Estate (Pty) Ltd as being highly desirable for a mixed-use development in terms of the following characteristics:

- **Site Extent:** The proposed development inclusive of associated infrastructure can be appropriately located on the identified site, which covers a total area of approximately approx. 150 hectares in extent.
- **Land availability and Site access:** - The property has direct access to Midlands Road, which seems to be a provincial road. No other existing and future provincial roads are influenced by the proposed township, as the proposed township is not located within close proximity to any of these roads. The property does not impact any local roads that fall under the jurisdiction of Sol Plaatje Municipality. Access to the site is provided via gravel roads that can potentially be used and/or upgraded for the proposed development. The site is therefore appropriately located for easy transport of components and equipment as well as labour movement to and from the site.
- **Current Land Zoning:** The property is zoned "Agricultural" in terms of the Sol Plaatje Municipality Land Use Management Scheme, 2008. In terms of this zoning, the properties may only be used for agricultural and residential purposes.

4.2 Layout Design Alternatives

The proposed mixed-use development is expected to have a development footprint of approximately 60 ha of the total 150ha. Therefore, the development and its associated infrastructure (i.e. internal roads, etc.) can conveniently be positioned within the broader site to avoid areas of sensitivity. Therefore, the extent of the site allows for the identification of layout design and site-specific alternatives.

a) **Alternative 1 - Layout Plan**

The area intended for development has been sub-divided into three areas, with a fourth area set aside purely for open space and wetland. The extent of the various proposed land uses in the township is represented in the table below and **Figure 7** respectively.

LAND USE	AREA 1		AREA 2		AREA 3		TOTAL	
	Ha	%	Ha	%	Ha	%	Ha	%
Open Space					7.12	52.6	7.12	11.9
High Density	22.40	70.2	7.86	55.2			30.26	50.7
Medium Density	2.53	7.9	0.32	1.4	6.09	45.0	8.94	15.0
Single Residential			3.77	26.5			3.77	6.3
Business	2.08	6.5					2.08	3.5
Community Facility	0.73	2.3					0.73	1.2
Roads	4.15	13.1	2.29	16.9	0.32	2.4	6.76	11.4
TOTAL	31.89	53.5	14.24	23.9	13.53	22.6	59.66	100.0



Figure 7: Concept Layout Plan Alt 1 (please refer to A3 map included in Appendix A).

b) Alternative 2: Layout Plan

Alternative 2 was the final concept layout proposed and is the Applicant’s Preferred Layout (see Figure 8). The entire development is envisaged to consist of 96 mixed use units, the proposed development is primarily comprised of mixed uses, with a mix of various typologies, as summarised below:

- (a) 12 High density residential erven (8 erven, developed at 80 du/ha); and 4 erven, to be developed at 60 dwelling units per hectare).

- (b) 81 single residential erven, with a minimum of erf size of 260m²
- (c) Business purposes
- (d) A taxi ranks; and
- (e) 1 erf as a Public Open Space

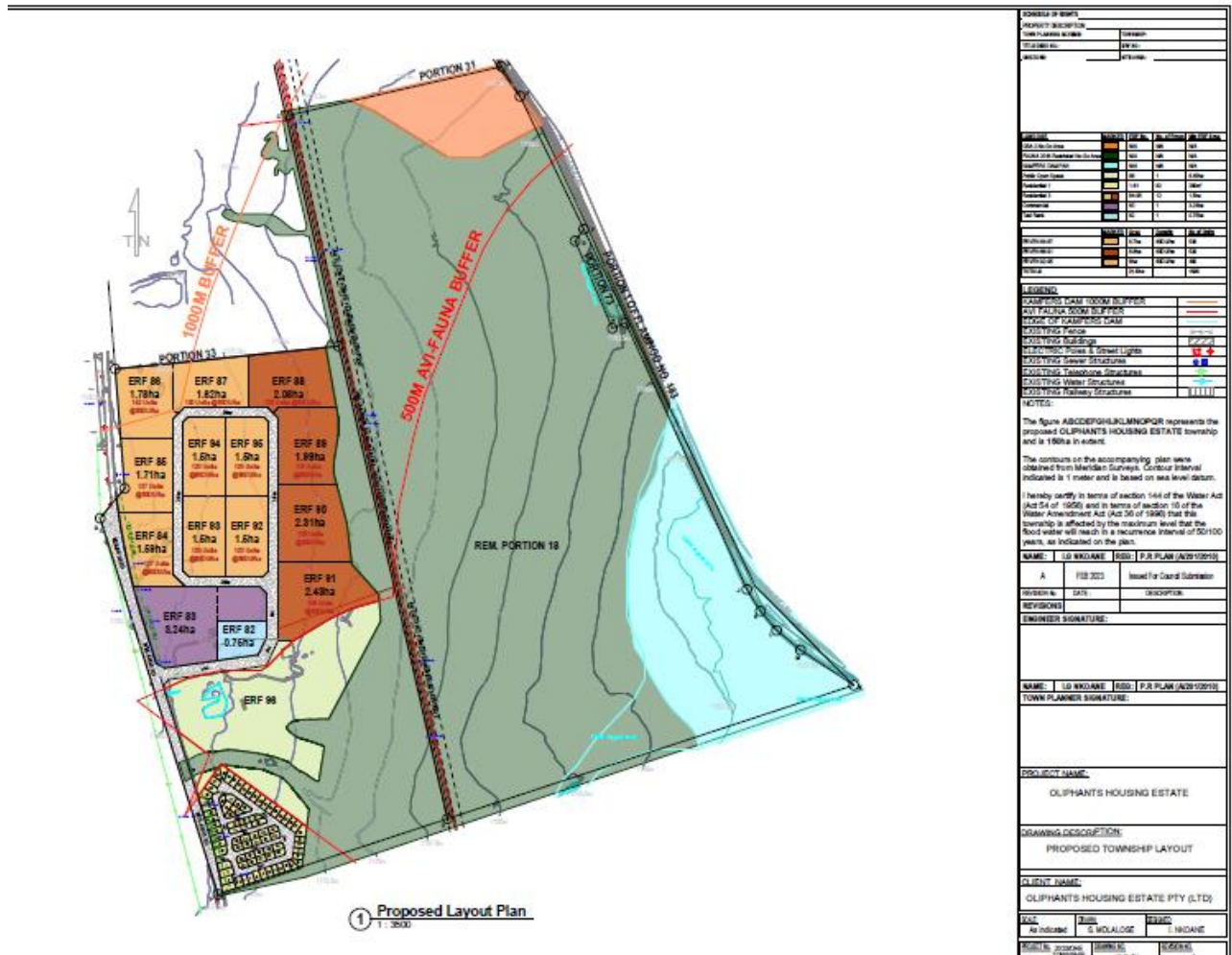


Figure 8: Concept Layout Plan Alt 2 (please refer to A3 map included in Appendix A).

Preferred Alternative: The layout was drafted after careful consideration of the various constraints and opportunities on the site. As part of the development process, the developer undertook the Avi-Fauna Study, the outcome of which had a detrimental effect on the nature of the layout to be developed. In terms of the Avi-faunal study, “The final Scoping Report and Plan of study for EIA concluded that the identified potential impacts associated with the construction of the residential development are localised and restricted to the project footprint. with operational impacts likely to be more far-reaching. Relevant to avifaunal component, the loss of avifaunal habitat and displacement of waterbird species as a result of disturbance associated with construction and operational activities were highlighted as significant impacts. Despite the obvious presence of a significantly sensitive habitat and the associated species complements within the proposed project’s area of influence, the Final Scoping Report and Plan a Study for EIA further concluded that there are no fatal flaws associated with the proposed residential development.’

The developer undertook an Avi-Faunal study, with the outcome that two buffer zones were identified i.e., the 500m buffer within which no development is recommended, and the 1000m buffer within which development can be undertaken with mitigatory factors. The proposed layout is an amendment from a previously submitted layout as it takes into consideration the buffer zones.

4.3 Sewer requirement alternatives

There are no municipal sewers in the immediate vicinity of the proposed development, with the nearest bulk sewer facility, being the Homevale Wastewater Treatment Works, located some 1,5 km from the lowest point of the Development. It is understood that the Municipality is experiencing operational difficulties with this treatment works, but for the purposes of this report it is assumed that these are of a temporary nature and the Homevale WWTW can be considered as the recipient of the effluent from Oliphant Estate.

Option 1

The exact reasons for the inability of Homevale WWTW to handle further sewage have not been divulged and thus any option to assist in overcoming this lack of capacity, would need to be investigated prior to carrying out any remedial work and the costs, all of which be borne by the Developer. In view of the large costs associated with up-sizing of wastewater treatment works, this is not seen as a viable option.

Option 2

The only way to ensure that the volume of effluent emanating from the full development can be dealt with over the full phased development, which will take several years, will be for the Developer to establish their own on-site package plant. These plants are modular and thus can be sized and upgraded as more development takes place.

In view of the restrictions on the volumes of stormwater and treated water entering the Kamfers Dam, the uncontrolled release of “grey water” into the Dam cannot be tolerated and this water would need to be pumped to irrigate the Open Areas and Conservation Areas of Areas 3 and 2 respectively. It is further proposed that the package plant be located in Erf 22 of Area 2, in such a way that, should the Homevale WWTW be upgraded during the phased development of Oliphant Estate, then consideration could be given to replacing the package plant with a Sewer Pump Station and Rising main to the then upgraded Homevale WWTW.

4.4 The No Go Alternative

The no-go option would mean that the proposed housing development project would not be implemented at this location. Should this alternative be selected, there would be no impacts on the site due to the construction and operation activities of a housing development.

However, at a broader scale, the objectives of the Northern Cape Provincial Spatial Development Framework (2019) (NCPSDF), as part of the Spatial Development Strategies for Infrastructure Investment that housing backlog within the province must be eradicated would not be realised. Although the development will only be contributing a fraction to the housing backlog in the province, this would assist in meeting the government’s goal for housing in the province.

5 REGULATORY AND LEGAL CONTEXT

In terms of APPENDIX 3(3)(1) of the EIA Regulations (2014)(as amended 2017), an Environmental Impact Assessment Report must include –

e) A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.

5.1 Legislation and Guidelines that have informed the preparation of this EIA Report

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in **Table 4 and Table 5** respectively.

Table 4: Relevant legislative and permitting requirements applicable to the proposed project

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
National Legislation		
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of the EIA Regulations of 2014 (GNR 326) and the 3 Listing Notices (GNR 324, 325 & 327). a Basic Assessment Process is required to be undertaken for the proposed project.</p> <p><i>In terms of sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as read with the Environmental Impact Assessment (EIA) Regulations of GN R982, as amended by GN R326) Oliphants Housing Estate (Pty) Ltd requires an Environmental Authorization for the project.</i></p>	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform – competent authority
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p> <p><i>While no permitting requirements arise from this section of the Act, this will be applicable during construction in order to ensure minimization of impacts on the environment.</i></p>	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
National Water Act (Act No 36 of 1998)	<p>Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required).</p> <p>Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course -</p>	Department of Water and Sanitation (DWS)

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	<p>Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i. In terms of Section 19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.</p> <p>A Water Use License is required for the development as per the following specific water uses:</p> <ul style="list-style-type: none"> ▪ Section 21(c): Impeding or diverting the flow of water in a watercourse; and ▪ Section 21(i): Altering the bed, banks, course or characteristics of a watercourse. <p>This is a legislative process governed by Department of Water and Sanitation (DWS) for the authorisation of all water used defined in Section 21.</p>	
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as “priority areas.” Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas</p> <p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan during the construction phase of the project for dust management</p>	<p>Local Municipality</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<p>» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including</p> <ul style="list-style-type: none"> » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a site exceeding 5 000 m² in extent <p>» The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.</p> <p>» Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p> <p>In accordance to Section 38 a Heritage Impact Assessments (HIAs) will be undertaken for the following associated developments: (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length; (c) any development</p>	<p>South African Heritage Resources Agency (SAHRA)</p> <p>Provincial Heritage Resources Authority</p>

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>or other activity which will change the character of a site (i) exceeding 5000m in extent</p> <p>Chapter 4, Part 2 of the National Environmental Management: Biodiversity Act (No. 10 of 2004), (NEMBA) provides for listing of plant and animal species as threatened or protected. If a species is listed as threatened, it must be further classified as Critically Endangered, Endangered or Vulnerable. These species are commonly referred to as TOPS listed. The Act defines these classes as follows:</p> <ul style="list-style-type: none"> ○ Critically endangered species: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future. ○ Endangered species: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species. ○ Vulnerable species: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species. ○ Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). <p>Certain activities, known as ‘Restricted Activities’, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species.</p> <p>The 2018 assessment recorded three (3) provincially protected plant species on the site, namely large populations of the geophyte <i>Ammocharis coranica</i>, the succulent <i>Aloe grandidentata</i> and a few individuals of the succulent <i>Orbea lutea</i>.</p> <p>At the time of this assessment, only <i>Ammocharis carinica</i> and <i>Aloe grandidentata</i> were recorded. It is likely that a denser grass layer obscured the small <i>Orbea lutea</i> and it is highly likely to still be present on the larger Secondary Project areas of influence (PAOI). All three these plant species can easily be transplanted and relocated to suitable habitat outside the development footprint on the site.</p>	<p>Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform</p>
<p>National Forests Act (Act No. 84 of 1998)</p>	<p>In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated” GN 908 provides a list of protected tree species.</p> <p><i>Of these trees, Vachellia erioloba (camel thorn), occurs abundantly in the Kimberly area. However, this tree was not noted on the site and no other protected trees were expected to be present. Some tree stumps were recorded, and it is assumed that</i></p>	<p>Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform</p>

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
National Veld and Forest Fire Act (Act 101 of 1998)	<p><i>trees are harvested for firewood. This tree makes excellent firewood and could have been harvested if it was historically present. The likelihood of being present on Portion 18 is low.</i></p> <p>In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
Hazardous Substances Act (Act No 15 of 1973)	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product; and » Group V: any radioactive material. <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Health
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards.</p>	Chemicals and Waste Management "Department" - General waste

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	<p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. <p><i>In terms of GNR921, no waste license is required for the project. No waste license activities are applicable to this project. The developer will however be required to store and manage waste in accordance with the requirements of this Act and associated Standards.</i></p>	
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. <p><i>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include: Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Transport vehicles exceeding the dimensional limitations (length) of 22m.</i></p>	<p>South African National Roads Agency Limited (SANRAL) (national roads)</p> <p>Provincial Department of Transport</p>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:</p> <p>Category 1 plants: are prohibited and must be controlled.</p> <p>Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.</p> <p>Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.</p> <p>These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.</p>	<p>DAFF</p>

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	<p><i>While no permitting or licensing requirements arise from this legislation, this Act will find application during the EIA process and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented.</i></p>	
<p>Subdivision of Agricultural Land Act (Act No 70 of 1970)</p>	<p>Details the subdivision of agricultural land and provisions under which the act is triggered. It also provides for the approval of such division by the Minister of Agriculture. Applies for subdivision of all agricultural land and long-term leasing of portions of agricultural land.</p> <p><i>Long-term leases on portions or subdivision of the site properties will require an approval of the Minister of Agriculture. An application to DAFF will need to be submitted detailing the areas to be subdivided or leased for the purposes of the proposed development. An application in terms of SALA will need to be undertaken and submitted following the issuing of an environmental authorisation for the proposed project.</i></p>	<p>Local Municipality – competent authority Provincial Departments of Agriculture and Environment (DAFF)-commenting authority</p>
<p>Spatial Planning and Land Use Management Act 16 OF 2013</p>	<p>This Act has the main objectives to:</p> <ul style="list-style-type: none"> • provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic; • ensure that the system of spatial planning and land use management promotes social and economic inclusion; • provide for development principles and norms and standards; • provide for the sustainable and efficient use of land; • provide for cooperative government and intergovernmental relations amongst the national, Regulations under the SPLUMA not in force yet. <p><i>Legislation that regulates Land Use Planning has led to “spatial planning tools” that are contained in Municipal and District Strategic Management Frameworks (SMFs), Strategic Development Initiatives (SDIs) and Municipal By-laws</i></p>	<p>Local Municipality</p>
Provincial Legislation		
<p>Northern Cape Nature Conservation Act, Act No. 9 of 2009</p>	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project:</p> <ul style="list-style-type: none"> • Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; • Aquatic habitats may not be destroyed or damaged; • The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. • The Act provides lists of protected plant and animal species for the Province. • A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations. 	<p>Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform – competent authority</p>

5.2 Relevant policy used in the compilation of this Environmental Impact Assessment Report

Table 5: Standards and guidelines applicable to the project

Theme	Standard/Guidelines	Summary
	National Development Plan 2030	The National Development Plan (NDP) offers a long-term perspective for development in the country. The NDP aims to eliminate poverty and reduce inequality by 2030. Provisions of housing infrastructure and job opportunities (such as the proposed project) are in support of the NDP.
Air	South African National Standard (SANS) 69	Framework for setting and implementing national ambient air quality standards.
	SANS 1929: Ambient Air Quality	Sets limits for common pollutants.
Noise	SANS 10328:2003: Methods for Environmental Noise Impact Assessments.	General procedure used to determine the noise impact.
	SANS 10103:2008: The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication.	Provides noise impact criteria.
	National Noise Control Regulations	Provides noise impact criteria.
	SANS 10210: Calculating and Predicting Road Traffic Noise	Provides guidelines for traffic noise levels.
Waste	DWAF (1998) Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.	DWAF Minimum Requirements
Water	Best Practise Guideline (G1) Stormwater Management DWA 2006	Provides guidelines to the management of storm water
	South African Water Quality Guidelines	Provides water quality guidelines
Municipality	Sol Plaatje Local Municipality, Integrated Development Plan (2018/2019) and <i>Frances Baard District Municipality, Integrated Development Plan (2014 - 2019.)</i>	<p>According to the Municipal Systems Act of 2000, all Municipalities have to undertake an Integrated Development Planning (IDP) process to produce Integrated Development Plans (IDPs). As the IDP is a legislative requirement it has a legal status and it supersedes all other plans that guide development at local government level.</p> <p><i>According to the Frances Baard District Municipality Spatial Development Framework, 2014 - 2019 of which the Sol Plaatje Municipality is part of, the site was excluded from the urban development boundary and was earmarked as a conservation area. An application was brought to include the site in the urban development boundary and to develop the site as a mixed- use development. The Sol Plaatje Municipality approved this application</i></p>
Municipality	Land Use Management Scheme, 2008	<p>A land use scheme must give effect to and be consistent with the municipal spatial development framework (SDF) and determine the use and development of land within the municipal area to which it relates in order to promote - (a) economic growth; (b) social inclusion; (c) efficient land development; and (d) minimal impact on public health, the environment and natural resources.</p> <p><i>The property is zoned "Agricultural" in terms of the Sol Plaatje Municipality Land Use Management Scheme, 2008. In terms of</i></p>

		<p><i>this zoning, the properties may only be used for agricultural and residential purposes. In addition, it is suggested that erven zoned "Residential 3", subject to the normal development parameters for this zoning in terms of the Sol Plaatje Municipality Land Use Management Scheme, 2012 including:</i></p> <ul style="list-style-type: none"> ○ <i>A maximum density of 80 dwelling units per hectare.</i> ○ <i>Maximum height of 3 storeys for buildings.</i>
<p>National Screening Tool</p>	<p>The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.</p>	<p>The Screening Tool also provides site specific EIA process and review information, for example, the Screening Tool may identify if an industrial development zone, minimum information requirement, Environmental Management Framework or bio-regional plan applies to a specific area.</p> <p>The Screening Tool identifies related exclusions and/ or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site.</p> <p>The Screening Tool allows for the generating of a Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended whereby a Screening Report is required to accompany any application for Environmental Authorisation</p> <p><i>A screening report for the project is included in Appendix G3 of the report.</i></p>

6 PUBLIC PARTICIPATION PROCESS

In terms of APPENDIX 3(3)(1) of the EIA Regulations 2017 (as amended), an Environmental Impact Assessment Report must include –

h) A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including –

- (ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;*
- (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.*

6.1 Purpose of Public Participation

The engagement of Interested and Affected Parties (I&AP's) and the Stakeholder Engagement Process is an important part of any environmental Impact assessment. The main objectives of the Stakeholder Engagement / Public Participation Process include amongst others:

- Informing the adjacent landowners, tenants, residents' associations, ward councillors, the local municipality and other organs of state of the proposed project;
- Establishing lines of communication between the stakeholders, I&AP's and the project team;
- Providing all parties with an opportunity to exchange information and to express their views and concerns regarding the proposed project;
- Obtaining comments/input from stakeholders and I&AP's, and ensuring that all views, issues, concerns and queries raised are fully documented; and
- Identifying all the significant issues associated with the proposed project

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- Giving written notice to:
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority.
- Placing an advertisement in:
 - (i) one local newspaper; and
 - (ii) in at least one provincial newspaper.
- Open and maintain a register/ database of interested and affected parties and organs of state.
- Release of a Draft EIA Report for Public Review

- Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6 of the EIA Regulations, 2014, the following summarises the key public participation activities conducted to date.

6.2 List of Stakeholder and IAPs Identified and Notified

Identification of I&APs was undertaken by the consultant through existing contacts and databases, recording responses to site notices and the newspaper advertisement, as well as through the process of networking. The **key stakeholder groups** identified include:

- **National government** departments, including:
 - AGRI South Africa;
 - Department of Agriculture, Forestry & Fisheries
 - Department of Water and Sanitation;
 - Department of Rural Development and Land Reform
 - South African Heritage Resources Agency (SAHRA)
 - South African National Parks
- **Provincial government** departments including:
 - Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
 - Department of Agric. Rural Dev. & Land
 - Department of Agriculture, Forestry & Fisheries
 - Ngwao-Boswa Ya Kapa Bokone (Northern Cape Provincial Heritage Resources Authority)
 - Department of Water and Sanitation
 - Department of Mineral Resources
 - Northern Cape Department of Roads and Public Works
 - Northern Cape Department of Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA)
- **Local and District Municipalities** having jurisdiction over the study area being the:
 - Frances Baard District Municipality
 - Sol Plaatjie Local Municipality
- **Parastatals** including:
 - Telkom SA Limited
 - Transnet Freight Rail
 - Eskom
- Neighbouring landowners
- Other potentially affected parties and landowners
- Industry and business
- Community Based Organisations, and
- Non-Governmental Organisations (i.e. Birdlife South Africa)

An I&AP's register was opened and maintained in terms of Regulation 42 and contains the names, contact details and addresses of:

- i. all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
- ii. all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
- iii. all organs of state which have jurisdiction in respect of the activity to which the application relates.

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to **Appendix D8**). While I&APs were encouraged to register their interest in the project from the onset of the process undertaken by Envirolution Consulting, the identification and registration of I&APs has been on-going for the duration of the EIA process.

6.3 Notification of I&APs

The PPP commenced on the **12 November 2021** with an initial notification and call to register for a period of 30 days. I&APs were notified of the Initial call to register as presented below.

6.3.1 Initial Notification of I&APs

Registered letters, emails and facsimiles (faxes) were prepared and distributed to the identified relevant authorities, affected and adjacent landowners and legal occupiers, ward councillors and other pre-identified key stakeholders. The notification documents included the following information:

- The purpose of the proposed project;
- Details of the NEMA Regulations that are anticipated to be applicable and must be adhered to;
- List of anticipated activities to be authorised;
- Location and extent of activities to be authorised;
- Details of the affected properties (including a locality map or an indication of where the locality map may be viewed or obtained);
- Brief but sufficient detail of the intended operation to enable I&APs to assess/ surmise what impact the project will have on them or on the use of their land (if any);
- Initial call to register duration; and
- Contact details of the EAP

These are all included in **Appendix D3**.

6.3.2 Placement of Site Notices

Four site notices were placed along, within and surrounding the perimeter of the proposed project area and its surroundings on 12 November 2021. The on-site notices included the following information:

- Project name;
- Applicant name;
- Project location;
- Description of the environmental authorisation application process;
- Legislative requirements; and
- Relevant EAP contact person details for the project.

Proof of the above is included in **Appendix D1**.

6.3.3 Newspaper advertisement

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project, and EIA process Newspaper advertisement were placed in Diamond Field Newspaper requesting Interested and Affected Parties (I&APs) to register, and submit their comments.

These are all included in **Appendix D2**.

6.3.4 Notifications of Availability of the draft EIA Report

Notification regarding the availability of the Scoping Report for public review has been given in the following manner:

- Registered letters with details on where the Scoping Report is available from, as well as the duration of the public review comment period, were distributed to all registered I&APs (which includes key stakeholders, affected and surrounding landowners, and registered occupiers);
- Facsimile notifications with information similar to that in the registered letter described above, were distributed to all registered I&APs; and
- Email notifications with a letter attachment containing the information described above were also distributed to all registered I&APs.

The Draft EIA Report was made available for **public review** from **26 April 2023 to 29 May 2023** for a period of 30 days at the following locations:

- **Kimberley Public Library**
- Dropbox link sent to registered I&APs via email
- Email copy of the EIA Report document (without appendices) sent to all registered I&APs via email

In addition, the Draft EIA Report was sent to the **following authorities for review**:

- Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
- Department of Water and Sanitation
- Local & District Municipality

These are all included in **Appendix D3**.

6.3.5 Stakeholder Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities will be provided in order for I&APs to have their issues noted. I&APs will be consulted through the following means:

- Public meeting in the study area (open meeting)
- Focus group meetings (pre-arranged and stakeholders invited to attend)
- One-on-one consultation meetings (for example with directly affected or surrounding landowners)
- Telephonic consultation sessions
- Written, faxed or e-mail correspondence

These are all included in **Appendix D6**.

6.3.6 Summary of Issues Raised by I&AP's

Issues raised to date have been addressed in a transparent manner and the full details (such as the comment received, the name of the I&AP who commented, the issue raised and the main aspect of the raised issue, as well as the response provided to the I&AP) included in the Public Participation Report (**Appendix D7**). The list below provides a summary of the main issues that were raised by I&APs thus far since the initiation of the project:

- Concerns of adverse effects the project may have on the flamingo breeding project.
- Concern over the development causing sewage spills as in the case of Kyalami Corner shopping centre and the Beaulieu bird sanctuary.
- Homevale sewage works is unable to handle the current sewage going through the plant, how will it handle additional sewer from this development
- Soil erosion and sedimentation of the watercourse system
- The proposed development will result in an increase in hardened surfaces
- Likely to have a negative impact on the downstream water resources / watercourse
- Pollution as a result of runoff from development area entering into the watercourse
- Disturbance within the area thereby increasing the encroachment of alien invasive species as well as weeds
- Noise and air pollution due to the development
- Pollution of water resources and soil
- Vegetation removal – vegetation forms a central part of the wetland definition and requires undisturbed conditions which can lead to the encroachment of alien invasive species
- The waste water pipeline could propose a threat if not inspected leaking
- Construction activities i.e. excavations and vegetation clearing expose soil to environmental factors including rainfall and wind. The exposure to these factors will result in the removal of topsoil and the deposition of this sediment in the downslope watercourse system
- Sediment release from the construction site into the downstream aquatic environment is one of the most common forms of waterborne pollution
- Mismanagement of waste and pollutants including construction waste and other hazardous chemicals will result in these substances entering and polluting the sensitive natural downstream environments either directly through surface runoff during rainfall events or subsurface water movement
- An increase in pollutants will lead to changes in the water quality of the watercourse, affecting its ability to act as an ecological corridor in the larger landscape and for example have a direct impact on the near threatened flamingo population that is breeding in the Kamfer dam area
- Litter or other contaminants on the site can be deposited in the downstream water resource environment which will have a negative impact on the environment
- Substances such as cement, oil, fuels or other harmful chemicals could be toxic to fauna and faunal habitats within the watercourse
- The proposed development could result in the loss of nearly all of the aquatic habitat on the site and water quality impairment
- Impending on flow paths with removal of vegetation, excavations for foundations and clearing of areas
- Erosion and sedimentation of soil because of vehicle activity and operation of equipment and machinery for example

7 ENVIRONMENTAL ATTRIBUTES AND BASELINE

In terms of APPENDIX 3(3)(1) of the EIA Regulations 2017 (as amended), an Environmental Impact Assessment Report must include –

h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including-

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

7.1 Regional Setting

Regionally the site for the proposed Oliphant Estate Township Development is located within the Sol Plaatjie Local Municipality under the jurisdiction of Francis Baard District in the Northern Cape Province, the site is located north of Kimberley, more specifically between Galeshewe to the south and Roodepan suburb to the northwest of the site. To the east of the site is a more open township. Most of the area northeast of the site is farmland with game. Of great importance is that the south-eastern corner of the site is adjacent to the Kamfers Dam which is known as a breeding site for lesser flamingo. A railway line runs along the entire north-eastern boundary of the site.

7.2 Biophysical Attributes/Features of the Study Area

Geographical features are man-made or naturally-created features of the Earth. Natural geographical features consist of landforms and ecosystems.

7.2.1 Regional Climate

Summer and autumn rainfall and very dry winters are typical of the area with a mean annual precipitation of about 450 mm. Extreme variation exists between winter minimum (mean monthly minimum in July - 4.1oC) and summer maximum (mean monthly maximum in January 37.5oC) temperatures. The winters are dry and cold and frost is frequent in winter.

7.2.2 Topography & Drainage

The site slopes from north-east to south-west towards Kamfers Dam at an incline of approximately 1 in 66, which means for every 66 meters the incline will fall by 1 meter. **Figure 9** shows a three-dimensional image of the terrain on which the township will be developed.

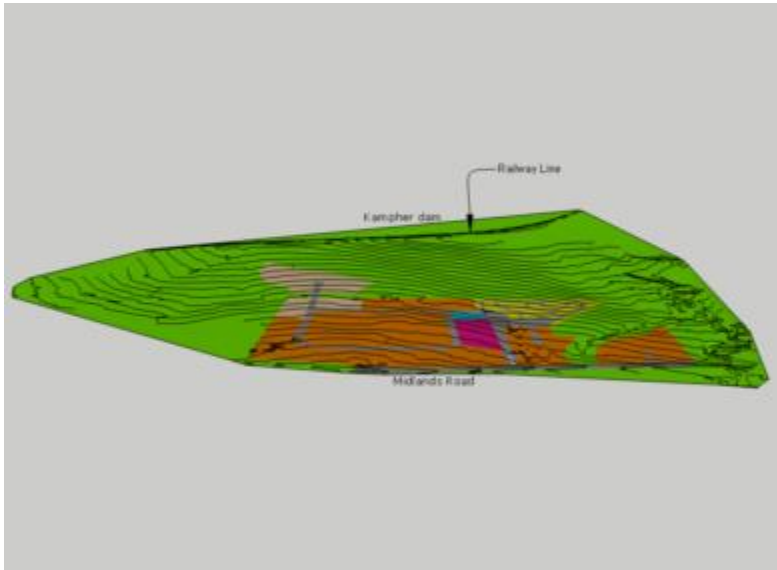


Figure 9: Three-Dimensional Image of the Terrain.

7.2.3 Geology

Kimberley lies in the north central margin of the Karoo Basin with outcrops of the unconformably underlying Ventersdorp Supergroup, in particular the Allanridge fFormation (**Figure 10**). In turn, much younger sands of the Kalahari Group overlie much of the Karoo sequence.

The Karoo Supergroup rocks cover a very large proportion of South Africa and represent some 120 million years (300 – 183 Ma). These deep to shallow water sediments have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

During the Carboniferous Period South Africa was part of the huge continental landmass known as Gondwanaland and it was positioned over the South Pole. As a result, there were several ice sheets that formed and melted, and covered most of South Africa. Gradual melting of the ice as the continental mass moved northwards and the earth warmed, formed fine-grained sediments in the large inland sea. These are the oldest rocks in the system and are exposed around the outer part of the ancient Karoo Basin, and are known as the Dwyka Group. They comprise tillites, diamictites, mudstones, siltstones and sandstones that were deposited as the basin filled. This group has been divided into two formations with Elandsvlei Formation occurring throughout the basin and the upper Mbizane Formation occurring only in the Free State and KwaZulu Natal (Johnson et al., 2006).

Overlying the Dwyka Group rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. In the west and central part are the following formations, from base upwards: Prince Albert Formation, Whitehill Formation, Collingham Formation, Laingsburg / Ripon Formations, Tierberg / Fort Brown Formations, and Waterford Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Overlying the Ecca Group are the rocks of the Beaufort Group that has been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. As with the older Karoo sediments, the formations vary across the Karoo Basin. The

Stormberg Group forms the upper layers of the Karoo Supergroup and is capped by the Drakensberg basalts. At around the same that the basalts were erupting numerous dykes and sills intruded through the Karoo sediments. They are of Jurassic age and are known as the Jurassic dolerites (**Figure 10**)

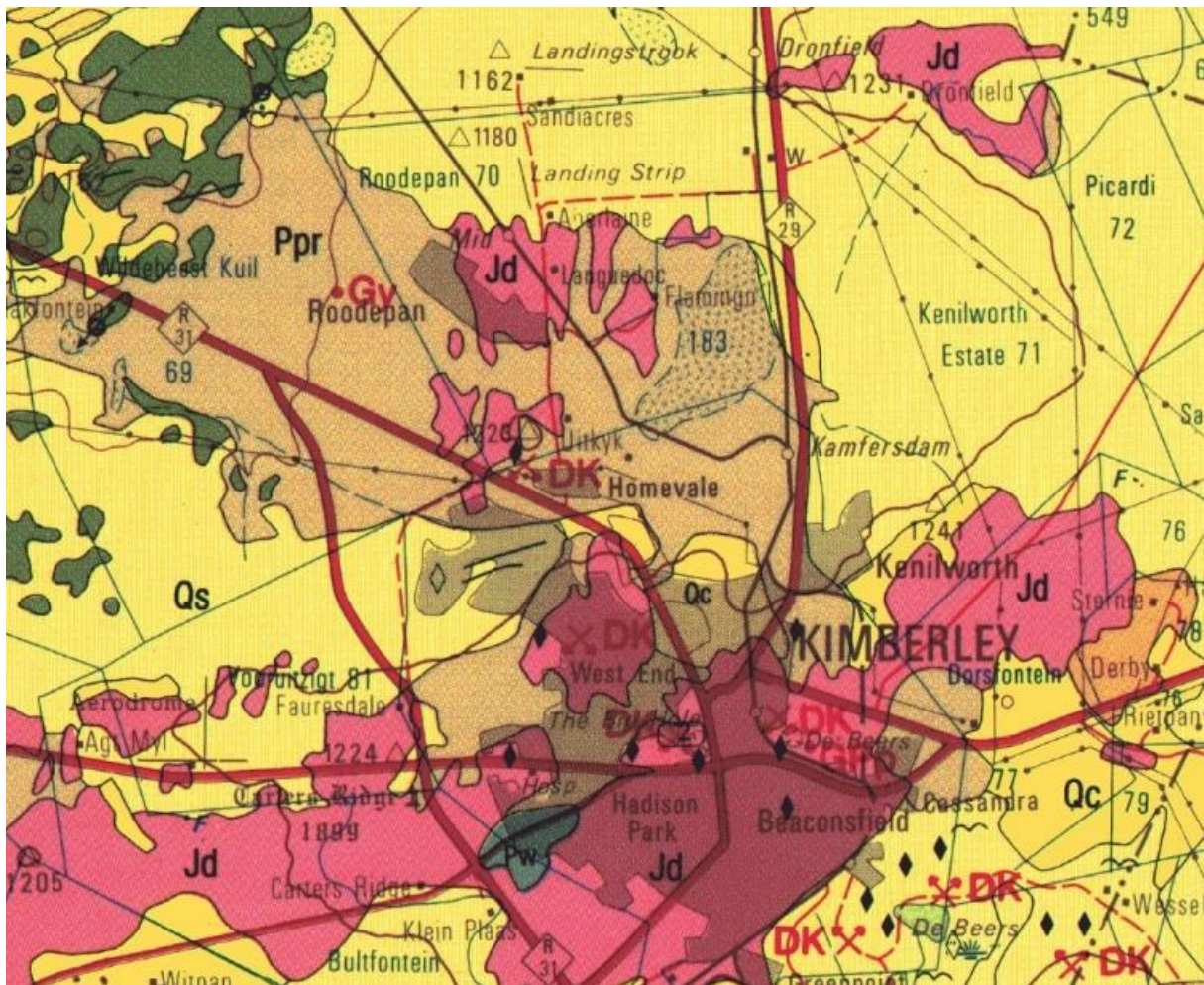


Figure 10: Geological map of the area around Kimberley with the proposed Oliphant Estate housing project shown within the blue rectangle

7.3 Ecological Profile

7.3.1 Avifauna

Site Sensitivity Verification: A screening report for the proposed residential development area and PAOI was generated on 28 July 2022. The majority of the proposed Project areas of influence (PAOI) is considered to have a HIGH Animal Species Theme Sensitivity, based on the possible occurrence of African Marsh Harrier *Circus ranivorus*, Burchell's Courser *Cursorius rufus*, Caspian Tern *Hydroprogne caspia*, Ludwig's Bustard *Neotis ludwigii*, Lanner Falcon *Falco biarmicus*, Lappet-faced Vulture *Torgos tracheliotos*, Secretarybird *Sagittarius serpentarius*, Tawny Eagle *Aquila rapax*, White-backed Vulture *Gyps africanus* and Yellow-billed Stork *Mycteria ibis*. Although these species were not observed during the most recent site verification survey in August 2022, they have been recorded within the broader nine-pentad area during the SABAP2 surveys. However, with the exception of White-backed Vulture (n=131), also observed during the 2018 biodiversity survey (Eco Agent, 2018) and Secretarybird (n=77), the remaining species have been recorded in low numbers (<30 individuals) over the 15-year survey

period to date. It is important to note that the single pentad within which the proposed residential development is located yields a lower species diversity and abundance with regards to the aforementioned terrestrial species, which is a likely indication of the current significant level of disturbance that exists within the PAOI.

Most notably, is the omission of Lesser Flamingo, in addition to other water and wetland dependent SCC (i.e. Greater Flamingo *Phoeniconaias roseus* and Maccoa Duck *Oxyura maccoa*) from the avian *Sensitivity Features* list, as a result of the LOW sensitivity assigned to Kamfers Dam within the *Animal Species Theme*. This is in direct contrast to the HIGH sensitivity assigned to Kamfers Dam within the *Aquatic Biodiversity Theme* – a decidedly more accurate reflection of the sensitivity of this water habitat and the species its supports.

Lesser Flamingo (Near Threatened) is an itinerant species that is highly susceptible to changes in its local environment and is therefore dependent on a network of suitable sites for its breeding and foraging needs. Breeding epochs are unpredictable and are largely dependent on seasonal rains, but most breeding occurs between November in southern Africa. During breeding, Lesser Flamingos congregate frequently in large mixed breeding colonies with Greater Flamingos. When not breeding, Lesser Flamingo are constantly on the move between feeding sites, often several hundred kilometres apart. These movements occur mostly at night (Childress et al. 2008), often during full moon conditions. Relevant to the proposed residential development, this nocturnal behavioural characteristic is critically important when considering the potential light pollution impact of the residential estate. Lesser Flamingo have very specific breeding requirements 1) the location must be inaccessible to terrestrial disturbance from humans or animal predators; 2) subject to seasonal flooding that is sufficiently shallow to enable the construction of the conical mud nests without them being washed away, but sufficiently deep and long-lasting to prohibit terrestrial predators from reaching the nesting colony; and 3) within easy flying distance (i.e. 120-180 km) of a good feeding site for the parents. In term of feeding, the correct water chemistry permitting the growth of cyanobacteria is vital to adequately support this species. Changes in the hydrology of their breeding habitats, particularly with regards to water levels and inflow poor quality water and human induced disturbance are key threats. Other threats include, the disruption of nesting colonies by predators, harvesting of eggs, poisoning and disease (Childress et al. 2008). With up to 50 000 individual birds occurring at Kamfers Dam, this colony is the most important permanent population of and the only breeding locality for this species in South Africa. Successful breeding seasons took place during 2007/2008 and again 2017/2018, resulting in Kamfers Dam becoming the fourth breeding locality in the Africa.

Greater Flamingo (Near Threatened) are decidedly nomadic, making their occurrence highly unpredictable. They are however a regular and semi-permanent foraging visitor to Kamfers Dam, with numbers between 250 and up to 9 000 individuals (Ecotone, 2018). Approximately 100 chicks were produced in 2009/2010, on a purpose-built S-shaped island constructed within Kamfers Dam. Similarly, to Lesser Flamingo, water quality and fluctuations in water levels reduce food resources and increase predation risk, leading to mass mortality as well as the failure of breeding attempts (Berry 1972, Fox et al. 1997, Simmons 2005).

Maccoa Duck (Near Threatened) is a relatively scarce species confined to Africa, with populations in the north and south of the continent (Berruti et al, 2007). South Africa has the largest national population of this species, however, there is some evidence that the South African populations are declining. Maccoa Duck feeds mainly on benthic invertebrates, making the species and ideal indicator of pollution and

wetland quality. This species nests over deep water in emergent vegetation, usually Typha or sedges and may be a possible breeder at Kamfers Dam. Rapid changes in water levels disrupt breeding and feeding conditions. Other key threats to this species include; disturbance resulting from activities of subsistence living of local communities around wetlands; improved treatment of sewage water reducing the food supply; botulism; increased pollutants, predation and poaching (Berutti et al.,2005).

Observations of Lesser Flamingo and Greater Flamingo (in addition to a diversity of the more common water dependent species) during the most recent field survey conducted on 4-6 August 2022, the 2018 biodiversity survey and species abundance data collected for the years 1991 to February 2022 at Kamfers Dam (*unpublished data* curated by Tania Anderson, 2022) further demonstrates the utilisation of the PAOI by these SCC. While parts of the PAOI are subject to fairly significant levels of disturbance, Kamfers Dam provides the **only** suitable avifaunal habitat that is capable of supporting the water dependent SCC listed above within the PAOI. The desktop analysis of secondary data sets and the observations emanating from the on-site field surveys, confirms the HIGH sensitivity assigned to the PAOI.

Avifaunal Habitats: Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur there. The classification of vegetation types is from Mucina & Rutherford (2006 and 2012), while from an avifaunal perspective, the Atlas of southern African Birds (SABAP1) recognises six primary vegetation divisions or biomes within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison et al. 1997). Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. Assessment of the PAOI revealed three broadly described avifaunal micro habitats i.e. thornveld, surface waterbodies and their associated wetlands and urban/industrial areas (**Figure 11**).

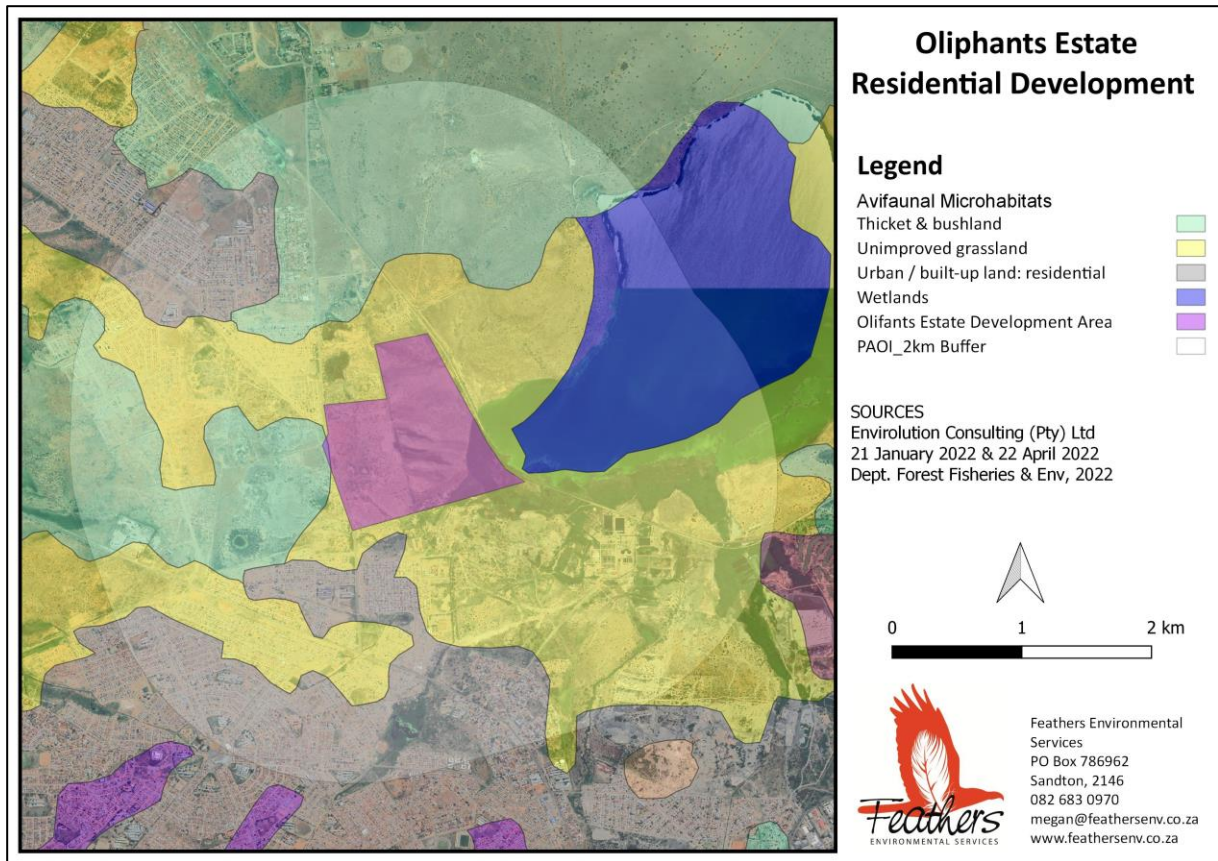


Figure 11: Regional map detailing the land use types occurring within the the proposed residential estate development area and PAOI.

7.3.2 Vegetation

Overview: Although the Vegetation Map (Mucina and Rutherford 2006) indicates that Vaalbos Rocky Shrubland (SVk 5) occupies most of the site, it was found during the site visit that the entire site falls within Kimberley Thornveld (SVk 4) (**Figure 12**). As the site was utilized over a long period, the vegetation is mostly transformed, degraded and secondary. A small part of the Kamfers Dam occurs in the south-eastern corner of the site, though it is separated from the Dam by a railway line. This area is nevertheless still wetland and connected to the pan by culverts under the railway line. The Kamfers Dam is considered to be a pan classified as Highveld Salt Pans (AZi 10, Mucina and Rutherford 2006).

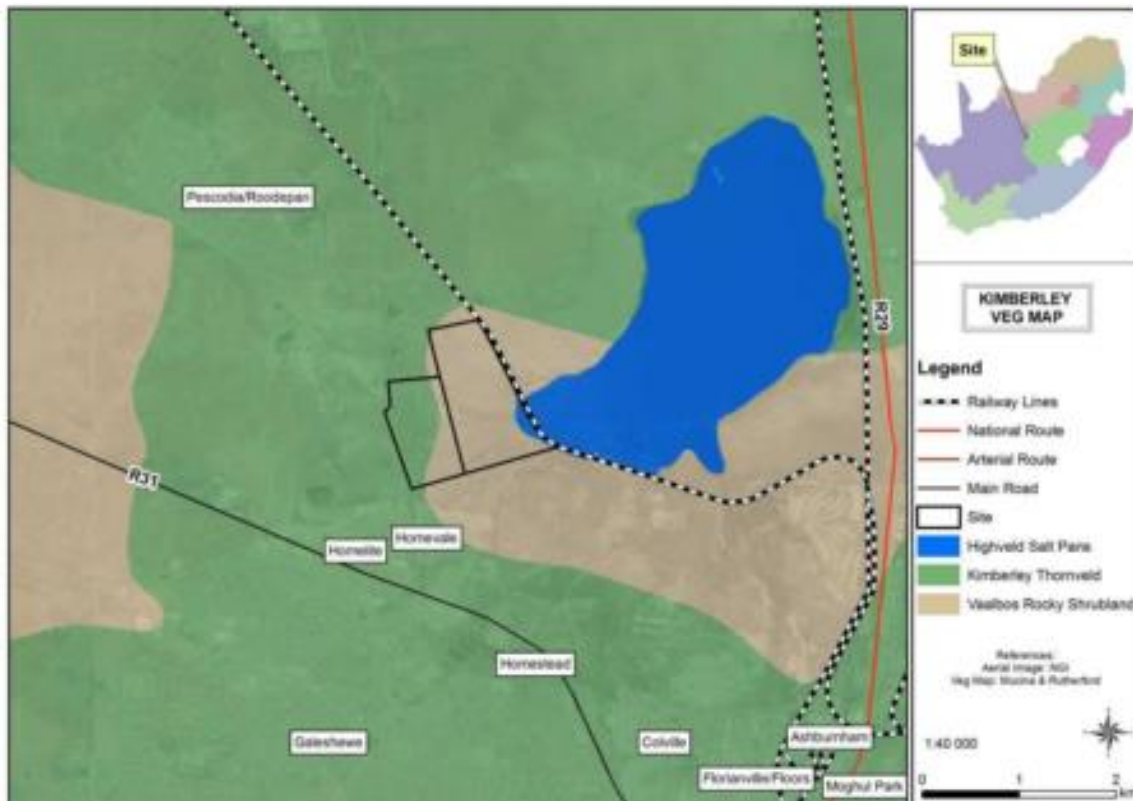


Figure 12: The Vegetation Map (Mucina and Rutherford 2006).

Conservation Value: The Kamfers Dam in the south-eastern portion of the site comprises a Critical Biodiversity Area 1 (CBA1) as this is the habitat of the lesser flamingo and great numbers of other water birds. The north-eastern section of the Portion 18 is classified as a CBA2, which is the best option for meeting biodiversity targets, while avoiding conflict with other land uses. According to the Northern Cape Critical Biodiversity Area Map (Figure 13), these areas should remain natural, with only low impact development considered.

An Ecological Support Area (ESA) is present west of the site. The remainder of the site falls within 'Other Natural Areas' that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.

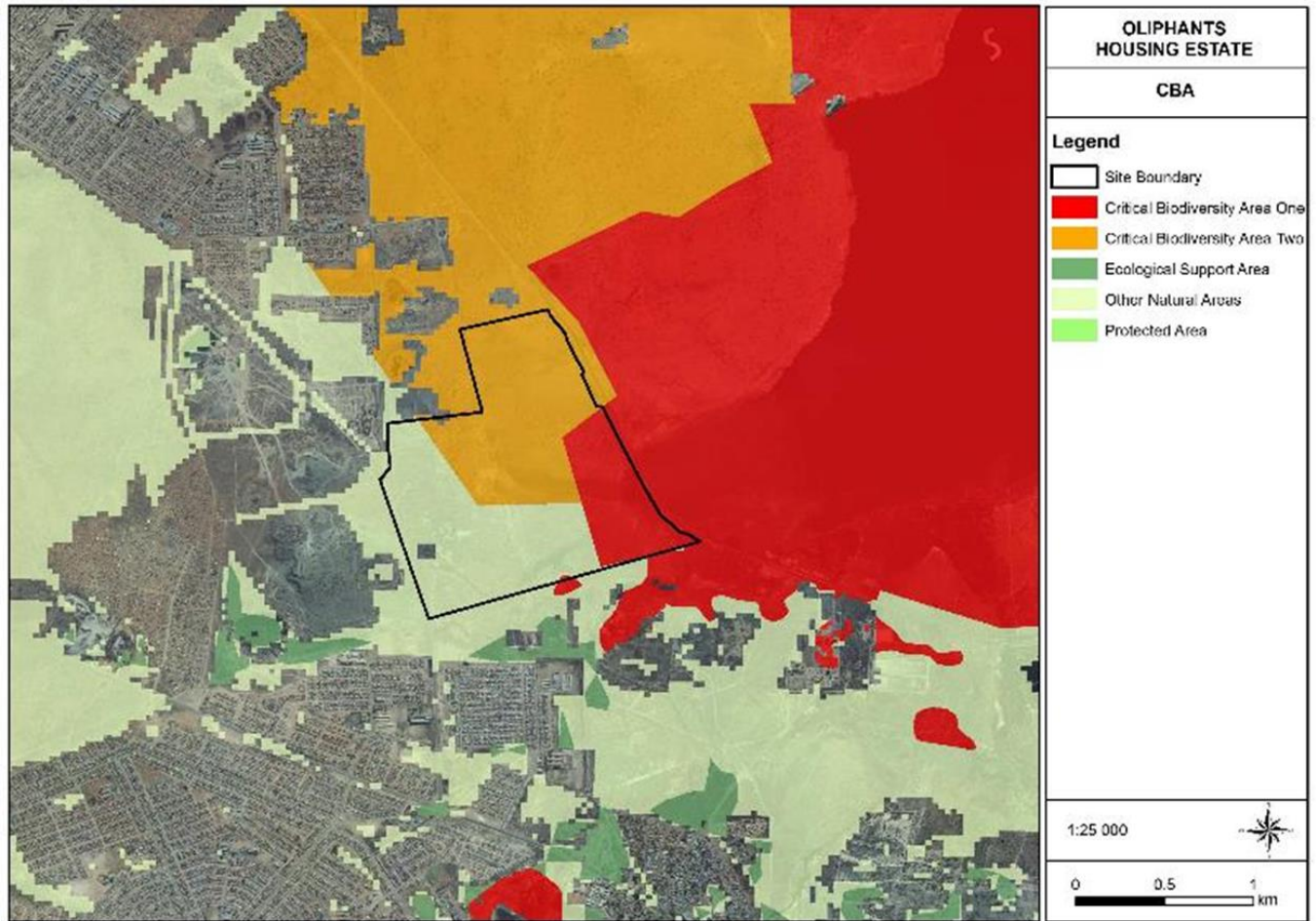


Figure 13: The Critical Biodiversity Areas of the site and surrounding areas.

7.3.3 Fauna

Mammals

Species richness: It must be emphasised that the species richness inferred is for the general area and NOT for the study site itself. The species richness for the general area is fair.

Endangered species: There is a small possibility that six Red Data mammals might occur on the site. The species are the Southern African hedgehog, the African striped weasel, Temminck's ground pangolin, black-footed cat, brown hyena and the Dent's horseshoe bat. Red Data species occurring on the site will be displaced by the development. In relative terms, however this will not worsen the conservation ranking of any species flagged herein.

Sensitive species and/or areas (Conservation ranking): From a mammal point of view there should not be any specially protected mammal species on the study site. However, the nearby Kamfers Dam, with its breeding population of lesser flamingos, is of national and international importance. The wetlands on the site are also sensitive and must be protected. The vegetation type (Kimberley Thornveld, SVk 4) is classified as Least threatened.

Habitat(s) quality and extent: The terrestrial, wetland and arboreal habitat quality is fair, but it is jeopardised by anthropogenic influences such as a railway line, tar and gravel roads, power lines, dumping, invasive plants, winter veld fires, extensive diggings, ruins, buildings, grazing by horse and cattle and old mining activities. During the site visit two snares for mammals were found as well as adults and children with catapults to shoot small mammals and birds.

Herpetofauna

Species richness: It must be emphasised that the species richness inferred is for the general area and NOT for the study site itself. The species richness for the general area is fair.

Endangered species: Except for the controversial red data status of giant bullfrog which might occur on the site, no other reptile or amphibian species with Red Data status should occur on the study site.

Sensitive species and/or areas (Conservation ranking): From a herpetofaunal point of view there should not be specially protected herpetofauna species on the study site. However the nearby Kamfers Dam, with its breeding population of lesser flamingos is of national and international importance. The wetlands on the site are also sensitive and must be protected. The vegetation type (Kimberley Thornveld, SVk 4) is classified as Least threatened.

Habitat(s) quality and extent: The terrestrial, wetland and arboreal habitat quality is fair, but it is jeopardised by anthropogenic influences such as a railway line, tar and gravel roads, power lines, dumping, invasive plants, winter veld fires, extensive diggings, ruins, buildings, grazing by horse and cattle and old mining activities.

7.4 Water Resources of the study area

There are important wetland features on the study site. At the southern boundary of the study site, a stream flows (**Figure 14**) into the nearby Kamfers Dam, with its breeding population of lesser flamingos (**Figure 15**). Part of the Kamfers Dam on a neighbouring property falls in the 500 metres buffer area around the study site. Several wetland areas occur north of the stream on the southern half of the study site. A few manmade burrow pits/quarries occur on the study site. One very large, fenced-off, quarry occurs on the south-western part of the study site, however these water bodies are regarded as either non-functional or too isolated to serve as habitat for some moisture-reliant mammals, like the Cape clawless otter, spotted neck otter and marsh mongoose.



Figure 14: Part of the wetlands on the south-eastern section of the study site.



Figure 15: Flamingos in the Kamfers Dam.

7.4.1 Catchment Hydrology and National Freshwater Ecosystem Priority Area (NFEPA)

The project area falls in the south-eastern boundary of the C91E quaternary catchment which has a gross area of 1509 km². The major rivers within the Vaal WMA are the Wilge, Liebensbergvlei, Mooi, Renoster, Vals, Sand, Vet, Haart, Molopo and Vaal. All runoff emanating from the project location drains into the Kamfer Dam. The project area is unique in that it forms part of a larger endorheic catchment, which means all runoff drains to a single location, which does not have a clear outflow. The Kamfer Dam therefore serves as the single outflow location.

Kamfers Dam is listed as n NFEPA wetland, Rank 2, this rank refers to wetlands with the following attributes:

- Wetlands within 500 m of a IUCN threatened frog point locality;
- Wetlands within 500 m of a threatened waterbird point locality;
- Wetlands (excluding dams) with the majority of its area within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes;
- Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands of exceptional biodiversity importance, with valid reasons documented;
- Wetlands (excluding dams) within a sub-quaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose

7.4.2 Watercourse Classification and Delineation

The EcoAgent (2018) assessment identified several wetland types as shown in **Figure 16**. Note the site boundary in the current assessment is reduced from the site assessed in 2018. While the current assessment agrees with much of the 2018 wetland delineation and classification, a few changes are proposed. The extent of several wetlands is slightly increased and changes to the classification of several wetlands are made. Two wetland drivers in addition to the natural surface water drainage are relevant to this study, and also to the proposed changes to the delineation and classification presented in 2018. These two drivers are soil with a high clay content and water spilt from leaking pipes.

The presence of soils with a high clay content occurs throughout the site. Depressions therefore quickly fill with rain water and also water leaking from pipes or sewage infrastructure, which allows the clay to swell and trap this water, resulting in wetland conditions. A distinction between natural and artificial wetlands are complicated by the long-term nature of leaks. It appears as though the volume of water leaked into the adjacent landscape is higher than in 2018. This observation is based on the fact that wetlands partly driven by leaking infrastructure are more extensive than in 2018. However, depressions in the landscape not linked to the leaking infrastructure had not filled with rainwater (they were dry and soil was cracked) in 2022. This leads us to the conclusion that the extended wetlands did not result only from the higher rainfall the region experienced in the last two seasons.

The change in classification of wetlands is related to the same drivers. It is unlikely that clay soils will form extensive seepage conditions as is indicated in EcoAgent (2018). Seepage wetlands are therefore reclassified as Unchannelled Valley Bottom Wetlands with Artificial Components. The Artificial Seep indicated in **Figure 16** does have a slight correlation with wetlands reflected on historic imagery (EcoAgent, 2018) although it is acknowledged that the correlation is not strong. An elevation profile shows benches with shallow valleys in the slope of the site that correspond to the branches of this

wetland. Following the precautionary principle, they are included into the classification of Unchannelled Valley Bottom with Artificial Components. Abbreviations for wetlands include:

- CVB – Channelled Valley Bottom wetland
- UVB – Unchannelled Valley Bottom

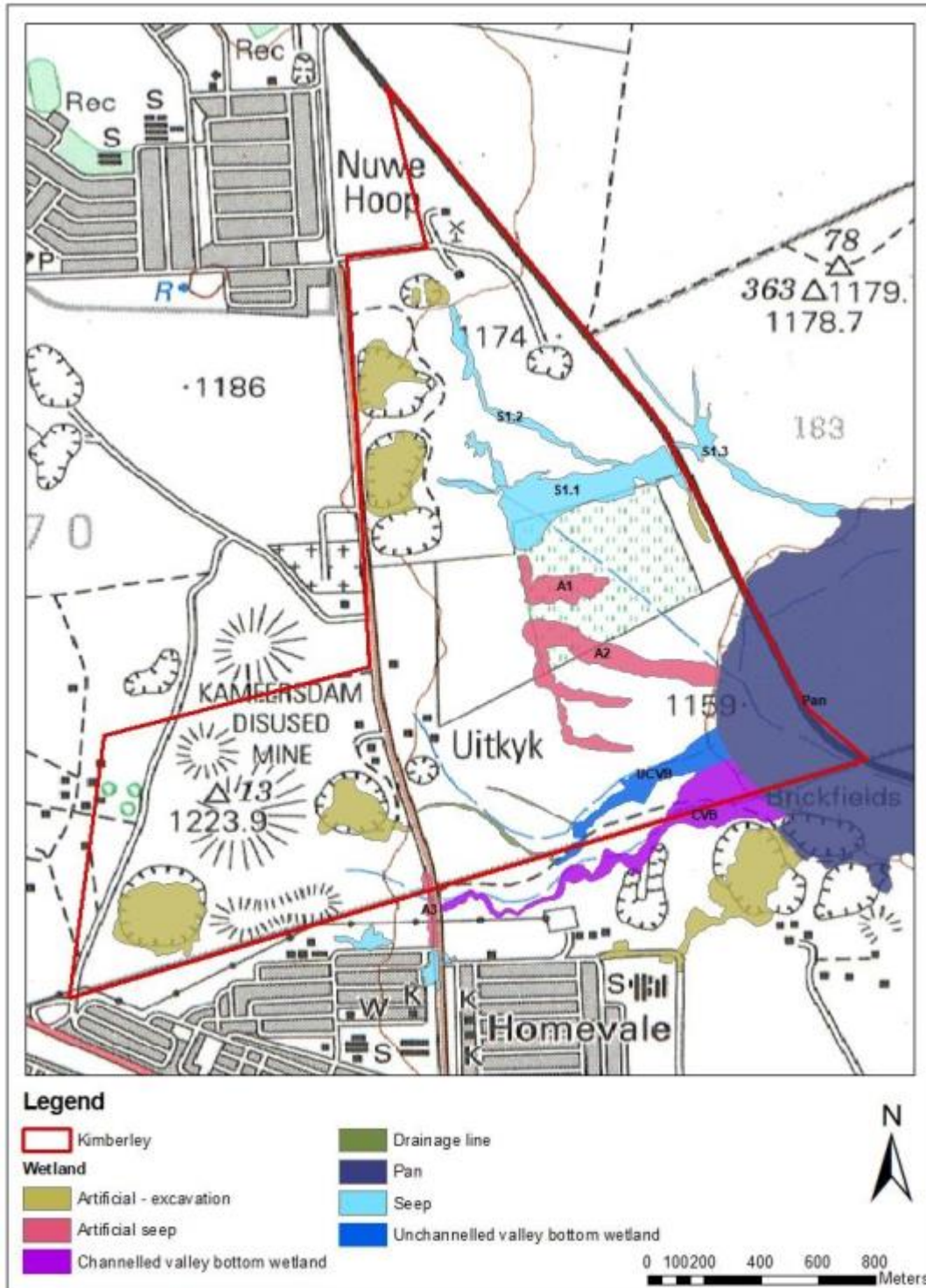


Figure 16: Watercourses delineated and classified in EcoAgent (2018).

The revised wetland map, including a 500m Area of Investigation around the amended site boundary, calculated buffer zones and the DWS regulated Area are shown in **Figure 17**. It is evident that wetland

boundaries will respond to changes in the drivers for example, should issues regarding stormwater and sewage be managed so as to reduce spills, the extent and nature of the wetlands affected by these spills will be altered.

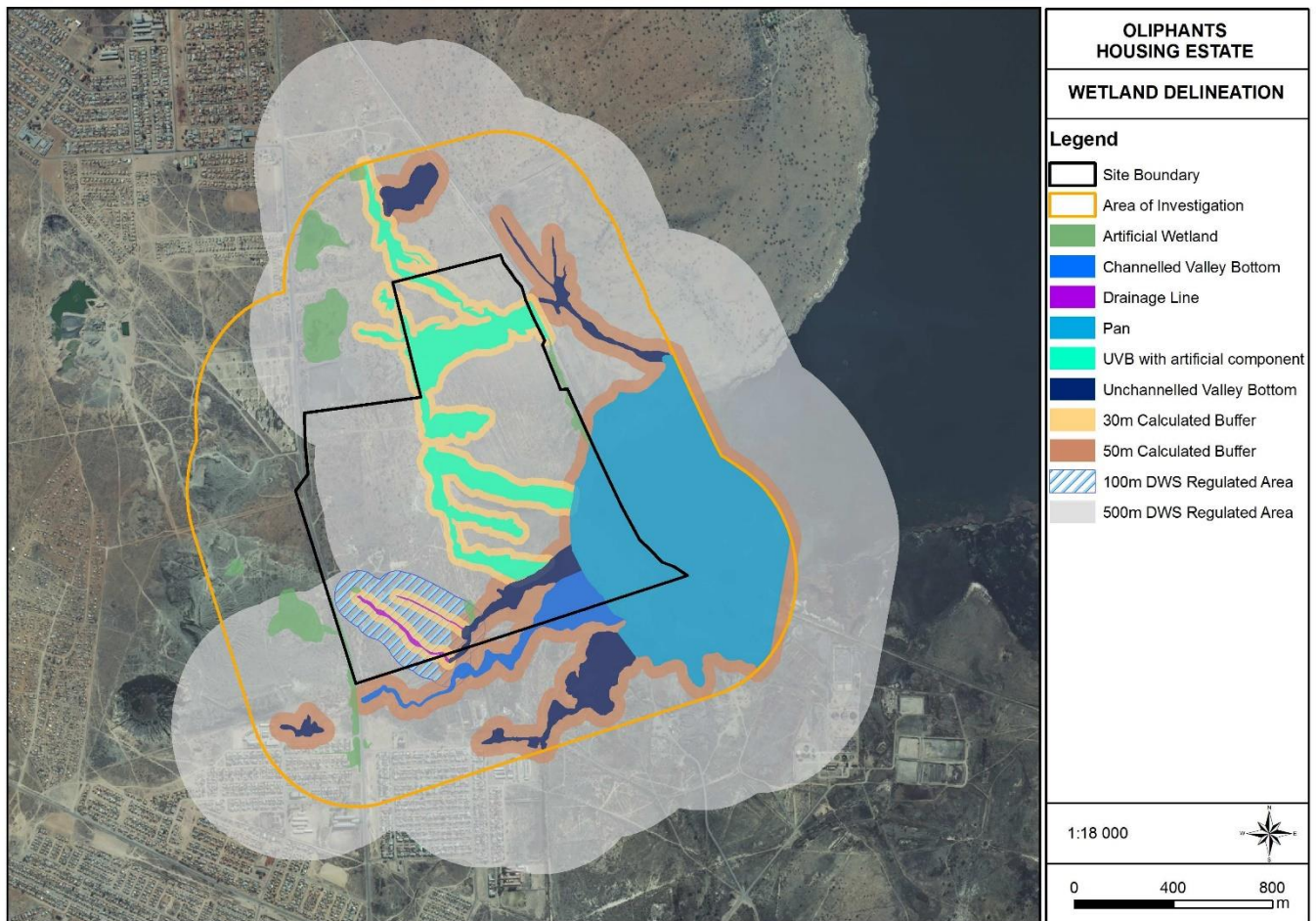


Figure 17: Verified watercourses and associated calculated buffer zone, stormwater outlets and the DWS regulated area

7.4.3 Soil & Vegetation Indicators

Soil and vegetation **characteristics** recorded in 2018 have not altered significantly. Bleached clay with clear redoximorphic features were observed throughout the delineated wetlands (**Figure 18**). An extensive list of plant species recorded in the wetlands is presented EcoAgent (2018).





Figure 18: Plant and soil characteristics observed on-site support the description in EcoAgent (2018).

7.5 Cultural Heritage Aspects of the area

Cultural Landscape:

- During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. Open sites were still preferred near watercourses. These people were adept at exploiting the huge herds of animals that passed through the area, on their seasonal migration. As a result, tools belonging to this period also mostly occur in the open or in erosion dongas. Similar to the ESA material, artefacts from these surface collections are viewed not to be in a primary context and have little or no significance.
- Later Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. The stone artefacts they produced are much smaller than those of the Middle Stone Age and consist of a great variety of functional types. LSA people preferred, though not exclusively, to occupy rock shelters and caves and it is this type of sealed context that make it possible for us to learn much more about them than is the case with earlier periods.
- With reference to the Iron Age, all sources also indicate that this area was not occupied during the Iron Age by early farming communities. In his study on the spread of the Iron Age into the Northern Cape, Humphreys (1976) used not only archaeological evidence, literary sources and eyewitness accounts, but also environmental factors such as rainfall data and vegetation cover. From this he concluded that it was not an environment conducive for keeping large herds of cattle, which was the mainstay of Iron Age communities' economy.
- Although the region is not regarded as archaeologically sensitive, it is located within a historically significant landscape central to the Kimberley Diamond Rush of the 1870's. The history of the discovery of diamonds and the effect it had the history of the country and even the world at large, is well known and need not be repeated here in any detail.
- The old Kamfersdam mine, occurs to the west of the project area. It apparently came into existence during the late 1880s but produced diamonds of a low quality and it seems as if it has been closed down in recent years.

Site specific review:

- From a review of the available old maps and aerial photographs (Fig. 10 to 17) it can be seen that the project area has undergone little change over time. It has always been open space. What is significant is that the various old maps indicate that what is now referred to as Kamfersdam seems to have been much smaller in the past.
- One man-made feature seems to be the old Barkley-West Road that crossed the area. This has now become the powerline servitude as the road seems to have been rerouted to the west. The railway line forming the eastern border of the project area was completed in 1928.
- Currently a number of homesteads are located on the site. As far as could be ascertained all are of recent times, i.e. not older than 20 to 30 years. All except one are still inhabited. A midden is located at each site and is mainly made up of cinders and soil, with some building rubble making up the bulk of the material. An inspection of these middens did not reveal any material, i.e. bottles and tins that seems to be older than a few years.

7.6 Social Characteristics of the Study Area and Surrounds

The purpose of this section is to provide an overview of the current socio-economic situation within the proposed project area. This section will provide a strategic understanding of the socio-economic profile of the study area, in order to develop a better understanding of the socio-economic performance as a background to the development of the project. The data presented in this section has been largely derived from the most recent (2011) Census, as well as the municipalities IDP.

Sol Plaatje Local Municipality (SPLM)

Kimberley, which is located in SPLM, is the seat of the Provincial Legislature for the Northern Cape and the Provincial Administration. It services the mining and agricultural sectors of the region. The city also projects itself as a significant tourist destination, the 'City that Sparkles', boasting a diversity of museums and visitor attractions. It is also a gateway to other Northern Cape destinations including the Mokala National Park, nature reserves and numerous game farms or hunting lodges, as well as historic sites of the region.

Population Dynamics: SPLM covers an area of 1 873 km² and has a total population of 245 606 (SPLM IDP Review, 2010-2011), which accounts for approximately 30% of the total population of the Northern Cape Province. SPLM therefore makes up the majority of the population of the FBDM. Of this total 99.2% of the population is urbanised, with Kimberley (167 000) and Ritchie (9 960) being the two largest settlements within the LM. Approximately 57% of the population falls within the age group 20-64. Over the last ten years, the population in SPLM has grown slowly at an average pace of 0.92% per annum. According to the IDP 54% of the population in 2001 was African, 32% Coloured, 13% White and 1% Indian. In terms of age, 56.7% of the total population in SPLM were between the ages of 20 and 65, in comparison with 53.9% for the Northern Cape.

Employment: In 2006, there were approximately 60 000 people employed in SPLM, which is approximately 25.9% of all people employed in the Northern Cape. Approximately 32 000 people were unemployed. The unemployment rate in 2008 was estimated to be in the region of 40%.

Economy: SPLM accounted for approximately 30% of total provincial Gross Domestic Product (GDP) in 2009 - and 82.1% of FBDM, making it the most important LM in FBDM (Global Insight: 2010). The largest economic role-players in SPLM include the tertiary sector i.e. community services, finance, transport and trade. The mining sector also contributes significantly towards the economy, – although its contribution has steadily declined over the last 20 years or so. It is estimated that 74,147 people from SPLM were living in poverty in 2006. Of this amount, 77.5% were from the black communities. However, these numbers have decreased at an average of 1.7% per annum since 2001. In 2006, the annual disposable income in SPLM grew at an average of 5.65% per annum from 2001. The population group that experienced the highest growth in its annual disposable income was the black population, which also accounted for 39.9% of total disposable income in 2006. Despite this the poverty gap in Sol Plaatje has increased in recent years meaning that persons or households lack the resources necessary to be able to consume a certain minimum basket of goods.

7.7 Visual Characteristics of the area

The current land-use on the site is limited grazing by communal livestock from surrounding townships, though the site is basically located within Kimberley Town and this area has been utilised for diamond mining for about 150 years. Remains of mining activities are evident on the site. Signs of old agricultural fields are also present, now covered by secondary vegetation (**Figure 19**).



Figure 19: Google Earth Image of the site indicating the disturbed nature of the site.

The site is vacant at present. There are several dilapidated structures on site and would require clearance prior to any development taking place. The property is situated in an area primarily used and zoned for residential, agricultural and business activities. (See Zoning and Land Use plans in this regard). The property is located close to local schools, a cemetery, shops, police station and industries. The immediate surrounding properties comprise affordable housing and RDP residential erven. The property may only be used for residential and agricultural purposes (one dwelling house only) and no

development rights were granted to the property. The property is zoned "Agricultural" in terms of the Sol Plaatje Municipality Land Use Management Scheme, 2008. In terms of this zoning, the properties may only be used for agricultural and residential purposes.

The following servitudes encumber the Remainder of Portion 18 of the farm Roode Pan No. 70 as per Title Deed T2833/2015:

1. K84/1995S: Electrical Power Line Servitude (22 meters wide) in favour of Sol Plaatje Municipality as per SG. Diagram 7451/1989
2. Section A(1) of the title deed provides that all roads and thoroughfares now existing on the said land, shall remain free and uninterrupted, and that the government reserves the right to make, or cause to be made on or across the said land, for the public benefit such roads, Railroads, Railway Stations, Paths, Aqueduct, Dams, Drains, Reservoirs, Watercourses or other public works as may be required as also to conduct telegraphs over the said land to establish convenient outspans for the use of travellers. It is probably under this provision that Midlands Road came into existence

7.8 Atmospheric Emissions sources in the Project Area

Emission sources within the Sol Plaatje Local Municipality, where the proposed housing development is located, include combustion installations (boilers), motor vehicles, rail, Kimberley Airport, domestic fuel burning, landfills, sewage works, mining activities

The proposed Kimberley Housing Development is particularly in near proximity to two existing sewage works/wastewater treatment plants (WWTPs), i.e. the Galeshewe and Homevale WWTPs; informal settlements and townships, the largest of which include Retswele and Galeshewe Townships; and several unpaved and paved roads in surrounding areas. These emission sources are within a 3km radius of the proposed development. In addition to the existing sources, three mixed-use sites (commercial and residential), i.e. BMW, Colville and St Augustine sites, and two quarry sites (Roodepan and Voolruitgt Quarries) including two brick making facilities (Clay and Cement Brick facilities) are proposed to be developed by Kimberley Rehabilitation and Development (KRD) near the proposed Kimberley Housing Development. The quarry sites and brick making facilities will be located north and south-west of the proposed housing development.

Exposure concentrations within the Project Area

The first step in understanding health impacts of pollution is to gather information about the type and concentration of pollutants in a given area of interest i.e. exposure concentrations. For air pollutants, exposure concentrations can be derived from two types of sources:

- Ambient air quality measurements undertaken in the area of interest, and/or
- Air dispersion modelling of all sources impacting the area of interest.

Currently, there is no air quality monitoring undertaken in the vicinity of the proposed development. Also, it was not feasible to undertake a detailed dispersion modelling to determine cumulative exposure concentrations of all pollutants that may affect the Estate. However, since the concerns raised were specifically in relation to KRD project as well as the local Wastewater Treatment Plant (WWTP); exposure concentration analysis done in this study focused only on the impact of these two developments.

- **Pollutant concentrations associated with KRDP:** To estimate concentrations of air pollutants at Olifants Estate associated with KRDP project, we used KRDP Air Quality Assessment report produced by Airshed Planning Professionals Pty Ltd (2021). We then applied Geographic Information Systems (GIS) software to superimpose the dispersion model output (provided in the KRDP Air Quality Assessment Report section 4.3) on the Estate boundary map provided by the client. This enabled us to estimate the concentrations inside the estate. The following pollutants were analysed as these were the only pollutants considered in the of KRDP project air quality assessment report:
 - Particulate Matter (PM₁₀) and associated dust
 - Sulphur Dioxide (SO₂)
 - Hydrogen Fluoride (HF)
- **Pollutants concentrations associated with WWTP:** To estimate concentrations of odour causing pollutants at Olifants Estate, we reviewed literature on dispersion and transport of H₂S from WWTPs. Although there are over 1000 odour causing pollutants, we focused on H₂S since it is the most commonly used indicator of odour in WWTPs:

The aim was to understand how far can odours associated with H₂S travel and whether or not Olifants Estate falls within that travel distance range. We relied on literature values because we did not receive any air quality impact report from the WWTP.
- **Additionally,** we had telephonic interviews with one resident who resides near the proposed Olifants Estate to obtain his experiences of pollution and odours from the WWTP which we believe would be representative of what residents of the proposed Olifants Estate might experience. This also allowed us to improve our understanding of odours from the local WWTP because odour detection and impacts is very subjective and therefore relying on estimated emissions concentrations alone is not always sufficient.

7.9 Noise sources within the Project Area

The study area is generally noisy due to traffic along the Midlands Road. Midlands road is the main traffic carrier connecting the northern townships of Roodepan and Midlands to the Kimberley CBD, carries traffic till late hours of night with workers going in and out of the CBD and the mining hubs of Kimberley. This constant moderate traffic on the Midlands Road has significant influence on the soundscape in the area. The results also showed that eastern portions of the site which are further away from the anthropogenic activity (main road) generally experience lower noise level during both day and night. Sites closer to the main road have higher ambient sound levels than other areas. Both Daytime and Night-time noise levels were higher than recommended SANS limits. **Figure 20** shows the main sources of ambient noise, which is basically the road traffic. While there is a rail line located on the eastern boundary of the proposed development site, this line is currently non-functional, however it could be a future source of noise, should the line be reactivated.

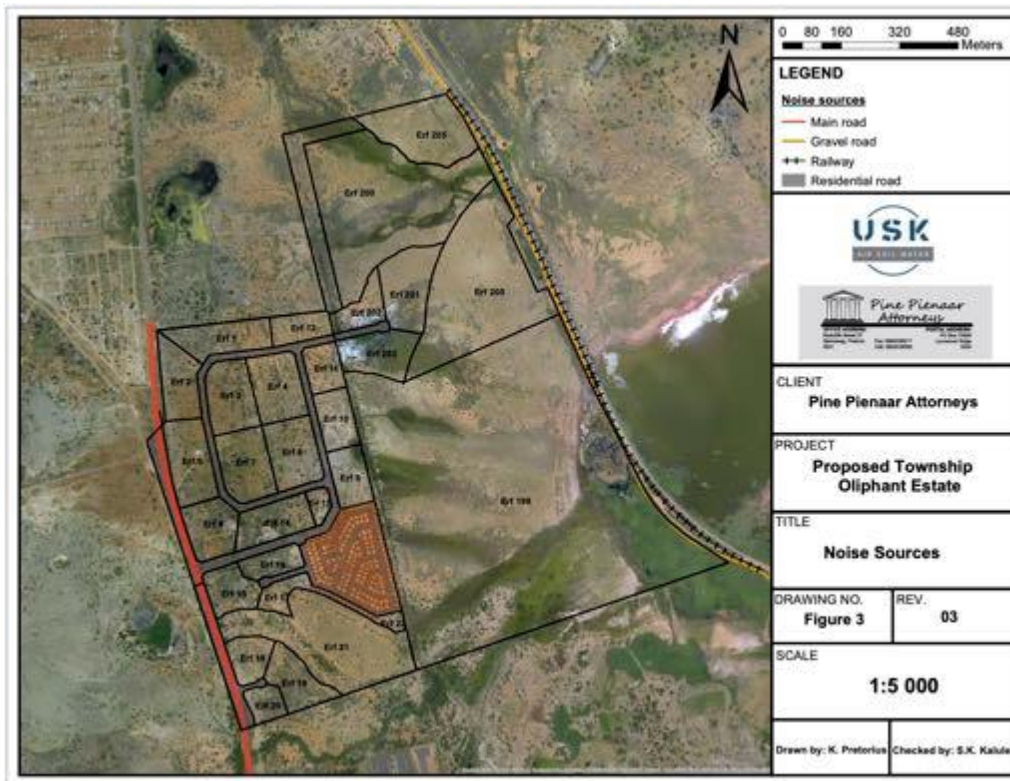


Figure 20: Noise Sources

8 IDENTIFICATION OF ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

In terms of APPENDIX 3(3)(1) of the EIA Regulations (2014) (as amended 2017), an Environmental Impact Assessment Report must include –

(k) A summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.

The activities that are associated with the construction, maintenance and operation of the proposed project, which could potentially have an impact on the environment, are also highlighted in this section. In addition, the Department of Environmental Affairs guide on assessing cumulative effects describes that it is not practical to analyse the cumulative effects of an action on every environmental receptor. Therefore, for cumulative effects analysis to help the decision-maker and inform interested and affected parties, it must be limited to effects that can be evaluated meaningfully. This chapter will highlight potential impacts and issues that can be evaluated.

8.1 Specialist assessments identified

Based on the selected classification shown in **Appendix G3** (screening report) and the environmental sensitivities of the proposed development footprint. In addition, comments received on the previous EIA process from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, the Department recommended that the following specialist assessments form part of the Final Environmental Impact Assessment report.

1. Health Impact Assessment
2. Geotechnical assessment
3. Noise Impact Assessment
4. Hydrology Assessment
5. Aquatic Impact Assessment
6. Biodiversity Impact Assessment including; Terrestrial biodiversity, Avifauna and Flora Assessment
7. Ambient Air Quality Impact
8. A detailed storm water management plan

The above recommendation by the Dept was noted by the project team, as such these studies have been commissioned and forms part of the EIA study that is currently being undertaken.

8.2 Avifauna

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E1** –for more details).

8.2.1 Results of the Avifauna Assessment

Sensitive features present within the PAOI include the waterbodies and their associated wetland areas (**Figure 21**), particularly Kamfers Dam as a designated IBA and Critical Biodiversity Area (CBA). Assigning an appropriate buffer to these areas is essential for the protection of these key habitats and will act as a barrier between the identified impacts (human activities) and the sensitive waterbody features. It is important to note that while buffers provide protection, they do not address all water related problems. They need to be implemented in conjunction with a variety of complementary mitigation and

management measures. Impacts associated with hydrological changes i.e. the inflow of storm water as well as point source discharges such as sewage outflows would be better managed by targeting these areas and impacts through source-directed management and treatment. The recommended buffers in this assessment have been assigned to the project area to ensure the basic aquatic processes, to reduce the impact on water resources from anthropological activities and to secure habitat for aquatic, semi-aquatic and terrestrial species. Biodiversity that is dependent on water for some parts of its life cycle but also require terrestrial habitats adjacent to the water to meet the rest of its life cycle needs benefit from the implementation of a buffer that protect not only the species and core habitats of conservation concern but also the corridors that make it possible to sustain a viable population. In the case of residential projects like this, buffers should not be viewed as restrictive, but rather as an opportunity that will lead to increased property values because of the aesthetic and tourism related activities that can benefit the local community.

The 500m buffer assigned to Kamfers Dam in the 2018 Biodiversity Impact Assessment cannot be viewed as a mitigatory measure, it is a requirement of the regulated area of a watercourse as defined by DWS and for the protection of breeding sites as per the new species guidelines (SANBI, 2020). This 500m buffer must be viewed as a no-go area. An additional avian buffer needs to be assigned as a means to not only prevent and protect, but rather to enhance the habitat and ensure the sustainability of Kamfers Dam as a Key Biodiversity Area. The Terrestrial Fauna Biodiversity and Animal Species Summary (KasI, 2022) provides a detailed description of the recommended buffer distances, as prescribed by SANBI in their Species Environmental Assessment Guideline:

The species assessment guidelines (SANBI, 2020) provide some guidelines on buffers for animal species. The avifauna species sensitive to disturbance is the relevant category in the guidelines in terms of the confirmed Lesser Flamingo and the potential African Marsh Harrier (included as a cautionary species). The entire Kamfers Dam and the reedy wetlands in the south are relevant receptors as breeding and foraging areas for the two species. Noise and visual impacts are listed in the guidelines. Dust and particulate impacts also need consideration, but indirect impact to habitat (water levels and water quality) through poor quality run-off and increased quantity of run-off are considered significant impacts that must be managed in terms of this proposed development.

The likely buffer sizes are determined for high intensity impact (commercial and industrial development, removal of soil or vegetation, 10dB above ambient noise levels, overall noise level higher than 50dB) and low intensity impacts (housing and urban areas, tourism and recreational activities). High intensity impacts require a buffer of 500m or more; guidelines state a minimum of a 1000m for raptor nests and large-bodied SCC, with smaller buffers for water birds (500m) and passerine nests (200m). The guidelines further stipulate that low intensity impacts may have smaller buffers, but at least 200m buffers for raptors in formally proclaimed conservation areas.

8.2.2 Site Sensitivity

This assessment concurs with the assigned 1000m buffer assigned to Kamfers Dam in the Terrestrial Fauna Biodiversity and Animal Species Summary (KasI, 2022) as an adequate mitigation measure to secure Kamfers Dam and its associated wetland and reedbed habitats. Although somewhat disturbed and degraded currently, the terrestrial habitat within the 1000m buffer would under optimal conditions provide the necessary foraging habitat for African Marsh Harrier. Securing this habitat and minimising the human-induced disturbance impacts associated with the residential development, will ensure the

enhancement of the terrestrial habitat resulting in the probable return of this SCC to and regular use of the Kamfers Dam area.

This assessment is encouraged by the steps taken by the applicant to avoid the identified environmental sensitivities within the proposed development area, by excluding AREA 3 and most of AREA 4 from the development footprint. It is the recommendation of this assessment that all forms of development be excluded from Area 4 entirely and that Single Residential or Medium Density Nodes be developed in favour of a High-Density Node in Areas 1 and 2. It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the custodians of Kamfers Dam and its primary stakeholders (i.e. BLSA, Ekapa, HWWTW and the Sol Plaatjie Municipality) and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies.

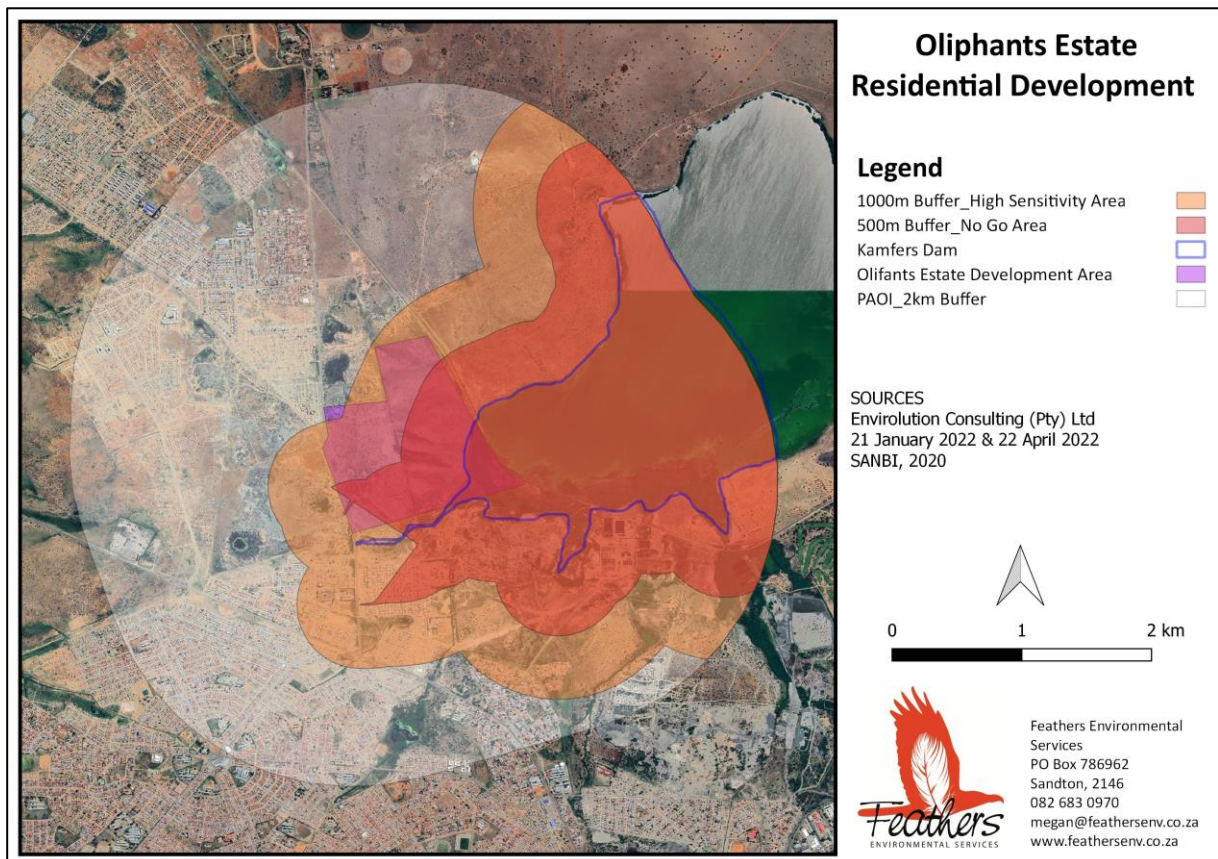


Figure 21: Recommended avian buffers – 500m No Go Area and 1000m High Sensitivity Area.

8.2.3 Summary of impacts assessed

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. With so many variables involved, the impacts of each development must be assessed individually. The principal areas of concern for SCC and non-SCC development-sensitive species related to the proposed residential development are described below:

Displacement as a result of habitat loss or transformation within the physical development footprint

- This impact is dependent on various factors i.e., the location and the size of the development, the amount of habitat affected; the uniqueness of the habitat; and the sensitivity and conservation status of the bird species utilizing that habitat (Smallie, 2013). Areas of habitat will be cleared to accommodate the considerable amount of housing infrastructure required, reducing the amount of habitat available to birds for foraging, roosting and breeding. This impact is likely to have calamitous consequences for the smaller bird species with small home ranges as entire territories could be removed during construction activities. The vegetation present within the proposed residential estate footprint is subject to existing degradation and is, in parts, already heavily transformed. It is therefore unlikely to support the more sensitive woodland species listed.
- Despite the levels of existing habitat degradation, Kamfers Dam and its associated wetland margins remain critical habitat that need to be avoided. Unfortunately, due to the nature of this impact, it cannot be mitigated to negligible levels, but it can be reduced with the construction of the residential estate outside of the imposed avian buffers (discussed in Section 9) ensuring the least risk posed to SCC and non-SCC development sensitive species. A reduction in the number of housing units will further reduce this impact. The proposed Single Residential and Medium Density Nodes need to be considered in favour of the proposed High-Density Node.

Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)

- Kamfers Dam is a dynamic and discrete ecosystem, that is highly sensitive to fluctuating water levels and the intrinsic changes in its biotic components. An optimal range of conditions must occur for the composition of the algal species to flourish within the Dam. The density of Lesser Flamingo is directly correlated to the density of blue-green algae which stimulates the onset of breeding behaviours. Any changes, particularly anthropological factors superimposed on this system will modify the prey base available to SCC and may irreversibly alter the ecological status of this vulnerable ecosystem. Kamfers Dam is situated within one of two depressions/low points in the topography, with storm water flowing into either Du Toits Pan or Kamfers Dam during the rainy season. The proposed residential area is situated directly within the area where rain water is channeled upon entry into Kamfers Dam. Storm water management is critical for the sustainability of Kamfers Dam. Currently, the management of the water levels at Kamfers Dam is severely hamstrung with limited municipal involvement due to financial constraints and non-operational pumping infrastructure. So, it is vitally important that the residential development does not further comprise an already ailing management structure by impeding or exacerbating the delivery of storm water into the Dam.

Displacement as a result of disturbance

- Construction requires a significant amount of machinery and labour to be present on site for a period of time. For most bird species, construction activities are likely to be a cause of temporary disturbance and will impact on foraging, breeding and roosting behaviors. However, for shy, sensitive species or ground nesting birds, construction activities in close proximity to breeding locations, could be a source of disturbance resulting in temporary breeding failure or even permanent abandonment of nests and displacement from the site entirely. In addition, species commuting around the area may become disorientated, avoid the site and fly longer distances than

usual as a result, and for some species this may have critical energy implications (Smallie, 2013). Most notably, the day to day activities (i.e. noise pollution, light pollution, waste disposal, the keeping of pets and easy access to the dam) of the residents occupying the proposed residential estate, are likely to cause a more permanent and significant degree of disturbance to the birds residing and breeding at Kamfers Dam. The construction of the residential estate will undoubtedly displace the avifaunal community that reside both within the physical footprint of the estate, as well as have a profound impact on the species utilising Kamfers Dam. Strict adherence to the imposed avian buffers is vital to the sustainable functioning of the Dam and will reduce the significance of this impact for SCC and non-SCC development sensitive species. Again, a reduction in the number of housing units will further reduce this impact. The proposed Single Residential and Medium Density Nodes need to be considered in favour of the proposed High-Density Node.

Direct mortality/ill health as a result of sewage and contaminated storm water inflow

- Similarly, to fluctuations in water levels, the quality of the water within Kamfers Dam is critical to the survival of the SCC, particularly Lesser Flamingo, Greater Flamingo and Maccoa Duck that regularly utilise the waterbody. Low water levels will reduce the food supply, resulting episodic mortalities that are directly attributed to immunodeficiency induced malnutrition. Heavy metals (associated with industrial pollution), pesticides, algal toxicity and bacterial infection can easily find their way into Kamfers Dam either through the inflow of sewage or contaminated storm water. Kamfers Dam experienced an outbreak of Botulism in 2013 due to a sewage leak on the HWWTW infrastructure, killing hundreds of waterfowl and flamingos (BLSA, 2021). In 2021 significant mortalities were recorded again, due to a bacterial infection as a result of a suppressed immune response. An increase in lead and iron levels within the Dam were reported to be the root cause of the mortalities. The HWWTW infrastructure is currently in disrepair and unable to process Kimberley's burgeoning sewage quantities. Sewage emanating from the Oliphants high-density residential estate cannot be fed directly into the HWWTW, unless substantial upgrades are conducted on the existing infrastructure. Domestic poultry, often associated with low income households and areas of dense human settlement are a source of avian tuberculosis – another significant threat to wild bird populations. Human-induced avian mortality is a significant impact that must be avoided at all costs
- Direct mortality as a result of construction activities
Bird mortality as a result of construction activities is improbable because birds are incredibly mobile and able to move out of harm's way. If mortality does occur, it is likely to be confined to a localised area and restricted to immobile species e.g. nestlings occurring within the physical development footprint. The significance of this impact can be reduced with strict adherence to the recommendations that will stem from a pre-construction avifaunal walk-through, which may include delaying construction to accommodate breeding SCC, if any
- Mortality due to collisions with the existing power line infrastructure as a result of light pollution
Collisions are the biggest single threat posed by power lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds. These species are mostly heavy-bodied birds with limited maneuverability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. Quantifying this impact in terms of the likely number

of birds that will be impacted, is very difficult because a number of variables play a role in determining the risk, for example weather, rainfall, wind, age, flocking behaviour, power line height, light conditions, topography, population density and so forth. A potential impact of the proposed residential development is light pollution. Lesser and Greater Flamingos have a propensity for undertaking nocturnal movements/migrations particularly on clear nights. Excessive lighting in and around the proposed residential estate may result in disorientation and unwarranted movement/flights in and out of the Kamfers Dam area. Both overhead railway and power line infrastructure occur along the boundaries of Kamfers Dam, which have in the past been the cause of a great number of collision related mortalities. In addition, artificial light alters foraging behaviour and vocal communication, often resulting in disorientation and some birds attracted to the light may fall victim to predation by feral or domestic cats.

Mortality as a result of hunting/poaching and egg removal

- The proximity of the proposed residential estate to Kamfers Dam, allows for ease of access to the various species residing on the open water or within the reedbeds. These species may become targets for hunting and egg removal. During the 2018 survey, two snares were found as well as adults and children with catapults to shoot small mammals and birds. Domestic cats and dogs are also a likely source of predation.

Indiscriminate and/or Incorrect waste disposal and inadequate service delivery with regards to waste removal

- The proposed high-density residential estate will in all likelihood generate a significant amount of household waste. If this waste is disposed of indiscriminately or improperly or is not stored correctly awaiting removal, this waste will disperse into the Kamfers Dam. In the wet season, waste (plastics) may be flushed into the Dam together with other surface contamination (as a result of waste water discharge). Birds become entangled in plastic, wire, and other debris. Similarly, birds can inadvertently ingest plastics, ropes and elastic bands, leading to possible medium-term fatalities away from the site, sometimes through the cumulative effect of repeated ingestion.

Impacts on avitourism

- Birding is one of the fastest growing nature-based tourism activities in the world and is experiencing similar growth in interest and popularity in South Africa. South Africa's diversity of birds and endemic species, as well as a full complement of major bird habitats, make it a premier destination for avitourism. In a Department of Trade & Industry (dti) commissioned study, the total size of South Africa's avitourism market is estimated to be between 21 000 and 40 000 avitourists annually and between 8 000 and 16 000 foreign avitourists visiting South Africa per annum (dti, 2010). Collectively, avitourists spend an estimated R927 million to R1,725 billion on birding trips, support services and equipment each year. Avitourists spend more money per visitor than those in other niche market segments. Avitourists have higher than average income levels, book longer trip lengths (a higher total of days travelling for birding purposes) and have a greater tendency to visit multiple provinces within South Africa compared to the mainstream tourism market. Avitourism generally has positive environmental and conservation impacts (dti, 2010). The presence of Lesser Flamingo in addition to other SCC and large spectacular assemblages of waterfowl are a major attraction within the Northern Cape Province, contributing significantly to regional and national economies. Any impact that results in the permanent displacement of Lesser Flamingo and other SCC from the Dam will negatively impact the tourism industry within the province.

8.3 Fauna

8.3.1 Fauna Species

A full biodiversity study was completed by Bredenkamp *et al.* (2018) prior to the release of the protocols. According to the Environmental Screening Report, the site has areas ranked as Low and Very High sensitivity for terrestrial biodiversity (CBAs and ESAs) and areas ranked as Low, Medium (1 bird) and High (2 birds) sensitivity for animal species.

The information in the report is recent (completed 3-4 years ago), addresses the terrestrial biodiversity components as relevant to terrestrial fauna and also addressed the three listed Species of Conservation Concern (SCCs). This report is therefore compiled as a summary report (the 2018 report is attached as **Appendix E2**) extracting the requirements of the relevant protocols and supplemented with additional desktop information where deemed necessary

The following is relevant in terms of vertebrate fauna species:

- Of the three listed bird SCCs:
 - The African Marsh Harrier (*Circus ranivorus*) cannot be excluded from the reedy vegetation of the stream and dam in the eastern corner of the property and this species forms the focus of the SEI assessment below. Although records in the past were scant and recent records are absent, any destruction of the reedy wetlands would result in loss of any potential existing individuals or prevent the recurrence of the species in the area.
- In terms of other TOP species recorded in the greater area or likely to occur on site:
 - The Maccoa Duck (*Oxyura maccoa*) is considered a foraging visitor and possible breeder at Kamfersdam. As an aquatic species its main habitat unit is largely off-site, but may be exposed to indirect impact through contaminated water runoff, which must be managed.
 - Although unlikely to utilise the Kamfersdam, as an opportunistic breeder during the rainy season, the Giant Bullfrog (*Pyxicephalus adspersus*) cannot be excluded from site or neighbouring areas from where the species may swarm onto site during the breeding season. Active monitoring and adaptive management measures must be implemented to reduce potential impact to the species.
- The Kamfersdam and associated IBA is a significant water bird habitat within the greater arid region. Many significant congregatory species and water birds utilise the dam. Furthermore, the Kamfersdam is the only breeding site for the Lesser Flamingo (*Phoenicopterus minor*) in South Africa and one of four regular sites in sub-Saharan Africa. The Maccoa Duck (*Oxyura maccoa*) may also be a potential breeder in the dam (**see section 8.3 for further detail on the avifauna**).
- The site is not within a significant area of faunal endemism.
- In terms of invertebrates:
 - No SCC trigger species are listed in the Environmental Screening Report.
 - No significant TOP species populations are expected on site. Species that do occur on site will also occur in the adjacent landscapes and will persist in the area, especially in the Dronfield Nature Reserve, north of Kamfersdam where anthropogenic disturbance will be lower.

8.3.2 Site Ecological Importance and Overall Site Sensitivity

The site sensitivity was completed in the 2018 report and included the 500m buffer of the Kamfersdam for the flamingos, but the SEI assessment as prescribed by the species assessment guideline (SANBI, 2020) was not a prerequisite at that time.

The only trigger SCC that cannot be excluded is the African Marsh Harrier, the focus species for the site ecological importance (SEI) assessment (**Table 6 and Figure 22**) as per the of the Animal Species Environmental Assessment Guideline (SANBI, 2020). Although the Lesser Flamingo is not a listed SCC (SANBI, 2020), it has been incorporated into this SEI assessment as Kamfersdam is the only breeding site for this species in South Africa. The following is relevant:

- Habitat units were extrapolated in part from the prior vegetation map (Bredenkamp *et al.* 2018) and Google Earth Imagery (June 2018). The updated wetland and flora reports should be consulted for final delineations of habitat units and their sensitivity plans incorporated into the overall terrestrial and aquatic biodiversity sensitivity plan.
- The disturbed shrubveld and degraded *Prosopis* shrubveld has been merged into a single bushveld habitat unit as no SCCs or TOPS would be associated specifically with either one or the other habitat unit.
- The reedy wetland, specifically around the Kamfersdam, has been evaluated as a separate habitat as this is the preferred habitat for the African Marsh Harrier.
- The quarries have also been mapped separately to other transformed / disturbed habitat units as these create man-made aquatic habitats.
- The estimated global population size for the African Marsh is unknown (IUCN); the SA numbers are <2500 mature individuals (Taylor *et al.*, 2015). A HIGH CI is given to the Reedy Wetlands unit.
- Although the Lesser Flamingo is only listed as Near Threatened (MEDIUM CI) the critical role of the Kamfersdam as a sole breeding site for the species in South Africa (and as a critical aquatic habitat for other species within the greater arid region), makes the dam critical in terms of conservation of the species and a HIGH CI is given to this aquatic habitat.
- Although wetlands on site and immediately connected to site cumulatively exceed 100ha (Very High FI), the wetlands are disconnected and not all the wetlands support reedy habitat. A HIGH FI is given to the Reedy Wetlands unit and Wetlands unit.
- The section of the dam on the property is minor, but as a habitat unit the Kamfersdam exceeds 100ha and a VERY HIGH FI is given to the Kamfersdam unit.
- As stated in the report, the African Marsh Harrier has not been observed on site since 1997 and even at that time it was estimated that only a couple of individuals were present. The species is therefore clearly sensitive to surrounding anthropogenic impact and has a low likelihood of returning to site due to existing activities. However, if the species still persists in the area then it has a higher tolerance to the surrounding activities. It is therefore difficult to rate the RR, and the MEDIUM rating has been selected for the Reedy Wetlands unit.
- The Lesser Flamingo is likely to continue using the dam. However, breeding of the species at the dam (approximate area of recent breeding indicated in **Figure 22**) will be impacted if the development proceeds within the 500m buffer or if the development does not actively manage runoff from site (impaired water quality and quantity which are listed threats for the Kamfersdam IBA). Declines in populations are expected, although cannot be fully quantified and a LOW RR is given to the Kamfersdam unit.

Table 6:: Overall Site Ecological Importance (SEI) assessment

Evaluation unit	CI	FI	BI	RR	SEI
Disturbed bushveld	Low	Medium	Low	Medium	Low (Minimise & Restore)
Secondary grassland	Low	Medium	Low	Medium	Low (Minimise & Restore)
Wetlands	Medium	High	Medium	Medium	Medium (Minimise & Restore)
Reedy wetlands	High	High	High	Medium	High (Avoid & Minimise)
Kamfersdam	High	Very High	Very High	Low	Very High (Avoid)
Quarries	Low	Low	Low	High	Very Low (Minimise)
Transformed / disturbed	Very low	Very low	Very low	Very high	Very Low (Minimise)

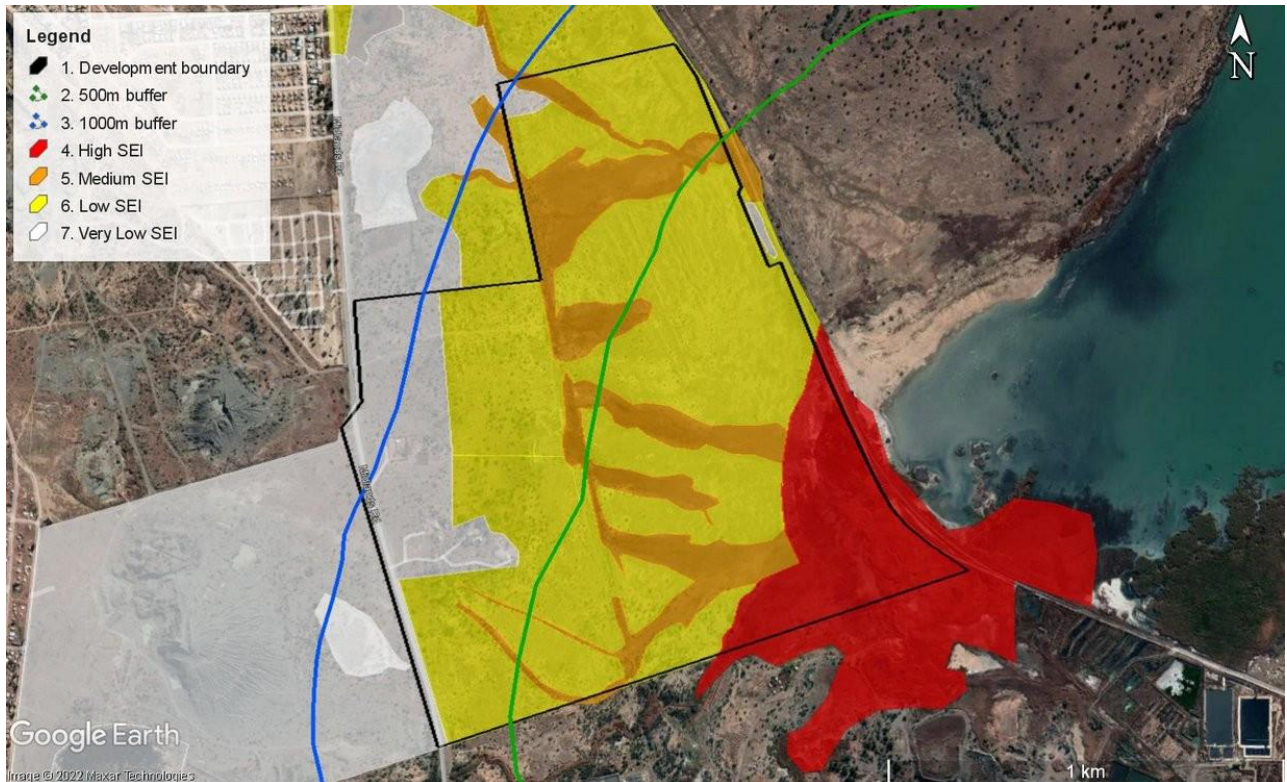


Figure 22: Site Ecological Importance in terms of terrestrial fauna species of conservation concern overlaid onto Google Earth imagery (June 2018)

8.4 Terrestrial Vegetation

Dimela Eco Consulting was asked to verify the vegetation on the site and surrounds against a 2018 ecological assessment undertaken by Eco Agent (Eco Agent, 2018). Therefore, the vegetation assessment should include a terrestrial vegetation assessment, as well as a terrestrial plant species assessment, as published in the Government Gazette No 43855 on 30 October 2020 in terms of sections 24(5)(a) and 25 (5)(h) of NEMA. However, the historic ecological report of the site, undertaken in 2018 (Eco Agent, 2018) found that most of the vegetation on the site is degraded and of low vegetation sensitivity. This report was used as a reference for the state of vegetation.

This report therefore entails a site verification of the larger site assessed in 2018, including limited vegetation sampling within walked transects, verification of the vegetation description as per EcoAgent (2018) and a habitat assessment for the plant species of conservation concern as listed in the screening tool, to comply with the Protocols for terrestrial vegetation and plant species assessments published in 2020

8.4.1 Vegetation units as delineated in historical report of Eco Agent (2018)

The assessment undertaken in March 2018 found that the vegetation units on the site assessed were disturbed, degraded, and transformed and only the wetland areas were considered as being sensitive to development. The table below lists the eight (8) vegetation units that were delineated in the year 2018 along with its ecological sensitivity. Six of these vegetation units is present on Portion 18, on which the development is now proposed. This vegetation and ecological sensitivity are geographically represented in **Figure 23 and Figure 24** (Eco Agent, 2018).

Despite being in a CBA2, the 2018 assessment indicated that due to decades of intensive disturbance by the mining operation and related activities, the vegetation became degraded, even locally transformed. The sensitivity in terms of biodiversity were awarded a Medium-Low and Low sensitivity (Eco Agent, 2018). Thus, according to the historic report, the site is developable, bar wetland and associated buffer areas.

Table 7: List of mapping units with ecological sensitivity as delineated in 2018 (Eco Agent, 2018) and verified during the January 2022 site verification

Vegetation mapping unit	Sensitivity analysis result
<p>1. Disturbed <i>Vachellia tortilis</i> Thornveld</p> <p>A disturbed relict of the Kimberley Thornveld, or even secondary vegetation that developed on degraded sites. This plant community occurs as isolated patches in the northern and south-eastern parts of the study site. The dominant tree is <i>Vachellia tortilis</i>, though the invasive <i>Prosopis glandulosa</i> is often also present.</p>	Medium-low
<p>2. Highly Transformed Area</p> <p>Areas that are totally transformed by previous mining operations, buildings (rubble from ruins of previous infrastructure and current buildings.), a football field and other degraded areas surrounding old quarries or mining pits and old roads. The soil is extremely disturbed. The dominant shrub/tree is <i>Vachellia tortilis</i>, though the alien invasive <i>Prosopis glandulosa</i> is often dominant. The herbaceous vegetation scanty. Some forbs occur in the area, several being weed species.</p>	Low
<p>3. Disturbed Open Shrubveld</p> <p>Historically disturbed, and bare patches, similar to the Highly Transformed Areas occur scattered throughout this area. The plant species composition is also very similar to that of the Highly Transformed Areas, but the Disturbed Open Shrubveld is in a somewhat better condition. The bare patches are locally dominated by the invasive <i>Prosopis glandulosa</i> though particularly better grass cover of typical <i>Vachellia tortilis</i> Thornveld is also present.</p>	Low
<p>4. Old Fields Secondary Grassland</p> <p>Secondary grassland that established on historically cultivated fields in the central part of the study site. The grass layer is dominant, dominated by <i>Eragrostis lehmanniana</i>. Trees are rare but <i>Vachellia karroo</i> and dwarf shrubs are present.</p>	Low
<p>5. Degraded <i>Prosopis</i> Area</p> <p><i>Prosopis glandulosa</i>, an alien invader plant species, occur on bare and somewhat sodic soils mainly along drainage lines and flooded areas. Very few other plant species occur in this area, and those that are present often indicate sodic conditions. The area is prone to erosion.</p>	Low
<p>6. Mine Dump</p>	Low

Vegetation mapping unit	Sensitivity analysis result
<p>The mine dump west of Midlands Road is bare, with scanty vegetation limited to the eastern side of the dump, around an excavation, currently filled with water. The plant species are limited to a few trees and shrubs of <i>Vachellia tortilis</i> and the alien <i>Prosopis glandulosa</i>. Scanty grass includes <i>Eragrostis lehmanniana</i> and <i>Chloris virgata</i>.</p>	
<p>7. Wetlands</p> <p>The dominant species in most of the wetland unit is grass species and no trees are present apart from the invasive <i>Prosopis</i> species and <i>Tamarix</i> species on the outer edges of some of the wetland units. The vegetation on site fairly typical of wetland conditions. Most of the areas dominated by <i>Typha capensis</i>, <i>Phragmites australis</i>, <i>Cyperus eragrostis</i> and <i>Cyperus congestus</i> appears to be artificial wetland area or appear to receive additional water from artificial sources. The vegetation is dominated by <i>Phragmites australis</i> where the wetland unit enters the pan.</p>	<p>Medium high to high</p>
<p>8. Quarries and Mining Pits</p> <p>Artificial wetlands where water are accumulates in the bottom of the excavations. Although wetland conditions are present in the excavations, these conditions are artificial</p>	<p>Low</p>

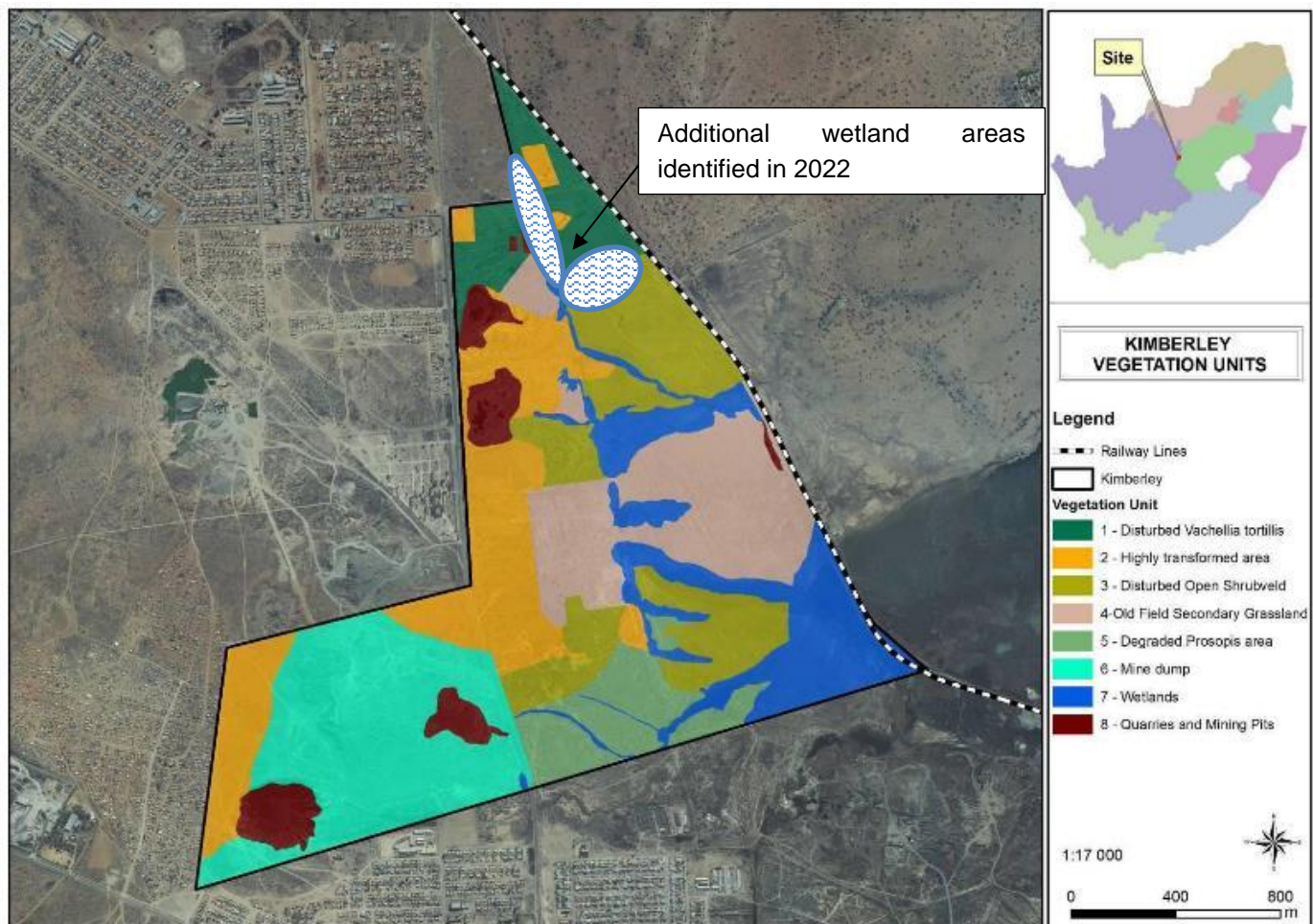


Figure 23: Vegetation units on the site as per Eco Agent (2018) and verified during the January 2022 site verification.

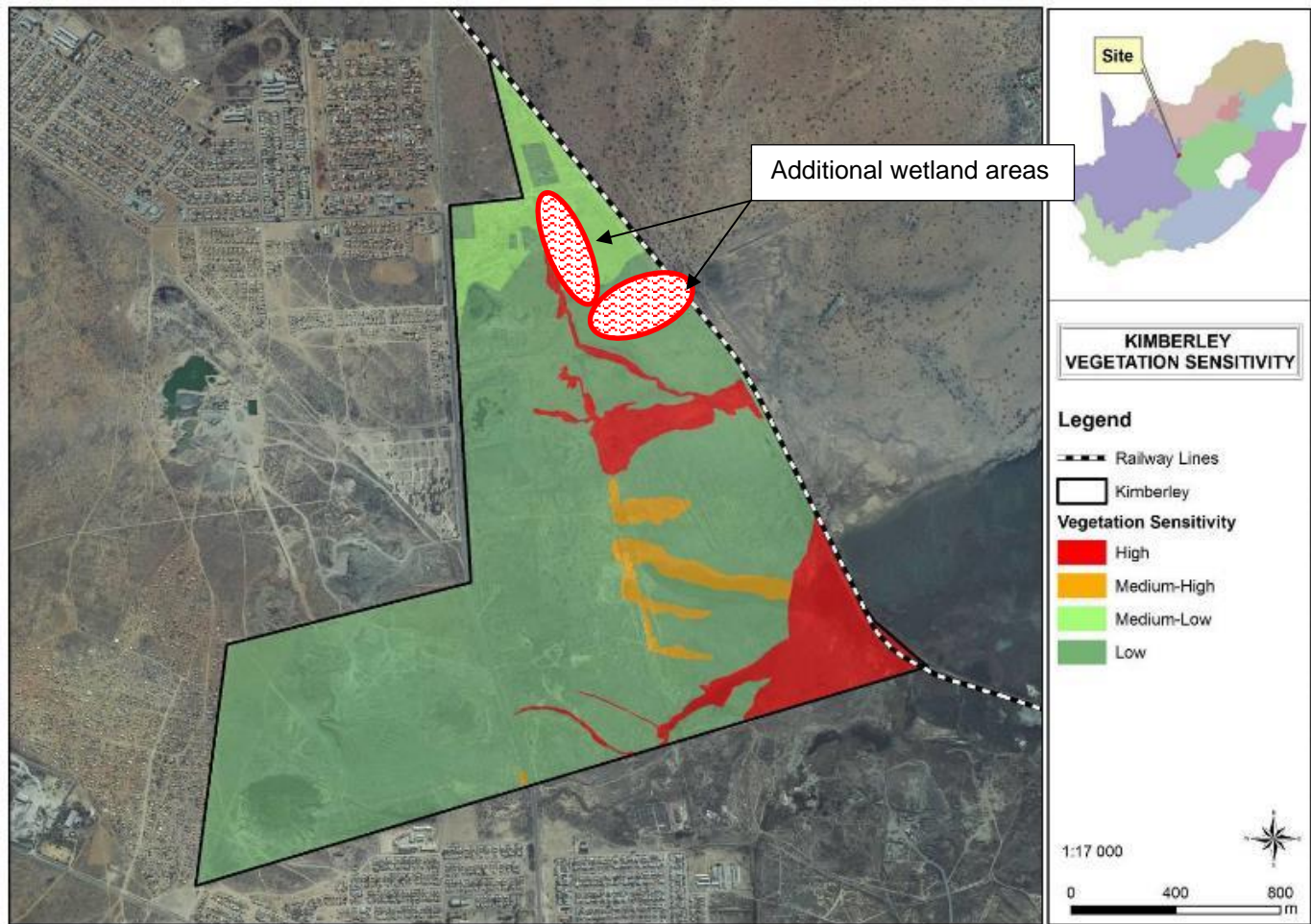


Figure 24: Ecological sensitivity of the site as delineated in 2018 (Eco Agent, 2018)

8.4.2 Plant Species of Conservation Concern

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009b), Raimondo et al, (2009), information gathered from the Plants of Southern Africa website (POSA) for the area the site is situated in, the historical report for the site (Eco Agent, 2018), and information received from the South African National Biodiversity Institute (SANBI) on sensitive species.

- **Historic assessment of 2018:** The 2018 assessment did not record any threatened species. Although the plant species listed in that report may occur in the vicinity, they were not found on the study site, probably due to the long-term disturbance, degradation and transformation caused by long term human occupation and the mining operations (Eco Agent, 2018). The wetland section of the Eco Agent report (2018), list that a *Nerine* species was recorded in wetland conditions. Several *Nerine* species are threatened, however, none with a distribution around Kimberley.
- **Current habitat assessment and plant species compliance statement:** **Appendix E3** list species that has been short-listed to have a possibility of occurring, including a Vulnerable species for which the habitat assessment was undertaken. The wetland areas and associated buffers are the only potential habitat for two species listed in **Appendix E3**. Neither of these species were recorded and the likelihood of occurring is considered medium to low, particularly as the 2018 assessment also

did not record any of these species (Eco Agent, 2018). No further plant species of conservation concern assessments are thought to be needed.

8.4.3 Protected plants

At the time of this assessment, no TOPS listed species were recorded within the proposed development footprint.

- **NEMBA Threatened or Protected Plant Species (TOPS):** At the time of this assessment, no TOPS listed species were recorded within the proposed development footprint.
- **Provincially Protected Plants:** Several plants are provincially protected by the Northern Cape Nature Conservation Act No.9 of 2009. The removal or pruning of these plants will require a permit from the Northern Cape Department of Environment and Nature Conservation.
 - The 2018 assessment recorded three (3) provincially protected plant species on the site, namely large populations of the geophyte *Ammocharis coranica*, the succulent *Aloe grandidentata* and a few individuals of the succulent *Orbea lutea*.
 - At the time of this assessment, only *Ammocharis carinica* and *Aloe grandidentata* were recorded. It is likely that a denser grass layer obscured the small *Orbea lutea* and it is highly likely to still be present on the larger Secondary PAOI. All three these plant species can easily be transplanted and relocated to suitable habitat outside the development footprint on the site.
- **National protected trees:** The National Forest Act, 1998 (Act No. 84 of 1998) enforces the protection of several indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the Department of Agriculture, Land Reform and Rural Development (DALRD, formerly Agriculture, Forestry and Fisheries) ((Notice of the List of Protected Tree Species under the National Forests Act, 1998 (ACT NO 84 OF 1998), Notice 536 of 2018, Government Gazette, 7 September 2018).

Of these trees, *Vachellia erioloba* (camel thorn), occurs abundantly in the Kimberly area. However, this tree was not noted on the site and no other protected trees were expected to be present. Some tree stumps were recorded, and it is assumed that trees are harvested for firewood. This tree makes excellent firewood and could have been harvested if it was historically present. The likelihood of being present on Portion 18 is low.
- **Alien Invasive Plant Species:** The alien plant species identified on the study site are listed in **Appendix E3**. Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:
 - (a) notify the competent authority in writing
 - (b) take steps to manage the listed invasive species in compliance with
 - (i) section 75 of the Act;
 - (ii) the relevant invasive species management programme developed in terms of regulation 4; and
 - (iii) any directive issued in terms of section 73(3) of the Act.

The following category 1b plants were observed within the site

Table 8: Category 1b invasive plant species and the vegetation group(s) it was recorded in.

Species	Common name	Vegetation groups
<i>Cirsium vulgare</i>	Scotch Thistle	Wetland areas
<i>Flaveria bidentis</i>	Smeltersbush	Wetland areas and sporadically across the site
<i>Tamarix ramosissima</i>	Pink tamarisk	Wetland areas, highly transformed areas

8.4.4 Site Ecological Importance

The interpretation of the SEI ranks is described in **Table 9** below, the SEI rating was utilised to generate the vegetation sensitivity map (**Figure 25**). *This map must be considered along with the fauna sensitivity map and wetland map (where applicable) to obtain an overall sensitivity map.*

Table 9: Scoring of vegetation that occurs within the secondary PAOI. The vegetation printed in bold is present on Portion 18

Broad vegetation community	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) – mitigation
Degraded secondary <i>Vachellia tortilis</i> Thornveld	Low ¹	Medium-high ²	Medium	High	Low (Minimise & Restore)
Highly transformed	Low ¹	Low ³	Low	High	Very Low (Minimise)
Disturbed Open Shrubveld	Low ¹	Medium-high ²	Medium	High	Low (Minimise & Restore)
Old Fields, Secondary grassland	Low ¹	Low ³	Low	High	Very Low (Minimise)
Degraded <i>Prosopis</i> Area	Low ¹	Medium ⁴	Low	Medium	Very Low (Minimise)
Mine Dump	Low ¹	Low ³	Low	High	Very Low (Minimise)
Wetlands	Low ¹	High ⁵	Medium	Low	High (Avoid & Minimise)
Artificial wetlands	Low ¹	Medium ⁴	Low	Low	Medium (Minimise & Restore)

¹ No confirmed or highly likely SCC / range-restricted species. Less than 50 % contains natural habitat with limited potential to support SCC.

² Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type, Good habitat connectivity with potentially functional ecological corridors, Mostly minor current negative ecological impacts with some major historical impacts

³ Several minor and major ecological impacts, modified vegetation

⁴ Historical impacts, currently has an ecological function or comprise drainage / hydrology function

⁵ Intact area for any conservation status of ecosystem type, good habitat connectivity, good rehabilitation potential

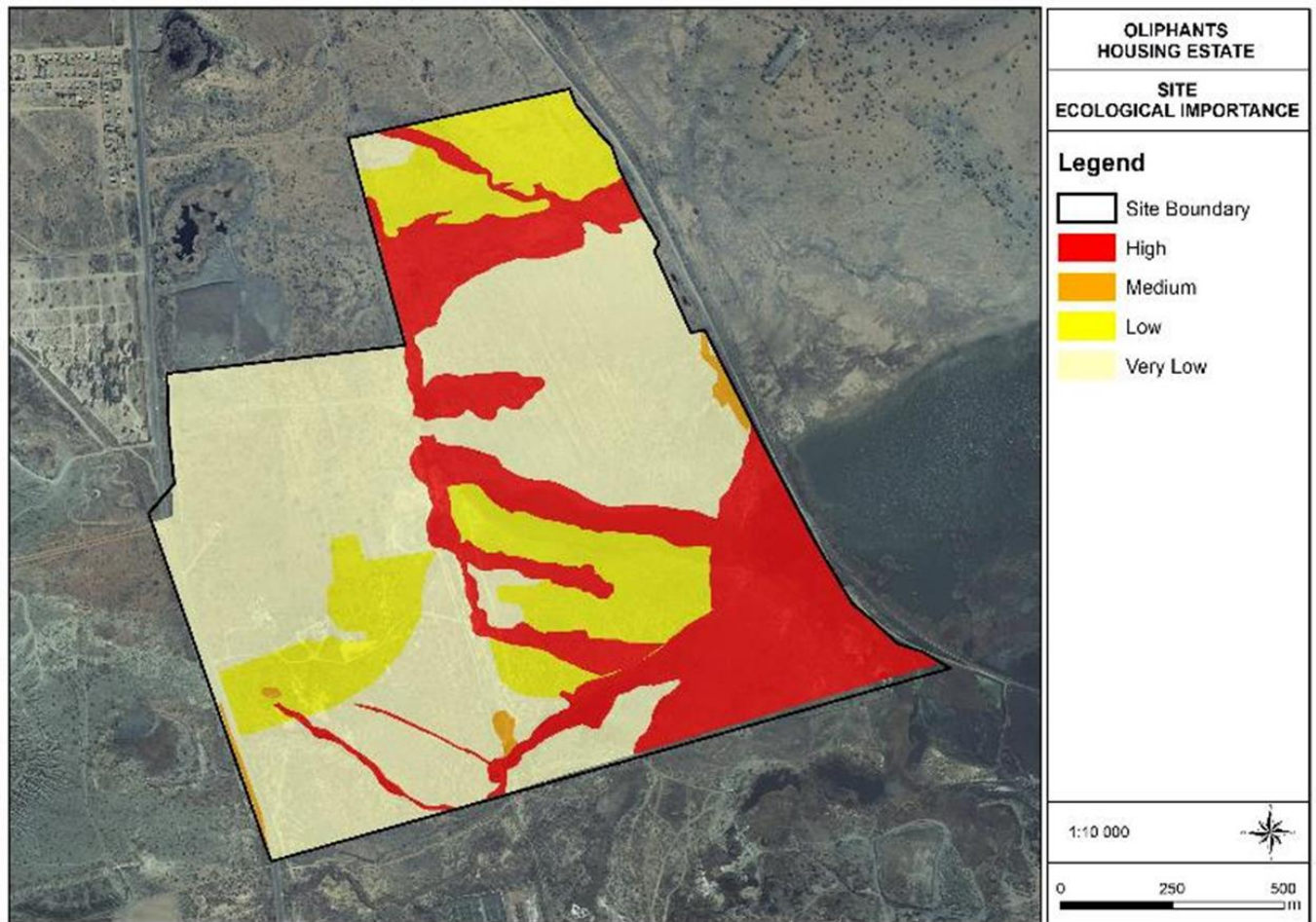


Figure 25: Site Ecological Sensitivity

This assessment concurs with the sensitivity analysis of 2018 (Eco Agent, 2018) in that most of the site is developable, bar the wetland areas and associated buffer areas as recommended by the wetland and fauna specialist.

- **Very low SEI:** The vegetation that was historically cleared and highly disturbed rated as very-low SEI. These modified vegetation units are not in a natural state. No plant species of conservation concern were recorded, and it is highly unlikely that such species are present.

Development activities of medium to high impact are acceptable. Most types of development can proceed within low SEI with little to no impact on conservation worthy vegetation. However, edge effects to other proximate sensitivity classes must be prevented, and buffers to watercourses must be respected. The Degraded Prosopis Area must be managed in accordance with the wetland specialist's recommendation as it comprises drainage lines.

- **Low SEI:** Degraded and some secondary vegetation comprised good basal cover and can readily rehabilitate. It further has good habitat connectivity with mostly minor current negative ecological impacts with some major historical impacts.

These are developable areas that are connected to or in proximity to sensitive features and open spaces. Edge effects must be prevented.

- **Medium and High SEI:** The artificial wetland and wetland areas rated medium and high SEI respectively. The vegetation is typical of wetland areas. The vegetation rated as Medium and High SEI were in natural to semi-natural state, with good habitat connectivity, minimal current impacts and a potential to support plant species of conservation concern.

The moist areas play a role in the health and functioning, as well a water quality of watercourses in the area. These watercourses are essential to maintain ecological corridors for the movement and survival of species within a landscape fragmented by mining, urbanisation, and cultivation. In addition, the hydrological processes associated with these ecological features are strongly associated with the intactness of the vegetation within and surrounding these areas. The vegetation plays an important role in flood attenuation, prevent soil erosion and sedimentation of wetlands and pans, and promote the uptake of toxins from the water.

In medium SEI vegetation, development activities of medium impact are acceptable. Minimization & restoration mitigation must be implemented followed by appropriate restoration activities. In high SEI, impacts must be avoided. Development within these areas is undesirable and impacts are difficult to mitigate, if at all. Impacts must be avoided or managed in accordance with the wetland specialists' recommendations.

8.5 Aquatic system and Wetlands

8.5.1 Summary of results for each watercourse unit discussed

EcoAgent (2018) describes various impact to the different watercourse units on site including the railway bisecting a section of the pan, the powerline, roads, leaking pipelines and excavation. This aspect of watercourse integrity is the subject of concern for many stakeholders as it significantly impacts on the viability of a breeding population of Lesser Flamingos. **Table 10** provides a summary of the results recorded for the watercourse units potentially affected by the proposed Oliphant Township.

Table 10: Summary of results for each watercourse unit discussed

Watercourse Type	Assessment Method
Kamfers Dam - Pan	<p>PES: C – Moderately Modified with a combined PES score of 3.1, 69%. The Water Quality obtained the lowest score (F – Critically Modified). The condition of the wetland is expected to decrease gradually in the next 5 years, although Water Quality is expected to deteriorate rapidly unless catchment wide correction is affected.</p> <p>ES (2.2 – Moderate) + EI (4.0 Very High) = EIS (4.0 Very High). The most significant Ecosystem Services are Biodiversity Maintenance, Assimilation of Phosphate, Nitrate and Toxicants which scored Very High. Education and Research also scored Very High.</p> <p>Water quality: The SASS EC if read with the water quality results indicate that the aquatic habitat is highly altered and modified by anthropogenic activities. The water quality assessment indicated that the system at sample site 3 is polluted with <i>E.Coli</i>- this should not be present in a natural system. The TDS of sample 1 (Kamfers Dam) is of concern and it is not clear if this is part of the natural cycle as associated with many Northern Cape depression systems. Sample 2 also indicates elevated TDS_ this can also influence the results at sample 1. Elevated phosphates (PO₄) in conjunction with elevated NO₃ and Total oxidised nitrogen as N indicates a system possibly in Mesotrophic conditions. Further testing inclusive of Chemical oxygen demand (COD) is recommended to confirm.</p> <p>Instream habitat (IHAS): The IHAS score was calculated to 40% and 38% sample site (Error! Reference source not found.). This indicates the habitat is “Insufficient for supporting a diverse aquatic macro invertebrate community”.</p>

	<p>Aquatic macroinvertebrate assemblages: Sample 1: Not completed due to classification of system Sample 2: SASS score 30, 8 taxa, ASPT 3.8.</p> <p>Using the “Dallas Bands” (Dallas, 2007) the SASS5 Ecological Category was determined to E/F classification. The classification suggests that the system is in poor condition. This assessment is in line with the site observations.</p> <p>Recommended Ecological Management Category: C. The development may not result in further deterioration of the Ecological Category below C</p>
Unchannelled Valley Bottom wetlands (UVB)	<p>PES: C – Moderately Modified with a combined PES score of 2.2 – 78%. The Vegetation module of the assessment scored highest (B) although the modules Hydrology, Geomorphology and Water Quality showed more impact (PES Class C). The condition of the wetland is expected to decrease gradually in the next 5 years.</p> <p>ES (1.1 – Low) + EI (1.5 Moderate) = EIS (1.5 Moderate). The most significant Ecosystem Services are Phosphate Assimilation which scored Very High. Sediment Trapping, Nitrate and Toxicant Assimilation scored Moderate.</p> <p>Recommended Ecological Management Category: C. The development may not result in further deterioration of the Ecological Category below C</p>
Channelled Valley Bottom Wetlands (CVB)	<p>PES: C – Moderately Modified with a combined PES score of 2.7 – 73%. All four modules fall in the C category. The condition of the wetland is expected to decrease gradually in the next 5 years.</p> <p>ES (1.1 – Low) + EI (1.5 Moderate) = EIS (1.5 Moderate). The most significant Ecosystem Services are Phosphate Assimilation which scored Very High. Sediment Trapping, Nitrate and Toxicant Assimilation scored Moderate.</p> <p>Water quality: The SASS EC if read with the water quality results indicate that the aquatic habitat is highly altered and modified by anthropogenic activities. The water quality assessment indicated that the system at sample site 3 is polluted with <i>E.Coli</i>- this should not be present in a natural system. The TDS of sample 1 (Kamfers Dam) is of concern and it is not clear if this is part of the natural cycle as associated with many Northern Cape depression systems. Sample 2 also indicates elevated TDS_ this can also influence the results at sample 1. Elevated phosphates (PO₄) in conjunction with elevated NO₃ and Total oxidised nitrogen as N indicates a system possibly in Mesotrophic conditions. Further testing inclusive of Chemical oxygen demand (COD) is recommended to confirm.</p> <p>Instream habitat (IHAS): The IHAS score was calculated to 40% and 38% sample site (Error! Reference source not found.). This indicates the habitat is “Insufficient for supporting a diverse aquatic macro invertebrate community”.</p> <p>Aquatic macroinvertebrate assemblages: Sample 3: SASS score 10, 5 taxa, ASPT 2</p> <p>Recommended Ecological Management Category: C. The development may not result in further deterioration of the Ecological Category below C</p>
Channelled Valley Bottom wetlands with Artificial Elements (CVB with Artificial Elements)	<p>PES: C – Moderately Modified with a combined PES score of 3.7 – 63%. The modules Hydrology and Geomorphology fall in the C category. Modules Water Quality and Vegetation are more impacted and fall in the D category. The condition of the wetland is expected to decrease gradually in the next 5</p> <p>ES (1.1 – Low) + EI (1.5 Moderate) = EIS (1.5 Moderate). The most significant Ecosystem Services are Phosphate Assimilation which scored Very High. Sediment Trapping, Nitrate and Toxicant Assimilation scored Moderate.</p> <p>Recommended Ecological Management Category: C. The development may not result in further deterioration of the Ecological Category below C</p>
Drainage Lines	<p>EC: The Ecological Category obtained for the two drainage lines fall in the ES (1.0 – Low) + EI (1.5 Moderate) = EIS (1.5 Moderate). The most significant Ecosystem Service is Phosphate Assimilation which scored Very High.</p> <p>Recommended Ecological Management Category: C</p>

8.5.2 Impacts on wetlands

The Kamfers Dam was an ephemeral pan seasonally inundated from the natural receiving environment. Anthropogenic activities in Kimberly have led to the release of additional storm water and sewage (both treated and untreated) into the system. This has transformed the pan into a permanently inundated system. Increased water levels have led to the inundation and destruction of breeding habitat for Lesser

Flamingo. Ekapa Mining attempted to mitigate the issue with the installation of a S-shaped breeding habitat. This was inundated as the water levels in the pan rose again.

Lesser flamingos inhabit many large alkaline or saline lakes, salt pans and estuaries throughout Africa. The nesting habitats of lesser flamingos includes areas in very shallow water so they can construct their nests out of the wet mud found in the area. The water typically measures less than one meter deep. During the site visit in January 2021 a very full Kamfers Dam was observed. This is attributed to above seasonal rainfall and pre-rainfall season levels of the pan.

The proposed development layout relative to the delineated wetlands with their associated buffer zones is presented in **Figure 26**.

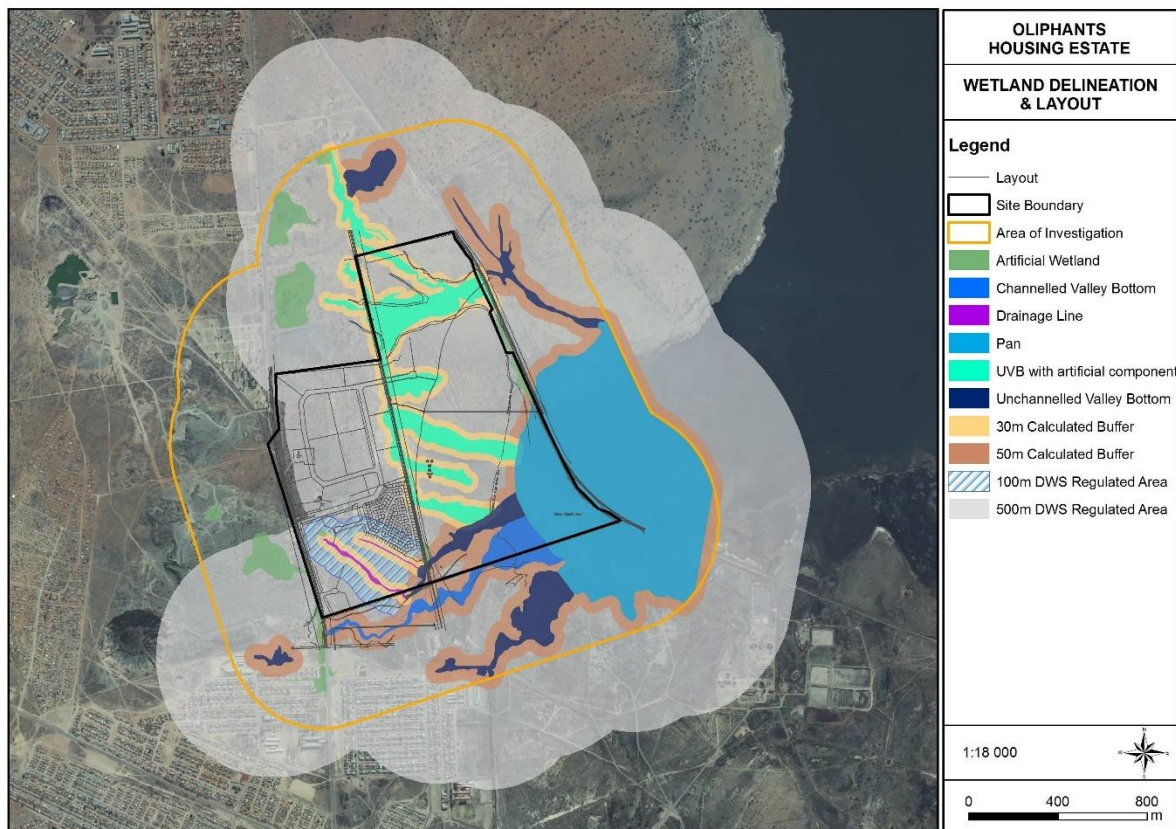


Figure 26: The proposed development layout relative to the delineated watercourses and their buffer zones

The establishment of a residential development adjacent to Kamfers Dam will increase the burden of regional stormwater infrastructure and services that are currently dysfunctional. Although the proposed layout is largely excluded from watercourses and their buffer zones, development on the study site will lead to surface hardening of this section of Kamfers Dam's catchment. This will lead to increased runoff into the already unnatural permanently inundated depression system. With no observed attenuation in the town of Kimberly the risks of flooding events during high rainfall episodes are of grave concern. Currently water from the Homeville section of the catchment is contaminated with sewage (>32000 CFU/100mg *E.coli*). This indicates the sewage reticulation of an existing section of town of Kimberly not to be operational and cumulative impacts are a concern. A discussion on impacts to the aquatic environment (as required in GN320 of March 2020) is summarised in **Table 11**.

Table 11: Impacts as per GN320 of March 2020

Number	Impact question	Expected impact
2,5,3	How will the development impact on fixed and dynamic ecological processes that operate within or across the site	
	a) How will the development impact on fixed and dynamic ecological processes that operate within or across the site a. Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes); and	Negatively. Fixed dynamic processes in terms of water levels will be altered by surface hardening. Additional releases of sewage into the pan are expected.
	b) Change in the sediment regime (e.g. sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns) of the aquatic ecosystem and its sub -catchment;	During the construction phase there can be a significant increase in sedimentation if mitigation measures are not adhered to. This is also expected in the early operation phase until areas are vegetated. Sediment regimes are expected to stabilize over time.
	c) The extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.).	The Kamfers Dam has already been altered from an ephemeral to permanently inundated system. Additional releases of water as expected from the development will further exacerbate the issue
	d) to what extent will the risk associated with water uses and related activities change?	See risk assessment (GN509 of NWA) in the accompanying risk assessment report.
2,5,4	How will the proposed development impact on the functioning of the aquatic feature? This must include:	
	a) Base flows (e.g. too little/too much water in terms of characteristics and requirements of system)	Negative impact. Base flows will be increased.
	b) Quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over - abstraction or instream or off -stream impoundment of a wetland or river)	Negative impact. It is expected that water contaminated with sewage and other hazardous substances will be released into the Kamfers Dam.
	c) Change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchanneled valley -bottom wetland to a channelled valley -bottom wetland).	The Kamfers Dam has already been altered from an ephemeral to permanently inundated system. Additional releases of water as expected from the development will further exacerbate the issue. Typing will not be altered due to topography of the site.
	d) Quality of water (e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication)	Expected to be altered and degraded by the development
	e) Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).	Some fragmentation is expected but will stabilise over time given that the trench is effectively rehabilitated.
	f) The loss or degradation of all or part of any unique or important features (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.) associated with or within the aquatic ecosystem.	Not observed and thus not expected to be impacted.
2,5,5,	How will the development impact on key ecosystem regulating and supporting services especially:	
	a) Flood attenuation	Flood attenuation functions of the site will be lost if not replaced with artificial attenuative structures
	b) Stream flow regulation	As with flood attenuation increased flows from the site is expected.
	c) Sediment trapping	Increased flows from the site will decrease sediment trapping functions. Increases in sediments are expected from the site.
	d) Phosphate assimilation	Assimilation of phosphates will be decreased due to decreased vegetated areas. Increases in phosphate sources into the aquatic ecosystem is also expected. The functionality will be decreased.

Number	Impact question	Expected impact
	e) Nitrate assimilation	Same as with phosphates.
	f) Toxicant assimilation	Additional toxicants are expected from the site. This will decrease the assimilation functionality of the system.
	g) Erosion Control	Increased surface hardening will increase erosive volumes of water. This will lead to decreased erosion controls.
	h) Carbon Storage?	Decreased vegetation areas will decrease sequestration of carbon throughout the site. Additions of phytoremediation will assist with carbon storage.

8.6 Heritage Resources (Archaeology and Palaeontology)

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development and is summarised in section 9.2.5.

- As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development.

The palaeontological sensitivity of the area under consideration is presented in **Figure 27**. The site for development is in the Prince Albert Formation. West and east of 24°E, the Ecca Group comprises the basal Prince Albert Formation, in the southwestern half of the Karoo Basin, and comprises shales and silty shales. In the west where it overlies the Dwyka Group there are fining upward sequences of sandstones, siltstones, silty shales and rhythmites. Marine fossils such as cephalopods, lamellibranches and brachiopods, and fragmentary plant fossils and palaeoniscoid fish remains (Douglas area; Anderson and McLachlan, 1976). The southern facies of the Prince Albert Formation have darker shales, chert and carbonaceous nodules produced under a reducing environment, with rare marine fossil fragments (Johnson et al., 2006).

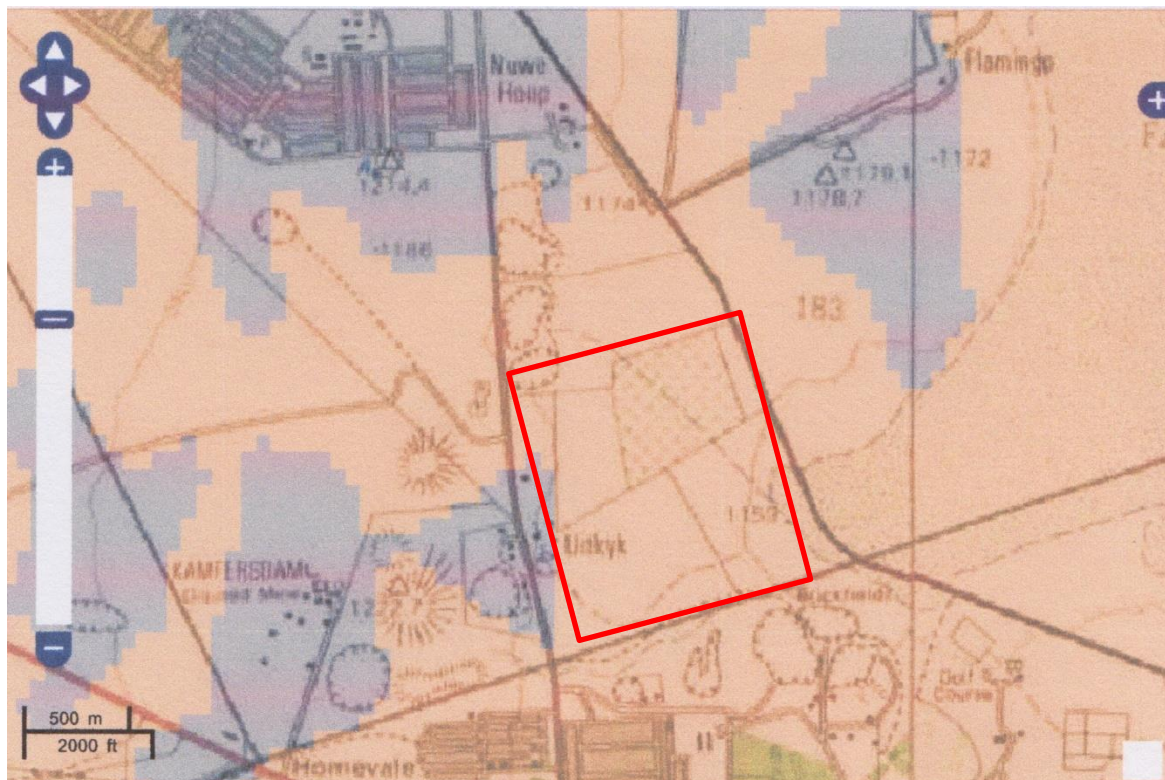


Figure 27: Palaeosensitivity map for the site for the proposed for the Oliphant Estate housing development shown within the red rectangle.

Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero. From the SAHRIS map above the area is indicated as highly sensitive (orange) so a desktop study is required. Fossils recorded to date from this formation are very sporadic and the nearest site is near Douglas.

Deepwater shales do not preserve fossils but they might be preserved in a shallow water setting. So far there are no records from the Prince Albert Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be very unlikely.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils, but they are not common. Since there is a small chance that fossils from the Prince Albert Formation may be disturbed, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

8.7 Visual impacts

The proposed site and the surrounding areas are mostly agricultural farmland with cultivated or grazing fields dominating the study area. The relatively even topography is ideal for such agricultural activities. The construction and operation of the Oliphant Estate Township Development may affect the current visual character and sense of place of the surrounding areas through on-site activities and change in the character of the area due to the implementation of the project. The proposed project may add or remove certain feature to or from the existing study area which will cause a visual change,

Sensitivity of observers: The following observer groups have been identified in the study area:

- Residents; Nearby settlements
- Motorists utilising the local road network along the Midlands Road

The concentration and distribution of residents within Nearby settlements i.e. Roodepan and Homevale. Viewer incidence is considered medium as only a relatively small number of residents are within the Zone of Maximum Visual Exposure (ZMVE). Residents in the study area are classified as visual receptors of **high sensitivity owing to their** sustained visual exposure and attentive interest towards their living environment. Residents from the informal settlements and townships of Retswele and Galeshewe Townships; are approximately 3km from the project site. Their exposure to the potential visual impacts will be significantly reduced due to their distance from the source; therefore, their **sensitivity will be low.**

Motorists are considered the least sensitive group of observers due to the speed at which they travel and their brief exposure to impacts. This group is mostly limited to road users on the Midlands Road and gravel road network branching off from the tar road. Intermittent views of the proposed housing development expected as motorists travel through the study area. At this point motorists will be more aware of the presence of the development although only for a **short duration, therefore of low sensitivity.**

Sensitivity of the Landscape Character:

The study area features existing powerline infrastructure as well as a railway line which increases the project's compatibility with the landscape character. The proposed Kimberley Housing Development is particularly in near proximity to two existing sewage works/wastewater treatment plants (WWTPs), i.e. the Galeshewe and Homevale WWTPs. The quarry sites and brick making facilities will be located north and south-west of the proposed housing development. The existing features on site has impacted on the natural landscape character and therefore reduces its sensitivity towards projects of a similar nature to **medium sensitivity**.

8.8 Potential Social impacts

The potential positive social impacts during the construction phase are largely linked to the creation of employment and skills development opportunities. The potential negative impacts are linked to the impact on local road surfaces associated with the transport of heavy components and the impact on local communities and the presence of construction workers on the site.

During the operation phase the potential exists for further, albeit limited, job creation and some skills development (positive impacts). However, there is also the potential for impacts on the social dynamics of the study area due to the construction of the proposed project. On a regional scale, the operation of the project could potentially result in positive changes in the quality of lives of many by means of addressing the current housing backlog in the Sol Plaatjie Local Municipality. On a national scale, the proposed project could aid with the National Development Plan (NDP) aims to eliminate poverty and reduce inequality by 2030. Provisions of housing infrastructure and job opportunities (such as the proposed project) are in support of the NDP.

The following impacts are identified as the major impacts associated with the development of the project the construction and operational phases of the development.

The key social issues associated with the *construction phase* are the following:

Potential positive impacts

- Creation of employment and business opportunities, and
- Opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Noise, dust and safety impacts of construction related activities and vehicles.

The following key social issues are of relevance to the *operational phase*:

Potential positive impacts

- The establishment of housing development in the area.

Potential negative impacts

- The visual impacts and associated impact on sense of place;

8.9 Potential Impacts Associated with Existing and Proposed Emission Sources

Emission of pollutants from both the existing and proposed emission sources mentioned in Section 2.1 impacts human health and the environment in various ways. However, as the proposed Kimberley Housing Development is located near to the existing WWTPs and Galeshewe/Retswele townships, as well as the proposed KRD project emission sources, and is thus considered a sensitive receptor, this report focuses on potential impacts associated with emissions from the WWTPs, nearby townships and planned KRD project activities, which include nuisance effects, ambient air quality impacts, odour impacts, health impacts and noise impacts. It must be noted that the impacts are likely to be higher nearer to the sources as well as at nearby sensitive receptors such as the proposed Kimberley Housing project. At sensitive receptors far from the proposed and existing activities, impacts are likely to be lower.

8.9.1 Nuisance Impacts

TSP will mainly be emitted from activities such as vehicle dust entrainment on paved roads at the proposed three mixed-use sites; screening and materials handling at the proposed Roodepan Quarry and Clay Brick Facility; and crushing, screening, mining and brick making at the proposed Vooruitzigt Quarry and Cement Brick Facility (AIRSHED, 2021). TSP in the form of dustfall (i.e. particles with an aerodynamic diameter greater than 20 µm) is classified as nuisance dust and can result in reduced visibility and cause physical damage to various materials and objects (<https://www.epa.gov>, 05 August 2019).

8.9.2 Air Quality Impacts

All pollutants emitted from the proposed KRD project, which are listed in Section 2.2, have the potential to affect ambient air quality in the area when released into the air. Based on the AIRSHED (2021) Air Quality Impact Assessment Report (AQIAR) for the proposed KRD project, the greatest air quality impacts, which have been classified as medium to high in the AQIAR, are associated with TSP (as dustfall), PM10 and PM2.5 emissions produced from most of the proposed KRD project activities. Further, in the AIRSHED (2021) AQIAR, simulated PM10 daily concentrations for the Roodepan Quarry and Clay Brick Facility are shown to exceed the applicable National Ambient Air Quality Standards (NAAQS) at nearest sensitive receptors outside the western and north-western boundaries. SO₂ and HF emissions associated with operation of the Zig-Zag Kiln at the proposed Clay Brick Facility are predicted to have a low impact on air quality.

Existing domestic solid fuel combustion in nearby townships (e.g. Retswele and Galeshewe) also impacts ambient air quality in the area through the release of combustion pollutants such include PM10, PM2.5, NO₂, SO₂ and CO, while WWTPs (e.g. Homevale and Galeshewe WWTPs) affect ambient air quality when pollutants such as VOCs, NH₃, H₂S and GHGs such as CO₂, CH₄ and nitrous oxide (N₂O) are emitted into the air.

8.9.3 Odour Impacts

Odour impacts at the project area are mainly associated with emissions emanating from the WWTPs, which are located near the proposed Kimberley Housing Project. The emissions include NH₃, VOCs and H₂S. *“Odour emanates from a mixture of NH₃, VOCs and H₂S, and is an olfactory response to a mixture of compounds. Odour decreases with time after an emission event*

in response to dispersion (dilution), deposition, and chemical reactions” (<http://www3.epa.gov>, 02 August 2019),

8.9.4 Health Impacts

As the proposed Kimberley Housing Development will be affected by emissions/pollutants from the existing WWTPs and the proposed KRD project activities (including emissions from nearby surrounding domestic fuel combustion activities), it is likely that residents of the proposed Kimberley Housing Development will also be affected in terms of health due to exposure to some of the pollutants. Health impacts are associated with exposure to certain threshold levels of pollutants over specified periods of time (i.e. short-term or long-term effects).

Kimberley Rehabilitation and Development (KRD) project impacts

- *Pollutants of concern:* Although all modelled pollutants will reach the boundaries of Olifants Estate, only PM₁₀, PM_{2.5} and dust levels will exceed acceptable levels inside the Estate boundaries. This means that should the proposed KRD project continue, there will be some negative impacts to the most sensitive members (usually elderly and children) of Olifants Estate community associated with PM₁₀ and PM_{2.5}. Such impacts would include cardiovascular diseases and lower and upper respiratory health issues.
- *Severity of impacts:* Section **Error! Reference source not found.** of **Appendix E8** provides a quantification of health impacts for the East and West wing of the Estate. The results show that in the East wing, pollution from KRD project is likely to cause approximately 65 hospital admissions and 36 hospital admissions associated respiratory illnesses and cardiovascular diseases per year. These numbers represent approximately 2% of the population of the Estate. However, the West wing of the plant does not show any health impacts on residents. This is because although pollution from KRD project will reach these parts of the Estate, the concentrations of pollutants will meet acceptable levels in this wing.
- *Pollution sources of concern:* The predicted exceedances in PM₁₀, PM_{2.5} and dust in the Estate are mainly associated with clay brick manufacturing and vehicle emissions as haul trucks are expected to transport raw materials from other parts of KRD project to the Roodepan quarry for clay brick manufacturing.
- *Development area of concern:* What is also clear from the dispersion modelling maps above is that the East Wing of the Estate is least impacted by pollution. In fact, in this wing (East wing) all pollutants meet acceptable daily limits pollution levels in this wing.

Homevale WWTP impacts

Olifants Estate is located only 0.8 kilometres from the local Homevale WWTP, and literature suggests that detectable odour plumes can reach over 2-4 km from their sources depending on atmospheric stability (Augustus et al, 2019), size of the treatment facility and WWTP operating conditions. Meanwhile, one person interviewed confirmed that they were able to detect odours from Homedale WWTP 3km away in the almost same direction as that of the proposed Estate. Hence, it was concluded that it is possible for residents of the proposed Olifants Estate to detect odours from Homevale, should the plant resume operations

8.10 **Noise Impacts**

8.10.1 During Construction Phase

The potential inward noise impacts associated with the construction of the proposed development are discussed in the following sections. Construction phase activities are only anticipated to take place during daytime only.

- **Noise Sensitive Locations:** A review of the inward noise assessment and the threshold values indicates that the daytime noise guidance limit for construction noise ranges from 65-75dB LAeq Construction and some minor demolition works will be undertaken between 07:00-18:00 Monday to Friday, 07:00-17:00 on Saturdays, with no working on Sundays or public holiday in line with national building regulations.

During the construction phase of the proposed development, a variety of items of plant will be in use, as shown in section 10 (recommendations). Noise levels experienced by noise sensitive locations (NSLs) during such works depend upon several variables, the most significant of which are:

- The noise generated by plant/equipment used on site, generally expressed as Sound Power Levels
- (Lw) or the vibration generated by the plant.
- The periods of use of the plant on site, known as its on-time.
- The distance between the noise/ vibration source and the NSL.
- The noise attenuation due to ground absorption, air absorption and barrier effects.
- In some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings; and
- The time of day or night the works are undertaken.

The closest NSLs have been identified as shown in **Figure 28** and described below. The area highlighted in the red band consists of township residential housing, social amenities including churches, creches and schools, which have been identified as sensitive noise receptors during construction. Ambient baseline noise levels in these areas are already high with LAeq in the 50 to 60 dB range.

- **Predicted Construction Noise Levels:** Predicted noise levels for construction of the Proposed Development have been based upon construction methods used for other similar developments. As a conservative approach, it is assumed that all plant and activities will be taking place at the closest approach to each NSLs, whereas this will not always be the case and, in any event, activities are unlikely to occur for any significant duration. It is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. **Figure 29** presents the predicted daytime noise levels from an indicative construction period at the NSLs



Figure 28: Noise Sensitive Receptors – Construction Phase

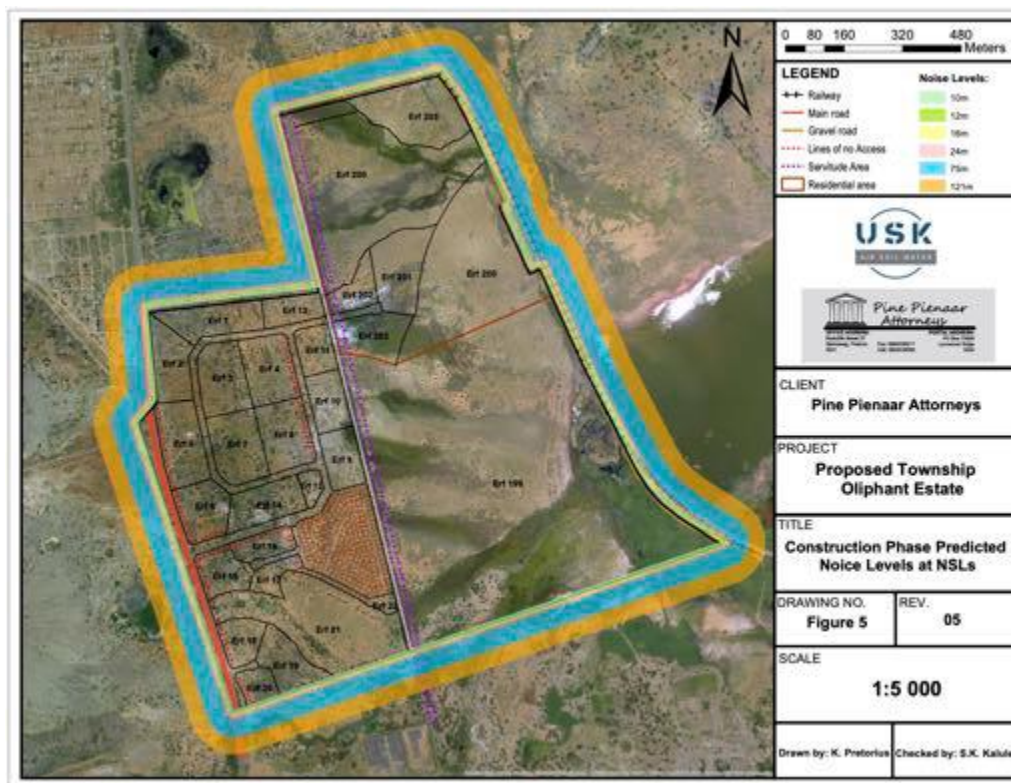


Figure 29: Construction Phase Predicted Noise Levels at NSLs

8.10.2 Operational Phase

The potential inward noise impacts associated with the operational phase of the proposed development are discussed in the following sections.

- **Inward Noise:** There are seven primary potential sources of noise associated with the development once operational. These are:
 - Additional vehicular traffic on public roads
 - Residential: The noise impact of the residential aspect of the development on the receiving environment will be slight. It will be limited to internal vehicle movements entering and carparks and residents using the public open space.
 - Business / Retail Units: The retail units of the development will also have a potential noise impact on the residential aspect of the development; however, this aspect of the development will not occur during the night-time period. The main noise associated with retail premises is from deliveries by lorries or van and from external speakers. External speakers shall not be used at any of the retail units. All deliveries will be permitted between 07:00hrs –19:00hrs, to ensure that this activity does not impact the more sensitive night-time period. Retail units shall be posted appropriate signage to this effect.

8.11 Impacts on Roads and Traffic

An increase in traffic can be expected during the construction phase. The movement of machinery and vehicles will constitute an additional source of noise to the study area. However, this will be limited to the period of construction and mitigation can involve the use of equipment fitted with noise abatement technology (where possible) and the restriction of construction to certain days and times.

9 ASSESSMENT OF POTENTIAL IMPACTS

In terms of APPENDIX 3(3)(1) of the EIA Regulations 2017 (as amended), an Environmental Impact Assessment Report must include –

h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including—

(v) The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts –

(aa) Can be reversed;

(bb) May cause irreplaceable loss of resources; and

(cc) Can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;

(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(viii) the possible mitigation measures that could be applied and level of residual risk;

i) A full description of the process undertaken to identify, assess and rank the impacts that the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including –

(i) A description of all environmental issues and risks that were identified during the environmental impact process; and

(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures

(j) An assessment of each identified potentially significant impact and risk, including –

(i) Cumulative impacts;

(ii) The nature, significance and consequences of the impact and risk;

(iii) The extent and duration of the impact and risk;

(iv) The probability of the impact and risk occurring;

(v) The degree to which the impact and risk can be reversed;

(vi) The degree to which the impact and risk may cause irreplaceable loss of resources;

(vii) The degree to which the impact and risk can be mitigated.

This chapter serves to assess the significance of the positive and negative environmental impacts (direct, indirect, and cumulative) expected to be associated with the **proposed construction of a mixed-use residential development on the Remainder of Portion 18 of the Farm Roode Pan 70.**

9.1 Assessment of alternatives

The following alternatives have been considered and assessed through this EIA report. The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects are considered. The details pertaining to each alternative considered, as well as the technical preference are provided below:

- **Location alternatives:** No site alternatives are proposed for this project as the proposed site has been identified highly desirable for a mixed-use development as described in section 4.1.
- **Layout alternatives:** Two layout plans are considered for the mixed-use development as described in section 4.1.

NB: In most part of this section the assessment tables the alternatives are not comparatively assessed however *where applicable, the differences are highlighted.*

9.2 Methodology of the Impact Assessment

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the proposed development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed projects is well understood so

that the impacts associated with the projects can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

As per the DEAT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacting that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. therefore, assuming worst case scenario.

In addition to the above, the impact assessment methodology includes the following aspects whereby the significance of the impact is calculated as follows and rating significance is explained below.

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- » The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * Medium-term (5–15 years) – assigned a score of 3;
 - * Long term (> 15 years) - assigned a score of 4; or;
 - * Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;

- * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease); and
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
- * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- » The **status**, which is described as positive, negative or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E + D + M) P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

- » **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- » **30-60 points:** Medium/Moderate (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

The specialist findings presented in this section represents a summary of the detailed and original specialist studies contained in the relevant appendices to this report (**Appendices E1 to E10**). The current summary of specialist findings is provided in the interest of brevity and with a view to facilitating public participation; as contemplated in the NEMA principles. The Competent Authority, with its mandate of substantive review of the EIA report, is therefore urged to also read the original specialist studies in the relevant appendices to this report with the aim of discharging its decision-making function. *Should any discrepancy occur between this summary, and the relevant detailed specialist study; the detailed specialist study will prevail.*

9.2.1 Avifauna Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK ON AVIFAUNA	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Impact 1: Displacement as a result of habitat loss or transformation within the physical development footprint</p> <p><i>Residual Risks: None anticipated provided that the mitigation measures are implemented correctly.</i></p>	<p style="text-align: center;">HIGH (Alt1)</p> <p style="text-align: center;">MEDIUM (Alt 2)</p>	<ul style="list-style-type: none"> Adherence to the 500m buffer as a minimum No development within Area 4 Construction activity should be restricted to the immediate footprint of the infrastructure. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. 	<p style="text-align: center;">MEDIUM (Alt 1)</p> <p style="text-align: center;">LOW (Alt 2)</p>
<p>Impact 2: Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	<p style="text-align: center;">HIGH</p>	<ul style="list-style-type: none"> Development of an integrated management plan for storm water and sewage management with key stakeholders Construction of appropriate sewage and storm water management infrastructure Ongoing maintenance of the sewage and storm water management infrastructure 	<p style="text-align: center;">MEDIUM (Alt 1)</p> <p style="text-align: center;">LOW (Alt 2)</p>

NATURE OF POTENTIAL IMPACT/RISK ON AVIFAUNA	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 3: Displacement as a result of disturbance</p> <p><i>Residual Risks: It is envisaged that mitigation, if required, will reduce but not eliminate the disturbance impact.</i></p>	HIGH	<ul style="list-style-type: none"> • Develop an integrated management plan with key stakeholders to address sources of disturbance • Disturbance by residents of birds breeding and foraging in the area must be minimized and controlled. • Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). • Construction activities should occur outside of the Lesser Flamingos breeding season. • Strict adherence to the 500m buffer as a minimum. • No development within Area 4. • Single Residential Nodes and Medium-Density Nodes should be constructed in favour of High-Density Nodes. 	<p>MEDIUM (Alt 1)</p> <p>LOW (Alt 2)</p>
OPERATIONAL PHASE IMPACTS			
<p>Impact 1: Displacement as a result of disturbance</p> <p><i>Residual Risks: It is envisaged that mitigation, if required, will reduce but not eliminate the disturbance impact.</i></p>	HIGH	<ul style="list-style-type: none"> • Develop an integrated management plan with key stakeholders to address sources of disturbance • Disturbance by residents of birds breeding and foraging in the area must be minimized and controlled. • Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). • Construction activities should occur outside of the Lesser Flamingos breeding season. • Strict adherence to the 500m buffer as a minimum. • No development within Area 4. • Single Residential Nodes and Medium-Density Nodes should be constructed in favour of High-Density Nodes. 	<p>MEDIUM (Alt 1)</p> <p>LOW (Alt 2)</p>

NATURE OF POTENTIAL IMPACT/RISK ON AVIFAUNA	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 2: Direct mortality/ill health as a result of sewage and contaminated storm water inflow</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	HIGH	<ul style="list-style-type: none"> • Develop an integrated management plan for storm water and sewage management with key stakeholders. Measures to rapidly deal with spills or floods must be put in place before construction commences. • No stormwater, pollutants, sewerage or other waste must pollute the area or enter Kamfers Dam during the construction or operational phases. • Storm water and sewer reticulation must make use of a bulk outfall system and must be transported away from Kamfers Dam - the development must not make use of the storm water and sewage systems at Kamfers Dam which are currently unable to process the current storm water and sewage yields. • Construction of appropriate sewage and storm water management infrastructure • Ongoing maintenance of the sewage and storm water management infrastructure • A management and monitoring system must be implemented to carefully monitor the water quality and water levels of the Kamfers Dam to benefit the ecological and habitat requirements of the waterbirds, in particular Lesser Flamingo. 	MEDIUM (Alt 1) LOW (Alt 2)
<p>Impact 3: Direct mortality/ill health as a result of construction activities</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	LOW	<ul style="list-style-type: none"> • Conduct a pre-construction inspection (avifaunal walk-through) of the final residential development layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed. 	LOW
<p>Impact 4: Direct mortality due to collisions with powerlines as a result of light pollution</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	LOW	<ul style="list-style-type: none"> • Develop an integrated management plan to address potential light pollution impacts • Collision mortalities to be reported to the appropriate channels to ensure mitigation of the power line infrastructure 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON AVIFAUNA	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 5: Direct mortality/ill health as a result of hunting/poaching and egg removal</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	<p>HIGH (Alt1)</p> <p>MEDIUM (Alt 2)</p>	<ul style="list-style-type: none"> Develop an integrated management plan to address potential hunting/poaching and egg removal impacts. this may include policies with regards to pet ownership within the estate Construction of an appropriate barrier (fencing) to secure the Kamfers Dam area Commitment to the ongoing maintenance of the fence for the life span of the residential estate 	<p>MEDIUM (Alt 1)</p> <p>LOW (Alt 2)</p>
<p>Impact 6: Indiscriminate waste disposal and inadequate service delivery with regards to waste removal</p> <p><i>Residual Risks: Little anticipated provided that the mitigation measures are implemented correctly.</i></p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> Develop an integrated management plan to address potential domestic waste pollution and the appropriate removal thereof. Food and domestic waste to be stored in sealed containers Timeous waste removal services to be provided 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON FAUNA	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 1: Destruction of fauna habitat and ecological connectivity</p> <p>Activity: The sources of this impact include:</p> <ul style="list-style-type: none"> ○ Clearing of and damage to vegetation in the construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers; <p>Residual Risks: Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation due to soil and vegetation clearing and landcover disturbance during construction.</p>	MEDIUM	<ul style="list-style-type: none"> • As an opportunistic breeder during the rainy season, the Giant Bullfrog (<i>Pyxicephalus adspersus</i>) cannot be excluded from site or neighbouring areas from where the species may swarm onto site during the breeding season. Active monitoring and adaptive management measures must be implemented to reduce potential impact to the species. • The following is relevant: <ul style="list-style-type: none"> ○ If swarms are noted in construction areas consider ceasing activity in these areas until species resume hibernation. Activity periods are after rainfalls from November to January, inclusive. ○ Temporary walls can be erected to divert swarms away from construction areas, but monitoring must continue as species are adept burrowers. 	LOW
<p>Impacts 2: Disturbance to fauna through noise, vibration and dust</p> <p>Nature: The existing developed nature of the site means that these impacts are taking place on a daily basis and the additional contribution by the proposed development will be minimal. Working within the wetland may flush out species within the area, but there are ample similar habitats for such species to retreat to and the impacts are not considered significant.</p> <p>Residual Risks: Flora and fauna stress and/or fatalities as a result of erosion and/or sedimentation due to soil and vegetation clearing and landcover disturbance during construction.</p>	MEDIUM	<ul style="list-style-type: none"> • Select and utilise quieter equipment where feasible. • Ensure dust suppression, through water sprinkling, is applied at time of high dust generation. • Any noisy point-sources utilised on site should be enclosed, and all equipment / machinery fitted with silencers where applicable. • All equipment / machinery will be serviced and maintained within operating specifications to prevent excessive noise. 	LOW

9.2.3 Vegetation Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Impact 1: Destruction of vegetation</p> <p>Nature: The development will require the removal of vegetation, although most of the vegetation comprise degraded or secondary vegetation. The development will decrease open space and ecological corridors. Although degraded, the vegetation plays a functional role in protecting soil, mitigating floods and allowing the movement of water through the site.</p> <p>Activity: The sources of this impact include:</p> <ul style="list-style-type: none"> ○ Clearing of and damage to vegetation in the construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers; ○ Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction; ○ Edge effects; ○ Storage of equipment within adjacent vegetation. <p>Residual Risks: The colonisation of the disturbance footprint by alien invasive plant species</p>	MEDIUM	<p><i>Planning:</i></p> <ul style="list-style-type: none"> • No development may take place within areas designated as wetland or wetland buffer zones as delineated by the wetland specialist. Development in such areas is subject to a WUL and mitigation as set out by the wetland assessment. • Plan open space areas to remain in a natural state, planted with species naturally occurring in the area. <p><i>Construction:</i></p> <ul style="list-style-type: none"> • Category 1b invasive species should be removed from the site prior to earthworks. This will limit the spread of such species downstream and into disturbed soils. An independent Ecological Control Officer (ECO) should be appointed to oversee construction. • Keep the development footprint, including site camps, as small as possible • A temporary fence or demarcation must be erected around the construction area (include the actual footprint, as well as areas where material is stored and needed for e.g. trenching) to prevent access to adjacent vegetation. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. • No open fires are permitted within naturally vegetated areas. • Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. • Introduce adequate sedimentation control measures at watercourse crossings and when excavation or disturbance within moist grasslands takes place. • Limit clearing of indigenous vegetation to only the development footprint. • Where topsoils need to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation • Never mix topsoils with subsoils or other spoil materials • Maintain site demarcations in position until the cessation of construction work. 	MEDIUM

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
		<ul style="list-style-type: none"> After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. 	
<p>Impacts 2: Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse)</p> <p>Nature: The removal of surface vegetation will expose the soils, which in rainy events would wash into the wetlands causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive plant species can spread easily into these eroded soils. After construction, a lack of rehabilitation or failed rehabilitation will result in bare soils that are susceptible to erosion. Furthermore, maintenance vehicles could disturb rehabilitated areas which could lead to soil erosion, habitat modification, trampling of vegetation as well as the destruction of protected plants and plants of conservation concern</p> <p>Activity: The sources of this impact include:</p> <ul style="list-style-type: none"> Removal of vegetation in proximity to the moist grassland, without proper rehabilitation or failure of rehabilitation; Access roads, especially on slopes, channels rainfall and causes erosion; Lack of rehabilitation or failed rehabilitation; Maintenance vehicles disturbing rehabilitated areas; Spillages of construction material and harmful chemicals; and Failure of rehabilitation of the construction footprint. <p>Residual Risks: <i>A risk that heavy rain and flooding could alter the flow of water through the wetlands and the development or the subsequent removal or destruction of the vegetation by other resulting land uses do remain.</i></p>	<p>MEDIUM</p>	<p><i>Planning:</i></p> <ul style="list-style-type: none"> No construction / activities should be undertaken within the wetlands as per the wetland report recommendations Compile a stormwater management plan that will safeguard the wetlands from construction and operational impacts. The development must make use of permeable paving and incorporate open spaces and gardens to ensure that water infiltrates into the soils and not runoff towards the wetlands. <p><i>Construction:</i></p> <ul style="list-style-type: none"> Do not allow erosion to develop on a large scale before acting. Make use of existing roads and tracks where feasible, rather than creating new routes through grassland areas. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). Runoff from roads must be managed to avoid erosion and pollution problems. Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (erosion management plan required) Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. The grassland can be removed as sods and re-established after construction is completed. Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that vegetation cover is sufficient within one growing season. If not, then the areas need to be rehabilitated with a grass seed mix containing species that naturally occur within the study area. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
		<ul style="list-style-type: none"> Prevent spillage of construction material, oils or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. After construction clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoils and landscape to surrounding 	
<p>Impacts 3: Removal / Destruction of protected plants and plants of conservation concern</p> <p>Nature: The construction could result in the removal of plant species of conservation concern, impact on their habitat, pollinators and inevitably the persistence of these species. This could put further strain on the already declining populations..</p> <p>Residual Risks: Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting.</p>	<p>MEDIUM</p>	<p>Planning:</p> <ul style="list-style-type: none"> Ensure that the ROD makes provision for the removal of provincially protected plants. Ideally these plants, where removed, must be housed in a nursery facility, and used to rehabilitate disturbed areas. A local nurseryman / botanist should advise. No development should take place within natural wetlands and wetland buffers. <p>Construction:</p> <ul style="list-style-type: none"> An Eco should take note off all bulbous and succulent species unearthed and consult with the specialist / botanist for identification. Such species should be collected and used in the landscaping / rehabilitation of open spaces. 	<p>LOW</p>
<p>Impact 4: Loss and disturbance of watercourse/pan habitat and fringe vegetation impact ratings.</p> <p>Nature: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function.</p> <p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> The development footprint should remain outside the delineated wetland, riparian areas and buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas Implement an Alien Plant Control Plan 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 5: Potential increase in invasive vegetation</p> <p>Nature: The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. In addition, if rehabilitation of the indigenous vegetation is unsuccessful or is not enforced, exotic and invasive vegetation may further invade the area.</p> <p>Residual Risks: Reinfestation or introduction of additional weeds during construction or landscaping that could spread towards the CBA area</p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> • Alien invasive species, in particular category 1b species that were identified within the study area, should be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. • All alien seedlings and saplings must be removed as they become evident for the duration of construction. • All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. • If filling material is to be used, this should be sourced from areas free of invasive species. 	<p>LOW</p>
<p>OPERATIONAL PHASE IMPACTS</p>			
<p>Impact 1: Destruction of vegetation</p> <p>Nature: The development will require the removal of vegetation, although most of the vegetation comprise degraded or secondary vegetation. The development will decrease open space and ecological corridors. Although degraded, the vegetation plays a functional role in protecting soil, mitigating floods and allowing the movement of water through the site.</p> <p>Activity: The sources of this impact include:</p> <ul style="list-style-type: none"> ○ Clearing of and damage to vegetation in the construction footprint, access roads, construction camps, vehicle / machinery traffic and trampling by workers; ○ Illegal disposal and dumping of construction material such as cement or oil, as well as maintenance materials during construction; ○ Edge effects; ○ Storage of equipment within adjacent vegetation. <p>Residual Risks: The colonisation of the disturbance footprint by alien invasive plant species</p>	<p>LOW</p>	<ul style="list-style-type: none"> • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction. • Areas that will remain open space should be rehabilitated / landscape using indigenous species naturally occurring in the Kimberley thornveld. Do not use artificial fertilizers as it could have an impact on the water quality in the Kamfers Dam. • No operational activities may impact negatively on remaining natural vegetation within wetlands. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impacts 2: Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse)</p> <p>Nature: The removal of surface vegetation will expose the soils, which in rainy events would wash into the wetlands causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive plant species can spread easily into these eroded soils. After construction, a lack of rehabilitation or failed rehabilitation will result in bare soils that are susceptible to erosion. Furthermore, maintenance vehicles could disturb rehabilitated areas which could lead to soil erosion, habitat modification, trampling of vegetation as well as the destruction of protected plants and plants of conservation concern</p> <p>Activity: The sources of this impact include:</p> <ul style="list-style-type: none"> ○ Removal of vegetation in proximity to the moist grassland, without proper rehabilitation or failure of rehabilitation; ○ Access roads, especially on slopes, channels rainfall and causes erosion; ○ Lack of rehabilitation or failed rehabilitation; ○ Maintenance vehicles disturbing rehabilitated areas; ○ Spillages of construction material and harmful chemicals; and ○ Failure of rehabilitation of the construction footprint. <p>Residual Risks: • <i>A risk that heavy rain and flooding could alter the flow of water through the wetlands and the development or the subsequent removal or destruction of the vegetation by other resulting land uses do remain.</i></p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> • Do not disturbed soil unnecessary during maintenance. Ensure that maintenance work does not take place haphazardly, but according to a fixed plan. • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • Monitor rehabilitation and ensure that rehabilitated areas do not erode. • Monitor rehabilitation and delay the re-introduction of livestock (where applicable) to all rehabilitated areas until an acceptable level of re-vegetation has been reached. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON VEGETATION	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impacts 3: Removal / Destruction of protected plants and plants of conservation concern</p> <p>Nature: The construction could result in the removal of plant species of conservation concern, impact on their habitat, pollinators and inevitably the persistence of these species. This could put further strain on the already declining populations..</p> <p>Residual Risks: Species removed and relocated as part of rehabilitation could die due to transplantation shock or damage during replanting.</p>	<p>LOW</p>	<ul style="list-style-type: none"> • Monitor replanted species for survival for the first three years. • Maintenance workers may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. 	<p>LOW</p>
<p>Impact 4: Potential increase in invasive vegetation</p> <p>Nature: The seed of alien invasive plant species that occur on and in the vicinity of the construction areas could spread into the disturbed and stockpiled soil. Also, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation unit to the construction site. In addition, if rehabilitation of the indigenous vegetation are unsuccessful or is not enforced, exotic and invasive vegetation may further invade the area.</p> <p>Residual Risks: • Reinfestation or introduction of additional weeds during construction or landscaping that could spread towards the CBA area</p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> • No alien and invasive plant species as listed on 18 September 2020 in the list of Alien Invasive Species published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 43726 of 2020) may be planted within the development. • Only use indigenous species naturally occurring on the site for rehabilitation or landscaping. 	<p>LOW</p>

9.2.4 Aquatic and Wetland Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Impact 1: Impacts to hydrological function at a landscape level</p> <p>Nature: Changes to hydrological function at a landscape level which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes). The extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flows (e.g. too little/too much water in terms of characteristics and requirements of system). Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).</p> <p>Activity: The sources of this impact include the compaction of soil, the removal of vegetation, surface water redirection, changes to watercourse morphology or input of high energy surface water which could occur during construction and operation of the residential development.</p> <p>Residual Risks: Stormwater management in the town of Kimberly is already functioning sub-optimally. Adding to the burden will affect hydrological function on a landscape level, flood regimes, base flows and dynamic processes</p>	MEDIUM	<ul style="list-style-type: none"> • During the construction phase, best practice mitigation measures should be implemented. • Stormwater attenuation on site should accommodate more than 50% of storm event to protect the Kamfers dam from further inundation. • Predictions of stormwater flows should take into consideration expected climate change related catchment changes. • Effective control of stormwater from access roads should be undertaken 	LOW
<p>Impacts 2: Changes in sediment regime</p> <p>Nature: Changes in sediment regimes of the aquatic ecosystem and its sub-catchment by for example sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns</p> <p>Activity: Construction and maintenance activities will result in earthworks and soil disturbance as well as the disturbance of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourses and pan and increase the turbidity of the water. Possible sources of the impacts include:</p>	MEDIUM	<ul style="list-style-type: none"> • Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses. • Sediment traps should be installed • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. • During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the adjacent surface vegetation. 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<ul style="list-style-type: none"> ○ Earthwork activities during construction ○ Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soils. ○ Disturbance of soil surface ○ Disturbance of slopes through creation of roads and tracks adjacent to the watercourse ○ Erosion (e.g. gully formation, bank collapse) <p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented effectively and sedimentation is appropriately managed.</p>		<ul style="list-style-type: none"> • Sediment control should be effective and not allow any release of sediment pollution downstream. This should be audited on a weekly basis to demonstrate compliance with upstream conditions. • Any excavated soil/ stockpiles may not exceed 1 m in height. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later usage as backfill material. 	
<p>Impacts 3: Introduction and spread of alien vegetation</p> <p>Nature: Introduction and spread of alien vegetation.</p> <p>Activity: Activity: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.</p> <p>Residual Risks: Expected to be limited provided that an Alien Plant Control Plan is effectively implemented</p>	MEDIUM	<ul style="list-style-type: none"> • Undertake an Alien Plant Control Plan which specifies actions and measurable targets • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 4: Loss and disturbance of watercourse/pan habitat and fringe vegetation i.</p> <p>Nature: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function.</p> <p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>	MEDIUM	<ul style="list-style-type: none"> The development footprint should remain outside the delineated wetland, riparian areas and buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas Implement an Alien Plant Control Plan 	LOW
<p>Impact 5: Changes in water quality</p> <p>Nature: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/rivers and a reduction in watercourse function.</p> <p>Residual Risks: Although it may be controlled and largely prevented, the impact of a single spill will have a significant residual effect on the local watercourse integrity. Residual risks should therefore be considered significant</p>	MEDIUM	<ul style="list-style-type: none"> Locate the infrastructure outside the calculated buffer zone Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. Provision of adequate sanitation facilities located outside of the watercourse area or its associated buffer zone The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. Currently it is evident that the wastewater treatment of the Kimberly is not operational. Additional sewage cannot be sent to a system that is already not operational. Sewage must be treated on site before reticulation to irrigate open space areas or sent to evaporation ponds. Incorporation of phytoremediation into the storm water attenuation systems to facilitate nutrient reduction, sediment regime control and manage toxicants releases. 	LOW
<p>Impact 6: Loss of aquatic biota</p> <p>Nature: Loss of instream habitat, deposition of wind-blown sand, loss of fringing vegetation and erosion, alteration in base flow, natural fire regimes and subsequent loss of non-marginal and marginal vegetation. Increase in invasive species due to disturbance. Change in water quality. Changes in flow</p>	MEDIUM	<ul style="list-style-type: none"> Ensure that no unnecessary vegetation is removed during the construction phase, Avoid unnecessary aquatic ecosystem crossing - limit work within the stream, river or wetland. The use of single access points for crossings. Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICA NCE (WITHOUT MITIGATI ON)	PROPOSED MITIGATION	SIGNIFICA NCE (WITH MITIGATI ON)
<p>Activity: Loss and disturbance of biota due to direct development on the watercourse as well as changes in habitat including water quality, the water column, increased sediment, increased alien vegetation fire regime and habitat fragmentation</p> <p>Residual Risks: <i>Since pollution and changed hydrology of Kamfers Dam is significant, the aquatic fauna assemblages are reduced to more hardy species. Residual risks to further loss of aquatic fauna is therefore moderate. It remains an important source of food for endangered bird species</i></p>		<p>or its associated buffer zones.</p> <ul style="list-style-type: none"> Mark all areas which don't form part of the proposed development within the watercourse as no-go areas. 	
OPERATIONAL PHASE IMPACTS			
<p>Impact 1: Impacts to hydrological function at a landscape level</p> <p>Nature: Changes to hydrological function at a landscape level which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes). The extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flows (e.g. too little/too much water in terms of characteristics and requirements of system). Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).</p> <p>Activity: The sources of this impact include the compaction of soil, the removal of vegetation, surface water redirection, changes to watercourse morphology or input of high energy surface water which could occur during construction and operation of the residential development.</p> <p>Residual Risks: <i>Stormwater management in the town of Kimberly is already functioning sub-optimally. Adding to the burden will affect hydrological function on a landscape level, flood regimes, base flows and dynamic processes</i></p>	MEDIUM	<ul style="list-style-type: none"> Stormwater attenuation on site should accommodate more than 50% of storm event to protect the Kamfers dam from further inundation. Predictions of stormwater flows should take into consideration expected climate change related catchment changes. Effective control of stormwater from access roads should be undertaken 	MEDIUM

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impacts 2: Changes in sediment regime</p> <p>Nature: Changes in sediment regimes of the aquatic ecosystem and its sub-catchment by for example sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns</p> <p>Activity: Construction and maintenance activities will result in earthworks and soil disturbance as well as the disturbance of natural vegetation.</p> <p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented effectively and sedimentation is appropriately managed.</p>	MEDIUM	<ul style="list-style-type: none"> Sediment control should be effective and not allow any release of sediment pollution downstream. This should be audited on a weekly basis to demonstrate compliance with upstream conditions. Any excavated soil/ stockpiles may not exceed 1 m in height. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later usage as backfill material. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. Monitoring should be done to ensure that sediment pollution is timeously addressed 	LOW
<p>Impacts 3: Introduction and spread of alien vegetation impact ratings</p> <p>Nature: Introduction and spread of alien vegetation.</p> <p>Activity: Activity: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plans can easily colonise and impact on downstream users.</p> <p>Residual Risks: Expected to be limited provided that an Alien Plant Control Plan is effectively implemented</p>	MEDIUM	<ul style="list-style-type: none"> Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Pan Rehabilitate or revegetate disturbed areas 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impact 4: Loss and disturbance of watercourse/pan habitat and fringe vegetation</p> <p>Nature: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/streams and a reduction in watercourse function.</p> <p>Residual Risks: Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>	LOW	<ul style="list-style-type: none"> • Implement an Alien Plant Control Plan • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish 	LOW
<p>Impact 5: Changes in water quality</p> <p>Nature: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Activity: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/streams and a reduction in watercourse function.</p> <p>Residual Risks: Although it may be controlled and largely prevented, the impact of a single spill will have a significant residual effect on the local watercourse integrity. Residual risks should therefore be considered significant</p>	MEDIUM	<ul style="list-style-type: none"> • It should be ensured that regular maintenance takes place to prevent failure of any infrastructure associated with the proposed development; • The managing authority should test the integrity of the sewer pipelines at least once every five years or more often should there be any sign or reports of a leak. • A detailed rehabilitation plan should be drawn up with the input from a water quality, soil contamination assessment and ecologist should any spills occur. • Independent water quality analyses should be undertaken annually, or as specified by an aquatic specialist, to demonstrate and audit compliance of effective pollution control measures 	MEDIUM
<p>Impact 6: Loss of aquatic biota</p> <p>Nature: Loss of instream habitat, deposition of wind-blown sand, loss of fringing vegetation and erosion, alteration in base flow, natural fire regimes and subsequent loss of non-marginal and marginal vegetation. Increase in invasive species due to disturbance. Change in water quality. Changes in flow</p> <p>Activity: Loss and disturbance of biota due to direct development on the watercourse as well as changes in habitat including water quality, the water column, increased sediment, increased alien vegetation fire regime and habitat fragmentation</p>	MEDIUM	<ul style="list-style-type: none"> • Weed control in aquatic ecosystem and buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • Incorporation of phytoremediation into the storm water attenuation systems to facilitate nutrient reduction, sediment regime control and manage toxicants releases. 	MEDIUM

NATURE OF POTENTIAL IMPACT/RISK ON THE AQUATIC AND WETLANDS	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p><i>Residual Risks: Since pollution and changed hydrology of Kamfers Dam is significant, the aquatic fauna assemblages are reduced to more hardy species. Residual risks to further loss of aquatic fauna is therefore moderate. It remains an important source of food for endangered bird species</i></p>			

9.2.5 Heritage & Palaeontological Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK ON CULTURAL HERITAGE	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Impact 1: Loss or damage to sites, features or objects of cultural heritage significance</p> <p>Nature: As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development.</p>	LOW	<p>For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. Because of the presence of the identified rubbish middens, it is recommended that a “watching brief” is implemented when construction is to take place. This implies that a suitably qualified archaeologist is on standby when construction work takes place in order to evaluate any and all features and objects that might be exposed during construction work.</p>	LOW
<p>Impact 2: Potential increase in invasive vegetation</p> <p>Nature: Deepwater shales do not preserve fossils but they might be preserved in a shallow water setting. So far there are no records from the Prince Albert Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be very unlikely.</p>	LOW	<ul style="list-style-type: none"> It is extremely unlikely that any fossils would be found in the loose soils and sand that will be excavated for foundations. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr. 	LOW
OPERATIONAL PHASE IMPACTS			
<p>Impact 1: Loss or damage to sites, features or objects of cultural heritage significance</p> <p>Nature: As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development.</p>	LOW	<p>For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.</p> <p>Because of the presence of the identified rubbish middens, it is recommended that a “watching brief” is implemented when construction is to take place. This implies that a suitably qualified archaeologist is on standby when construction work takes place in order to evaluate any and all features and objects that might be exposed during construction work.</p>	LOW
<p>Impact 2: Potential increase in invasive vegetation</p> <p>Nature: Deepwater shales do not preserve fossils but they might be preserved in a shallow water setting. So far there are no records from the Prince Albert Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be very unlikely.</p>	LOW	<p>It is extremely unlikely that any fossils would be found in the loose soils and sand that will be excavated for foundations. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.</p>	LOW

9.2.6 Visual Impacts Assessment

NATURE OF POTENTIAL IMPACT/RISK ON VISUAL QUALITY	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Impact 1: Severity of impacts on observers and landscape character</p> <p>Nature: The construction phase will introduce new elements to the visual environment (i.e. construction teams and equipment) that are otherwise uncharacteristic within the context of the study area. The construction activity will cause damage to the existing vegetation cover and expose the underlying soil due to the movement of the technical team and the operation of construction equipment. This will cause the removal of the plant cover that is part of the baseline character of the study area. Unsightly scarring of the landscape will negatively impact on the visual quality of the visual resource and the natural character of the site. Visual intrusion can be expected due to the unsightly construction activity and the influence on the visual quality of the landscape character.</p> <p>Indirect Impacts Residual Impacts: Residual risks will occur and remain as impacts as the visual intrusion and impact on the landscape character cannot be effectively mitigated, unless major layout or design changes.</p>	MEDIUM	<ul style="list-style-type: none"> Minimise the disturbance footprint by clearly marking the working area and thereby limiting construction activities within a dedicated area and keeping the disturbance footprint as small as possible. Locate the lay-down area and construction camp in an area that is already disturbed and screened from sensitive viewpoints. Keep to existing road infrastructure as far as possible to minimise the physical damage to vegetation in the powerline servitude. Keep the construction site neat and clean. Dispose all waste material in suitably closed containers and remove off site at regular intervals. Rehabilitate the disturbed area as soon as possible to minimise the impact of exposed soil and re-establish a vegetation cover. 	LOW
OPERATIONAL PHASE IMPACTS			
<p>Direct impacts:</p> <ul style="list-style-type: none"> Visual change that will cause visual intrusion. Alteration to the landscape character. Increased visual dominance . 	MEDIUM	<p>Previously rehabilitated areas must be monitored to prevent the infestation of weeds that may become an unsightly feature;</p>	LOW

NATURE OF POTENTIAL IMPACT/RISK ON VISUAL QUALITY	SIGNIFICA NCE (WITHOUT MITIGATI ON)	PROPOSED MITIGATION	SIGNIFICA NCE (WITH MITIGATI ON)
<p>Nature: The completed project will introduce a new face to the study area, thereby increasing noticeable visual change to the baseline environment.</p>			

9.2.7 Social Impact Assessment

NATURE OF POTENTIAL IMPACT/RISK ON SOCIAL	SIGNIFICA NCE (WITHOUT MITIGATI ON)	PROPOSED MITIGATION	SIGNIFICA NCE (WITH MITIGATI ON)
CONSTRUCTION PHASE IMPACTS			
<p>Impacts 1: Creation of employment and business opportunities during the construction</p> <p>Indirect Impacts Residual Impacts: Improved pool of skills and experience in the local area.</p>	MEDIUM	<p>Enhancements</p> <p>Employment</p> <ul style="list-style-type: none"> Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. Before the construction phase commences the proponent and its contractors should meet with representatives from the Local Municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase. The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the 	MEDIUM

NATURE OF POTENTIAL IMPACT/RISK ON SOCIAL	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
		<p>potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase.</p> <ul style="list-style-type: none"> Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. <p>Business</p> <ul style="list-style-type: none"> The proponent should seek to develop a database of local companies, specifically Broad Based Black Economic Empowerment (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 contractors. These companies should be notified of the tender process and invited to bid for project-related work. The proponent, in consultation with the Local Municipality and the local Chamber of Commerce, should identify strategies aimed at maximising the potential benefits associated with the project. 	
<p>Impacts 2: Potential impacts on family structures and social networks associated with the presence of construction workers</p> <p>Indirect Impacts Residual Impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community</p>	<p>MEDIUM</p>	<ul style="list-style-type: none"> Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks; The proponent and the contractor 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; The contractor should make necessary arrangements to enable workers from outside the area to return home on a regular basis during the 18-month construction phase. This would reduce the risk posed by non-local construction workers to local family structures and social networks; 	<p>LOW</p>

NATURE OF POTENTIAL IMPACT/RISK ON SOCIAL	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
		<ul style="list-style-type: none"> The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction Oliphant Township is completed. This would reduce the risk posed by non-local construction workers to local family structures and social networks; and As per the agreement with the local farmers in the area, no construction workers, will be permitted to stay overnight on the site. Security personnel will be housed in the vicinity of the site. 	
<p>Impacts 3: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site</p> <p>Indirect Impacts Residual Impacts: Once construction is completed; this will not be an impact.</p>	LOW	<ul style="list-style-type: none"> Site clearing activities should be phased so as to minimise the total area cleared at any given time. Progressive rehabilitation should also be carried out during the construction phase; The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends and holiday periods; The contractor must ensure that damage caused by construction related traffic to the internal access roads is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor; Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; and All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. 	LOW
OPERATIONAL PHASE IMPACTS			

NATURE OF POTENTIAL IMPACT/RISK ON SOCIAL	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impacts 1: Contribution to service delivery within the local municipality</p> <p>Nature: The idea of the Oliphant Estate residential development was born from the need of an all-inclusive socio-economic mixed-use development to the north of the Bloemfontein CBD. Kimberley is under great pressure for development, the idea of creating a new economic hub to the north of Kimberley is a new possibility.</p> <p>Indirect Impacts Residual Impacts: Improved development within the community and better infrastructure</p>	LOW	<p>Enhancements:</p> <ul style="list-style-type: none"> • Use the project to promote and increase the contribution of renewable energy to the national energy supply; • Maximise the public's exposure to the project via an extensive communication and advertising programme; • Implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project. 	MEDIUM
<p>Impacts 2: Potential visual impact and impact on sense of place associated</p> <p>.</p>	LOW	<ul style="list-style-type: none"> • Rehabilitate all disturbed areas, construction areas, roads, slopes etc immediately after the completion of construction works. The measures listed above to address the potential impacts associated with the construction phase also apply to the construction of the power line. 	LOW

9.2.8 Atmospheric Emissions Impacts

NATURE OF POTENTIAL IMPACT/RISK ON NOISE	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			

NATURE OF POTENTIAL IMPACT/RISK ON NOISE	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<p>Impacts 1: Dust generated during vegetation clearing</p> <p>Nature: Clearance of vegetation will expose bare ground and movement of heavy duty vehicles and machinery on site will generate dust. It must also be noted that the site was previously used for mining activities and tailing dams are a source of toxic metals. Limited gaseous or particulate emissions are anticipated from exhaust emissions from construction equipment on-site. The overall impact on the environment is likely to be of low significance as the will not release emissions into the atmosphere and impacts associated with dust and vehicle emissions will be localised.</p>	MEDIUM	<ul style="list-style-type: none"> • Continuous watering of the site should be carried out to prevent dust pollution during windy and dry conditions. • A continuous dust monitoring process needs to be undertaken during construction. • Speed restriction of 20km/h must be implemented for all construction vehicles. • All vehicles transporting friable materials such a sand, rubble etc must be covered by a tarpaulin or wet down. • Construction work to be undertaken during weekdays as far as practical. • No burning of refuse or vegetation is permitted. 	LOW
OPERATIONAL PHASE IMPACTS			
<ul style="list-style-type: none"> • Nuisance Impacts • Air Quality Impacts • Odour Impacts • Health Impacts <p>Nature: Emission of pollutants from both the existing and proposed emission sources mentioned in Section 2.1 impacts human health and the environment in various ways. However, as the proposed Kimberley Housing Development is located near to the existing WWTPs and Galeshewe/Retswele townships, as well as the proposed KRD project emission sources, and is thus considered a sensitive receptor, this report focuses on potential impacts associated with emissions from the WWTPs, nearby townships and planned KRD project activities, which include nuisance effects, ambient air quality impacts, odour impacts, health impacts and noise impacts. It must be noted that the impacts are likely to be higher nearer to the sources as well as at nearby sensitive receptors such as the proposed Kimberley Housing project. At sensitive receptors far from the proposed and existing activities, impacts are likely to be lower.</p>	MEDIUM	<ul style="list-style-type: none"> • It is recommended that an air quality monitoring campaign be conducted before commencement of operations at the proposed Kimberley Housing Development. • Given the potential impacts of KRD project on the East wing of the Estate, it is proposed that should both projects (KRD and Olifants Estate development) go ahead, efforts should be made to reduce or where possible avoid occupancy of the East wing of the Estate. Occupancy of the East wing should be limited to areas where PM levels are in compliance with NAAQS. These are all area that are not red (Figure 3 and 6 of Appendix E8). The East wing of the Estate is most preferred from air pollution point of view, for the protection of human health from the effects of KRD project. Given the potential, though short-term impacts from Homevale WWTP, we recommend that should both projects (Homevale & Olifants Estate development) resume, the WWTP should put measures in place to minimise odours. While there are various operational measures that can be deployed by WWTPs to reduce odours, each measure should be evaluated for adequacy based on a thorough assessment of the configuration, operational designs and technological feasibility for a specific plant. 	LOW

9.2.9 Noise Impacts

NATURE OF POTENTIAL IMPACT/RISK ON NOISE	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
CONSTRUCTION PHASE IMPACTS			
<p>Direct Impacts: Noise as a result of the construction of the Township</p> <p>Nature: The potential inward noise impacts associated with the construction; Construction phase activities are only anticipated to take place during daytime only</p> <p>Indirect Impacts Residual Impacts: none</p>	MEDIUM	<p>With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2. Whilst construction noise impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive locations, the contractor will ensure that all best practice noise control methods will be used, to ensure impacts at off-site noise sensitive locations are minimized. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:</p> <ul style="list-style-type: none"> • Selection of quiet plant. • Noise control at source. • Screening. • Liaison with the public • Monitoring 	LOW
OPERATIONAL PHASE IMPACTS			
<p>Direct impacts: The potential inward noise impacts associated with the operational phase of the proposed development</p> <p>Nature: There are seven primary potential sources of noise associated with the development once operational. These are:</p> <ul style="list-style-type: none"> ○ Additional vehicular traffic on public roads ○ Residential: The noise impact of the residential aspect of the development on the receiving environment will be slight. It will be limited to internal vehicle movements entering and carparks and residents using the public open space. 	MEDIUM	<p>Noise mitigation at the receiver can be achieved by either installing a fence on the property or by upgrading the façade/glazing and ventilation of a building to provide a greater degree of noise reduction to internal areas. To determine internal noise levels within the proposed site a review of the external noise levels, internal noise levels and building elements have been undertaken as set out below.</p> <ul style="list-style-type: none"> • Glazing: As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. Glazing Type 1 offers a minimum sound insulation performance of 33dB Rw. A standard thermal double-glazed system will typically achieve this level of performance. Type 2 provides an enhanced sound insulation performance of 37dB Rw or greater. On review of the calculated noise levels across the development site over day and night-time periods, 	LOW

NATURE OF POTENTIAL IMPACT/RISK ON NOISE	SIGNIFICANCE (WITHOUT MITIGATION)	PROPOSED MITIGATION	SIGNIFICANCE (WITH MITIGATION)
<ul style="list-style-type: none"> Business / Retail Units: The retail units of the development will also have a potential noise impact on the residential aspect of the development; however, this aspect of the development will not occur during the night-time period. The main noise associated with retail premises is from deliveries by lorries or van and from external speakers. External speakers shall not be used at any of the retail units. All deliveries will be permitted between 07:00hrs –19:00hrs, to ensure that this activity does not impact the more sensitive night-time period. Retail units shall be posted appropriate signage to this effect. 		<p>two glazing specifications have been determined for the residential properties to achieve the recommended internal noise levels for day and night-time periods within living rooms and bedrooms. Site Layout Drawings in Appendix E9 show the recommended location of glazing types proposed. Type 2 glazing predominately relates to the living spaces of properties along the road to the south of the development and Midlands Road. For all other property facades, glazing Type 1 provides a sufficient level of sound insulation.</p> <ul style="list-style-type: none"> Wall Construction: In general, all wall constructions, i.e., block work or concrete, offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50dB Rw for this construction. The predicted daytime noise levels at the open spaces of the development once built is currently modelled between 30– 53 dB LAeq and as such would achieve the Local Authority’s daytime noise criteria in external amenity spaces. <p>Mitigating against noise from the neighboring roads particularly Midlands Road should be considered and form an integral part of the design process from the early master planning stages. This exercise established that the most appropriate and beneficial form of mitigation is the positioning of the buildings facing the Midland Road to act as a barrier. A perimeter wall along Midlands Road should be considered.</p>	

9.3 Assessment of the Do Nothing Alternative

The no-go alternative option means 'do nothing' or the option of not undertaking the proposed pivot construction project or any of its activities, consequently leading to the continuation of the current land-use, which is leaving the location as a natural semi-vegetated area. As such, the 'do nothing' alternative or keeping the current status quo with no activities occurring on-site also provides the baseline against which the impacts of the preferred alternative was compared.

The no go alternative would imply that no residential development activities are undertaken and, as such, the negative impacts as stated above, would not materialise.

However, conversely, this will negate the potential positive impacts associated with the direct and indirect socio-economic benefits of not constructing the residential development will not be realised. The need for additional housing opportunities in the area will not be realised, currently no formal Agricultural activities are taking place on Portion 18 of Roode Pan No.70 although they are zoned as Agricultural. However, the site is located adjacent to established residential developments.

9.4 Cumulative Impacts Assessment

Significant cumulative impacts that could occur due to the development of the housing development and its associated infrastructure in proximity to each other include impacts such as:

- Loss of vegetation and impacts on ecology
- Impacts on avifauna
- Heritage impacts
- Visual impacts
- Social impacts
- Air quality impacts

Figure 30 shows the proposed location of the Oliphant Estate Township in relation to all other known applications. Cumulative impacts discussed within this section have been considered within the detailed specialist studies, where applicable (refer to **Appendix E**). The combined effect of the development for this area will have a cumulative visual impact, impact on the landscape character, social impact, and impacts on ecology and soil erosion.

As there is uncertainty as to whether all the above-mentioned developments will be implemented, it is also difficult to quantitatively assess the potential cumulative impacts. It is, however, important to explore the potential cumulative impacts qualitatively as this will lead to a better understanding of these impacts and the possible mitigation that may be required. As these cumulative impacts are explored in more detail the trade-offs between promoting infrastructural improvement in the province versus the local and regional environmental and social impacts and benefits (i.e. landscape, ecology, employment etc.) will become evident. It is only when these trade-offs are fully understood, that the true benefits of this housing development can be assessed.

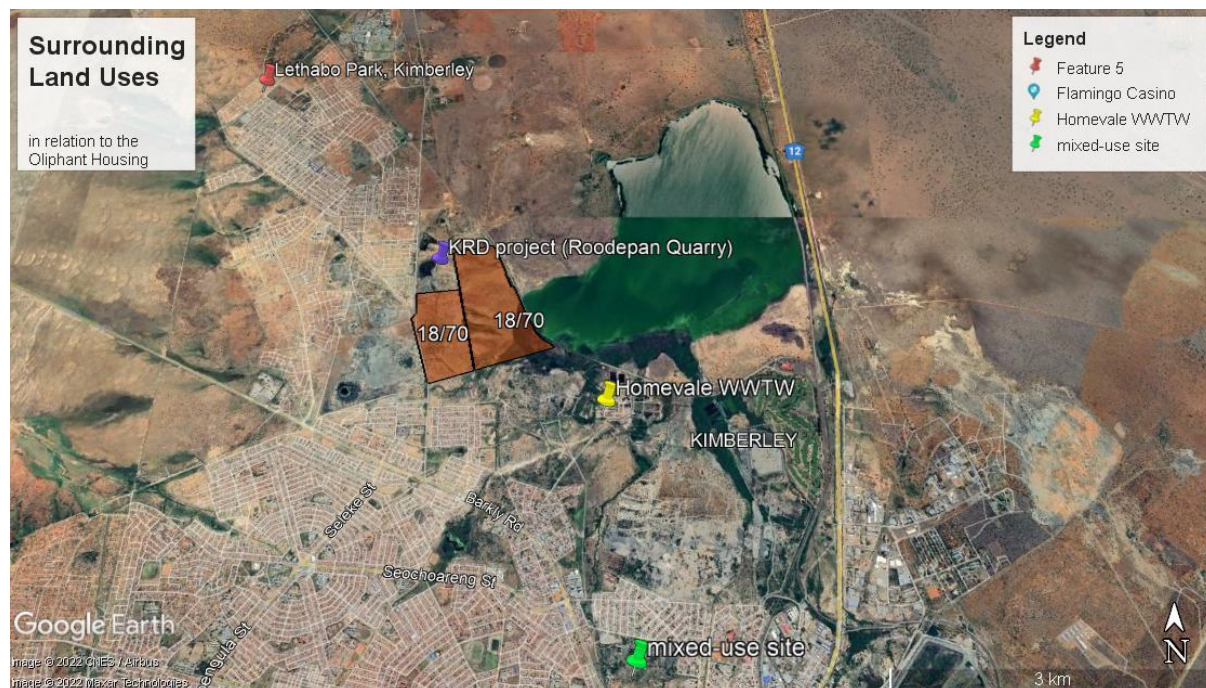


Figure 30: Location of proposed Oliphant Housing Development (orange polygons) in relation to surrounding proposed development and land uses.

In the sections below the potential cumulative impacts of other development within the immediate vicinity of the proposed housing are explored. The discussion and associated conclusions must be understood in the context of the uncertainty associated with the proposed developments and the qualitative nature of the assessment.

- **Avifauna:** Relevant to the proposed residential development, the removal of vegetation will be limited to the project footprint and will be maintained during the operational lifespan of the facility. While the smaller passerines are unlikely to be displaced permanently from the development area as a result of habitat transformation, established housing infrastructure will alter movement, breeding and foraging patterns for the SCC recorded in the PAOI i.e. African Marsh Harrier. It stands to reason that the more land is altered in this manner, the greater the impact on birds. Displacement of SCC as a result of disturbance is more difficult to quantify. However, based on the affect that urbanisation has had on the diversity and abundance of SCC species occurring in the PAOI currently, it is plausible that any additional human-induced disturbance will permanently displace SCC from the area altogether.
- **Impacts to hydrological function** are expected to be High. Further disturbance of water flow in this wetland will exacerbate an already impacted system
- **Changes in sediment regimes** of the aquatic ecosystem and its sub -catchment are expected to be low. Should mitigation measure not be implemented effectively, sediment deposition may affect the capacity of the pan and lead to a loss of bird habitat. Reversing this process is unlikely and should be prevented in the first place.
- **Introduction and spread of alien vegetation.** Since alien vegetation is already present in the catchment, cumulative impacts can be Moderate to High. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.

- **Loss and disturbance of watercourse** habitat and fringe vegetation impact are expected to be Low. Should degradation occur, it may result in a high degree of irreplaceable loss of resources.
- **Changes in water quality.** Cumulative impacts: Decreased water quality from spills of contaminants will contribute to regional water quality decrease, therefore should be considered a significant cumulative impact
- Loss of aquatic biota are moderate due to further loss of the aquatic biota
- **Destruction or degradation of Vegetation** - Reducing open space and CBA in proximity to Kamfers Dam and an increase in development pressure around Kamfers Dam.
- **Exposure to erosion and subsequent sedimentation** or pollution of proximate moist grassland (watercourse): Erosion of the development footprint upslope from the wetlands could increase sedimentation in already degraded watercourses o the area. However, this could be mitigated. Possible erosion of areas lower than construction and the subsequent housing development, possible contamination of wetlands and/or groundwater reserves due to hydrocarbon or other spillage and an increase of modified areas (together with surrounding developments) that will affect flora population dynamics and runoff patterns
- **Social economic:** Positive Cumulative Impacts

Generally, the development may have positive social impacts during construction and operation through the provision of job opportunities to local people and improving on skills transfer as well as adding to the market confidence for economic development in the area. Therefore **the cumulative impact of this project** is rated of Low significance for the larger part of the project, however the cumulative impacts on the wetland area could be of medium significance should mitigation measure not be implemented as changes made to the bed or banks of watercourse and unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site, The cumulative impact of multiple housing and other urban related developments on birds is therefore negative. The construction of multiple additional facilities will result in the overall cumulative impact being HIGH. Responsible environmental management will be required during the entire project life cycle. **These management measures should be guided by the Environmental Management Plan, attached as Appendix F.**

10 CONCLUSIONS AND RECOMMENDATIONS

In terms of APPENDIX 3(3)(1) of the EIA Regulations (2014) (amended 2017), an Environmental Impact Assessment Report must include:

(l) An environmental impact statement which contains –

- (i) A summary of the key findings of the environmental impact assessment;
- (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint of the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and
- (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(m) Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified throughout the assessment;

(o) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.

(p) A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

(r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;

(s) An undertaking under oath or affirmation by the EAP in relation to-

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

The previous chapters of this report together with the specialist studies contained within **Appendix E** provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the undertaken Environmental Impact Assessment (EIA) process for the proposed Development of the **Oliphant Estate Township Development on the Remainder of Portion 18 of The Farm Roode Pan 70** (as summarised in section 2.1 of this report) by providing a summary of the conclusions of the assessment. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project. Potential impacts which could occur as a result of the proposed project are summarised in the sections which follows.

10.1 Summary of the key findings & impacts

The specialist findings are summarised as follows:

Avifauna

In conclusion, the habitat within which the proposed development area is located is MODERATELY sensitive from a potential bird impact perspective. In recent years, anthropogenic impacts, mostly in the form of mining and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance with the study area. This is reflected in the low reporting rates for priority species, which may also indicate that levels of disturbance are high. The construction of the proposed residential estate will result in impacts of HIGH to MODERATE significance to birds that are

supported by Kamfers Dam. In the absence of a suitable alternative location for assessment and stringent and well-thought out management plans and infrastructure developments to facilitate sewage and storm water inflows into Kamfers Dam, among other significant impacts, the no-go alternative presents itself as most preferred alternative. However, should this development proceed through to construction, the anticipated impacts can be reduced through the commitment to and application of adaptive mitigation measures that will need to be implemented throughout the project's life span.

In accordance with the outcomes of the impact assessment detailed in Section 11 and 12, in conjunction with the baseline conditions as presented in Section 7 and the impact management measures in Section 13, the proposed residential estate is very likely to impact negatively on the species complements that are supported by Kamfers Dam. It is this specialist's opinion that the construction and operation of the proposed residential estate can only occur with acceptable levels of impact on the resident avifauna subject to the development of a robust integrated management plan and partnership with key stakeholders, to address the multitude of human-induced impacts, for the entire projected life span of the residential. development Commitment to this process is critical to the survival of the SCC within the PAOI and the sustainability of Kamfers Dam as an IBA, CBA and premier tourist attraction.

Terrestrial Biodiversity (Fauna)

The 2018 Biodiversity Report summarised their findings as follows: From a mammal point of view there should not be any specially protected mammal species on the study site. From a mammal perspective, no objection can be raised against the development. From a herpetofauna perspective, no objection can be raised against the development. Measures will have to be taken to stop water pollution of the nearby Kamfers Dam. The removal of invasive plants will increase the quality of habitat for herpetofauna.

Terrestrial Biodiversity (vegetation)

The site verification undertaken on 6 January 2022 confirmed the findings of the Eco Agent (2018) assessment in that most of the area assessed is of low vegetation sensitivity and suitable for development. The vegetation map of 2018 was found to be valid with minimal changes such as an increase in the tree layer in some areas noted. However, additional wetland areas were recorded during the 2022 verification, albeit north of Portion 18 that is proposed for the development.

The wetland areas, and associated buffer zones on and around the site should be regarded as undevelopable as per the recommendations of the wetland specialists (Limosella, 2022), while buffer areas to threatened avifauna species must also be adhered to (Kasl, 2022). The vegetation within Portion 18 was degraded or secondary in nature and of little conservation importance. However, the vegetation has a functional role as open space, habitat, and ground water recharge zones, which should be mitigated by creating or maintaining indigenous open space that will serve as ground water recharge zones. In addition, the vegetation within the wetland is important for the health and functioning thereof. Due to the increase in hardened surfaces associated with developments, it likely that cumulative impacts can affect the sensitive wetland community adversely should no mitigatory measures be applied.

The greatest threat to the rehabilitation of the land disturbed by construction, is the potential of invasive plant species rapidly establishing on the disturbed soil and spreading into adjacent natural areas. If remedial measures and monitoring are properly implemented, the vegetation that will be disturbed during construction could rehabilitate well over time, and long-term impacts on vegetation and faunal habitats could thus be minimal. Once in use, the pipelines have relatively contained impacts on the vegetation and can successfully be mitigated to limit or even negate the negative impacts

Furthermore, the presence of proximate access roads and dirt roads as well as the presence of several smaller tracks and existing road servitudes in the area, will greatly reduce the impacts of the proposed development. With regards to plant species of conservation concern: Six species have been short-listed to have a possibility of occurring, including a Vulnerable species for which the habitat assessment was undertaken. The wetland areas and associated buffers are the only potential habitat for two species short-listed. Neither of these species were recorded and the likelihood of occurring is considered medium to low, particularly as the 2018 assessment also did not record any of these species. No further plant species of conservation concern assessments are thought to be needed.

Aquatic and Wetlands:

Two wetland drivers in addition to the natural surface water drainage are relevant to this study. These two drivers are soil with a high clay content and water spilt from leaking pipes.

The presence of soils with a high clay content occurs throughout the site. Depressions therefore quickly fill with rain water and also water leaking from pipes or sewage infrastructure, which allows the clay to swell and trap this water, resulting in wetland conditions. A distinction between natural and artificial wetlands are complicated by the long-term nature of leaks.

Wetland types recorded on the site include the pan (Kamfers Dam), Channelled and Unchannelled Valley Bottom wetlands, Unchannelled Valley Bottom wetlands with Artificial elements and Drainage Lines and Artificial wetlands which are obviously created by voids.

Expected impacts to these watercourses, and particularly to the downslope Kamfers Dam, are twofold. Firstly, the stormwater runoff generated by the development in the context of the already inundated pan and expected increased flood events resulting from climate change will add to cumulative impacts to the beleaguered pan. In addition, the risk of further addition of sewage into the pan is high. A single spill event will have significant negative impacts to the habitat of endangered bird species. The realistic likelihood of mitigating these impacts fall to the engineers to prove with empirical data and should be afforded a high level of scrutiny.

Heritage Assessment:

This study describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The investigation consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that also included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval. Although the region is not regarded as archaeologically sensitive, it is located within a historically significant landscape central to the Kimberley Diamond Rush of the 1870's.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development. For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. Because of the presence of the identified rubbish middens, it is recommended that a "watching brief" is implemented when construction is to take place. This implies that a suitably qualified archaeologist is on standby when construction work takes place in order to evaluate any and all features and objects that might be exposed during construction work.

Palaeontological Assessment:

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to preserve fossils, but they are not common. Since there is a small chance that fossils from the Prince Albert Formation may be disturbed, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Therefore, based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the soils and sands of the Quaternary. There is a very small chance that fossils may occur in the shales of the early Permian Prince Albert Formation so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the developer, environmental officer, or other responsible person once excavations for foundations and amenities have commenced then they should be rescued and a paleontologist called to assess and collect a representative sample.

Air Quality Assessment:

Existing emission sources near the proposed housing development have been identified as sewage works/wastewater treatment plants (WWTPs), i.e. the Galeshewe and Homevale WWTPs; informal settlements and townships, the largest of which include Retswele and Galeshewe Townships; and several unpaved and paved roads in surrounding areas. These emission sources are within a 3km radius of the proposed development. In addition to the existing sources, three mixed-use sites (commercial and residential), i.e. BMW, Colville and St Augustine sites, and two quarry sites (Roodepan and Vooruitzicht Quarries) including two brick making facilities (Clay and Cement Brick facilities) are proposed to be developed by Kimberley Rehabilitation and Development (KRD) near the proposed Kimberley Housing Development.

The pollutants listed in this report, as well as activities at the WWTPs and the proposed KRD project sites will likely have an impact on the proposed Kimberley Housing Development in terms of nuisance, air quality, odour, health and noise. It is thus recommended that ambient air quality monitoring, odour monitoring and noise monitoring be undertaken at the proposed housing development prior to commencement of the project. Monitoring will aid in determining baseline ambient air pollutant concentrations and dustfall rates, odour concentrations and noise levels in the area, which residents at the proposed residential area will likely be exposed to. These assessments would then aid in determining potential human health effects of pollutants associated with the various activities (i.e. existing WWTPs and proposed KRD project activities) on residents at the proposed Kimberley residential area, should this be required. Additionally, the AQIAr compiled by AIRSHED in 2021 for the proposed KRD project can be used to inform a health risk assessment study to assess how sensitive receptors near the proposed KRD project sites will be affected by pollutants from operations associated with the proposed project.

In conclusion, it is recommended that an air quality monitoring campaign, a health impact study and a noise monitoring study be conducted before commencement of operations at the proposed Kimberley Housing Development. Rayten believes that residents at the proposed residential area could be at high risk due to their proximity to existing and proposed emission sources in the area

Health Risk Assessment:

Although all modelled pollutants will reach the boundaries of Olifants Estate, only PM10, PM2.5 and dust levels will exceed acceptable levels inside the Estate boundaries. This means that should the proposed KRD project continue, there will be some negative impacts to the most sensitive members

(usually elderly and children) of Olifants Estate community associated with PM10 and PM2.5. Such impacts would include cardiovascular diseases and lower and upper respiratory health issues.

The predicted exceedances in PM10, PM2.5 and dust in the Estate are mainly associated with clay brick manufacturing and vehicle emissions as haul trucks are expected to transport raw materials from other parts of KRD project to the Roodepan quarry for clay brick manufacturing. What is also clear from the dispersion modelling maps above is that the East Wing of the Estate is least impacted by pollution. In fact, in this wing (East wing) all pollutants meet acceptable daily limits pollution levels in this wing.

Olifants Estate is located only 0.8 kilometres from the local Homevale WWTP, and literature suggests that detectable odour plumes can reach over 2-4 km from their sources depending on atmospheric stability (Augustus *et al*, 2019), size of the treatment facility and WWTP operating conditions. Meanwhile, one person interviewed confirmed that they were able to detect odours from Homedale WWTP 3km away in the almost same direction as that of the proposed Estate. Hence, we conclude that it is possible for residents of the proposed Olifants Estate to detect odours from Homevale, should the plant resume operations

Noise Assessment:

Environmental Noise Impact from the proposed Oliphant Estate has been modeled and predicted in accordance with internationally recognized methodologies and software model. The predicted noise due to the construction and operational of the proposed development have been assessed at the surrounding identified Noise Sensitive Receptors both on the receiving environment and inward to the new development.

The predicted noise levels have been evaluated against several criteria incorporating South African and international guidance. The unmitigated worst-case level of impact for all three constructions, and operational were found to be of medium significance, while mitigated realistic scenario impacts have been determined to be of low significance.

It is our professional opinion that the proposed development should be authorized, with conditions that the recommended mitigation measures are implemented.

10.2 A summary of the positive and negative impacts and risks of the proposed project

A summary of the impact assessments is presented in **Table 12**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (i.e. the weighted score is the average of each of the individual scores). The impact scores are also colour coded according to the following:

< 30	Low significance
30 to 60	Moderate significance
>60	High significance

It must be noted that the impact scores in **Table 12** below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development

Table 12: Impact Summary table

CONSTRUCTION PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
Avifauna Assessment		
Displacement as a result of habitat loss or transformation within the physical development footprint	High (Alt1) Medium (Alt 2)	Medium (Alt 1) Low (Alt 2)
Displacement as a result of off-site habitat transformation (rise or fall in Kamfers Dam's water level)	High	Medium (Alt 1) Low (Alt 2)
Introduction and spread of alien vegetation	High	Medium (Alt 1) Low (Alt 2)
Fauna Assessment		
Destruction of fauna habitat and ecological connectivity	High (Alt1) Medium (Alt 2)	Medium (Alt 1) Low (Alt 2)
Disturbance to fauna through noise, vibration and dust	Medium	Low
Removal / Destruction of protected plants and plants of conservation concern	Medium	Low
Vegetation Assessment		
Destruction of vegetation	Medium	Medium
Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse)	Medium	Low
Removal / Destruction of protected plants and plants of conservation concern	Medium	Low
Removal / Destruction of protected plants and plants of conservation concern	Medium	Low
Aquatic and Wetland Impact Assessment		
Impacts to hydrological function at a landscape level	Medium	Low
Changes in sediment regime	Medium	Low
Introduction and spread of alien vegetation	Medium	Low
Loss and disturbance of watercourse/pan habitat and fringe vegetation i.	Medium	Low
Changes in water quality	Medium	Low
Loss of aquatic biota	Medium	Low
Heritage & Paleo Impact		
Loss or damage to sites, features or objects of cultural heritage significance	Low	Low
Potential increase in invasive vegetation	Low	Low
Visual Impacts		
Severity of impacts on observers (OB) and landscape character (LC)	Medium	Low
Social Impacts		
Creation of employment and business opportunities during the construction (positive)	Low	Medium

Potential impacts on family structures and social networks associated with the presence of construction workers	Medium	Low
Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site	Low	Low
Atmospheric Emissions Impacts		
Dust generated during vegetation clearing	Medium	Low
Noise Impacts		
Noise as a result of the construction of the Township	Medium	Low
OPERATIONAL PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
Avifauna Assessment		
Displacement as a result of disturbance	High	Medium (Alt 1) Low (Alt 2)
Direct mortality/ill health as a result of sewage and contaminated storm water inflow	Medium	Low
Direct mortality/ill health as a result of construction activities	Low	Low
Direct mortality due to collisions with powerlines as a result of light pollution	Low	Low
Direct mortality/ill health as a result of hunting/poaching and egg removal	High (Alt1) Medium (Alt 2)	Medium (Alt 1) Low (Alt 2)
Indiscriminate waste disposal and inadequate service delivery with regards to waste removal	Medium	Low
Fauna Assessment		
Destruction of fauna habitat and ecological connectivity	Medium	Low
Disturbance to fauna through noise, vibration and	Medium	Low
Vegetation Assessment		
Destruction of vegetation	Low	Low
Exposure to erosion and subsequent sedimentation or pollution of proximate moist grassland (watercourse)	Medium	Low
Removal / Destruction of protected plants and plants of conservation concern	Low	Low
Potential increase in invasive vegetation	Medium	Low
Aquatic and Wetland Impact Assessment		
Impacts to hydrological function at a landscape level	Medium	Low
Changes in sediment regime	Medium	Low
Introduction and spread of alien vegetation impact ratings	Medium	Low
Loss and disturbance of watercourse/pan habitat and fringe vegetation	Low	Low
Changes in water quality	Medium	Low
Loss of aquatic biota	Medium	Low
Heritage & Paleo Impact		

Loss or damage to burial sites within the project boundaries	Low	Low
Loss or damage to sites, features or objects of cultural heritage significance	Negligible	Negligible
Visual Impacts		
Severity of impacts on observers (OB) and landscape character (LC)	Medium	Low
Social Impacts		
Contribution to service delivery within the local municipality	Medium	Medium
Potential visual impact and impact on sense of place associated	Medium	Medium
Air Quality & Odour		
<ul style="list-style-type: none"> • Nuisance Impacts • Air Quality Impacts • Odour Impacts • Health Impacts 	Medium	Low
Noise impacts		
Noise as a result of the construction of the Township	Medium	Low

10.3 Environmental Sensitivities Mapping

From the conclusions of the detailed studies undertaken, sensitive areas within the development 500m corridor were identified and flagged for consideration and avoidance (where possible) by the Preferred Layout Plan. The following **highly sensitive areas/environmental features** as shown in **Figure 31** have been identified on the site:

- **No-go area:** Sensitive features present within this area include the waterbodies and their associated wetland areas;
- **Pan:** The Kamfersdam is a significant water bird habitat within the greater arid region. Many significant congregatory species and water birds utilise the dam. Furthermore, the Kamfersdam is the only breeding site for the Lesser Flamingo (*Phoenicopterus minor*) in South Africa and one of four regular sites in sub-Saharan Africa. The Maccoa Duck (*Oxyura maccoa*) may also be a potential breeder in the dam;
- **Critical Biodiversity Areas (CBAs):** The development plan as depicted in the 2018 report (Appendix E1) is still considered relevant and valid and has been incorporated as a No-Go zone. In addition, it is proposed to exclude the northern-most CBA2 area as part of the No-Go zone. A second CBA2 (yellow shaded area, which was not excluded from the 2018 development zone, occupies an area with secondary grassland and a highly transformed habitat in the savanna bushveld setting and high-density development should be avoided
- **500m buffer zone:** From an avifauna point of view, the 500m buffer zone must be retained as a no-go zone and the feasible development areas
- **1000m buffer zone:** The remaining area between the 500m and 1000m buffer zone should preferably be low density development.

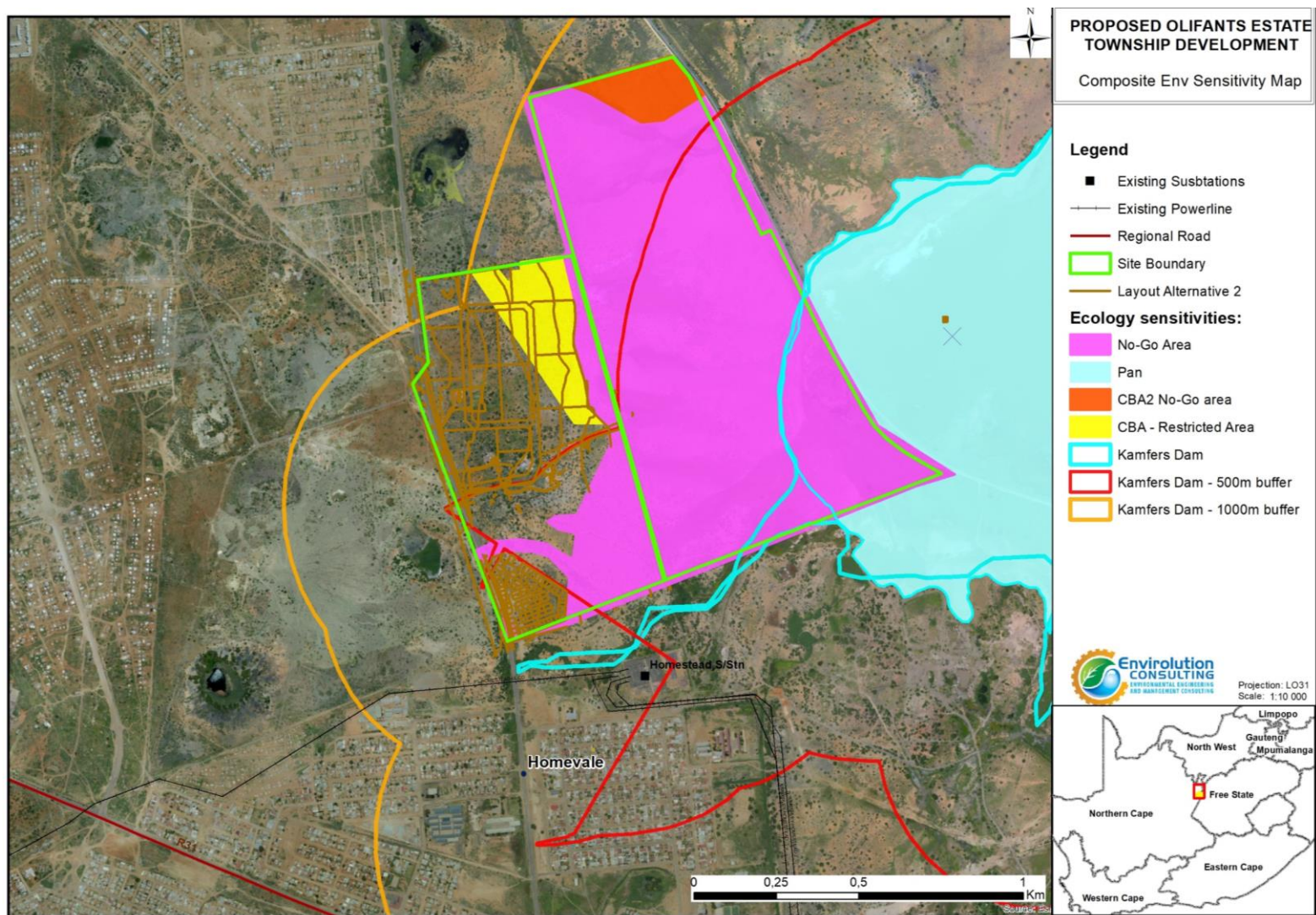


Figure 31: Composite Environmental Sensitivity Map showing areas of high sensitivity on the preferred Site Layout Plan (Alt 2) (A3 map included in Appendix A).

10.4 Conclusion (Impact Statement)

The principles of NEMA have been considered in this assessment through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided. In addition, the successful implementation and appropriate management of this proposed project will aid in achieving the principles of minimisation of pollution and environmental degradation at a national scale.

The EIA process has been undertaken in accordance with the requirements of the EIA Regulations and all effort has been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the project can be made by the Regulating Authority. The general objectives of Integrated Environmental Management have been taken into account for this EIA report by means of identifying, predicting and evaluating the actual and potential impacts on the biophysical environment, socio-economic conditions and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles of sustainable environmental management.

The technical viability of establishing a mixed-use residential development on the Remainder of Portion 18 of the Farm Roode Pan 70 has been established by Oliphants Housing Estate (Pty) Ltd. The positive implications of establishing the mixed-use residential development on the identified site include the following:

- The said portion of land is now included in the urban edge for earmarked for development. The amendment of the SDF would enable the applicant to submit a township establishment to the requirements of the Municipality. The municipality will be able to approve development applications based on the capacity of available services.
- The project will assist the district and local municipalities in reducing levels of unemployment through the creation of jobs, skills development opportunities and support of local business.
- This development is imperative to the Sol Plaatje Local Municipality as it addresses the need of basic services, housing, economic growth, job opportunities and in turn reduces poverty levels within the municipality;

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are **no environmental fatal flaws** that should prevent the proposed project from proceeding, “***provided that the recommended mitigation and management measures are implemented accordingly***”. As demonstrated on **Table 12** (Impact Summary), the significance levels of the majority of identified negative impacts have been reduced to acceptable levels by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of an alternative layout plan in relation to site-specific sensitivities identified.

The mitigation hierarchy principle was implemented towards limiting as far as possible the negative impacts on biodiversity from the development whereby the avoidance of areas of sensitivity is illustrated by the facility layout drawing overlain on the sensitivity map included as **Figure 31**. The developer undertook different studies, with the outcome that two buffer zones were identified i.e., the 500m buffer within which no development is recommended, and the 1000m buffer within which development can be undertaken with mitigatory factors. The proposed layout is an amendment from a previously submitted layout as it takes into consideration the buffer zones. The current layout has taken into considerations

all environmental constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) included within **Appendix F**.

With reference to the information available at this planning approval stage in the project cycle, the **confidence** in the environmental assessment undertaken is regarded as **acceptable** provided all measures are taken to protect and preserve surrounding environment.

10.5 Recommendations

The **Layout Plan Alternative 2** as presented in **Figure 31** has been designed to avoid the majority of the sensitive environments on the site as discussed in section 10.3. Therefore, this layout as presented is considered acceptable and is **recommended as the preferred** layout for the Oliphant Estate Township Development.

The EAP however concurs with the Avifaunal specialist's opinion that *the construction and operation of the proposed residential estate can only occur with acceptable levels of impact on the resident avifauna subject to the development of a robust integrated management plan and partnership with key stakeholders, to address the multitude of human-induced impacts, for the entire projected life span of the residential development*. Commitment to this process is critical to the survival of the SCC within the PAOI and the sustainability of Kamfers Dam as an IBA, CBA and premier tourist attraction. However, should this development proceed through to construction, the anticipated impacts can be reduced through the commitment to and application of adaptive mitigation measures that will need to be implemented throughout the project's life span.

Based on the anticipated impacts described above, the following recommendations are provided regarding practical mitigation measures for potentially significant impacts to be included in the Environmental Authorisation and the subsequent Environmental Management Programme (EMPr):

Avifauna

- No development within the delineated 500m buffer as a minimum requirement.;
- No development within Area 4 of the proposed 150ha residential estate footprint;
- Single Resident and Medium-Density Nodes to be constructed within the 1000m buffer;
- It is further recommended that development within the 1000m buffer in Areas 1 and 2 be subject to the establishment of a partnership between the applicant and the custodians of Kamfers Dam and its primary stakeholders and the drafting of an integrated management plan to ensure the appropriate management of the residential estate and the greater PAOI in terms of:
 - the establishment and ongoing maintenance of appropriate and effective sewage, storm water and waste management strategies,
 - the construction of a fence to secure Kamfers Dam and its resident species from hunting, poaching and egg removal
 - policies to address and mitigate noise and light pollution and the keeping of pets;
- Conduct a pre-construction inspection (avifaunal walk-through) of the final residential development layout, to identify any species that may be breeding on the authorised development site or within the immediate surrounds to ensure that any impacts likely to affect breeding species (if any) are adequately managed;
- Avoid removal of sensitive vegetation types. The recommendations of the botanical study **must be strictly implemented**, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned;

- Construction activity should be restricted to the immediate footprint of the infrastructure;
- All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment;
- All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction;
- No stormwater, pollutants, sewerage or other waste must pollute the area or enter Kamfers Dam during the construction or operational phases;
- Storm water and sewer reticulation must make use of a bulk outfall system and must be transported away from Kamfers Dam - the development must not make use of the storm water and sewage systems at Kamfers Dam which are currently unable to process the current storm water and sewage yields;
- A management and monitoring system must be implemented to carefully monitor the water quality and water levels of the Kamfers Dam to benefit the ecological and habitat requirements of the waterbirds, in particular Lesser Flamingo;
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum;
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species; and
- Measures to control noise associated with construction activities should be applied according to current best practice in the industry.

Fauna:

- As an opportunistic breeder during the rainy season, the Giant Bullfrog (*Pyxicephalus adspersus*) cannot be excluded from site or neighboring areas from where the species may swarm onto site during the breeding season. Active monitoring and adaptive management measures must be implemented to reduce potential impact to the species. The following is relevant:
 - If swarms are noted in construction areas consider ceasing activity in these areas until species resume hibernation. Activity periods are after rainfalls from November to January, inclusive.
 - Temporary walls can be erected to divert swarms away from construction areas, but monitoring must continue as species are adept burrowers.
- The 500m buffer must be respected as a minimum no-go area.
- CBA2 to be exclude from the northern-most area as part of the No-Go zone. A second CBA2 (yellow shaded area on the composite sensitivity map),
- The remaining area between the 500m and 1000m buffer zone should preferably be low density development

Vegetation:

- No development may take place within areas designated as wetland or wetland buffer zones as delineated by the wetland specialist. *Development in such areas is subject to a WUL and mitigation as set out by the wetland assessment.* Plan open space areas to remain in a natural state, planted with species naturally occurring in the area.
- Category 1b invasive species should be removed from the site prior to earthworks. This will limit the spread of such species downstream and into disturbed soils.
- Several plants are provincially protected by the Northern Cape Nature Conservation Act No.9 of 2009, the removal or pruning of these plants will require a permit from the Northern Cape Department of

Environment and Nature Conservation. Ideally these plants, where removed, must be housed in a nursery facility, and used to rehabilitate disturbed areas. A local nurseryman / botanist should advise.

Aquatic & Wetlands:

- The development footprint should remain outside the delineated wetland, riparian areas and buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas
- It is recommended that attenuation of stormwater is done at more than 50% of storm event to protect the Kamfers dam from inundation.
- The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.
- Currently it is well known that the wastewater treatment of the Kimberly is not operational. Additional sewage cannot be sent to a system that is already not operational. Sewage must be treated on site before reticulation to irrigate open space areas or sent to evaporation ponds.
- Incorporation of phytoremediation into the storm water attenuation systems to facilitate nutrient reduction, sediment regime control and manage toxicants releases.
- Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.
- It should be ensured that regular maintenance takes place to prevent failure of any infrastructure associated with the proposed development
- A detailed rehabilitation plan should be drawn up with the input from a water quality, soil contamination assessment and ecologist should any spills occur.
- Independent water quality analyses should be undertaken annually, or as specified by an aquatic specialist, to demonstrate and audit compliance of effective pollution control measures

Air Quality:

- Monthly dustfall monitoring and reporting: At least four (4) dust buckets must be installed in four principal wind directions around the proposed Kimberley Housing Development;
- Continuous PM10 and PM2.5 monitoring and reporting: As the objective of the monitoring will be to assess PM concentrations that residents at the proposed residential area will be exposed to, the monitoring station can be installed near to the proposed housing development;
- Passive monitoring and reporting for VOCs (Benzene, Toluene, Ethylbenzene, and Xylene), H2S and SO2;
 - A siting exercise can be undertaken prior to commencement of dustfall and ambient air quality monitoring for PM, VOCs, H2S and SO2, should it be required.
- Odour monitoring and reporting;

General conditions:

- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- Should any archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, shall cease immediately and the ECO shall be notified as soon as possible. Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency.

- Noise mitigation at the receiver can be achieved by either installing a fence on the property or by upgrading the façade/glazing and ventilation of a building to provide a greater degree of noise reduction to internal areas.
- Sediment control should be effective and not allow any release of sediment pollution downstream. This should be audited on a weekly basis to demonstrate compliance with upstream conditions.
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Rehabilitate construction sites by establishing with indigenous plant species, within the safety specifications for a power line. The 3m servitude for the underground cable servitude should be kept clear of plants to allow maintenance and repairs in future.

Undertake an Alien Plant Control Plan which specifies actions and measurable targets; On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species

- Erosion control measures must be utilised during construction, operations, decommissioning and rehabilitation of the power lines, cables and substations.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
- The developer should obtain all necessary permits including a Water Use License prior to the commencement of construction.
- Rehabilitate or revegetate disturbed areas

10.6 Declaration by the EAP

GESAN GOVENDER

I, _____, declare that –

- I act as the independent environmental assessment practitioner in this application;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I will take into account, to the extent possible, the matters listed in Regulation 13 of the Regulations when preparing the application and any report relating to the application;
- I undertake to disclose to the applicant and the Competent Authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the Competent Authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the Competent Authority, unless access to that information is protected by law, in which case it will be indicated that such information exists and will be provided to the Competent Authority;
- I will perform all obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in Section 49B of the Act.



Signature of the environmental assessment practitioner

ENVIROOLUTION CONSULTING

Name of company:

24 April 2022

Date

11 LIST OF APPENDICES

Appendix A: Site plan(s)

- Appendix A1: Locality Maps
- Appendix A2: Sensitivity Maps
- Appendix A3: Composite Sensitivity Map

Appendix B: Conceptual Site Plan

- Appendix B1: Site Layout Plan (Alt 1)
- Appendix B2: Site Layout Plan (Alt 2) – preferred

Appendix C: Site Photographs

Appendix D: Public Participation Process

- Appendix D1: Proof of Site notices
- Appendix D2: Newspaper Advertisement
- Appendix D3: Written notifications
- Appendix D4: Authority Consultation
- Appendix D5: Comments on the Draft EIA Report
- Appendix D6: Minutes of meetings
- Appendix D7: Comment & Response Report
- Appendix D8: I&APs Database

Appendix E: Specialist Report

- Appendix E1: Biodiversity and Wetland Assessment
- Appendix E2: Avifauna Assessment
- Appendix E3: Fauna Assessment
- Appendix E4: Vegetation Assessment
- Appendix E5: Aquatic Assessment
- Appendix E6: Heritage and Cultural Assessment
- Appendix E7: Palaeontology (desk-top)
- Appendix E8: Air Quality Assessment
- Appendix E9: Health Risk Assessment
- Appendix E10: Noise Impact Assessment

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Additional Information

- Appendix G1: EAP Affirmation, Details of EAP & Expertise
- Appendix G2: Services Report
- Appendix G3: Screening Report
- Appendix G4: Hydrology Assessment & Stormwater Management