

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act  
(Act 107 of 1998) (NEMA) as amended

The Legalization of the unlawful commencement of the clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a road over the watercourse, in order to establish a Township, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. The development is proposed to be known as Tigane Extension 7 and Tigane Extension 8.

**Report Date: February 2021**



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City of Matlosana LM



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**APPLICATION TO RECTIFY THE UNLAWFUL  
COMMENCEMENT OR CONTINUATION OF LISTED ACTIVITIES  
IN TERMS OF SECTION 24G OF THE NATIONAL  
ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998)**

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**1. PROJECT TITLE**

The Legalization of the unlawful commencement of the clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a road over the watercourse, in order to establish a Township, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. The development is proposed to be known as Tigane Extension 7 and Tigane Extension 8.

**2. INTRODUCTION**

AB Enviro was appointed during August 2019 to submit an application for Environmental Authorization for the proposed township establishment on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.

Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020. Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.

In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement of the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

The Applicant was not aware that they required Environmental Authorization before starting with provision of essential services in the area as the dimensions of the pipelines fell below the threshold as described for this variable in the 2014 NEMA EIA regulations, as amended. The intension of this application is thus to legalise the commencement of the provision of services to the informal housing by the provision of water.

The fact that informal settlement has commenced on site is an indication of the housing shortage in the area. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty.

Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

As soon as the applicant became aware that Environmental Authorization was required, AB Enviro-Consult was appointed to obtain the necessary authorizations.

The unlawful commencement triggered listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014. The development triggered the following regulations and listed activities:

| <b>Number and date of the relevant notice:</b> | <b>Activity No (s) (in terms of the relevant notice) :</b> | <b>Listed activity as per project description<sup>1</sup>:</b>   | <b>Anticipated years to complete construction (From date of commencement)</b> |
|--|--|--|---|
| GN. R 327, 7 April 2017                        | 19   | The infilling and depositing of 11 500 m <sup>3</sup> of concrete and compacted backfill material within a watercourse in order to construct a 2 800 m <sup>2</sup> bridge   | 10 Years  |
| GN.R. 325, 7 April 2017                        | 15   | Clearance of 174 ha of indigenous vegetation in order to establish a Township, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP   | 10 years  |
| GN.R. 324, 7 April 2017                        | 12 (h)(iv)(vi)   | The proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (located within a critical Biodiversity area 2 as identified in the North West Bioregional Plan) and within 30 meters of a non-perennial stream located on a portion of the | 10 Years  |



|  |  |  |  |
|--|--|--|--|
|  |  | Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP. |  |
|--|--|--|--|

The purpose of this document is to adhere to the requirements for the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended for the Legalization of the unlawful commencement of the clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a road over the watercourse, in order to establish a Township, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. The development is proposed to be known as Tigane Ext. 7&8.

## 2.1 DESCRIPTION OF THE PROCESS FOLLOWED

In order to assess a proposed development it is important to take into consideration the principles of NEMA. These principles are outlined in Chapter 1 and read as follows:

- 1) *"The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—*
  - a. *shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;*
  - b. *serve as the general framework within which environmental management and implementation plans must be formulated;*
  - c. *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;*
  - d. *serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and*
  - e. *guide the interpretation administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
- 2) *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
- 3) *Development must be socially, environmentally and economically sustainable.*
- 4) (a) *Sustainable development requires the consideration of all relevant factors including the following:*
  - (i) *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied:*
  - (ii) *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*

- (iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
  - (iv) that waste is avoided. or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
  - (v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
  - (vi) that the development. use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
  - (vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
  - (viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented. are minimised and remedied.*
- (b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*
- (c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*
- (d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*
- (e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*
- (f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured.*
- (g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*
- (h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*
- (i) The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.*
- (j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*

- (k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*
- (l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.*
- (m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*
- (n) Global and international responsibilities relating to the environment must be discharged in the national interest.*
- (o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*
- (p) The costs of remedying pollution, environmental degradation consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*
- (q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*
- (r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.”*

The above mentioned principals and the applicable legislation, Policies and Guidelines as described in Paragraph 2.4 of this Report were taken into account in the assessment of the Environmental Impacts for the proposed development. The process followed can be described as follows:

- 1) AB Enviro was appointed during August 2019 to submit an application for Environmental Authorization.
- 2) Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.
- 3) Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020.
- 4) Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.
- 5) In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a

24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

- 6) A Geotechnical Engineer was appointed to determine whether the Geology and Soils of the site is suitable for the proposed development
- 7) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- 8) A Palaeontological Specialist have conducted a desktop assessment to determine the likely impact of the development on palaeontological heritage features.
- 9) A Fauna and Flora specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- 10) A Civil Engineer has been appointed to determine the availability of services and the impact of the proposed development on services.
- 11) A Flood line engineer has been appointed to determine the 1:100 year flood line
- 12) A Wetland Specialist has been appointed to determine the impact of the proposed road and mitigate impacts on wetlands.
- 13) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- 14) Desk top studies were conducted and alternatives assessed.
- 15) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
- 16) A Botanical Fauna and Flora Habitat was conducted to assess the area and determine the impact of the activity.
- 17) A full Public Participation Process was followed to obtain inputs from interested and affected parties.
- 18) All the information obtained from the above mentioned processes was used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.
- 19) The inputs from the Specialists, interested and affected parties, together with the knowledge of the EAP was used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

## **2.2 ASSESSMENT PHASE**

- (1) *On application by a person who has committed an offence in terms of section 24F(2) the Minister or MEC, as the case may be, may direct the applicant to -*
  - (a) *compile a report containing -*
    - (i) *an assessment of the nature, extent, duration and significance of the impacts of the activity on the environment, including the cumulative effects;*
    - (ii) *a description of mitigation measures undertaken or to be undertaken in respect of the impacts of the activity on the environment;*

- (iii) a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how issues raised have been addressed;
- (iv) an environmental management plan;

The assessment phase included the necessary investigations to assess the possible impacts of the development on the site and the surrounding environment.

The operation of the facilities is likely to result in a number of negative and positive impacts on the biophysical and social environments. The significance of these impacts can be mitigated by the implementation of an Environmental Management Programme.

*The purpose of this Report is to document the outcome of the Assessment Phase of the project. The report fulfilled the requirements of the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended.*

Table 1 below provides a summary of the legislative requirements in terms of the compilation of an Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended. Cross-references are provided in terms of the relevant section within this Report where the NEMA and Report requirements have been addressed.

**Table 1: Environmental Impact Assessment Report in terms of Section 24G (1) (a)(vii) (aa)-(ee) of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended.**

| Section                       | Description of Requirements for Impact Assessment Reports  | Location in this report    |
|-------------------------------|--|----------------------------|
| Section 24G (1) (a)(vii) (aa) | a description of the need and desirability of the activity   | Paragraph 5                |
| Section 24G (1) (a)(vii) (bb) | an assessment of the nature, extent, duration and significance of the consequences for or impacts on the environment of the activity, including the cumulative effects and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity | Paragraph 8                |
| Section 24G (1) (a)(vii) (cc) | a description of mitigation measures undertaken or to be undertaken in respect of the consequences for or impacts on the environment of the activity;  | Paragraph 8                |
| Section 24G (1) (a)(vii) (dd) | a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how the issues raised have been addressed;   | Paragraph 9 and Appendix I |
| Section 24G (1) (a)(vii) (ee) | an environmental management programme  | Paragraph 10               |

### 2.3 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

### PERSONAL PARTICULARS AND CAREER HISTORY OF PROF DE VILLIERS

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### ACADEMIC AND PROFESSIONAL QUALIFICATIONS

#### Post–Matric Qualifications

| YEAR | Qualification | Institution | Field of Study     |
|------|---------------|-------------|--------------------|
| 1968 | B.Sc.         | PU FOR CHE  | Geography, Geology |
| 1970 | HONNS. B.Sc.  | PU FOR CHE  | Soil Science       |
| 1974 | M.Sc.         | PU FOR CHE  | Geography          |
| 1981 | Ph.D.         | UOFS        | Geography          |

### PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

| YEAR      | Qualification/ Registration           | Institution   | Field of Study         |
|-----------|---------------------------------------|---|------------------------|
| 1986      | Professional Natural Scientist        | S.A. Council for Natural Scientific Professions (400099/86) | Environmental Science  |
| 1994      | Quality Auditor                       | ESKOM   | Auditing               |
| 1998      | Personnel & Verifying Auditor         | SAATCA  | Environmental Auditing |
| 2006-2017 | Environmental Assessment Practitioner | Interim Certification Board EAPSA                           | Environmental Science  |

### MEMBERSHIP AND PARTICIPATION IN SOCIETIES, COUNCILS, ETC.

| Name of professional societies                                  | YEAR                     | Capacity        |
|---|--------------------------|-----------------|
| S.A. Geographical Society.                                      | 1967-1996                | Board Member    |
| Society for Geography   | 1968-2004                | Member          |
| SAGS Western Transvaal  | 1985-1989 1987-1989 1996 | Chairman        |
| Africa Geographical Association                                 | 1993-1995                | Vice-President. |
| Society for the Vaal River Catchment                            | 1980-1999                | Member          |
| S.A. Society for Photogrammetry, Remote Sensing and Cartography | 1984-1996                | Member          |
| Dendrological Society   | 1986-2005                | Member          |
| BirdLife South Africa   | 2003-present             | Member          |
| British Geomorphological Research Group                         | 1985-1997                | Member          |
| Int Com on Water Resource Systems                               | 1985-1997                | Member          |
| Int Com on Continental Erosion                                  | 1986-1990                | Member          |

|   |           |                         |
|---|-----------|-------------------------|
| Int Com on Remote Sensing and Data Transmission | 1986-1991 | Member                  |
| Society for S.A. Geographers                    | 1995-2005 | Member                  |
| SA Photogrammetrical and Geo. Info.             | 1995-2003 | Member                  |
| S.A. Association of Geomorphologists            | 1994-1999 | Board Member and member |
| SADC Mine Dump Study Group                      | 1996-2005 | Member                  |

## ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

| YEAR | Qualification             | Institution           | Field of Study           |
|------|---------------------------|-----------------------|--------------------------|
| 1993 | BA                        | PU FOR CHE            | Geography, Economics     |
| 1994 | HED                       | PU FOR CHE            | Geography Economics      |
| 2006 | B.Sc.(Honns)<br>Cum Laude | North-West University | Environmental Management |
| 2007 | M.Sc.                     | North-West University | Geography                |

## PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

| YEAR | Qualification/ Registration                                    | Institution   | Field of Study            |
|------|--|---|---------------------------|
| 2008 | Basic Principles of Ecological Rehabilitation and Mine Closure | Centre for Environmental Management (North West University) | Ecological Rehabilitation |
| 2019 | Registered as Environmental assessment Practitioner            | EAPASA<br>Registration number: 2019/808                     |                           |

## ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

| YEAR | Qualification                                       | Institution                              | Field of Study           |
|------|---|--|--------------------------|
| 1999 | BA  | PU FOR CHE                               | Geography, Tourism       |
| 2000 | BA (Honns)<br>Cum Laude                             | PU FOR CHE                               | Geography                |
| 2003 | Masters degree in Environmental Management          | PU FOR CHE                               | Environmental Management |
| 2001 | Aquabase Intro                                      | AQUABASE                                 | Hydrology                |
| 2001 | Geomedia Professional                               | INTERTECH                                | GIS                      |
| 2001 | Map Info  | SPATIAL TECHNOLOGY                       | GIS                      |
| 2019 | Registered as Environmental assessment Practitioner | EAPASA<br>Registration number: 2019/1573 |                          |

## EXPERIENCE OF THE CONSULTANCY

Over a period of 24 years (1996-2020) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 375 projects. Environmental Control Officer's duties are also performed on various projects.

The company was involved (from 1992-1994) in evaluation of 114 applications for the subdivision of land, 23 applications for resort developments, and 54 applications for business rights for the Department of Agriculture, Conservation and the Environment - North West Province.

The consultancy is qualified to undertake professional studies in waste management and is still involved in the development of waste disposal- (solid and liquid effluent), and emission studies. These studies are conducted both academically and practically. This work relates to mine waste, domestic waste and effluent as well as to the monitoring of waste disposal. Environmental audits in this respect are undertaken on a regular basis.

## 2.4 LEGAL AND OTHER REQUIREMENTS

| Title of legislation, policy or guideline                           | Applicability to the project  | Administering authority | Date             |
|---|---|-------------------------|------------------|
| National Environmental Management Act No. 107 of 1998 as amended.   | NEMA is the guiding legislation that has been considered during the Environmental Impact Assessment process and the compilation of this Scoping Report.   | NW:DEDECT               | 27 November 1998 |
| The Bill of Rights, Constitution of South Africa, Section 27 (1)(b) | <p>The Constitution of the Republic of South Africa is the legal source of all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act, it is stated that:</p> <p>Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>Given that environmental management is founded partly on the principles of public participation, Section 195 of the Constitution is of primary relevance:</p> <p>(1) Public administration must be governed by the democratic values and principles enshrined in the constitution, including the following principles: (a) (b) (c) (d) (e) Peoples needs must be responded to, and the public must be encouraged to participate in policymaking. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information (Government Gazette, 1996).</p> | National Government     | 1994             |
| New Regulations 2014 in terms of NEMA                               | Legislation consulted during the environmental impact assessment process to determine whether any listed activities would be triggered. The Regulations were also consulted to  | NW: DEDECT              | 7 April 2017     |



| Title of legislation, policy or guideline  | Applicability to the project   | Administering authority            | Date |
|--|--|------------------------------------|------|
|  | determine inter alia the requirements regarding the contents of Scoping reports and the public participation process that should be followed.  |                                    |      |
| National Water Act (36 OF 1998)  | <p>National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological integrity, economic growth and social equity when managing and using water.</p> <p>The major objectives of the National Water Act are to:</p> <ul style="list-style-type: none"> <li>•Aid in providing basic human needs;</li> <li>•Meet the growing demand of water in a sustainable manner;</li> <li>•Ensure equal access to water and use of water resources;</li> <li>•Protect the quality of water of natural resources;</li> <li>•Ensure integrated management of water resources;</li> <li>•Foster social and economic development; and</li> <li>•Conserve aquatic and related ecosystems.</li> </ul> <p>Section 19 of the National Water Act states that the person responsible for land upon which any activity is or was performed which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.</p> | Department of water and sanitation | 1998 |
| National Environmental Management: Biodiversity Act (NEMBA) (ACT NO. 10 OF 2004) | <p>The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.</p> <p>In terms of Chapter 4 of the Above Act:</p> <p>52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.</p>   | NW: DEDECT                         | 2004 |

| Title of legislation, policy or guideline                                   | Applicability to the project   | Administering authority                      | Date |
|---|--|--|------|
|   | <p>(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.</p> <p>(2) The following categories of ecosystems may be listed in terms of subsection:</p> <p>(a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;</p> <p>(b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;</p> <p>(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and</p> <p>(d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).</p> <p>(3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list.</p> <p>53 (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.</p> <p>(2) A threatening process, identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of the National Environmental Management Act (1998) and a listed ecosystem must be regarded as an area identified for the purpose of that section.</p> |  |      |
| National Environmental Management: Protected Areas Act (ACT NO. 57 OF 2003) | This Act aims to provide for a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity. The Protected   | National Department of Environmental Affairs | 2003 |

| Title of legislation, policy or guideline   | Applicability to the project   | Administering authority | Date |
|---|--|-------------------------|------|
|   | <p>Areas Act tries to ensure the protection of the entire range of biodiversity, referring to natural landscapes and seascapes. The Act makes express reference to the need to move towards Community Based natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the management of protected areas. The purpose of the Act is:</p> <ul style="list-style-type: none"> <li>•To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes and their ecological integrity.</li> <li>•To conserve biodiversity in those areas;</li> <li>•To protect South Africa's rare species;</li> <li>•To protect vulnerable or ecologically sensitive areas;</li> <li>•To assist in ensuring the sustained supply of environmental goods and services;</li> <li>•To provide for the sustainable use of natural and biological resources;</li> <li>•To create or augment destinations for nature-based tourism;</li> <li>•To manage the interrelationship between natural environmental biodiversity, human settlement and economic development;</li> <li>•To contribute to human, social, cultural, spiritual and economic development;</li> <li>•To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.</li> </ul> <p>This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures which must be followed before any of the kinds of protected areas are declared.</p> |                         |      |
| National Heritage Resources Act, Act No. 25 of 1999   | Legislation consulted during the impact assessment process, to determine the legal requirements relating to the management of heritage resources that are present in and around the site.  | SAHRA                   | 1999 |
| National Environmental Management: Waste Act, Act No. 59 of 2008, DEDECT together with the List of Waste Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment, GN No. 921 of 29 November 2013 | Legislation consulted to determine whether a waste licence will have to be obtained for the development.   | NW:DEDECT Waste Section | 2008 |

| <b>Title of legislation, policy or guideline</b>                                       | <b>Applicability to the project</b>   | <b>Administering authority</b>  | <b>Date</b> |
|--|---|---|-------------|
| <i>National Environmental Management: Air Quality Act (Act 39 of 2004)</i>             | To protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social Development. Construction activities may cause some air pollution. | Department of Environmental Affairs: Directorate Air quality management | 2004        |
| <i>The Conservation of Agricultural Resources Act (Act 43 of 1983)</i>                 | This Act regulates the flow pattern of runoff water, control of weeds and invader plants.   | NW: Department of Agriculture   | 1983        |
| <i>National Veldt and Forest Fire Act (Act 101 of 1998)</i>                            | Chapter 4 places a duty on owners to prepare and maintain firebreaks.   | Department of Agriculture, Forestry and Fisheries                       | 1998        |
| <i>National Forests Act, Act 84 of 1998 (NFA) DEDECT with GN1602 of December 2016.</i> | During the construction phase of the development certain protected trees may be affected. Licences will have to be obtained from the Minister before the affected trees may be cut, disturbed, damaged or destroyed. GN1602 of December 2016 contains the list of protected trees.              | Department of Agriculture, Forestry and Fisheries                       | 1998        |
| <i>Occupational Health and Safety Act (Act 85 of 1993)</i>                             | To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the protection of persons other than persons at work against hazards to health.  | Department of Employment and labour                                     | 1993        |

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

### **ADDITIONAL NATIONAL LEGISLATION**

Other National Legislation, which has implications for environmental control on the site, includes:

- Conservation of Agricultural Resources Act (43 of 1983), regulation of the flow pattern of runoff water, control of weeds and invader plants;
- National Environmental Management Waste Act (59 of 2008)
- The Guidelines contained in the Document of the Department of Environmental Affairs and Tourism (Department of Environmental Affairs and Tourism, 1998) , regarding the implementation of the regulations under sections 21, 22 and 26 of the above mentioned act
- The Guidelines contained in the Document on Integrated Environmental Management (Department of Environmental Affairs, 1992)
- The National Heritage Act (25/1999)
- Aide Memoir - Department of Water Affairs and Forestry (DWAF, 2003)
- Water Act (36/1998)
- Water Services Act (108/1997)
- Occupational Health and Safety Act, (1993/85)

- Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002)
- The Mine Health and Safety Act (MHSA) (Act No. 29 of 1996)
- National Forest Act (84/1998)

## **SUSTAINABLE DEVELOPMENT**

The principle of Sustainable Development has been established in the Constitution of the Republic of South Africa (108 of 1996) and given effect by NEMA. Section 1(29) of NEMA states that sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations.

Thus, Sustainable Development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions;
- Negative impacts on the environment, on people's environmental rights be anticipated; and, prevented, and where they cannot altogether be prevented, are minimised and remedied.

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

### ***3 DETAILS OF PROPERTY ON WHICH UNLAWFUL ACTIVITY TOOK PLACE:***

The development is located towards the North of the existing formalized township of Tigane on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. See Figure 1 for a copy of the Locality Map. The development is proposed to be known as Tigane Extension 7 and Tigane Extension 8. Tigane Extension 7 is located on a portion of Portion 100 of the farm Nooitgedacht No.434-IP. Tigane Extension 8 is located on a portion of the Remaining Extent of the farm Uraan No. 295-IP. The Tigane Extension 7 & 8 Precinct Area is situated approximately 31km's north-west of the CBD of Klerksdorp, adjacent to R503 provincial road, in the jurisdiction of City of Matlosana Local Municipality. All the properties are owned by City of Matlosana Local Municipality.



FIGURE 1. LOCALITY MAP



**FIGURE 2. SENSITIVITY MAP**

People have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. The following Figures are illustrations of the general view of the site. Vegetation at the site appears to be degraded. Disturbances that have caused extensive impacts to vegetation include numerous tracks. An erosion gully in the eastern section of the terrain as well as a non-perennial stream and excavations are evident. Some informal settlement, an unfenced graveyard as well as a pumping station are some more of the features on the proposed development site.



**Photograph 1. Degraded vegetation**



**Photograph 2. One of the tracks on site**





**Photograph 3. Erosion gully**



**Photograph 4. Excavation of soil**



**Photograph 5. Informal settlements and dumping of waste**



**Photograph 6. Unfenced graveyard**



**Photograph 7. Pumping station**

|                   |                                      |      |              |
|-------------------|--------------------------------------|------|--------------|
| <b>Landowner:</b> | City of Matlosana Local Municipality |      |              |
| Contact person:   | Mr TSR Nkhumise                      |      |              |
| Postal address:   | PO Box 99, Klerksdorp                |      |              |
| Postal code:      | 2570                                 | Cell | N/A          |
| Telephone:        | 018 487 8009                         | Fax  | 018 487 1652 |
| E-mail:           | dnkosi@klerksdorp.org                |      |              |

In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application.

|   |                                      |
|---|--------------------------------------|
| <b>Local authority in whose jurisdiction the proposed activity will fall:</b> | City of Matlosana Local Municipality |
| <b>Municipal Ward No:</b>   | 1                                    |

**Site Co-ordinates**

**Latitude (S):**

**Longitude (E):**

**Alternative S1 (preferred or only site alternative)**

Uraan 295-IP

Vogelstruisfontein 273-IP

Vogelstruisfontein 273-IP

Uraan 295-IP

| Latitude (S)    | Longitude (E)  |
|-----------------|----------------|
| 26° 44' 3.13"   | 26° 24' 38.9"  |
| 26° 43' 37.56"  | 26° 26' 17.39" |
| 26° 43' 22.135" | 26° 25' 36.61" |
| 26° 43' 33.16"  | 26° 24' 51.51" |

#### **4. DESCRIPTION OF THE ACTIVITY**

AB Enviro was appointed during August 2019 to submit an application for Environmental Authorization for the proposed township establishment on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.

Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020. Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.

In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement of the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

The Applicant was not aware that they required Environmental Authorization before starting with provision of essential services in the area as the dimensions of the pipelines fell below the threshold as described for this variable in the 2014 NEMA EIA regulations, as amended. The intension of this application is thus to legalise the commencement of the provision of services to the informal housing by the provision of water.

The fact that informal settlement has commenced on site is an indication of the housing shortage in the area. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty.

The site is influenced by a number of design factors that were considered for the proposed layout plan to be acceptable. These factors include the slope of the site, environmental sensitivity, service provision, erf size, access, road layout, as well as the geotechnical features presented in the Geotechnical Report. To ensure that the proposed development do not infringe on any design principles and the environmental sensitive areas, development will only be allowed to take place according to the prescribed methods: subsequently a buffer area has been established around the wetlands area and no residential development may take place beyond the 1:100 year flood line. A Bridge is proposed to allow road access within the north western corner of the development over a non-perennial watercourse.

**Tigane Extension 7:**

- **Residential 1**, to be utilized for housing purposes
- **Business 1**, to be utilized for business purposes.
- **Churches**, for the purpose of religious activities
- **Chreches and school**, to be utilized for educational purposes
- **Cemetery** for burial purposes
- **Park**, to be utilized for public open space purposes and
- **Streets**, for access to facilities.

**The township will consist of a mixed us: See Figure 3 for a copy of the proposed Layout Plan.**

| <b>TIGANE EXTENSION 7</b> |                     |                         |
|---------------------------|---------------------|-------------------------|
| <b>Proposed Zoning</b>    | <b>No. of Erven</b> | <b>Area in hectares</b> |
| <b>Residential 1</b>      | 1583                | 51.573                  |
| <b>Business1</b>          | 3                   | 0,4452                  |
| <b>Church</b>             | 2                   | 0,3073                  |
| <b>Chreche</b>            | 2                   | 0,3025                  |
| <b>Primary school</b>     | 1                   | 3.0755                  |
| <b>Cemetery</b>           | 1                   | 11,075                  |
| <b>Community facility</b> | 1                   | 0,1614                  |
| <b>Park</b>               | 6                   | 3,3475                  |
| <b>Streets</b>            |                     | 20,2118                 |

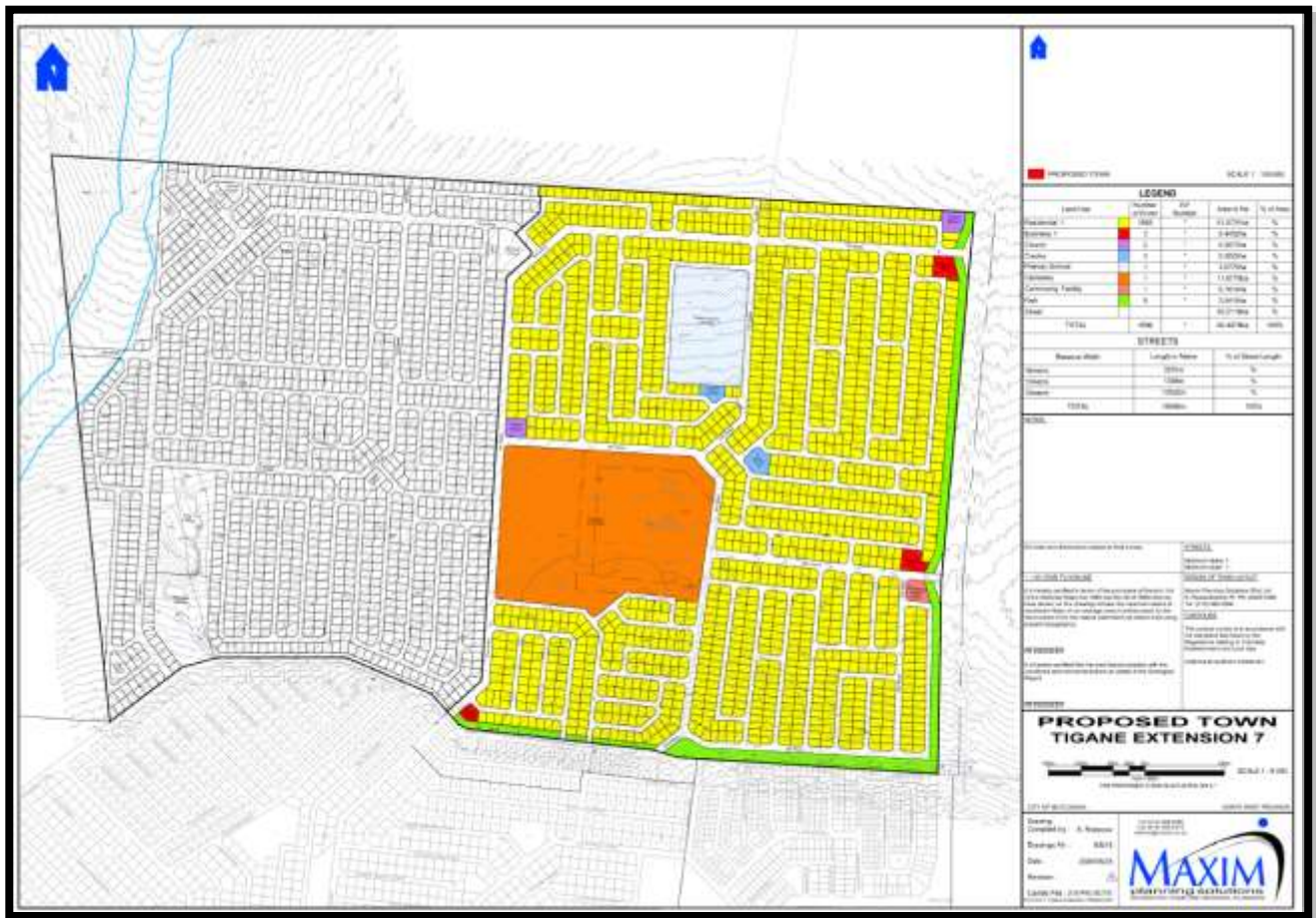


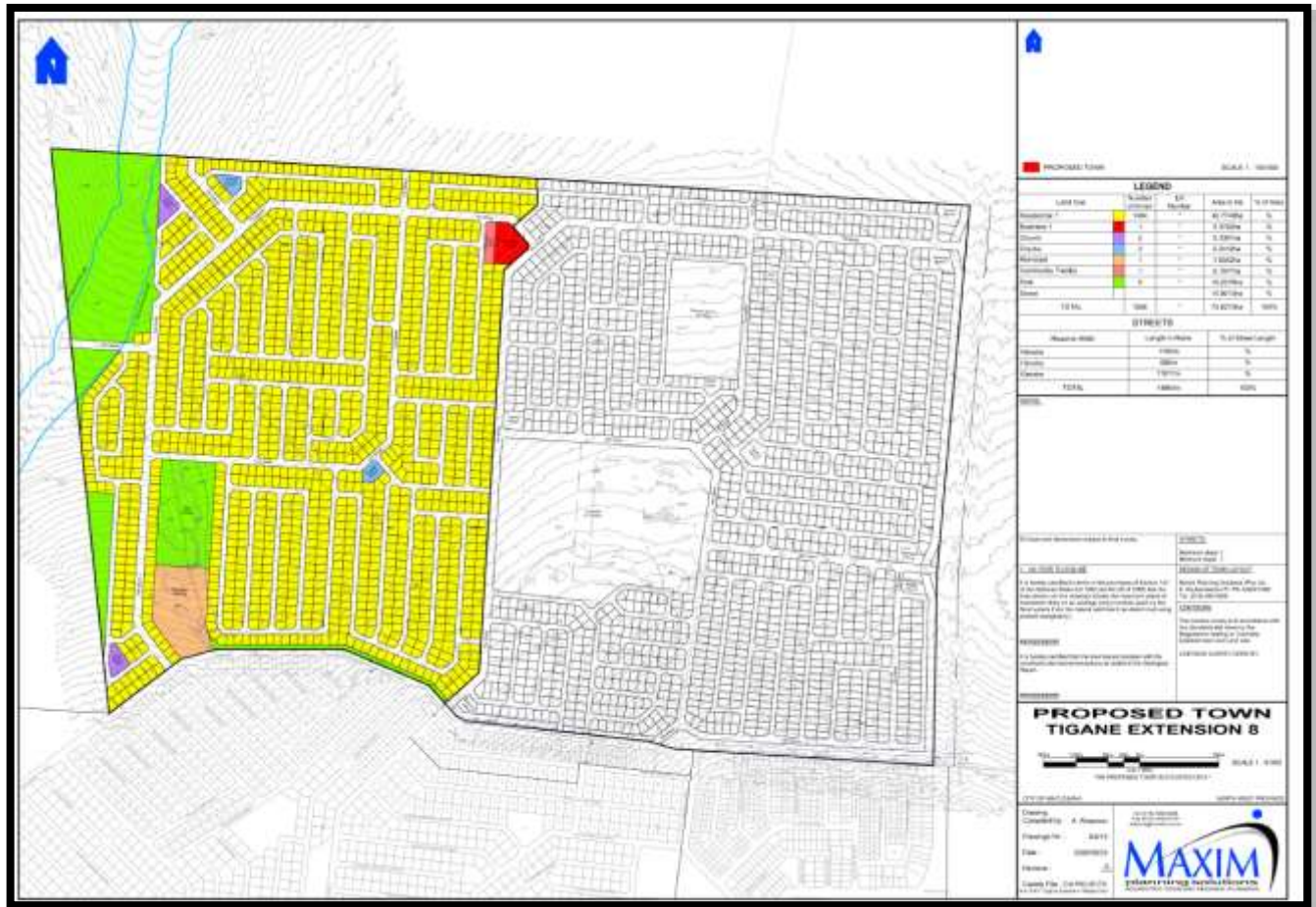
FIGURE 3. Proposed layout plan Tigane Extension 7.

Tigane extension 8. See Figure 4 for a copy of the proposed Layout Plan

- **Residential 1**, to be utilized for housing purposes
- **Business 1**, to be utilized for business purposes.
- **Churches**, for the purpose of religious activities
- **Chreches**, to be utilized for educational purposes
- **Municipal**, for municipal services
- **Park**, to be utilized for public open space purposes and
- **Streets**, for access to facilities.

| TIGANE EXTENSION 8 |              |                  |
|--------------------|--------------|------------------|
| Proposed Zoning    | No. of Erven | Area in hectares |
| Residential 1      | 1494         | 46,774.9         |
| Business1          | 1            | 0,374.2          |
| Church             | 2            | 0,336.1          |
| Chreche            | 2            | 0,241.9          |
| Community facility | 1            | 0,157.1          |

|                |   |         |
|----------------|---|---------|
| <b>Park</b>    | 5 | 10,2376 |
| <b>Streets</b> |   | 15.9013 |



**FIGURE 4. Proposed layout plan Tigane Extension 8.**

A buffer area has been established around the wetlands area and no residential development may take place beyond the 1:100 year flood line. A Bridge is proposed to allow road access within the north western corner of the development over a non-perennial watercourse.

### **Availability of Bulk Services**

#### **Water**

##### *Water Source*

The potable water for the Tigane is obtained from the Midvaal Water Company purification works next to the Vaal River near Vaal Reefs town.

##### *Water Purification works*

The treatment works which abstracts raw water from the Vaal River has enough extra capacity to cater for the demand of the proposed new Tigane Ext 7 and Ext 8 development.

##### *Service reservoirs*

Tigane is serviced by the Hartbeesfontein Reservoirs. The total capacity of the reservoirs is 18.5ML broken down as follows;

- i i. Reservoir 1 - 3.5ML
- ii ii. Reservoir 2 – 5ML
- iii iii. Reservoir 3 – 10ML

The Hartbeesfontein Reservoirs have been designed to provide in the future development of Tigane. There are two existing elevated steel water towers in Tigane for pressure with the following capacities;

- i i. Tank 1 - 0.25ML
- ii ii. Tank 2 – 0.5ML

#### *Supply pipelines and pump systems*

The rising main conveying potable water to the Hartbeesfontein reservoirs has a pipe diameter of 300mm. From the outlet of the Hartbeesfontein Reservoir, water gravitates to the Tigane Pump station through a 250mm diameter gravity main. From the Tigane Pump Station, the water is pump to the Tigane Pressure Tanks through a 200mm diameter rising main. The water from the tanks gravitates to Tigane through a 160mm diameter gravity main.

#### **Sewer**

The proposed Tigane Extension 7 and 8 settlements fall within an area serviced by the Hartbeesfontein Wastewater Treatment Plant (WTP). The Hartbeesfontein Wastewater Treatment Plant is owned and operated by City of Matlosana. The proposed Tigane Extension 7 and 8 settlements will discharge their sewer into the Hartbeesfontein WTP. The Hartbeesfontein WTP was upgraded to 8 ML/day in 2013. Currently it is receiving 3.8 ML/day. This implies that it has spare capacity of 4.2 ML/day.

#### *Bulk Services*

Through our site visit and inspection that was conducted on the 29th of June 2020 in the company of municipal personnel, it was established that the Hartbeesfontein/Tigane outfall sewer is in a fair condition

#### **Roads**

Access to the proposed development through intersections and primary roads according to the town planning layout is indicated on the attached plan which is self-explanatory. More than one access is available to each of the development areas via the Hartbeesfontein Provincial road (R503), and various other primary and secondary routes interlinked with the existing road network of Hartbeesfontein.

The pavement design of the Primary Roads marked as Roads marked in red on the attached plan will be designed for category UB s described in the UTG Design manuals but modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. All other secondary roads will be designed to category UC and again modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. Where possible surface runoff exceeds the permissible cross-section capacity of the Primary Roads, sub-surface pipe drainage system shall be installed.



### **Stormwater**

The proposed development will drain storm water run-off towards the natural low lying water-course on the north-western side of the development through the road network in combination with sub-soil drainage pipe network system. A formalised system will discharge the bulk storm-water in a north western direction as indicated on the appended plan.

### **Solid Waste**

The Matlosana Municipality will extend its existing refuse removal service to include the new development areas. The refuse will be dumped and managed at the formal licenced dumping site of Klerksdorp which has the capacity to receive the additional refuse.

## **5. NEED AND DESIRABILITY**

The fact that informal settlement has commenced on site is an indication of the housing shortage in the area. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty.

Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

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

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

The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and **basic services**.

The SDF and the Land Use Management system of the Local Municipality has identified certain areas that must address previously disadvantaged areas and historically disadvantaged residents. There is a definite need for the residents to have reasonable access to opportunities and facilities that supports living in the urban Settlement. It is the responsibility of the local municipality to ensure that the residents have reasonable access to community services and amenities, as well as employment opportunities and that the form of land development need to provide for basic needs in an affordable way. The proposed development will be in line with this principle by ensuring that people living in the area do in fact have reasonable access to opportunities and facilities.

The development addresses the need identified by the City of Matlosana Local Municipality, for the provision of additional mixed land use and social mix, such as the availability of housing for the people of the City.

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities, shops, schools, banking facilities, clinics, etc. and want their living environment to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure as well as retail and commercial activities;
- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised settlements in the area. The commercial node will:
  - Promote entrepreneurial services and products;
  - Be within walking distance to places of refreshment and trade for residents;
  - Provide Job opportunities; and
  - Improve neighbourhood quality

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

## 6. ALTERNATIVES

One of the objectives of an EIA is to investigate alternatives to the proposed project. The IEM procedure stipulates that the environmental investigation needs to consider feasible alternatives for any development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. In order to ensure that the development enables sustainable development, feasible alternatives must be explored (S. Cliff, 2015).

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental impact assessment process. Alternatives should be considered as a norm within the Environmental Process (S. Cliff, 2015).

The alternatives considered for the proposed development includes land use alternatives (including the No-go option). The various alternatives have been assessed in terms of environmental, social and technical feasibility.

### 6.1 LAND USE ALTERNATIVES

#### 6.1.1 MIXED LAND USE TOWNSHIP ALTERNATIVE (ALTERNATIVE 1)

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

The proposed township will comprise the following:

| <b>TIGANE EXTENSION 7</b> |                     |                         |
|---------------------------|---------------------|-------------------------|
| <b>Proposed Zoning</b>    | <b>No. of Erven</b> | <b>Area in hectares</b> |
| <b>Residential 1</b>      | 1583                | 51,573                  |
| <b>Business1</b>          | 3                   | 0,4452                  |
| <b>Church</b>             | 2                   | 0,3073                  |
| <b>Chreche</b>            | 2                   | 0,3025                  |
| <b>Primary school</b>     | 1                   | 3,0755                  |
| <b>Cemetery</b>           | 1                   | 11,075                  |
| <b>Community facility</b> | 1                   | 0,1614                  |
| <b>Park</b>               | 6                   | 3,3475                  |
| <b>Streets</b>            |                     | 20,2118                 |

| <b>TIGANE EXTENSION 8</b> |                     |                         |
|---------------------------|---------------------|-------------------------|
| <b>Proposed Zoning</b>    | <b>No. of Erven</b> | <b>Area in hectares</b> |
| <b>Residential 1</b>      | 1494                | 46,7749                 |

|                           |   |         |
|---------------------------|---|---------|
| <b>Business1</b>          | 1 | 0,3742  |
| <b>Church</b>             | 2 | 0,3361  |
| <b>Chreche</b>            | 2 | 0,2419  |
| <b>Community facility</b> | 1 | 0,1571  |
| <b>Park</b>               | 5 | 10,2376 |
| <b>Streets</b>            |   | 15.9013 |

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities, shops, schools, banking facilities, clinics, etc. and want their living environment to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure as well as retail and commercial activities;
- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised settlements in the area. The commercial node will:
  - Promote entrepreneurial services and products;
  - Be within walking distance to places of refreshment and trade for residents;
  - Provide Job opportunities; and
  - Improve neighbourhood quality.

### **6.1.2 SINGLE LAND USE HOUSING ONLY ALTERNATIVE (ALTERNATIVE 2)**

***Providing only one land use type (i.e., housing), mixed income development and social integration across race and income levels, which cannot be achieved.***

The business, and institutional uses (schools, church and creche) on site serves as a range of essential services (and the cemetery) that can be obtained by people living in its vicinity. In turn, the business, commercial nodes act as a pool of human and physical resources from which the inputs necessary for development can be distributed efficiently, and from which a community can draw to promote their development.

By restricting a township to one land use only, the above benefits to the local community, and subsequent council area, cannot be realised, and hence, is not a preferred land use option.

### **6.1.3 NO-GO ALTERNATIVE (ALTERNATIVE 3)**

The only other alternative that exists for the proposed development is the “no-go” option which will imply that the status quo will prevail. This is unacceptable, as other land parcels will have to be

sourced to provide for this need within the community. This will imply that infill development will not take place and will result in urban sprawl.

## **7. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT**

### **7.1. BIO-PHYSICAL ASPECTS**

#### **7.1.1 GEOLOGY AND SOIL**

The site is underlain by quartzite, conglomerate and greywacke of the Bothaville Formation, Platberg Group, of the Ventersdorp Supergroup. Surficial deposits include quaternary hillwash covering the lithology. No dolomite occurs in the area therefore no stability investigation is needed.

Some problems are foreseen regarding the collapsible properties associated with the quartzite with an expected total collapse of up to 15mm measured at the surface. The site is mainly classified as Site Class 2.

The engineering geological site classification indicating special development was as follows:

#### **Modified Normal to Special Development: Site Class C2/2A:**

Hillwash comprising orange to dark reddish brown silty clayey sand sometimes with fine gravel represents a medium to highly collapsible soil, with thickness in excess of 0,75m, and an expected range of up to 15mm of total soil movement measured at surface, from this zone on site. Foundations will therefore require modified normal foundation techniques such as lightly reinforced strip footings or reinforced boxed steel in slightly widened strip foundations, the use of split construction techniques or articulation joints at all internal and external doors and openings with light reinforcement (brickforce) in masonry, or soil replacement by an engineered fill soil raft with a COLTO classification of G5 or better, by removing all or part of the expansive horizon to 1,0m beyond the perimeter of the structure and replacing with inert backfill, compacted to 93%MOD ASSHTO density at or near optimum moisture content, where after normal strip footing foundations can be used. Site drainage, a concrete apron of 1,0m around all structures and plumbing and service precautions are advised. It is classified as C2 in terms of the NHBRC guidelines (1995) or the SAICE Code of practice (1995) and 2A after the classification for urban development (Partridge, Wood & Brink).

#### **Suitable for development with precaution Site Class PR:**

Quartzite rock outcrop and sub-outcrop will restrict excavatability required during service installation as well as foundation excavations. Blasting or difficult excavation operations will dramatically increase the development cost in this zone.

#### **Site Class PQ:**

Areas where small quarries or filling or dumping of spoil were identified must be rehabilitated before any construction can be allowed, and backfilling with an engineer's material with a COLTO classification of G5 or better may improve the developability of these zones, but these operations will dramatically increase the development cost in this zone.

### **Undevelopable: Site Class PD/PDM:**

Perennial drainage features where the 1:100 year flood line will determine or specify the allowable distance of development from rivers, usually at least 32m from the center of the river (PD), with adjacent areas subject to perennial wetness where seasonal marshy conditions may be encountered (PDM).

### **7.1.2 TOPOGRAPHY GEOLOGY AND SOIL**

The site is located on a plain surface dipping from southeast to northwest. The highest elevation occur along the southern border where a maximum of around 1550 meters is reached. The lowest point in the development occur at the extreme northwest where the non-perennial stream cross the site. Slight undulations occur. The maximum elevation difference is approximately 45m over a distance of 2140. The gradient is therefore at maximum 2%.

A detailed site survey has been carried out to establish levels. The Engineering report and the Layout plan address issues regarding drainage of the site.

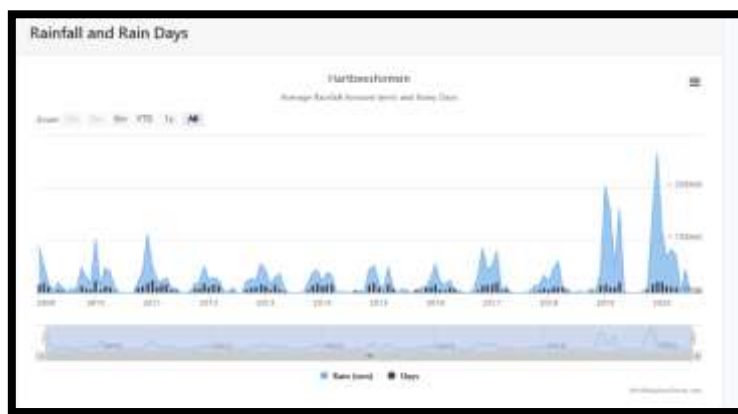
### **7.1.3 CLIMATE**

The climate of the area is typical of the South African interior. In the discussion of this variable, certain aspects of rainfall, temperature and wind that can influence the project will be highlighted.

It must be noted that the climatic data are recorded in the Department of Environmental Affairs (1988) climatic data records. Data for Klerksdorp weather station (0436/292 ) is available. This records were only taken between 1903-1952.

#### **7.1.3.1 Rainfall**

The average annual rainfall for the area is 625mm per annum. The highest annual rainfall recorded during the period for which the record is available is 980 mm (1976), while a yearly low of 365mm was recorded in 1903. Of note is the maximum-recorded daily rainfall of 140mm that was recorded during December 1943. Of importance is the fact that monthly minima of zero rainfall have been recorded for 6 months of the year. More recent data (last 10 years' average rainfall) is indicated below for Hartbeesfontein:



Source: <https://www.worldweatheronline.com/hartbeesfontein-weather-averages/north-west/za.aspx> Site visited: 15/10/2020

The variability of rainfall as well as the high intensity events will definitely influence the project. On average however, the impact of rainfall can be considered as positive, as sufficient water is generally available for sustaining vegetation. Extreme dry conditions during dry spells will negatively affect the project due to the secondary effects on vegetation as well as the possibility of fire hazards. Extreme maximum events can also have a negative effect on the project during all its phases.

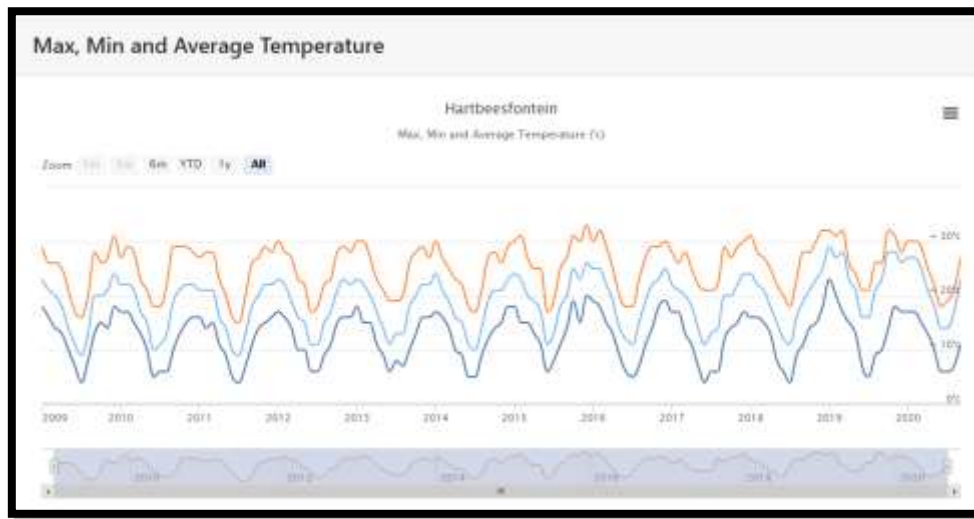
The overall impact can therefore be considered to be “variable” during the construction and operational phases (local in extent and long term in duration). The likelihood that these impacts may occur is probable, medium in intensity and significance. Steps to mitigate negative effects will be described in various sections of the Management Plan.

Due to the scale of the operation, the rainfall of the area cannot be affected by the project and is therefore “Not Applicable”.

### 7.1.3.2 Temperature

The average daily maximum temperature for the winter months for the area is approximately 20° C. The average daily minimum for that time of the year is in the order of 2,0° C.

During the summer months, the average daily maximum is in the order of 28° C and the daily average minimum approximately 14°C. The highest daily maximum recorded was 39,2°C while the lowest recorded temperature was -10,2°C. More recent data (last 10 years' average temperatures) is indicated below for Hartbeesfontein:



Source: <https://www.worldweatheronline.com/hartbeesfontein-weather-averages/north-west/za.aspx>

Site visited: 15/10/2020

In combination with a dry spell, such hot temperatures may be favourable for the spreading of veldfires.

The general impact of this variable on the project can be considered as positive during the construction and operational phases. The impacts can however be considered as having low intensity impacts of low significance. The extent is local and short term in duration.

Due to the scale of the project, it is clear that it will have no impact on the environment”.

### **7.1.3.3 Wind**

The average wind direction for the area during the summer months is from the north-to-north easterly quadrant, while during the early spring the direction is more north westerly. Southerly winds generally occur during the winter, but are not frequent. Normally very little wind is experienced during the winter due to the presence of the high-pressure cell situated over the country during that time of the year.

The wind speeds are normally fairly low, but high wind speeds may occur during early spring and during of thundershowers.

Wind can be considered as having a low intensity, and a low significance negative impact on the construction and operational phases of the project. The probability is probable and the impacts are local but short in duration. The project can have no influence on the wind and is therefore “not applicable.

### **7.1.3.4 Climate Change**

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

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



#### 7.1.4 SURFACE DRAINAGE

The area lies within the drainage basin of the Schoonspruit. The study area itself is situated on an area drained by overland flow. A single non-perennial stream drains from south to north where it joins a northeast flowing stream (Buisfontein Spruit) that eventually turns southeast to join the Schoonspruit. Visible erosion occurs where a small donga at the southern part of the site, is a concern. If the development is approved an opportunity exists to address this problem of erosion with a proper stormwater system. Plate flow is the dominant drainage pattern on site.



**FIGURE 5: 1:100 Year Flood line of the Buisfontein Spruit**

No erosion by sheet flow is evident on site. Surface drainage will have an influence on the project on a local scale and long in duration. The influence is positive in the sense that no major ground works are necessary to overcome possible erosion by sheet flow. The intensity and significance is low and of a probable probability.

The project will have a negative influence on the environment during the construction phase as the natural overland flow will be disturbed during this phase. If the prescribed management plan for the operational phase is adhered to, no undue stress will be placed on the environment - a positive impact can be expected. The likelihood of these impacts occurring is probable, but the intensity and significance, are judged low. The extent is local and the duration long.

#### 7.1.5. GROUND WATER

The permanent or perched water table on site is deeper than 1, 5 m below ground surface. The underground water table in the area is normally deep because of the geology of the area. The likelihood of problems arising from it is not very large if proper steps are taken to prevent possible pollution infiltration into the groundwater.

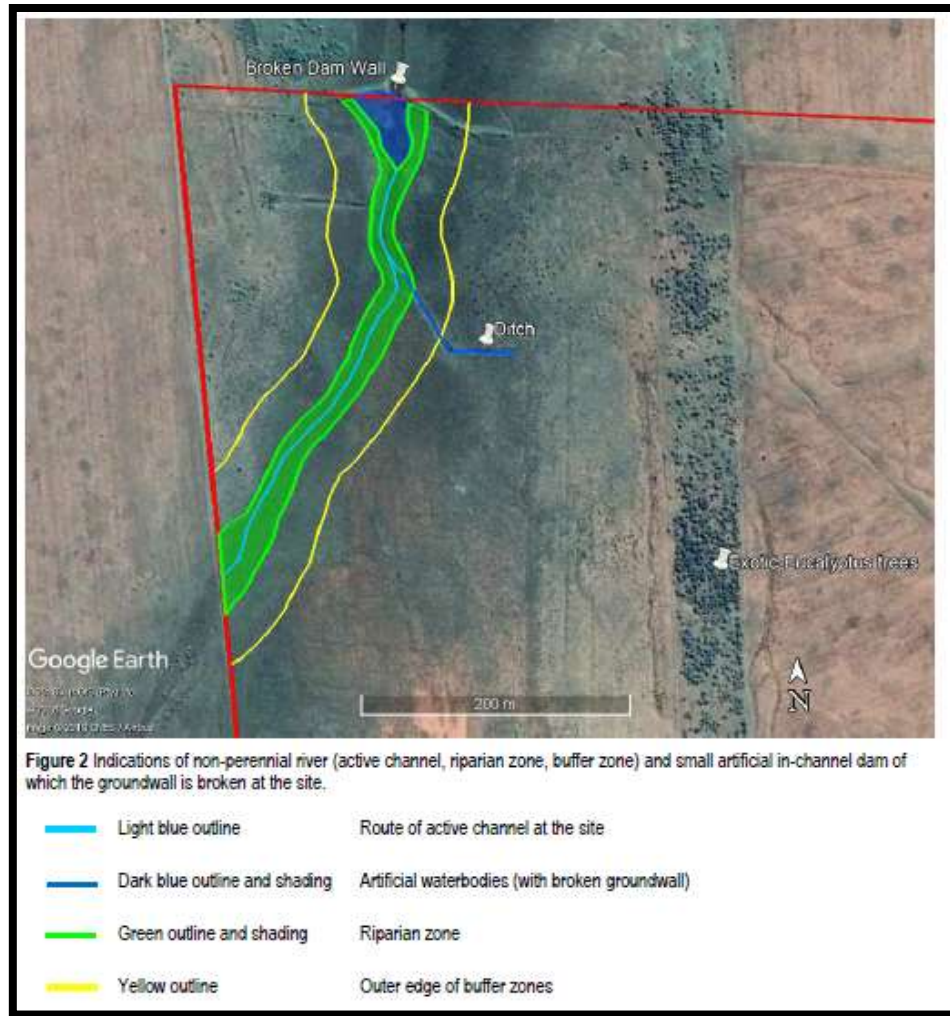
The impact and significance of this variable is considered low, probable but with a low significance.

The project could adversely affect ground water if proper steps are not implemented in order to prevent pollution from reaching the groundwater. If proper mitigation and pollution prevention steps are taken during the planning, implementation and post-construction phases it is highly unlikely that the groundwater will be affected. The eventual influence should therefore be one of low significance, probability and intensity.

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

#### **7.1.6. WETLANDS AND RIPARIAN ZONES**

A small non-perennial streambed, with its active channel and riparian zone, is present at the northwestern parts of the site. A small artificial waterbody, which is an in-channel dam (with a broken groundwall), is present in this tributary at the northwestern parts of the site. Wet areas at the active channel and small dam contains exotic plant species such as the grass *Paspalum dilatatum* and the herb *Oxalis corniculata*. Indigenous plant species such as *Stachys spathulata* and *Helichrysum aureonitens* occur near or at the outer parts of the watercourse at the site. *Persicaria* species (Knotweeds) occur at the permanent zone of the small artificial waterbody (small dam). Megagraminoids (large grasses such as reeds) are absent.



**FIGURE 6: Non Perennial River and small artificial in channel dam of which the groundwater is broken**

### 7.1.7. FLORA

The site is situated at the Grassland Biome which is represented by the Vaal-Vet Sandy Grassland vegetation type (Mucina & Rutherford, 2006). A brief overview of the vegetation type, which serves as an outline of the ecological context of the site, follows.

#### Gh 10 Vaal-Vet Sandy Grassland

Distribution: In South Africa the Vaal-Vet Sandy Grassland is present in the North-West Province and Free State Province. Vaal-Vet Sandy Grassland ranges from south of Lichtenburg and Ventersdorp to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort areas north of Bloemfontein. Altitude ranges from 1 220 – 1560 m for the entire vegetation type (Mucina & Rutherford 2006).

Vegetation and landscape features: Plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element are present. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *Themeda triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. Geology and soils: Aeolian and colluvial sand overlying sandstone, mudstone, and shale of the Karoo Supergroup (mostly the Ecca group) as well as older Ventersdorp Supergroup and basement gneiss in the north (Mucina & Rutherford 2006).

Important taxa of the Vaal-Vet Sandy Grassland listed by Mucina & Rutherford (2006): Graminoids: *Anthephora pubescens*, *Aristida congesta*, *Chloris virgata*, *Cymbopogon caesius*, *Cynodon dactylon*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis chloromelas*, *Eragrostis lehmanniana*, *Eragrostis plana*, *Eragrostis trichophora*, *Heteropogon contortus*, *Panicum gilvum*, *Setaria sphacelata*, *Themeda triandra*, *Tragus berteronianus*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*. Herbs: *Stachys spathulata*, *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespititium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*. Succulent Herb: *Tripteris aghillana* var. *integrifolia*. Low shrubs: *Felicia muricata*, *Pentzia globosa*, *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Helichrysum paronychioides*, *Ziziphus zeyheriana*.

**Note:** Not all of the above listed plant species for the vegetation types occur at the site in the study area. No threatened, critically rare, rare, declining Red data listed species or species of particular conservation occur in the study area.

Vegetation at most of the site is visibly degraded and cover of vegetation in many areas is conspicuously poor. Most of the site contains hitherto cultivated fields. Informal settlements have transformed vegetation in some areas. Some areas have been cleared, exposing soil. Free roaming goats and cattle likely cause overgrazing. Old plantation with relatively short alien invasive *Eucalyptus camaldulensis* is also present at the site. Overall the site is characterized by a highly modified or transformed grassland where the soil is exposed in many areas.

A *Seriphium plumosum* (Bankrupt Bush) is noticeable at some areas. Very few indigenous trees remain at the site which include *Vachellia karroo* (Sweet Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The indigenous shrub *Protasparagus laricinus* (Wild Asparagus) is found at disturbed places at the site. Indigenous grass species include *Aristida congesta*, *Aristida adscensionis*, *Eragrostis lehmanniana*, *Eragrostis superba*, *Elionurus muticus*, *Pogonarthria squarrosa*, *Heteropogon contortus*, *Melinis repens* and *Tragus berteronianus*. Indigenous forb species and shrublets include *Tripteris aghillana*, *Helichrysum caespititium*, *Bulbine narcissifolia*, *Barleria macrostegia*, *Hibiscus pusillus*, *Chamaesyce inaequilatera*, *Berkheya onopordifolia* and *Hilliardiella oligocephala*. Herbaceous shrub *Gomphocarpus fruticosus* is also at the site. Dwarf shrubs and shrublets at the site include *Felicia muricata*, *Pentzia globosa* and *Ziziphus zeyheriana*.

A number of alien invasive weed species are present at previously cleared and perviously cultivated areas. These alien invasive weeds include *Argemone ochroleuca* (Mexican Poppy), *Gomphrena*

*celosioides* (Globe Amaranth), *Schkuhria pinnata* (Dwarf Marigold), *Tagetes minuta* (Khaki Weed), *Conyza bonariensis* (Flea Bane), *Datura ferox* (Large Thorn-apple), *Datura stramonium* (Common Thorn Apple), *Verbena aristigera* (Fine-leaved Verbena), *Richardia brasiliensis* (Mexican Richardia), *Acanthospermum australe* (Prostrate Starbur), *Physalis viscosa* (Sticky Gooseberry), *Xanthium spinosum* (Spiny Cocklebur) and *Plantago lanceolata* (Buckhorn Plantain).

Most of the site contains hitherto cultivated fields. Informal settlements, clearings, informal dumping, and old *Eucalyptus* plantation with relatively short alien invasive *Eucalyptus* trees (Gums), extensive erosion from stormwater run-off of residential areas, free roaming goats and cattle and a conspicuous high frequency of alien invasive weeds are examples of human induced ecological impacts at the site.

### 7.1.8. FAUNA

#### Mammals

Mammals of particular high conservation priority

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

| Species   | Threatened Status           | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-----------------------------|--------------------------------|--|
| <b><i>Chrysospalax villosus</i></b><br>Rough-haired golden mole | Vulnerable                  | No                             | No   |
| <b><i>Cloeotis percivali</i></b><br>Short-eared Trident Bat     | Vulnerable/ Near-threatened | No                             | No   |
| <b><i>Diceros bicornis</i></b><br>Black rhinoceros              | Critically Endangered       | No                             | No   |
| <b><i>Lycaon pictus</i></b><br>African wild dog                 | Endangered                  | No                             | No   |
| <b><i>Loxodonta africana</i></b><br>African elephant            | Vulnerable                  | No                             | No   |
| <b><i>Mystromys albicaudatus</i></b><br>White-tailed mouse      | Endangered                  | No                             | No   |
| <b><i>Neamblysomus julianae</i></b><br>Juliana's Golden Mole    | Critically Endangered       | No                             | No   |
| <b><i>Panthera leo</i></b><br>Lion                              | Vulnerable                  | No                             | No   |

|   |            |    |    |
|---|------------|----|----|
| <b><i>Rhinolophus blasii</i></b><br>Blasi's Horseshoe Bat | Vulnerable | No | No |
| <b><i>Smutsia temminckii</i></b><br>Ground Pangolin       | Vulnerable | No | No |

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

| Species   | Threatened Status | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|--------------------------------|--|
| <b><i>Ceratotherium simum</i></b><br>White Rhinoceros | Near threatened   | No                             | No   |

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

| Species                                       | Threatened Status | Recorded at site during survey | Likely be a resident at the site |
|---|-------------------|--------------------------------|----------------------------------|
| <b><i>Myosorex varius</i></b><br>Forest shrew | Uncertain         | No                             | No                               |

### Mammals of particular conservation concern

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

| Species   | Threatened Status         | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|---------------------------|--------------------------------|--|
| <b><i>Chrysospalax villosus</i></b><br>Rough-haired golden mole | Vulnerable                | No                             | No   |
| <b><i>Cloeotis percivali</i></b><br>Short-eared Trident Bat     | Vulnerable/<br>threatened | Near- No                       | No   |

|  |                       |    |    |
|--|-----------------------|----|----|
| <b><i>Diceros bicornis</i></b><br>Black rhinoceros           | Critically Endangered | No | No |
| <b><i>Lycaon pictus</i></b><br>African wild dog              | Endangered            | No | No |
| <b><i>Loxodonta africana</i></b><br>African elephant         | Vulnerable            | No | No |
| <b><i>Mystromys albicaudatus</i></b><br>White-tailed mouse   | Endangered            | No | No |
| <b><i>Neamblysomus julianae</i></b><br>Juliana's Golden Mole | Critically Endangered | No | No |
| <b><i>Panthera leo</i></b><br>Lion                           | Vulnerable            | No | No |
| <b><i>Rhinolophus blasii</i></b><br>Blasi's Horseshoe Bat    | Vulnerable            | No | No |
| <b><i>Smutsia temminckii</i></b><br>Ground Pangolin          | Vulnerable            | No | No |

**Near Threatened** mammal species of the North West Province. Main source: Skinner & Chimimba (2005 with updates by several authors per species. With mammal species which normally needs a large range their residential status does not implicate that they are exclusively dependent on the site or use the site as important shelter or for reproduction. No = Not recorded at site/ Unlikely to be resident at the site. Yes: Recorded at the site/ likely to be resident at the site.

| Species   | Threatened Status | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|--------------------------------|--|
| <b><i>Ceratotherium simum</i></b><br>White Rhinoceros | Near threatened   | No                             | No   |

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

| Species                                       | Threatened Status | Recorded at site during survey | Likely be a resident at the site |
|---|-------------------|--------------------------------|----------------------------------|
| <b><i>Myosorex varius</i></b><br>Forest shrew | Uncertain         | No                             | No                               |

## Birds

### **Birds of particular high conservation priority**

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

| Species                         | Common name                       | Threatened Status     | Recorded at site during survey | Likely to use site as breeding area or habitat |
|---------------------------------|-----------------------------------|-----------------------|--------------------------------|--|
| <i>Aegypius tracheliotos</i>    | <b>Lappet-faced Vulture</b>       | Vulnerable            | No                             | No   |
| <i>Anthropoides paradiseus</i>  | <b>Blue Crane</b>                 | Vulnerable            | No                             | No   |
| <i>Aquila rapax</i>             | <b>Tawny Eagle</b>                | Vulnerable            | No                             | No   |
| <i>Ardeotis kori</i>            | <b>Kori Bustard</b>               | Vulnerable            | No                             | No   |
| <i>Balearica regulorum</i>      | <b>Grey Crowned Crane (Mahem)</b> | Vulnerable            | No                             | No   |
| <i>Botaurus stellaris</i>       | <b>Eurasian Bittern</b>           | Critically Endangered | No                             | No   |
| <i>Circus ranivorus</i>         | <b>African Marsh- Harrier</b>     | Vulnerable            | No                             | No   |
| <i>Crex crex</i>                | <b>Corn Crake</b>                 | Vulnerable            | No                             | No   |
| <i>Eupodotis senegalensis</i>   | <b>White-bellied Korhaan</b>      | Vulnerable            | No                             | No   |
| <i>Falco naumanni</i>           | <b>Lesser Kestrel</b>             | Vulnerable            | No                             | No   |
| <i>Geronticus calvus</i>        | <b>Southern Bald Ibis</b>         | Vulnerable            | No                             | No   |
| <i>Gorsachius leuconotus</i>    | <b>White-backed Night-heron</b>   | Vulnerable            | No                             | No   |
| <i>Gypaetus barbatus</i>        | <b>Bearded Vulture</b>            | Endangered            | No                             | No   |
| <i>Gyps africanus</i>           | <b>White-backed Vulture</b>       | Vulnerable            | No                             | No   |
| <i>Gyps coprotheres</i>         | <b>Cape Vulture</b>               | Vulnerable            | No                             | No   |
| <i>Pelecanus rufescens</i>      | <b>Pink-backed Pelican</b>        | Vulnerable            | No                             | No   |
| <i>Polemaetus bellicosus</i>    | <b>Martial Eagle</b>              | Vulnerable            | No                             | No   |
| <i>Rhynchops flavirostris</i>   | <b>African Skimmer</b>            | Endangered            | No                             | No   |
| <i>Sagittarius serpentarius</i> | <b>Secretarybird</b>              | Vulnerable            | No                             | No   |
| <i>Sarothrura ayresi</i>        | <b>White-winged Flufftail</b>     | Critically Endangered | No                             | No   |



|                      |                          |            |    |    |
|----------------------|--------------------------|------------|----|----|
| <i>Tyto capensis</i> | <b>African Grass-Owl</b> | Vulnerable | No | No |
|----------------------|--------------------------|------------|----|----|

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

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

| Species                    | Common name                   | Threatened Status | Recorded at site during survey | Likely to use site breeding area or habitat |
|----------------------------|-------------------------------|-------------------|--------------------------------|---|
| <i>Certhilauda chuana</i>  | <b>Short-clawed Lark</b>      | Near threatened   | No                             | No  |
| <i>Charadrius pallidus</i> | <b>Chestnut-banded Plover</b> | Near threatened   | No                             | No  |
| <i>Ciconia nigra</i>       | <b>Black Stork</b>            | Near threatened   | No                             | No  |
| <i>Circus macrourus</i>    | <b>Pallid Harrier</b>         | Near threatened   | No                             | No  |
| <i>Eupodotis caerulea</i>  | <b>Blue Korhaan</b>           | Near threatened   | No                             | No  |
| <i>Falco biarmicus</i>     | <b>Lanner Falcon</b>          | Near threatened   | No                             | No  |

## Beetles

### Beetles of particular conservation priority

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

| Species                      | Threatened Status | Recorded at site during survey | Likely to be resident based on habitat assessment |
|------------------------------|-------------------|--------------------------------|---|
| <i>Ichneustoma stobbiai</i>  | Uncertain         | No                             | No  |
| <i>Trichocephala brincki</i> | Uncertain         | No                             | No  |

## Scorpions

### Scorpion species of particular conservation priority

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

| Species                   | Threatened Status | Recorded at site during survey | Likely to be resident at site based on habitat assessment |
|---------------------------|-------------------|--------------------------------|---|
| <i>Hadogenes gracilis</i> | Uncertain         | No                             | No  |
| <i>Hadogenes gunningi</i> | Uncertain         | No                             | No  |

## Reptiles

### Reptiles of particular high conservation priority

The following tables list possible presence or absence of threatened reptile or near threatened reptile species in the study area. The Atlas and Red List of Reptiles of South Africa, Lesotho and South Africa (Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers, 2014) has been used as the main source to compile the list for assessment.

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

| Species                                       | Threatened Status | Resident at site | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|------------------|--------------------------------|--|
| <i>Crocodylus niloticus</i><br>Nile Crocodile | Vulnerable        | No               | No                             | No   |

| Species   | Threatened Status | Resident at site | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|------------------|--------------------------------|--|
| <i>Homoroselaps dorsalis</i><br>Striped Harlequin Snake | Near threatened   | No               | No                             | No   |



### Amphibians of particular conservation concern

No frog species that occur in the North West are listed as Threatened species (Vulnerable, Endangered or Critically Endangered) or Near Threatened species according to IUCN Amphibian Specialist Group (2013). Table 4.17 lists *Pyxicephalus adspersus* (Giant Bullfrog) as Least Concern globally. According to the Biodiversity Management Directorate of GDARD (Gauteng Department of Agriculture and Rural Development) (2014) there are no amphibians in Gauteng that qualify for red listed status (red listed here indicates a category of special conservation concern such as threatened or near threatened). Suitable habitat for Giant Bullfrog at site appears to be absent.

Near threatened amphibian species in North West Province. No = Amphibian species is not a resident on the site; Yes = Amphibian species is found to be resident on the site.

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

### Assessment of invertebrate species of particular conservation concern

#### Butterflies of particular conservation concern

Studies about the vegetation and habitat of threatened butterfly species in South Africa showed that ecosystems with a unique combination of features are selected by these often-localised threatened butterfly species (Deutschländer and Bredenkamp 1999; Edge 2002, 2005; Terblanche, Morgenthal & Cilliers 2003; Lubke, Hoare, Victor & Ketelaar 2003; Edge, Cilliers & Terblanche, 2008). Threatened butterfly species in South Africa can then be regarded as bio-indicators of rare ecosystems.

Four species of butterfly in Gauteng Province and North West Province combined are listed as threatened in the recent butterfly conservation assessment of South Africa (Mecenero *et al.*, 2013). The expected presence or not of these threatened butterfly species as well as species of high conservation priority that are not threatened, at the site sa listed in the following Tables.

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

| Species  | Threatened Status | Recorded at site during survey | Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely |
|--|-------------------|--------------------------------|---|
| <i>Aloeides dentatis dentatis</i><br>Roodepoort Copper | Endangered        | No                             | Highly unlikely   |
| <i>Chrysoritis aureus</i><br>Golden Copper             | Endangered        | No                             | Highly unlikely   |
| <i>Lepidochrysops praeterita</i><br>Highveld Blue      | Endangered        | No                             | Highly unlikely   |
| <i>Orachrysops mijburghi</i><br>Mijburgh's Blue        | Endangered        | No                             | Highly unlikely   |

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

| Species  | Threatened Status         | Recorded at site during survey | Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely |
|--|---------------------------|--------------------------------|---|
| <i>Colotis celimene amina</i><br>Lilac Tip       | Rare (Low density)        | No                             | Highly unlikely   |
| <i>Lepidochrysops procera</i><br>Savanna Blue    | Rare (Habitat specialist) | No                             | Highly unlikely   |
| <i>Metisella meninx</i><br>Marsh Sylph           | Rare (Habitat specialist) | No                             | Highly unlikely   |
| <i>Platylesches dolomitica</i><br>Hilltop Hopper | Rare (low density)        | No                             | Highly unlikely   |

### Beetles of particular conservation priority

Fruit chafer species (Coleoptera: Scarabaeidae: Cetoniinae) in the Gauteng Province and North-West Province which are of known high conservation priority. No *Ichnestoma stobbiai* or *Trichocephala brincki* were found during the surveys. There appears to be no suitable habitat for *Ichnestoma stobbiai* or *Trichocephala brincki* at the site. There appears to be no threat to any of the fruit chafer beetles of particular high conservation priority if the site were developed.

| Species                      | Threatened Status | Recorded at site during survey | Likely to be resident based on habitat assessment |
|------------------------------|-------------------|--------------------------------|---|
| <i>Ichneustoma stobbiai</i>  | Uncertain         | No                             | No  |
| <i>Trichocephala brincki</i> | Uncertain         | No                             | No  |

### Scorpion species of particular conservation priority

Rock scorpion species (Scorpiones: Ischnuridae) species that are of known high conservation priority in the Gauteng Province and North-West Province. None of these rock scorpions have been found at the site and the habitat does not appear to be optimal.

| Species                   | Threatened Status | Recorded at site during survey | Likely to be resident at site based on habitat assessment |
|---------------------------|-------------------|--------------------------------|---|
| <i>Hadogenes gracilis</i> | Uncertain         | No                             | No  |
| <i>Hadogenes gunningi</i> | Uncertain         | No                             | No  |

### Ecological Sensitivity at the site

Ecological sensitivity at the site is low. Informal dumping, trampling, tracks, likely overgrazing by free roaming cattle and clearings are widespread human induced impacts at the site. Informal settlements are present at some parts of the site. Soil compaction is noticeable at many places at the site. Pylons run through the site. Vegetation at the site appears to be degraded, modified or in some areas transformed. Hitherto cultivated fields cover most of the site. Threatened species appear to be absent. The scope for the vegetation at the site to be restored and conserved is small.

### Summary of risks and impacts

Vegetation at the site appears to be degraded, modified or in some areas transformed. Disturbances that have caused extensive impacts to vegetation include hitherto cultivated fields at large parts of the site, possible overgrazing by free roaming cattle and goats, clearings, trampling, informal dumping and informal settlements. Plant cover at many areas is visibly poor which lead to soil compaction and lower rainfall efficiency. Patches of degraded grassland with some indigenous grass species, herbaceous species and few trees remain at the site. The shrub *Protasparagus laricinus* is conspicuous at the site and its concentrations approach bush encroachment at some places.

Wetlands and rocky ridges appear to be absent at the site.

Grassland at the site is represented by the Vaal-Vet Sandy Grassland vegetation type (Gh 10) which is listed as a Threatened Ecosystem, Endangered, according to the National List of Threatened Ecosystems (2011). Terrestrial vegetation at the site has been modified and transformed at parts, in the past and is currently considerably degraded. The scope for the restoration and conservation of natural grassland at the site is small.

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site. The site is regarded as low ecological sensitivity. There is little scope for the degraded and increasingly isolated site to be part of a corridor of particular conservation importance. Following the mitigations, which will be upheld, and planned footprint for development all the impact risks listed above are moderate or low.

## **7.2. SOCIO ECONOMIC FACTORS**

### **7.2.1. SOCIAL AMENITIES**

The local municipality intends to promote the infilling of open spaces between existing townships in order to provide the necessary housing for people living within their jurisdiction. The Spatial Development Framework (SDF) addresses the scale of urban growth through planned extensions and redevelopment strategies. The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and basic services.

The SDF and the Land Use Management system of the Local Municipality has identified certain areas that must address previously disadvantaged areas and historically disadvantaged residents. There is a definite need for the residents to have reasonable access to opportunities and facilities that supports living in the urban Settlement. It is the responsibility of the local municipality to ensure that the residents have reasonable access to community services and amenities, as well as employment opportunities and that the form of land development need to provide for basic needs in an affordable way. The proposed development will be in line with this principle by ensuring that people living in the area do in fact have reasonable access to opportunities and facilities.

The proposed development addresses the need identified by the City of Matlosana Local Municipality, for the provision of additional mixed land use and social mix, such as the availability of housing for the people of the City.

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

## 7.2.2. AIR QUALITY

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

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

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

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

*Given the high volumes of pollutants emitted from fuel-burning within the industrial and power-generation sectors, their contribution to ambient concentrations and public health risks is often lower than might be expected. This is because these sources are generally characterized by constant releases, relatively high above ground level, and further away from residential settlements than are household fuel-burning and vehicle emissions.*

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

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

*environmental health is protected and that the cumulative impact of pollution from a number of sources is addressed.*

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

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

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

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

[https://www.environment.gov.za/sites/default/files/docs/stateofair\\_airqualityand\\_sustainable\\_development.pdf](https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf) Date visited: 17/03/2020.

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

In addition to the above, it should be noted that the project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

### **7.2.3. NOISE**

It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create undue noise during the operational phase.



#### **7.2.4. ARCHAEOLOGY AND CULTURAL SITES**

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel. If any cultural heritage (archaeological and/or historical) sites, features or material did exist here in the past it would have been disturbed or even destroyed as a result.

#### **IRON AGE SITES**

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa, the Stone Age can be divided into three periods.

A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago

Middle Stone Age (MSA) less than 300 000 – 20 000 years ago

Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125). According to Bergh there are no known Stone Age sites close to Klerksdorp, although a number of rock engraving sites are known to occur in the larger geographical area (Bergh 1999: 4-5). No Stone Age sites, features or material were found in the study area during the assessment.

#### **HISTORICAL SITES**

Only one site with features or material of cultural heritage historical in nature, origin or significance was identified and recorded in the study area during the field assessment. The area has been heavily impacted and disturbed in the recent past by agricultural and current ongoing residential and related activities. If any did exist here in the past, it would have been disturbed or destroyed as a result. The only site of Cultural Heritage Significance found in the area is a large (in) formal cemetery. The proposed development should incorporate this cemetery in its planning and management and any negative impacts on it should be avoided at all costs.

#### **SUMMARY**

it should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

#### **PALAEONTOLOGY**

In terms of Palaeontology a Palaeontological desktop assessment was done and the specialist found the following:

The entire area is underlain by mainly igneous rocks of the Precambrian Ventersdorp Supergroup. Although not indicated on the geological map there is a possibility that Quaternary surficial deposits could be present.

There is no possibility that these igneous rocks could contain fossils. In my opinion this development will not negatively affect palaeontological heritage. If, in the extremely unlikely event that fossils are exposed in superficial Quaternary deposits in the process of development activities, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

### **7.2.5. AESTHETICS**

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

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

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

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

The proposed development will change the scenic resources of the local area from an undeveloped site to a residential area. The visual intrusion is considered to be moderate as the proposed development partially fits into the surroundings but will be clearly noticeable.

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

### **7.2.6. TRAFFIC IMPACT AND ACCESS STUDY**

The Traffic Impact and Access Study investigated the expected transport related impacts of the proposed development. The study undertaken investigated the worst case potential impact of the development's external road network. Based on their site observations, the existing and base traffic flow volumes indicates that the proposed development will have little impact on the external road network.

It is proposed that no external road and/intersection upgrades will be required. It is further proposed that the road to Geduld is surfaced from where it ends up in gravel up to the proposed access road No 2. Provision should also be made for sidewalks along the Primary School frontages.

## 8. ENVIRONMENTAL IMPACT ASSESSMENT

### 8.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology:

| Nature of the potential impact |               | Description of the effect, and the affected aspect of the environment  |
|--------------------------------|---------------|--|
| <b>Duration (time scale)</b>   | Short term    | Up to 5 years  |
|                                | Medium term   | 6 – 15 years   |
|                                | Long term     | More than 15 years   |
| <b>Extent (area)</b>           | Local         | Confined to study area and its immediate surroundings  |
|                                | Regional      | Region (cadastral, catchment, topographic)   |
|                                | National      | Nationally (The country)   |
|                                | International | Neighboring countries and the rest of the world.   |
| <b>Magnitude (Intensity)</b>   | Low           | Site-specific and wider natural and/or social functions and processes are negligibly altered. ((A low intensity impact will not affect the natural, cultural, or social functions of the environment).                         |
|                                | Medium        | Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).  |
|                                | High          | Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist). |
| <b>Probability</b>             | Improbable    | Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).   |
|                                | Possible      | There is a possibility that the impact will occur  |
|                                | Probable      | It is most likely that the impact will occur   |
|                                | Definite      | The impact will definitely occur   |
| <b>Significance</b>            | Insignificant | Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)   |
|                                | Very Low      | Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)   |
|                                | Low           | The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)  |
|                                | Medium        | The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)   |
|                                | High          | The impact will influence the decision regarding the proposed activity   |

| Nature of the potential impact |           | Description of the effect, and the affected aspect of the environment   |
|--------------------------------|-----------|---|
|                                | Very High | The proposed activity should only be approved under special circumstances   |
| <b>Reversibility</b>           | Low       | There is little chance of correcting the adverse impact   |
|                                | Medium    | There is a moderate chance of correcting the adverse impact   |
|                                | High      | There is a high chance in correcting the adverse impact   |
| <b>Risk</b>                    | Low       | Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring. |
|                                | Medium    | Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management  |
|                                | High      | High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.  |

Attributes associated with the alternatives were assessed and is outlined below:

#### **Geographical attributes**

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

#### **Physical attributes**

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

#### **Biological attributes**

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be:

Phytogeography is the branch of biogeography that studies the distribution of plants.

Zoogeography is the branch that studies distribution of animals.

#### **Social attributes**

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

#### **Economic attributes**

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

## Heritage attributes

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

## Cultural attributes

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.

It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders' perceptions of the nature of the risk.

## 8.2 ASSESSMENT

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)  |  |                       |                                     |  |  |
|--|--|-----------------------|-------------------------------------|--|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative)   |  |                       |                                     |  |  |
| Environmental Attribute  | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation  | Assessment rating (Without mitigation) |
| <b>DIRECT IMPACTS:</b>   |  |                       |                                     |  |  |
| Geographical<br>Physical<br>Social<br>Economic   | 174 hectares of indigenous vegetation will be eradicated in order to establish the development | Duration              | Long term                           | Obtain the necessary environmental authorization for the development.              | Long term                              |
|  |  | Extent                | Local                               |  | Local                                  |
|  |  | Magnitude (Intensity) | High                                |  | High                                   |
|  |  | Probability           | Definite                            | Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area. | Definite                               |
|  |  | Significance          | Medium                              |  | Medium                                 |
|  |  | Reversibility         | Low                                 |  | Low                                    |
|  |  | Risk                  | Low                                 |  | Medium                                 |
|  | A 2 800m <sup>2</sup> bridge will have to be constructed over the non Perennial stream.        | Duration              | Long term                           | Obtain the necessary environmental authorization for the development.              | Long term                              |
|  |  | Extent                | Local                               |  | Local                                  |
|  |  | Magnitude (Intensity) | High                                |  | High                                   |
|  |  | Probability           | Definite                            | Conduct a Wetland Impact assessment to determine the sensitivity of the area.      | Definite                               |
|  |  | Significance          | Medium                              |  | Medium                                 |
|  |  | Reversibility         | Low                                 |  | Low                                    |
|  |  | Risk                  | Low                                 |  | Medium                                 |
| The 1:100 flood line and the edge of the wetland/riparian zone will have to be determined and will have to be incorporated into the final layout plan. |  |                       |                                     | Low  |  |
| Plan for the following:  |  |                       |                                     |  |  |
| The construction of the bridge to commence during the dry season to allow for the lowest possible impact on  |  |                       |                                     | Medium   |  |

**ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)**

**ALTERNATIVE 1: Mixed land use township (Preferred Alternative)**

| Environmental Attribute | Potential impacts and risks                             | Assessment criteria | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|-------------------------|---|---------------------|-------------------------------------|---|--|
|                         |   |                     |                                     | <p>the environment and to simplify the required construction procedures<br/>The local vegetation will be stored and used again during the rehabilitation period.</p> <p>Topsoil will be placed in a demarcated area for re-use during the rehabilitation period.</p> <p>The area to be used for stockpiling of the topsoil will be at an approved location.</p> <p>The area to be excavated needs to be clearly marked with lime.</p> <p>Provide shoring and bracing to the excavations where required.</p> <p>Erect physical barriers around the excavated area according to OHS requirements.</p> <p>The necessary erosion prevention mechanism shall be employed to ensure the sustainability of all structures;</p> <p>The construction camp shall not be located within the 1:100 year flood line or within a 100m of any watercourse; whichever the greater.</p> <p>Construct the infrastructure in accordance with the designs and ensure the natural flow of the river is not disturbed in the long term.</p> <p>Obtain the necessary environmental authorization for the development.<br/>Obtain the necessary Water Use Licenses.</p> <p>Implement the mitigation measures as described in the Environmental Management plan.</p> <p>Implement the mitigation measures as described by the Wetland specialists incorporated into the Environmental Management Plan.</p> |  |
|                         | The proposed development area is located within a CBA 2 | Duration            | Long term                           | Obtain the necessary environmental authorization for the development.   | Long term                              |
|                         |   | Extent              | Local                               |   | Local                                  |

**ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)**

**ALTERNATIVE 1: Mixed land use township (Preferred Alternative)**

| Environmental Attribute   | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation)  | Proposed mitigation   | Assessment rating (Without mitigation) |
|---|---|-----------------------|--|---|--|
|   | and the vegetation will be eradicated.  | Magnitude (Intensity) | High   | Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area.  | High                                   |
|   |   | Probability           | Definite   |   | Definite                               |
|   |   | Significance          | Medium   |   | Medium                                 |
|   |   | Reversibility         | Low  |   | Low                                    |
|   |   | Risk                  | Low  |   | Medium                                 |
|   | Plan for the provision of services for the development.   | Duration              | Long term  | Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.               | Long term                              |
|   |   | Extent                | Local  |   | Local                                  |
|   |   | Magnitude (Intensity) | High   |   | High                                   |
|   |   | Probability           | Definite   |   | Definite                               |
|   |   | Significance          | Medium   |   | Medium                                 |
|   |   | Reversibility         | Low  |   | Low                                    |
|   |   | Risk                  | Medium   |   | Medium                                 |
|   | Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect. | Duration              | Short term   | Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution. | Medium term                            |
|   |   | Extent                | Local  |   | Local                                  |
|   |   | Magnitude (Intensity) | Low  |   | Medium                                 |
|   |   | Probability           | Definite   |   | Definite                               |
|   |   | Significance          | Medium   |   | Medium                                 |
|   |   | Reversibility         | High   |   | High                                   |
|   |   | Risk                  | Low  |   | Medium                                 |
|   | Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.                       | Duration              | Short term   | Start the extermination of any invasive species as soon as possible and maintain the eradication programme.                   | Medium term                            |
| Extent  |   | Local                 | Local  |   |  |
| Magnitude (Intensity)   |   | Low                   | Low  |   |  |
| Probability   |   | Definite              | Definite   |   |  |
| Significance  |   | Medium                | Medium   |   |  |
| Reversibility   |   | High                  | High   |   |  |
| Risk  |   | Low                   | Medium   |   |  |
| Plan for the provision and maintenance of ablation facilities for construction workers to prevent pollution of surface and underground water. | Duration  | Short term            | Provide portable ablation facilities that will not cause pollution during the construction phase.<br><br>There should be 1 chemical toilet for every 30 workers on site.   | Short term  |  |
|   | Extent  | Local                 |  | Local   |  |
|   | Magnitude (Intensity)   | Medium                |  | Medium  |  |
|   | Probability   | Definite              |  | Definite  |  |
|   | Significance  | Medium                |  | Medium  |  |
|   | Reversibility   | High                  |  | High  |  |
|   | Risk  | Low                   |  | Medium  |  |
| Plan to manage possible impacts that the project can have on the soil and geology.  | Duration  | Long term             | Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised.<br><br>The findings of the Geotechnical Engineer must be incorporated into the design of the project. | Long term   |  |
|   | Extent  | Local                 |  | Local   |  |
|   | Magnitude (Intensity)   | Low                   |  | Medium  |  |
|   | Probability   | Definite              |  | Definite  |  |
|   | Significance  | Medium                |  | Medium  |  |
|   | Reversibility   | High                  |  | High  |  |
|   | Risk  | Low                   |  | Medium  |  |

**ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)**

**ALTERNATIVE 1: Mixed land use township (Preferred Alternative)**

| Environmental Attribute                        | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|--|--|-----------------------|-------------------------------------|---|--|
|  |  |                       |                                     | Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.  |  |
|  | Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase.                               | Duration              | Short term                          | Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.<br><br>The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible.<br><br>No snares may be set.                               | Short term                             |
|  |  | Extent                | Local                               |   | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Plan to ensure that should any finds in terms of Palaeontological or Cultural Heritage occur necessary steps be taken  | Duration              | Short term                          | Should any chance finds occur, to immediately contact the SAHRA/Palaeontological specialist.  | Short term                             |
|  |  | Extent                | Local                               |   | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | High                                   |
|  | Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it. | Duration              | Short term                          | Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer.<br><br>Ensure that the trenches stay open for as short a time as possible.<br><br>Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act. | Short term                             |
|  |  | Extent                | Local                               |   | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
| <b>Indirect impacts:</b>                       |  |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic | Plan to control dust generation from the proposed project which could impact on the surrounding area.  | Duration              | Short term                          | Spray water on open surfaces to ensure that dust does not cause air pollution during construction.<br><br>Start the rehabilitation of disturbed surfaces as soon as possible  | Short term                             |
|  |  | Extent                | Local                               |   | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.       | Extent                | Local                               | Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.<br><br>Ensure that all construction vehicles are in good working order and not leaking oil and or fuel.          | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Plan to provide method statements on the handling of waste materials such as glass,  | Extent                | Local                               | Implement the management plan to ensure that:   | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |



**ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)**

**ALTERNATIVE 1: Mixed land use township (Preferred Alternative)**

| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation  | Assessment rating (Without mitigation)                 |       |
|--|---|---|-------------------------------------|--|--|-------|
|  | plastic, metal or paper which may present a possible pollution hazard   | Probability   | Probable                            | All construction rubble is disposed of in a safe and environmentally acceptable manner.<br>NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase.<br><br>All cement is housed as to prevent spills (due to rain and or handling errors).<br><br>NO glass, plastic, metal, or paper shall be allowed to pollute the area. | Probable   |       |
|  |   | Significance  | Medium                              |  | Medium   |       |
|  |   | Reversibility   | High                                |  | High   |       |
|  |   | Risk  | Low                                 |  | Medium   |       |
|  | Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non-compliance to the relevant legislation. | Extent  | Local                               | Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act.<br><br>Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).          | Local  |       |
|  |   | Magnitude (Intensity)   | Medium                              |  | Medium   |       |
|  |   | Probability   | Probable                            |  | Probable   |       |
|  |   | Significance  | Medium                              |  | Medium   |       |
|  |   | Reversibility   | High                                |  | High   |       |
|  |   | Risk  | Low                                 |  | Medium   |       |
|  | Plan to create new employment opportunities.<br>Plan to use local labour to ensure local skills development will take place.  | Extent  | Local                               | No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.  | Local  |       |
|  |   | Magnitude (Intensity)   | Medium                              |  | Medium   |       |
|  |   | Probability   | Definite                            |  | Definite   |       |
|  |   | Significance  | Medium                              |  | Medium   |       |
|  |   | Reversibility   | Medium                              |  | Medium   |       |
|  |   | Risk  | Low                                 |  | Medium   |       |
|  | <b>Cumulative impacts:</b>  |   |                                     |  |  |       |
|  | Geographical<br>Physical<br>Social<br>Economic  | Plan the development to ensure the social well-being of the community for which the development is intended | Extent                              | Local  | Ensure that the development is constructed as planned. | Local |
| Magnitude (Intensity)  |   |   | Medium                              | Medium   |  |       |
| Probability  |   |   | Definite                            | Definite   |  |       |
| Significance   |   |   | Medium                              | Medium   |  |       |
| Reversibility  |   |   | Medium                              | Medium   |  |       |
| Risk   |   |   | Low                                 | Medium   |  |       |
| Plan to ensure that the services (solid waste, bulk water supply water, sewage, electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation. |   | Extent  | Local                               | Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.<br><br>Ensure that the development is constructed as planned.  | Local  |       |
|  |   | Magnitude (Intensity)   | Medium                              |  | Medium   |       |
|  |   | Probability   | Definite                            |  | Definite   |       |
|  |   | Significance  | High                                |  | High   |       |
|  |   | Reversibility   | High                                |  | High   |       |
|  |   | Risk  | Low                                 |  | Medium   |       |
| Plan for the increase in traffic volumes that will result from the proposed development  |   | Extent  | Local                               | The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.  | Local  |       |
|  |   | Magnitude (Intensity)   | Medium                              |  | Medium   |       |
|  |   | Probability   | Definite                            |  | Definite   |       |
|  |   | Significance  | Medium                              |  | High   |       |
|  |   | Reversibility   | Low                                 |  | Low  |       |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)    |                                |                       |                                     |                                  |  |
|--|--------------------------------|-----------------------|-------------------------------------|----------------------------------|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |                                |                       |                                     |                                  |  |
| Environmental Attribute  | Potential impacts and risks    | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation              | Assessment rating (Without mitigation) |
|  | Loss of indigenous vegetation. | Risk                  | Medium                              | No mitigation measures possible. | Medium                                 |
|  |                                | Extent                | Local                               |                                  | Local                                  |
|  |                                | Magnitude (Intensity) | Medium                              |                                  | Medium                                 |
|  |                                | Probability           | Definite                            |                                  | Definite                               |
|  |                                | Significance          | High                                |                                  | High                                   |
|  |                                | Reversibility         | Low                                 |                                  | Low                                    |
|  |                                | Risk                  | Medium                              |                                  | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase) |   |                       |                                     |   |  |
|---|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 2: Single land use: Housing only                |   |                       |                                     |   |  |
| Environmental Attribute                                     | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
| <b>DIRECT IMPACTS:</b>                                      |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic              | 174 hectares of indigenous vegetation will be eradicated in order to establish the development.                                 | Duration              | Long term                           | Obtain the necessary environmental authorization for the development.<br><br>Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area.<br><br>Implement the mitigation measures as described in the Environmental Management Plan. | Long term                              |
|   |   | Extent                | Local                               |   | Local                                  |
|   |   | Magnitude (Intensity) | High                                |   | High                                   |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | Medium                              |   | Medium                                 |
|   |   | Reversibility         | Low                                 |   | Low                                    |
|   |   | Risk                  | Low                                 |   | Medium                                 |
|   | The development area is located within a CBA2 and the vegetation will be eradicated.  | Duration              | Long term                           | Obtain the necessary environmental authorization for the development.<br><br>Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area.<br><br>Implement the mitigation measures as described in the Environmental Management Plan. | Long term                              |
|   |   | Extent                | Local                               |   | Local                                  |
|   |   | Magnitude (Intensity) | High                                |   | High                                   |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | Medium                              |   | Medium                                 |
|   |   | Reversibility         | Low                                 |   | Low                                    |
|   |   | Risk                  | Low                                 |   | Medium                                 |
|   | Plan for the provision of services for the development.   | Duration              | Long term                           | Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.   | Long term                              |
|   |   | Extent                | Local                               |   | Local                                  |
|   |   | Magnitude (Intensity) | High                                |   | High                                   |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | Medium                              |   | Medium                                 |
|   |   | Reversibility         | Low                                 |   | Low                                    |
|   |   | Risk                  | Medium                              |   | Medium                                 |
|   | Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect. | Duration              | Short term                          | Start the rehabilitation of disturbed surfaces as soon as possible.<br><br>Spray bare surfaces with water to prevent dust pollution.  | Medium term                            |
|   |   | Extent                | Local                               |   | Local                                  |
|   |   | Magnitude (Intensity) | Low                                 |   | Medium                                 |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | Medium                              |   | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)   |   |  |  |                     |   |             |   |            |
|---|---|--|--|---------------------|---|-------------|---|------------|
| ALTERNATIVE 2: Single land use: Housing only  |   |  |  |                     |   |             |   |            |
| Environmental Attribute   | Potential impacts and risks   | Assessment criteria  | Assessment rating (With mitigation)  | Proposed mitigation | Assessment rating (Without mitigation)  |             |   |            |
|   |   | Reversibility  | High   |                     | High  |             |   |            |
|   |   | Risk   | Low  |                     | Medium  |             |   |            |
|   | Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.                                     | Duration   | Short term   |                     | Start the extermination of any invasive species as soon as possible and maintain the eradication programme.   | Medium term |   |            |
|   |   | Extent   | Local  |                     |   | Local       |   |            |
|   |   | Magnitude (Intensity)  | Low  |                     |   | Low         |   |            |
|   |   | Probability  | Definite   |                     |   | Definite    |   |            |
|   |   | Significance   | Medium   |                     |   | Medium      |   |            |
|   |   | Reversibility  | High   |                     |   | High        |   |            |
|   |   | Risk   | Low  |                     |   | Medium      |   |            |
|   | Plan for the provision and maintenance of ablation facilities for construction workers to prevent pollution of surface and underground water. | Duration   | Short term   |                     | Provide portable ablation facilities that will not cause pollution during the construction phase.   | Short term  |   |            |
|   |   | Extent   | Local  |                     |   | Local       |   |            |
|   |   | Magnitude (Intensity)  | Medium   |                     |   | Medium      |   |            |
|   |   | Probability  | Definite   |                     |   | Definite    |   |            |
|   |   | Significance   | Medium   |                     |   | Medium      |   |            |
|   |   | Reversibility  | High   |                     |   | High        |   |            |
|   |   | Risk   | Low  |                     |   | Medium      |   |            |
|   | Plan to manage possible impacts that the project can have on the soil and geology.  | Duration   | Long term  |                     | Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised.<br><br>The findings of the Geotechnical Engineer must be incorporated into the design of the project.<br><br>Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. The findings of the Geotechnical Engineer must be incorporated into the design of the project.<br><br>Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. | Long term   |   |            |
|   |   | Extent   | Local  |                     |   | Local       |   |            |
|   |   | Magnitude (Intensity)  | Low  |                     |   | Medium      |   |            |
|   |   | Probability  | Definite   |                     |   | Definite    |   |            |
|   |   | Significance   | Medium   |                     |   | Medium      |   |            |
|   |   | Reversibility  | High   |                     |   | High        |   |            |
|   |   | Risk   | Low  |                     |   | Medium      |   |            |
|   |   | Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase. | Duration   |                     |   | Short term  | Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.<br><br>The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible.<br><br>No snares may be set. | Short term |
|   |   |  | Extent   |                     |   | Local       |   | Local      |
|   |   |  | Magnitude (Intensity)  |                     |   | Medium      |   | Medium     |
|   | Probability   |  | Definite   |                     | Definite  |             |   |            |
|   | Significance  |  | Medium   |                     | Medium  |             |   |            |
| Reversibility   | High  |  | High   |                     |   |             |   |            |
| Risk  | Low   |  | Medium   |                     |   |             |   |            |
| Plan to ensure that should any finds in terms of Palaeontological or Cultural Heritage occur necessary steps be taken | Duration  | Short term   | Should any chance finds occur, to immediately contact the SAHRA/Palaeontological specialist. | Short term          |   |             |   |            |
|   | Extent  | Local  |  | Local               |   |             |   |            |
|   | Magnitude (Intensity)   | Medium   |  | Medium              |   |             |   |            |
|   | Probability   | Definite   |  | Definite            |   |             |   |            |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)  |  |   |                                     |   |  |            |
|--|--|---|-------------------------------------|---|--|------------|
| ALTERNATIVE 2: Single land use: Housing only   |  |   |                                     |   |  |            |
| Environmental Attribute  | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation)   |            |
|  |  | Significance  | Medium                              |   | Medium   |            |
|  |  | Reversibility   | High                                |   | High   |            |
|  |  | Risk  | Low                                 |   | High   |            |
|  | Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it. | Duration  | Short term                          | Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer.<br><br>Ensure that the trenches stay open for as short a time as possible.<br><br>Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.   | Short term   |            |
|  |  | Extent  | Local                               |   | Local  |            |
|  |  | Magnitude (Intensity)   | Medium                              |   | Medium   |            |
|  |  | Probability   | Definite                            |   | Definite   |            |
|  |  | Significance  | Medium                              |   | Medium   |            |
|  |  | Reversibility   | High                                |   | High   |            |
|  |  | Risk  | Low                                 |   | Medium   |            |
|  | <b>Indirect impacts:</b>   |   |                                     |   |  |            |
|  | Geographical<br>Physical<br>Social<br>Economic   | Plan to control dust generation from the proposed project which could impact on the surrounding area. | Duration                            | Short term  | Spray water on open surfaces to ensure that dust does not cause air pollution during construction.<br><br>Start the rehabilitation of disturbed surfaces as soon as possible | Short term |
|  |  |   | Extent                              | Local   |  | Local      |
|  |  |   | Magnitude (Intensity)               | Low   |  | Low        |
| Probability  |  |   | Probable                            | Probable  |  |            |
| Significance   |  |   | Medium                              | Medium  |  |            |
| Reversibility  |  |   | High                                | High  |  |            |
| Risk   |  |   | Low                                 | Medium  |  |            |
| Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.               |  | Extent  | Local                               | Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.<br><br>Ensure that all construction vehicles are in good working order and not leaking oil and or fuel.  | Local  |            |
|  |  | Magnitude (Intensity)   | Low                                 |   | Low  |            |
|  |  | Probability   | Probable                            |   | Probable   |            |
|  |  | Significance  | Medium                              |   | Medium   |            |
|  |  | Risk  | Low                                 |   | Medium   |            |
| Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard                  |  | Extent  | Local                               | Implement the management plan to ensure that:<br>All construction rubble is disposed of in a safe and environmentally acceptable manner.<br>NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase.<br><br>All cement is housed as to prevent spills (due to rain and or handling errors).<br><br>NO glass, plastic, metal, or paper shall be allowed to pollute the area. | Local  |            |
|  |  | Magnitude (Intensity)   | Low                                 |   | Low  |            |
|  |  | Probability   | Probable                            |   | Probable   |            |
|  |  | Significance  | Medium                              |   | Medium   |            |
|  |  | Risk  | Low                                 |   | Medium   |            |
| Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation. |  | Extent  | Local                               | Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act.<br><br>Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with  | Local  |            |
|  |  | Magnitude (Intensity)   | Medium                              |   | Medium   |            |
|  |  | Probability   | Probable                            |   | Probable   |            |
|  |  | Significance  | Medium                              |   | Medium   |            |
|  |  | Risk  | Low                                 |   | Medium   |            |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase) |  |                       |                                     |   |  |
|---|--|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 2: Single land use: Housing only                |  |                       |                                     |   |  |
| Environmental Attribute                                     | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|   |  |                       |                                     | regard to the environment (acts, regulations, and special guidelines).  |  |
|   | Plan to create new employment opportunities.<br>Plan to use local labour to ensure local skills development will take place.   | Extent                | Local                               | No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act. | Local                                  |
|   |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |  | Probability           | Definite                            |   | Definite                               |
|   |  | Significance          | Medium                              |   | Medium                                 |
|   |  | Reversibility         | Medium                              |   | Medium                                 |
|   |  | Risk                  | Low                                 |   | Medium                                 |
| <b>Cumulative impacts:</b>                                  |  |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic              | Plan the development to ensure the social well-being of the community for which the development is intended  | Extent                | Local                               | Ensure that the development is constructed as planned.  | Local                                  |
|   |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |  | Probability           | Definite                            |   | Definite                               |
|   |  | Significance          | Medium                              |   | Medium                                 |
|   |  | Reversibility         | Medium                              |   | Medium                                 |
|   |  | Risk                  | Low                                 |   | Medium                                 |
|   | Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation. | Extent                | Local                               | Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.<br><br>Ensure that the development is constructed as planned.                       | Local                                  |
|   |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |  | Probability           | Definite                            |   | Definite                               |
|   |  | Significance          | High                                |   | High                                   |
|   |  | Reversibility         | High                                |   | High                                   |
|   |  | Risk                  | Low                                 |   | Medium                                 |
|   | Plan for the increase in traffic volumes that will result from the proposed development  | Extent                | Local                               | The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.   | Local                                  |
|   |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |  | Probability           | Definite                            |   | Definite                               |
|   |  | Significance          | Medium                              |   | High                                   |
|   |  | Reversibility         | Low                                 |   | Low                                    |
|   |  | Risk                  | Medium                              |   | Medium                                 |
|   | Loss of indigenous vegetation.   | Extent                | Local                               | No mitigation measures possible.  | Local                                  |
|   |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
| Probability   |  | Definite              | Definite                            |   |  |
| Significance  |  | High                  | High                                |   |  |
| Reversibility   |  | Low                   | Low                                 |   |  |
| Risk  |  | Medium                | Medium                              |   |  |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase) |   |                       |                                     |                                  |  |
|---|---|-----------------------|-------------------------------------|----------------------------------|--|
| ALTERNATIVE 3: (No-Go Option)                               |   |                       |                                     |                                  |  |
| Environmental Attribute                                     | Potential impacts and risks               | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation              | Assessment rating (Without mitigation) |
| <b>DIRECT IMPACTS:</b>                                      |   |                       |                                     |                                  |  |
| Geographical<br>Physical<br>Social<br>Economic              | No indigenous vegetation will be removed. | Duration              | Long term                           | No mitigation measures required. | Long term                              |
|   |   | Extent                | Local                               |                                  | Local                                  |
|   |   | Magnitude (Intensity) | Medium                              |                                  | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase) |   |                       |                                     |   |  |
|---|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 3: (No-Go Option)                               |   |                       |                                     |   |  |
| Environmental Attribute                                     | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
| Cultural  |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | High                                |   | High                                   |
|   |   | Reversibility         | Low                                 |   | Low                                    |
|   |   | Risk                  | Medium                              |   | Medium                                 |
| <b>Indirect impacts:</b>                                    |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural  | No new employment opportunities will be created during the planning and design phase.<br><br>No skills enhancement will take place<br><br>If this option is implemented, the projected boost to the local and regional economy will not take place.   | Extent                | Local                               | Ensure that the development is constructed and operated as planned. | Local                                  |
|   |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | Medium                              |   | Medium                                 |
|   |   | Reversibility         | Medium                              |   | Medium                                 |
|   |   | Risk                  | High                                |   | High                                   |
| <b>Cumulative impacts:</b>                                  |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural  | If this option is implemented, the projected boost to the local and regional economy will not take place.<br><br>No new employment opportunities will be created.<br>No improvement to local skills development will take place.<br>No broadened Tax base for the City of Matlosana Local Municipality. | Extent                | Local                               | Ensure that the development is constructed and operated as planned. | Local                                  |
|   |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|   |   | Probability           | Definite                            |   | Definite                               |
|   |   | Significance          | High                                |   | High                                   |
|   |   | Reversibility         | High                                |   | High                                   |
|   |   | Risk                  | Medium                              |   | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |   |                       |                                     |   |   |           |
|--|---|-----------------------|-------------------------------------|---|---|-----------|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                       |                                     |   |   |           |
| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation)  |           |
| <b>DIRECT IMPACTS:</b>   |   |                       |                                     |   |   |           |
| Geographical<br>Physical<br>Social<br>Economic                 | 174 hectares of indigenous vegetation will be eradicated in order to establish the development. | Duration              | Long term                           | Obtain the necessary environmental authorization for the development. | Long term   |           |
|  |   | Extent                | Local                               |   | Local   |           |
|  |   | Magnitude (Intensity) | High                                |   | High  |           |
|  |   | Probability           | Definite                            |   | Definite  |           |
|  |   | Significance          | Medium                              |   | Medium  |           |
|  |   | Reversibility         | Low                                 |   | Low   |           |
|  | the proposed development area is located within a CBA 2 and the vegetation will be eradicated.  |                       | Risk                                | Low   | Implement the findings of the Fauna and Flora Habitat survey.<br><br>Implement the mitigation measures as described in the Environmental Management Plan. | Medium    |
|  |   |                       | Duration                            | Long term   |   | Long term |
|  |   |                       | Extent                              | Local   |   | Local     |
|  |   |                       | Magnitude (Intensity)               | High  |   | High      |
|  |   |                       |                                     |   |   |           |
|  |   |                       |                                     |   |   |           |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |   |                       |                                     |  |  |
|--|---|-----------------------|-------------------------------------|--|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                       |                                     |  |  |
| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation  | Assessment rating (Without mitigation) |
|  |   | Probability           | Definite                            | Implement the findings of the Fauna and Flora Habitat survey.  | Definite                               |
|  |   | Significance          | Medium                              |  | Medium                                 |
|  |   | Reversibility         | Low                                 |  | Low                                    |
|  |   | Risk                  | Low                                 |  | Medium                                 |
|  | 2 800m <sup>2</sup> bridges will have to be constructed over the non perrinial stream | Duration              | Long term                           | The construction of the bridges and the installation of the pipe is to commence during the dry season to allow for the lowest possible impact on the environment and to simplify the required construction procedures<br>The local vegetation will be stored and used again during the rehabilitation period.<br><br>Topsoil will be placed in a demarcated area for re-use during the rehabilitation period.<br><br>The area to be used for stockpiling of the topsoil will be at an approved location.<br><br>The area to be excavated needs to be clearly marked with lime.<br><br>Provide shoring and bracing to the excavations where required.<br><br>Erect physical barriers around the excavated area according to OHS requirements.<br>The necessary erosion prevention mechanism shall be employed to ensure the sustainability of all structures;<br><br>The construction camp shall not be located | Long term                              |
|  |   | Extent                | Local                               |  | Local                                  |
|  |   | Magnitude (Intensity) | High                                |  | High                                   |
|  |   | Probability           | Definite                            |  | Definite                               |
|  |   | Significance          | Medium                              |  | High                                   |
|  |   | Reversibility         | Low                                 |  | Low                                    |
|  |   | Risk                  | Low                                 |  | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |   |                       |                                     |   |  |
|--|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                       |                                     |   |  |
| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  |   |                       |                                     | <p>within the 1:100 year flood line or within a 100m of any watercourse; whichever the greater.</p> <p>Construct the infrastructure in accordance with the designs.</p> <p>Implement the mitigation measures as described in the Environmental Management plan.</p> <p>Implement the mitigation measures as described by the Wetland specialists incorporated into the Environmental Management Plan.</p> |  |
|  | Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.                                  | Duration              | Short term                          | <p>Start the rehabilitation of disturbed surfaces as soon as possible.</p> <p>Spray bare surfaces with water to prevent dust pollution.</p>   | Medium term                            |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | Foreign plant species are likely to invade disturbed areas.   | Duration              | Short term                          | <p>Start the extermination of any invasive species as soon as possible and maintain the eradication programme.</p>  | Medium term                            |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | Ensure that should any finds in terms of Palaeontological or Cultural Heritage occur necessary steps be taken | Duration              | Short term                          | <p>Should any chance finds occur, to immediately seize work in the area and contact the SAHRA/Palaeontological specialist.</p>  | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | High                                   |
|  | Poorly planned ablution facilities for construction workers may cause pollution of                            | Duration              | Short term                          | <p>Provide portable ablution facilities that will not cause pollution</p>   | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   |                       |                                     |   |  |



| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |   |                       |                                     |   |  |
|--|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                       |                                     |   |  |
| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  | surface and underground water.  | Probability           | Definite                            | during the construction phase.  | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | The proposed project can impact on the soil and geology.  | Duration              | Long term                           | Implement the findings of the Geo-Technical Engineer.<br><br>Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.   | Long term                              |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.                        | Duration              | Short term                          | Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.<br><br>The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible.<br><br>No snares may be set.                               | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | Open trenches can be dangerous as they can either collapse on people or on equipment and people- especially small children, can fall into them. | Duration              | Short term                          | Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer.<br><br>Ensure that the trenches stay open for as short a time as possible.<br><br>Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act. | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
| Probability  |   | Definite              | Definite                            |   |  |
| Significance   |   | Medium                | Medium                              |   |  |
| Reversibility  |   | High                  | High                                |   |  |
| Risk   |   | Low                   | Medium                              |   |  |
| <b>Indirect impacts:</b>                                       |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic                 | Dust generation from the proposed project could impact on the surrounding area.   | Duration              | Short term                          | Spray water on open surfaces to ensure that dust does not cause air pollution during construction.<br><br>Start the rehabilitation of disturbed surfaces as soon as possible  | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |   | Probability           | Probable                            |   | Probable                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  |   | Extent                | Local                               |   | Local                                  |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |  |                       |                                     |   |  |
|--|--|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |  |                       |                                     |   |  |
| Environmental Attribute  | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  | Spills of lubricants / oils can take place on bare soil.                                   | Magnitude (Intensity) | Low                                 | Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.<br><br>Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Waste materials such as glass, plastic, metal or paper present a possible pollution hazard | Extent                | Local                               | Implement the management plan to ensure that:<br>All construction rubble is disposed of in a safe and environmentally acceptable manner.<br>NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase.<br><br>All cement is housed as to prevent spills (due to rain and or handling errors).<br><br>NO glass, plastic, metal, or paper shall be allowed to pollute the area. | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  | Risk   | Low                   | Medium                              |   |  |
|  | Non-compliance to the relevant legislation may cause social and environmental problems.    | Extent                | Local                               | Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act.<br><br>Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).   | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
| Reversibility  |  | High                  | High                                |   |  |
| Risk   | Low  | Medium                |                                     |   |  |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)           |   |                       |                                     |   |  |
|--|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                       |                                     |   |  |
| Environmental Attribute  | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  | New employment opportunities will be created.<br>Local skills development will take place.  | Extent                | Local                               | No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act. | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | Medium                              |   | Medium                                 |
|  |   | Risk                  | Low                                 |   | Medium                                 |
| <b>Cumulative impacts:</b>                                     |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic                 | Enhancement of the social well-being of the local communities for which the development is intended   | Extent                | Local                               | Ensure that the development is constructed as planned.<br><br>The demand for housing will be partially addressed in the area.   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | Medium                              |   | Medium                                 |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | <u>Solid waste:</u> The proposed development will add additional solid waste into the existing waste stream of the City of Matlosana Local Municipality.<br><br><u>Sewage:</u> The proposed development will add additional sewage into the existing sewage stream of the City of Matlosana Local Municipality.<br><br><u>Water supply:</u> The proposed development will add pressure to the water supply of City of Matlosana Local Municipality's Water. | Extent                | Local                               | Ensure that the development is constructed as planned by the Civil Engineer.  | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | High                                |   | High                                   |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | <u>Traffic:</u> The proposed development will result in an increase in traffic in the immediate surroundings of the proposed development.   | Extent                | Local                               | Ensure that the development is constructed as planned by the Town and Regional Planner  | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | High                                   |
|  |   | Reversibility         | Low                                 |   | Low                                    |
|  |   | Risk                  | Medium                              |   | Medium                                 |
|  | Indigenous vegetation will be removed.  | Extent                | Local                               | No mitigation measures possible.  | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | High                                |   | High                                   |
|  |   | Reversibility         | Low                                 |   | Low                                    |
|  |   | Risk                  | Medium                              |   | Medium                                 |
| Extent   |   | Local                 | Local                               |   |  |

**ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)**

**ALTERNATIVE 2: Single land use: Housing only**

| Environmental Attribute   | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation)   | Proposed mitigation   | Assessment rating (Without mitigation) |
|---|---|-----------------------|---|---|--|
| <b>DIRECT IMPACTS:</b>  |   |                       |   |   |  |
| Geographical<br>Physical<br>Social<br>Economic  | 174 hectares of indigenous vegetation will be eradicated in order to establish the development. | Duration              | Long term   | Obtain the necessary environmental authorization for the development.                                       | Long term                              |
|   |   | Extent                | Local   |   | Local                                  |
|   |   | Magnitude (Intensity) | High  |   | High                                   |
|   |   | Probability           | Definite  |   | Definite                               |
|   |   | Significance          | Medium  |   | Medium                                 |
|   |   | Reversibility         | Low   |   | Low                                    |
|   |   | Risk                  | Low   |   | Medium                                 |
|   | The proposed development area is located within a CBA 2 and the vegetation will be eradicated.  | Duration              | Long term   | Obtain the necessary environmental authorization for the development.                                       | Long term                              |
|   |   | Extent                | Local   |   | Local                                  |
|   |   | Magnitude (Intensity) | High  |   | High                                   |
|   |   | Probability           | Definite  |   | Definite                               |
|   |   | Significance          | Medium  |   | Medium                                 |
|   |   | Reversibility         | Low   |   | Low                                    |
|   |   | Risk                  | Low   |   | Medium                                 |
|   | Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.                    | Duration              | Short term  | Start the rehabilitation of disturbed surfaces as soon as possible.   | Medium term                            |
|   |   | Extent                | Local   |   | Local                                  |
|   |   | Magnitude (Intensity) | Low   |   | Medium                                 |
|   |   | Probability           | Definite  |   | Definite                               |
|   |   | Significance          | Medium  |   | Medium                                 |
|   |   | Reversibility         | High  |   | High                                   |
|   |   | Risk                  | Low   |   | Medium                                 |
|   | Foreign plant species are likely to invade disturbed areas.                                     | Duration              | Short term  | Start the extermination of any invasive species as soon as possible and maintain the eradication programme. | Medium term                            |
|   |   | Extent                | Local   |   | Local                                  |
|   |   | Magnitude (Intensity) | Low   |   | Low                                    |
|   |   | Probability           | Definite  |   | Definite                               |
|   |   | Significance          | Medium  |   | Medium                                 |
|   |   | Reversibility         | High  |   | High                                   |
|   |   | Risk                  | Low   |   | Medium                                 |
| Poorly planned ablution facilities for construction workers may cause pollution of surface and underground water. | Duration  | Short term            | Provide portable ablution facilities that will not cause pollution during the construction phase. | Short term  |  |
|   | Extent  | Local                 |   | Local   |  |
|   | Magnitude (Intensity)   | Medium                |   | Medium  |  |
|   | Probability   | Definite              |   | Definite  |  |
|   | Significance  | Medium                |   | Medium  |  |
|   | Reversibility   | High                  |   | High  |  |
|   | Risk  | Low                   |   | Medium  |  |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase) |   |                       |                                     |   |  |
|--|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 2: Single land use: Housing only         |   |                       |                                     |   |  |
| Environmental Attribute                              | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  | The proposed project can impact on the soil and geology.  | Duration              | Long term                           | The findings of the Geo-Technical Engineer must be adhered to.  | Long term                              |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.                        | Duration              | Short term                          | Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.<br><br>The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible.<br><br>No snares may be set.                               | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | Medium                                 |
|  | Ensure that should any finds in terms of Palaeontological or Cultural Heritage occur necessary steps be taken                                   | Duration              | Short term                          | Should any chance finds occur, to immediately seize work in the area and contact the SAHRA/Palaeontological specialist.   | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Low                                 |   | High                                   |
|  | Open trenches can be dangerous as they can either collapse on people or on equipment and people- especially small children, can fall into them. | Duration              | Short term                          | Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer.<br><br>Ensure that the trenches stay open for as short a time as possible.<br><br>Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act. | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
| Probability  |   | Definite              | Definite                            |   |  |
| Significance   |   | Medium                | Medium                              |   |  |
| Reversibility  |   | High                  | High                                |   |  |
| Risk   |   | Low                   | Medium                              |   |  |
| <b>Indirect impacts:</b>                             |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic       | Dust generation from the proposed project could impact on the surrounding area.   | Duration              | Short term                          | Spray water on open surfaces to ensure that dust does not cause air pollution during construction.  | Short term                             |
|  |   | Extent                | Local                               |   | Local                                  |
|  |   | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |   | Probability           | Probable                            |   | Probable                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | High                                |   | High                                   |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase) |  |                       |                                     |   |  |
|--|--|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 2: Single land use: Housing only         |  |                       |                                     |   |  |
| Environmental Attribute                              | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  |  | Risk                  | Low                                 | Start the rehabilitation of disturbed surfaces as soon as possible  | Medium                                 |
|  | Spills of lubricants / oils can take place on bare soil.                                   | Extent                | Local                               | Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.  | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Waste materials such as glass, plastic, metal or paper present a possible pollution hazard | Extent                | Local                               | Implement the management plan to ensure that:<br>All construction rubble is disposed of in a safe and environmentally acceptable manner.<br>NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase.<br><br>All cement is housed as to prevent spills (due to rain and or handling errors).<br><br>NO glass, plastic, metal, or paper shall be allowed to pollute the area. | Local                                  |
|  |  | Magnitude (Intensity) | Low                                 |   | Low                                    |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Non-compliance to the relevant legislation may cause social and environmental problems.    | Extent                | Local                               | Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act.<br><br>Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).   | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Probable                            |   | Probable                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | New employment opportunities will be created.<br>Local skills development will take place. | Extent                | Local                               | No mitigation measures needed apart from the fact that contractors will have to ensure that they abide  | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase) |  |                       |                                     |   |  |
|--|--|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 2: Single land use: Housing only         |  |                       |                                     |   |  |
| Environmental Attribute                              | Potential impacts and risks  | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
|  |  | Significance          | Medium                              | to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.                                  | Medium                                 |
|  |  | Reversibility         | Medium                              |   | Medium                                 |
|  |  | Risk                  | Low                                 |   | Medium                                 |
| <b>Cumulative impacts:</b>                           |  |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic       | Enhancement of the social well-being of the local communities for which the development is intended  | Extent                | Local                               | Ensure that the development is constructed as planned.<br><br>The demand for housing will be partially addressed in the area. | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | Medium                              |   | Medium                                 |
|  |  | Reversibility         | Medium                              |   | Medium                                 |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Solid waste: The proposed development will add additional solid waste into the existing waste stream of the City of Matlosana Local Municipality.<br><br>Sewage: The proposed development will add additional sewage into the existing sewage stream of the City of Matlosana Local Municipality.<br><br>Water supply: The proposed development will add pressure to the water supply of City of Matlosana Local Municipality's Water. | Extent                | Local                               | Ensure that the development is constructed as planned by the Civil Engineer.  | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | High                                |   | High                                   |
|  |  | Reversibility         | High                                |   | High                                   |
|  |  | Risk                  | Low                                 |   | Medium                                 |
|  | Traffic: The proposed development will result in an increase in traffic in the immediate surroundings of the proposed development.   | Extent                | Local                               | Ensure that the development is constructed as planned by the Town and Regional Planner  | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | Medium                              |   | High                                   |
|  |  | Reversibility         | Low                                 |   | Low                                    |
|  |  | Risk                  | Medium                              |   | Medium                                 |
|  | Indigenous vegetation will be removed  | Extent                | Local                               | No mitigation measures possible.  | Local                                  |
|  |  | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |  | Probability           | Definite                            |   | Definite                               |
|  |  | Significance          | High                                |   | High                                   |
|  |  | Reversibility         | Low                                 |   | Low                                    |
|  |  | Risk                  | Medium                              |   | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase) |                             |                     |                                     |                     |  |
|--|-----------------------------|---------------------|-------------------------------------|---------------------|--|
| ALTERNATIVE 3: (No-Go Option)                        |                             |                     |                                     |                     |  |
| Environmental Attribute                              | Potential impacts and risks | Assessment criteria | Assessment rating (With mitigation) | Proposed mitigation | Assessment rating (Without mitigation) |
| <b>DIRECT IMPACTS:</b>                               |                             |                     |                                     |                     |  |
| Geographical   |                             | Duration            | Long term                           |                     | Long term                              |

| ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)       |   |                       |                                     |   |  |
|--|---|-----------------------|-------------------------------------|---|--|
| ALTERNATIVE 3: (No-Go Option)                              |   |                       |                                     |   |  |
| Environmental Attribute                                    | Potential impacts and risks   | Assessment criteria   | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
| Physical<br>Social<br>Economic<br>Cultural                 | No impact on the indigenous vegetation will be removed.   | Extent                | Local                               | No mitigation measures required.                                    | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | High                                |   | High                                   |
|  |   | Reversibility         | Low                                 |   | Low                                    |
|  |   | Risk                  | Medium                              |   | Medium                                 |
| <b>Indirect impacts:</b>                                   |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural | No new employment opportunities will be created during the planning and design phase.<br><br>No skills enhancement will take place<br><br>If this option is implemented, the projected boost to the local and regional economy will not take place.   | Extent                | Local                               | Ensure that the development is constructed and operated as planned. | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | Medium                              |   | Medium                                 |
|  |   | Reversibility         | Medium                              |   | Medium                                 |
|  |   | Risk                  | High                                |   | High                                   |
| <b>Cumulative impacts:</b>                                 |   |                       |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural | If this option is implemented, the projected boost to the local and regional economy will not take place.<br><br>No new employment opportunities will be created.<br>No improvement to local skills development will take place.<br>No broadened Tax base for the MCity ahikeng Local Municipality. | Extent                | Local                               | Ensure that the development is constructed and operated as planned. | Local                                  |
|  |   | Magnitude (Intensity) | Medium                              |   | Medium                                 |
|  |   | Probability           | Definite                            |   | Definite                               |
|  |   | Significance          | High                                |   | High                                   |
|  |   | Reversibility         | High                                |   | High                                   |
|  |   | Risk                  | Medium                              |   | Medium                                 |

| ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)            |   |                         |                                     |   |  |
|--|---|-------------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |   |                         |                                     |   |  |
| Environmental Attribute  | Environmental Attribute   | Environmental Attribute | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
| <b>DIRECT IMPACTS:</b>   |   |                         |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural     | Poorly maintained and serviced infrastructure may cause environmental problems. | Extent                  | Local                               | It will be the responsibility of the Local Municipality to maintain the infrastructure. | Local                                  |
|  |   | Magnitude (Intensity)   | Medium                              |   | Medium                                 |
|  |   | Probability             | Definite                            |   | Definite                               |
|  |   | Significance            | Medium- high                        |   | High                                   |
|  |   | Reversibility           | High                                |   | Medium                                 |
|  |   | Risk                    | High                                |   | High                                   |
| <b>Indirect impacts:</b>                                       |   |                         |                                     |   |  |
| Geographical   |   | Extent                  | Local                               |   | Local                                  |



| ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)            |  |                         |                                     |   |  |
|--|--|-------------------------|-------------------------------------|---|--|
| ALTERNATIVE 1: Mixed land use township (Preferred Alternative) |  |                         |                                     |   |  |
| Environmental Attribute  | Environmental Attribute  | Environmental Attribute | Assessment rating (With mitigation) | Proposed mitigation   | Assessment rating (Without mitigation) |
| Physical<br>Social<br>Economic<br>Cultural                     | Lack of rehabilitation may cause problems  | Magnitude (Intensity)   | Medium                              | It will be the responsibility of the Local Municipality to ensure that the rehabilitation plan is implemented | Medium                                 |
|  |  | Probability             | Definite                            |   | Definite                               |
|  |  | Significance            | Medium- high                        |   | High                                   |
|  |  | Reversibility           | High                                |   | Medium                                 |
|  |  | Risk                    | High                                |   | High                                   |
| <b>Cumulative impacts:</b>                                     |  |                         |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural     | Enhancement of the social well-being of the local communities for which the development is intended                  | Extent                  | Local                               | No mitigation measures required.  | Local                                  |
|  |  | Magnitude (Intensity)   | Medium                              |   | Medium                                 |
|  |  | Probability             | Definite                            |   | Definite                               |
|  |  | Significance            | High                                |   | High                                   |
|  |  | Reversibility           | High                                |   | High                                   |
| Risk   | Medium   | Medium                  |                                     |   |  |
| Geographical<br>Physical<br>Social<br>Economic<br>Cultural     | Broadened tax base: The proposed development will generate more income for the City of Matlosana Local Municipality. | Extent                  | Local                               | No mitigation measures required.  | Local                                  |
|  |  | Magnitude (Intensity)   | Medium                              |   | Medium                                 |
|  |  | Probability             | Definite                            |   | Definite                               |
|  |  | Significance            | High                                |   | High                                   |
|  |  | Reversibility           | High                                |   | High                                   |
| Risk   | Medium   | Medium                  |                                     |   |  |

## 9. PUBLIC PARTICIPATION

### Public participation plan

Details of the public participation process proposed for the application as required by Regulation 41(2) of GN R. 326, dated April 2017 read with the directions regarding measures to address, prevent and combat the spread of COVID-19 relating to National Environmental Management permits and licences as published in GN R 650 dated 05 June 2020 (Issued in terms of the Directions set out in the Schedule in terms of regulation 4(10) of the Regulations issued by the Minister of Cooperative Governance and Traditional Affairs in terms of section 27(2) of the Disaster Management Act, 2002 (Act No. 57 of 2002) and published on 29 April 2020 in Government Notice No. R. 480 of Government Gazette No. 43258.)

### Public participation plan brief & purpose

The aim of this public participation plan is to provide our workforce with the measures we will be actively taking to mitigate the spread of the corona virus. As employee of AB Enviro Consult you are

instructed to follow all these rules diligently in order to sustain a healthy and safe workplace. It's important that we all respond responsibly and transparently to these health precautions.

### **Scope**

This public participation plan applies to all employees and sub-consultants of AB Enviro Consult. It is everybody's responsibility to read through this action plan and to ensure that we collectively and uniformly respond to this challenge

### **Purpose of the public participation**

**40.** (1) The public participation process to which the—

(a) Environmental Impact assessment report and EMPr, submitted in terms of regulation 19;

was subjected to must give all potential or registered interested and affected parties, including the competent authority, a period of at least 30 days to submit comments on the Environmental Impact assessment report and EMPr.

(2) The public participation process must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with—

(a) the competent authority;

(b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation;

(c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and

(d) all potential, or, where relevant, registered interested and affected parties.

(3) Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority.

The aim of this process is to provide interested and/or affected parties (I&AP) with background information on the proposed development and is an invitation to identified I&AP's to participate in the Environmental Impact Assessment (EIA) Process to identify possible impacts and alternatives and to provide them with an opportunity to contribute towards the compilation of the Environmental Management Programme (EMP) for the project.

Identification of I&AP's will be fundamental to the success of the development.

### **Public Participation process**

**41.** (1) This regulation only applies in instances where adherence to the provisions of this regulation is specifically required.

| DETAILS OF PUBLIC PARTICIPATION PROCESS   | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19   |
|---|--|
| <p>(2) The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by</p> | <p><u>Protocol for public participation</u></p> <ul style="list-style-type: none"> <li>➤ Face masks must be worn at all times.</li> <li>➤ Only two persons will be allowed to travel in a vehicle at one time.</li> <li>➤ During the public participation avoid contact with other people as far as possible. Should you have to talk to someone ensure that you stand at least 2 meters away from that person.</li> <li>➤ Wash your hands after using the toilet, before eating, and if you cough/sneeze into your hands (follow the 20-second hand-washing rule). You can also use the sanitizers that have been provided in each vehicle.</li> <li>➤ Cough/sneeze into your sleeve, preferably into your elbow. If you use a tissue, discard it properly and clean/sanitize your hands immediately.</li> <li>➤ Avoid touching your face, particularly eyes, nose, and mouth with your hands to prevent from getting infected.</li> <li>➤ Upon your return, sanitize everything that you take out of the vehicle. This includes your laptop, cell phone, car keys and face mask</li> </ul> |

| DETAILS OF PUBLIC PARTICIPATION PROCESS  | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19  |
|--|---|
| <p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—</p> <p>(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p>(ii) any alternative site;</p> | <ul style="list-style-type: none"> <li>➤ The notice board will be sterilized with an alcohol based spray at the office before it is loaded into the vehicle.</li> <li>➤ At the site, ensure that the person fixing the site notice is wearing all relevant PPE before exiting the vehicle. This will include a facemask and disposable gloves.</li> <li>➤ Ensure that no members of the public are within two meters from you and then fix the notice board at the boundary of the site.</li> <li>➤ Continue to ensure that you adhere to social distancing at all times.</li> <li>➤ Once the notice board is fixed, spray the notice board with the alcohol based disinfectant that has been provided in the vehicle.</li> <li>➤ Once you return to the vehicle, take off the disposable gloves and place them in the container provided. Spray your hands, the hammer and the pair of pliers with the alcohol based hand sanitizer provided.</li> </ul> |

| DETAILS OF PUBLIC PARTICIPATION PROCESS   | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19  |
|---|---|
| <p>(b) giving written notice, in any of the manners provided for in section 47D of the Act, to—</p> <p>(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> <p>(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> | <ul style="list-style-type: none"> <li>➤ The notices will be sterilized with an alcohol based spray at the office before it is loaded into the vehicle.</li> <li>➤ Written notifications will be hand delivered to the occupiers of the site and occupiers of land adjacent to the site. This will be done by placing a copy of the notice in their letter boxes or at a conspicuous place in their fence or at their house.</li> <li>➤ The person delivering the notices must be wearing all relevant PPE before exiting the vehicle. This will include a facemask and disposable gloves.</li> <li>➤ Ensure that you adhere to social distancing at all times.</li> <li>➤ Once you return to the vehicle, take off the disposable gloves and place them in the container provided. Spray your hands with the alcohol based hand sanitizer provided.</li> </ul> |
| <p>(iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;</p> <p>(iv) the municipality which has jurisdiction in the area;</p> <p>(v) any organ of state having jurisdiction in respect of any aspect of the activity; and</p> <p>(vi) any other party as required by the competent authority</p>   | <ul style="list-style-type: none"> <li>➤ Notifications will be sent via registered mail to all of the I&amp;AP's in this section.</li> <li>➤ Where an e-mail address can be obtained for an I&amp;AP, the notification will rather be sent via e-mail.</li> </ul> <p>The following I&amp;AP's have been identified:</p> <ol style="list-style-type: none"> <li>1. Department of Agriculture: North West Provincial Department</li> <li>2. Department of Biodiversity and conservation: North west provincial Department</li> <li>3. Department of Environment: North west Provincial Department</li> <li>4. Kenneth Kaunda District Municipality</li> <li>5. City of Matlosana Local Municipality</li> <li>6. Councilor of Municipal ward 1</li> <li>7. Department of Water and Sanitation</li> </ol>   |

| DETAILS OF PUBLIC PARTICIPATION PROCESS   | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19  |
|---|---|
| <p>(c) placing an advertisement in</p> <p>(i) one local newspaper; or</p> <p>(ii) any official that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;</p> <p>(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official referred to in paragraph (c)(ii); and</p> | <ul style="list-style-type: none"> <li>➤ A Newspaper advert will be placed in the Klerksdorp Record</li> <li>➤ The placement of the advert and the payment of the placement will be done electronically.</li> <li>➤ An electronic copy of the newspaper will also be requested from the publisher.</li> </ul> |
| <p>(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to—</p> <p>(i) illiteracy;</p> <p>(ii) disability; or</p> <p>(iii) any other disadvantage.</p>  | <ul style="list-style-type: none"> <li>➤ All correspondence will be in English. Should any one request notification in any other language, an interpreter will be appointed to translate the information to this individual.</li> </ul>   |

| DETAILS OF PUBLIC PARTICIPATION PROCESS  | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19   |
|--|--|
| <p>(3) A notice, notice board or advertisement referred to in subregulation (2) must—</p> <p>(a) give details of the application or proposed application which is subjected to public participation; and</p> <p>(b) state—</p> <p>(i) whether basic assessment or S&amp;EIR procedures are being applied to the application;</p> <p>(ii) the nature and location of the activity to which the application relates;</p> <p>(iii) where further information on the application or proposed application can be obtained; and</p> <p>(iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made</p> | <ul style="list-style-type: none"> <li>➤ The relevant information will be included in the notices.</li> <li>➤ The registered I&amp;AP will be requested to submit their response in writing and electronically to our offices.</li> <li>➤ Public participation meetings will be avoided as far as possible.</li> <li>➤ If a public participation meeting is to be held, only 50 people will be allowed in the venue at one time. Their temperatures will be taken and a basic screening will be held at the entrance. The wearing of masks will be compulsory as well as maintaining social distancing.</li> </ul> |
| <p>(4) A notice board referred to in subregulation (2) must—</p> <p>(a) be of a size of at least 60cm by 42cm; and</p> <p>(b) display the required information in lettering and in a format as may be determined by the competent authority.</p>   | <ul style="list-style-type: none"> <li>➤ The notice board will comply with these dimensions and the relevant information will be contained in this notice.</li> </ul>  |

| DETAILS OF PUBLIC PARTICIPATION PROCESS   | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19  |
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| <p>(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that</p> <p>(a) such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and</p> <p>(b) written notice is given to registered interested and affected parties regarding where the—</p> <p>(i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b);</p> <p>(ii) revised environmental impact assessment report or EMPr as contemplated in regulation 23(1)(b); or</p> <p>(iii) environmental impact assessment report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.</p> | <ul style="list-style-type: none"> <li>➤ Written notices will be given to I&amp;AP's electronically as far as possible.</li> <li>➤ Copies of reports and specialist reports will be made available in the form of a DropBox link that will be sent to them.</li> <li>➤ Their responses will also be requested to be electronically.</li> </ul>  |
| <p>(6) When complying with this regulation, the person conducting the public participation process must ensure that—</p> <p>(a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and</p> <p>(b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.</p>  | <ul style="list-style-type: none"> <li>➤ Once again, all efforts will be made to ensure that registered I&amp;AP's are afforded an opportunity to comment on all relevant documentation electronically.</li> <li>➤ DropBox links will contain all the relevant information.</li> <li>➤ No hard copies will be left at libraries. If a registered I&amp;AP does not have access to an electronic medium or the internet, they will be supplied with a hard copy of the documents. (Protocols as described above will be followed in order to hand deliver the document)</li> </ul> |



| DETAILS OF PUBLIC PARTICIPATION PROCESS   | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19   |
|---|--|
| <p>(7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.</p>   | <ul style="list-style-type: none"> <li>➤ Should this process be needed, the agreement between authorities will be conducted electronically.</li> </ul> |
| <p><b>Register of interested and affected parties</b></p> <p><b>42.</b> A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of—</p> <p>(a) 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;</p> <p>(b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and</p> <p>(c) all organs of state which have jurisdiction in respect of the activity to which the application relates.</p> | <ul style="list-style-type: none"> <li>➤ This will be done as far as possible electronically.</li> </ul>   |

| DETAILS OF PUBLIC PARTICIPATION PROCESS  | ACTIONS TO BE TAKEN IN ORDER TO PREVENT THE SPREAD OF COVID-19   |
|--|--|
| <p><b>Registered interested and affected parties entitled to comment on reports and plans</b></p> <p><b>43.</b> (1) A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.</p> <p>(2) In order to give effect to section 240 of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.</p> | <ul style="list-style-type: none"> <li>➤ Once again, all efforts will be made to ensure that registered I&amp;AP's are afforded an opportunity to comment on all relevant documentation electronically.</li> <li>➤ DropBox links will contain all the relevant information.</li> <li>➤ No hard copies will be left at libraries. If a registered I&amp;AP does not have access to an electronic medium or the internet, they will be supplied with a hard copy of the documents. (Protocols as described above will be followed in order to hand deliver the document)</li> </ul>  |
| <p><b>Comments of interested and affected parties to be recorded in reports and plans</b></p> <p><b>44.</b> (1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.</p> <p>(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to—</p> <p>(a) a lack of skills to read or write;<br/> (b) disability; or<br/> (c) any other disadvantage;<br/> reasonable alternative methods of recording comments must be provided for</p>  | <ul style="list-style-type: none"> <li>➤ All comments will be recorded electronically and will be included in the reports.</li> <li>➤ All correspondence will be in English. Should any one request notification in any other language, an interpreter will be appointed to translate the information to this individual.</li> <li>➤ If a person is not able to comment due to one of the listed scenarios, a meeting will be held with this individual and his or her comments will be recorded manually.</li> <li>➤ The same protocol that has been described above for a public participation meeting will be followed in this instance.</li> </ul> |

## 9.1 Advertisement and Notice

|                        |                   |               |
|------------------------|-------------------|---------------|
| Publication name       | Klerksdorp Record |               |
| Date published         | 11/12/2020        |               |
| Site notice 1 position | Latitude          | Longitude     |
|                        | 26°43'55.94"S     | 26°25'29.14"E |
| Site notice 2 position | 26°43'21.06"S     | 26°25'31.84"E |
| Date placed            | 11/12/2020        |               |

PLEASE SEE PROOF BELOW

**GEREGTELIKE KENNISGEWINGS**

**LEGAL NOTICES**

**NOTICE OF APPLICATION TO RECTIFY UNLAWFUL COMMENCEMENT OR RECTIFICATION OF UNLAWFUL COMMENCEMENT OR CONTINUATION OF LISTED ACTIVITIES IN TERMS OF SECTION 24G OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998) AS AMENDED**

NOTICE is hereby given of an application that has been submitted to the Northwest Department Economic Development, Environment, Conservation and Tourism to rectify an

**56 STANDS FOR SALE ERWE TE KOOP**

**ELANDIA - R780000.** 4 slaapkamers, 2 badkamers, groot kombuis, baie kaste, sitkamer, eetkamer, 2 x 1-slaapkamer, woonstelsel met R500000 se urinkomste. Boorgat, pragtige tuin. Henk: 073 234 8593. 250472 11/12

**ELLATON - R220000.** Orkney Vaalerwe vanaf R35000 tot R130000 vir waterfronterwe. Sekuriteit, bootry, visvangkrag. jy alles verniet as jy hier koop. Henk: 073 234 8593. 250471 11/12

**250476 11/12**  
1 Bedroomflat, R3000, Doringkruin, prepaid electricity, water included, modern and safe, electric fencing. Has a stove, contact Murdoch 083 722 3749.

**250391 11/12-23/12**  
AANTREKLIKE 41-jarige blond vir lekker kuintjie. Slegs blankes. Baie privaat, werk alleen. Maandae tot Vrydae 08:30 tot 16:00. Geen privaatnommers. Jacky: 076 548 4027.

**250464 11/12-18/12**  
Parties wish object to and/or the proposed are requested objections and reasons) to ABE by no later than 2021. A copy of is also available Consult on reau Number: 550121 All persons hav against the above estate must lodge Executor concern days from date of hereof.

**DE KOCKS ATTORNEYS**  
1st Floor, Jooste 49 Siddle Street, K 2570. Tel: 018 482 35 akhes2@dekocks.co erence: S VOGEL 061635.

**LOST OR DESTROYED DEED**  
NOTICE is hereby given of regulation 68 of the Registries Act 1937 intention to apply for the of a certified copy of of transfer T73661/2 favour of GERT WILHELM CALITZ, Identity Number 530265025083 in

unlawful commencement of a listed activity in terms of Section 24G of the National Environmental Management Act (No. 107 of 1998) as amended. The activity is listed in terms of Government Notice No. R.327, Listing Notice 1; Activity 19; Government Notice No. R.325, Listing Notice 2; Activity No. 15 and Government Notice No. R.324, Listing Notice 3; Activity No's 12 (h)(iv)(vi)) of NEMA 2014 as amended 7 April 2017.

This advertisement complies with the instructions regarding such notices, National Environmental Management Act (Act No. 107 of 1998, as amended) (Regulations promulgated on 4 December 2014), amended: (Government Notice No. R.326 of 2017) (Regulation 41(2)(c) (d)). The competent authority is the Northwest Department Economic Development, Environment, Conservation and Tourism.

**PROJECT TITLE:** Legalization of the commencement of the proposed clearance of 174ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, Northwest Province.

**PROJECT DESCRIPTION:** Clearance of 174ha of indigenous vegetation (located within a critical Biodiversity area 2 and within 30 meters from a non-perennial stream as identified in the Northwest Bioregional Plan) in order to establish a mixed use township (consisting of residential, business, municipal, community facilities, and institutional erven and streets).

**LOCATION:** A portion of Portion 10C (a portion of Portion 2) on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, Northwest Province.

**Client:** CITY OF MATLOSANA LOCAL MUNICIPALITY.

Consultant and contact person: Mrs. JE (Hannie) du Plooy, AB Environ Consult CC, 7 Louis Leipoldt Street, Potchestroom, 2531. Tel: 071 202 4027. Fax: 018 293 0671. Email: hannieduplooy@abenviro.co.za. Parties wishing to formally object to and/or comment on the proposed development are requested to forward their objections and comments (with reasons) to AB Environ Consult by no later than 30 January 2017.

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**PROOF OF SITE NOTICE AFFIXED IN LINE WITH COVID-19 PROTOCOL: PROTECTIVE GEAR AND SANITIZATION IN PLACE: 11/12/2020 (SEE BELOW)**





## 9.2 DETERMINATION OF APPROPRIATE MEASURES

Details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN R.982.

Key stakeholders (other than organs of state) identified in terms of Regulation 40(2)(d) of GN R.982:

| <b>Title, Name and Surname</b> | <b>Affiliation/ key stakeholder status</b> | <b>Contact details (tel number or e-mail address)</b> |
|--------------------------------|--|---|
| <b>N/A</b>                     | <b>Neighbour</b>                           | <b>See photo evidence</b>                             |
|                                |  |   |
|                                |  |   |
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|                                |  |   |

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





















**PROOF OF ALL COVID 19 PROTECTIVE MEASURES IN PLACE (GLOVES DISPENSED IN A USED GLOVE CONTAINER) AND POST PULIC PARTICIPATION SANITATION:**



### 9.3 AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders. Key stakeholders identified in terms of Regulation 7(1) and (2) and Regulation 40(2) (a)-(c) of GN R.982:

| Authority/Organ of State   | Contact person (Title, Name and Surname) | Tel No                 | Fax No         | e-mail                | Postal address   |
|--|--|------------------------|----------------|-----------------------|--|
| Department of Water and Sanitation   | Mr. TP NTili                             | (018) 384 3270         | (053) 831 4534 |                       | Cnr Dr. James Moroka Drive and Sekame Road Mega City Complex Unit 99 Sekame Street MMABATHO 2735 |
| Head of Department: North-West Department of Agriculture and Rural Development | Dr. P. Mokaila                           | (018) 389 5146/5104    | (018) 392 4377 |                       | Department Agriculture and Rural Development Private Bag X2039 Mmabatho 2735                     |
| North West Department of Biodiversity  | Head of Department                       | 018 389 5719/5431/5688 | 018 392 4377   |                       | Private Bag X2039 Mmabatho 2735  |
| Dr Kenneth Kaunda District Municipality  | The District Municipal Manager           | 018 473 8000           | 018 473 2523   |                       | Private Bag X5017, Klerksdorp, 2570  |
| City of Matlosana  | The Municipal Manager                    | 018 487 8009           | 018 487 1652   | dnkosi@klerksdorp.org | PO Box 99 Klerksdorp 2570  |
| Ward 1, City of Matlosana  | The Councilor                            | 018 487 8000           | 018 464 1780   |                       | PO Box 99 Klerksdorp 2570  |
| Eskom  | Mr. Dala                                 | 078 795 1188           |                | dalaME@eskom.co.za    |  |
| SAHRA  |  |                        |                | info@sahra.org.za     |  |
| NW: Dept. Public works and roads   |  | 018 387 2002           |                |                       | Private Bag X2080 Mmabatho 2735  |



## AB ENVIRO-CONSULT CC

Reg no. 2000/016652/23

7 Louis Lelopoldt Street,  
Potchefstroom, 2531  
Fac: + 27 (18) 293 0671  
Cell: + 27 (71) 202 4027  
[hannieduplooy@abenviro.co.za](mailto:hannieduplooy@abenviro.co.za)

10/12/2020

North West Department: Department of Agriculture and Rural Development  
The HOD Agriculture  
Private Bag X2039  
Mmabatho  
2735

Dear Sir/Madam

Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



## AB ENVIRO-CONSULT CC

Reg no. 2000/016652/23

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

10/12/2020

**North West Department: Department of Biodiversity  
Head of Department**  
Private Bag X2039  
Mmabatho  
2735

Dear Sir/Madam

**Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.**

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



## AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

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Potchefstroom, 2531  
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Cell: + 27 (71) 202 4027  
[hammadulplooy@abenviro.co.za](mailto:hammadulplooy@abenviro.co.za)

10/12/2020

Department of Water and Sanitation  
Sanlam Plaza  
East Burger Street  
Bloemfontein Central  
Bloemfontein  
9301

Tel: 018 384 0091

Dear Sir/Madam

Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



## AB ENVIRO-CONSULT CC

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[hannieduplooy@abenviro.co.za](mailto:hannieduplooy@abenviro.co.za)

10/12/2020

**North West Department: Public Works and Roads**

**HOD Roads**

Private Bag X2080  
Mmabatho  
2735

Dear Sir/Madam

Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



## AB ENVIRO-CONSULT CC

Reg no. 2000/016653/23

7 Louis Leipoldt Street,  
Potchefstroom, 2531  
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Cell: + 27 (71) 202 4027  
[bonnie@plooy@abenviro.co.za](mailto:bonnie@plooy@abenviro.co.za)

10/12/2020

**Dr Kenneth Kaunda**  
**District Municipal Manager**  
**Ms Barei Elizabeth Mosiane Segotso**  
Private Bag X5017  
Klerksdorp  
2570

Dear Sir/Madam

Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



## AB ENVIRO-CONSULT CC

Rag no. 2000/016653/23

7 Louis Leipoldt Street,  
Patchesbroom, 2531  
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Cell: + 27 (71) 202 4027  
[hannieduplooy@abenviro.co.za](mailto:hannieduplooy@abenviro.co.za)

10/12/2020

City of Matlosana Local Municipality  
The Municipal Manager  
Mr TSR Nkhumise  
PO Box 99  
Klerksdorp  
2570

Dear Sir/Madam

**Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP. City of Matlosana, North West Province.**

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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





## AB ENVIRO-CONSULT CC

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10/12/2020

Eskom  
[DalaME@eskom.co.za](mailto:DalaME@eskom.co.za)

Dear Sir/Madam

**Legalization of the commencement of the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters from a non-perennial stream, in order to establish a township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No. 273-IP, City of Matlosana, North West Province.**

AB ENVIRO CONSULT was appointed by City of Matlosana Local to submit an application to the North West Department Economic Development, Environment, Conservation and Tourism for the above mentioned proposed development.

Please find enclosed a copy of the Section 24G report. We must receive your comments by no later than the 30<sup>th</sup> January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

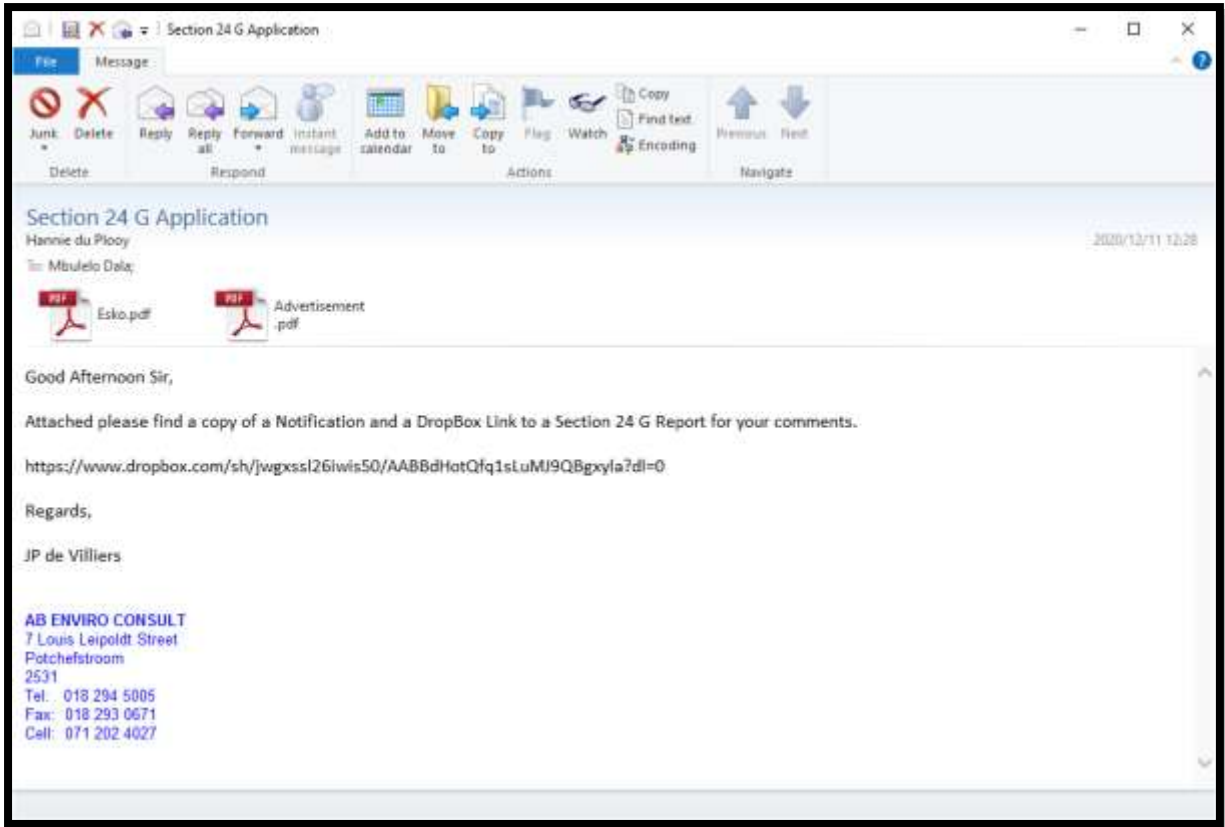
If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

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



#### 9.4 ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

| Summary of main issues raised by I&APs  | Summary of response from EAP   |
|---|--|
| SAHRA have requested a Paleaontological study to be conducted as part of the original EIA and scoping application | A PIA was conducted and the report has been sent to SAHRA under the original reference relating to the EIA application |
|   |  |

#### 9.5 COMMENTS AND RESPONSE REPORT

| I&AP registered: | Comment received:  | Response by the EAP:  |
|------------------|--|---|
| SAHRA            | SAHRA have requested a Palaeontological study to be conducted as part of the original EIA and scoping application. | A PIA was conducted and the report has been sent to SAHRA under the original reference relating to the EIA application<br>The PIA found: "the entire area is underlain by mainly igneous rocks of the Precambrian Ventersdorp Supergroup. Although not indicated on the geological map there is a possibility that Quaternary surficial deposits could be present. There is no possibility that these igneous rocks could |

|  |  |  |
|--|--|--|
|  |  | <p>contain fossils. In the PIA specialist's opinion: this development will not negatively affect palaeontological heritage. If, in the extremely unlikely event that fossils are exposed in superficial Quaternary deposits in the process of development activities, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented".</p> |
|  |  |  |

## Township establishment Tigane

Our Ref:



an agency of the  
Department of Arts and Culture

T: +27 21 462 4002 | F: +27 21 462 4024 | E: info@sahra.org.za  
South African Heritage Resources Agency | 111 Barrington Street | Cape Town  
P.O. Box 40377 | Cape Town | 8001  
www.sahra.org.za

Enquiries: Elijah Dumisani Katsetse  
Tel: 0214624502  
Email: ekatsetse@sahra.org.za  
CaseID: 15678

Date: Monday November 02, 2020  
Page No: 1

### Interim Comment

In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999)

Attention: City of Matlosana Local Municipality

Environmental Impact Assessment for the proposed the proposed clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a bridge over the watercourse, in order to establish a Township, which includes a cemetery, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province.

AB Enviro Consult CC has been appointed by The City of Matlosana Local Municipality to conduct an Environmental Authorisation (EA) Application for the proposed low Township establishment development on a remaining portion of Farm Uraan No 295-IP, and the remaining portion of the farm Vogelstruisfontein No 297-IP City of Matlosana Local Municipality, North West Province.

A draft Scoping Report has been submitted in terms of the National Environmental Management Act, no 107 of 1998 (NEMA) and the NEMA Environmental Impact Assessment (EIA) Regulations. The proposed development will include approximately in excess of 3000 erven with associated services, and various residential, business and public spaces, over 170 ha.

APelser Archaeological Consulting have been appointed to provide heritage specialist input as part of the EIA process as required by section 24(4)b(iii) of NEMA and section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA).

*Pelser, A. 2019. Report on a Phase 1 HIA for a proposed township development of Tigane extensions 7 & 8 on a portion of a remaining extent of the Farm Uraan No 295-IP & portion of a remaining extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana, North West Province.*

The report had not identified any finds of cultural and/or heritage nature and has thus recommended that the development be allowed to continue. A Chance Finds Procedure is recommended to be implemented.

Interim Comment

Township establishment Tigane

Our Ref:



an agency of the  
Department of Arts and Culture

T: +27 21 462 4502 | F: +27 21 462 4524 | E: info@sahra.org.za  
South African Heritage Resources Agency, 1114 Springfontein Street | Cape Town  
P.O. Box 45577 | Cape Town | 8001  
www.sahra.org.za

Enquiries: Elijah Dumisani Katsetse  
Tel: 0214624502  
Email: ekatsetse@sahra.org.za  
CaseID: 15678

Date: Monday November 02, 2020  
Page No: 2

The proposed development footprint is located in areas of moderate sensitivity for palaeontological resources as per the SAHRIS PalaeoSensitivity map. As such, a desktop Palaeontological Impact Assessment (PIA) is required to be conducted as part of the EA process. The desktop PIA must be compiled by a qualified palaeontologist and must comply with the SAHRA 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments.

Further comments will be issued upon receipt of the above requested report and the submission of the draft EIA with appendices.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

---

Elijah Dumisani Katsetse  
Heritage Officer  
South African Heritage Resources Agency

---

Phillip Hine  
Manager: Archaeology, Palaeontology and Meteorites Unit  
South African Heritage Resources Agency

**ADMIN:**  
Direct URL to case: <http://www.sahra.org.za/node/543221>

## 10 Environmental Management Programme

### 10.1 INTRODUCTION

The purpose of this Environmental Management Programme (EMPr) is to ensure 'good environmental practice' by taking a holistic approach to the management of environmental impacts during the construction and operation of the the clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a road over the watercourse, in order to establish a Township, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by the applicant and his nominated contractor. However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored.

It is important to note that this EMPr is focused primarily on the construction and operational phases of the project. Due to the projected lifespan, a detailed Site Closure and Decommissioning has not been included in this document as it is not intended for a project of this nature. Design specifications from an environmental point of view were taken into consideration, the Environmental Assessment Practitioner (EAP) have provided input with regard to possible mitigation measures for reducing environmental impacts.

This EMPr is also intended to ensure that the principles of sound Environmental Management and the general "Duty of Care" specified in the National Environmental Management Act are promoted on site during all phases of the development

This EMPr has been designed to suit the particular activities and needs of the construction and operation of the proposed township establishment to be known as Tigane Extension 7 and Tigane Extension, located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province, and incorporates specific project mitigation measures. This EMPr therefore identifies the following:

- Construction and operation activities that will impact on the environment;
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

It is important to note that the EMPr is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the contractor, resident engineer and relevant environmental authorities in writing for approval.

AB Enviro was appointed during August 2019 to submit an application for Environmental Authorization for the proposed township establishment on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.

Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020. Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.

In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

A professional team consisting of the following experts have been assembled in order to ensure the success of the proposed development:

- A Geotechnical Engineer
- A Town and Regional Planner
- Traffic Engineer
- The Civil Engineer
- A SAHRA Specialist.
- A Ecological and Wetland specialist
- Registered Environmental Assessment Practitioner (EAP)

They were responsible for the following actions:

- A Geotechnical Engineer had to determine whether the Geology and Soils of the site is suitable for the proposed development.
- A Town and Regional Planner designed the proposed development in such a way that the layout of the proposed development, takes into account the measures described by the Civil Engineer and that the layout satisfies the needs of future occupiers of the site
- The Civil Engineer had to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services. He also designed the proposed infrastructure.
- A Traffic Engineer was appointed to determine the improvements required to the existing and surrounding road network and intersections in the immediate vicinity to accommodate the proposed development.
- SAHRA Specialist determined the possible impact of the development on Archaeological and cultural features.
- A Palaeontological Specialist have conducted a desktop assessment to determine the likely impact of the development on palaeontological heritage features.
- The Ecological and Wetland specialist determined the impact of the proposed development on the streams and the Fauna and Flora of the area

- The EAP must assess all possible environmental issues that may affect the proposed project and ensure that all interested and affected parties are notified in order to assist him in identifying possible impacts. He must also give mitigation measures where applicable.
- It will be essential to plan for the appointment of an Environmental Control Officer (ECO) who will be responsible to ensure that all aspects regarding the environmental issues are implemented and monitored. The ECO will also be responsible for maintaining a database of all records pertaining to the environment for the study area.
- The surveyor ensured that the cadastral information is accurate, up to date and properly mapped. The contours of the area are accurately plotted.

## 10.2. Contents of the Environmental Management Programme

The contents of an EMPr, shown below, are contained in Appendix 4 of the NEMA EIA Regulations 982 of 2014 as amended and published in Appendix 4 of Government Notice No. R 326 of 2017.

1. (1) An EMPr must comply with section 24N of the Act and include-
  - (a) details of
    - (i) the EAP who prepared the EMPr; and
    - (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
  - (b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
  - (c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, in buffers;
  - (d) a description of the impact management outcomes, including management statements, identifying the impacts and that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-
    - (i) planning and design;
    - (ii) pre-construction activities;
    - (iii) construction activities;
    - (iv) rehabilitation of the environment after construction and where applicable post closure; and
    - (v) where relevant, operation activities;
  - (f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes and outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to
    - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
    - (ii) comply with any prescribed environmental management standards or practices;
    - (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
    - (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
  - (g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
  - (h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
  - (i) an indication of the persons who will be responsible for the implementation of the impact management actions;



- (j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented
- (k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
- (l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
- (m) an environmental awareness plan describing the manner in which-
  - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work;
  - (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
- (n) any specific information that may be required by the competent authority.

### 10.3. Details of Environmental Assessment Practitioner

Environmental Assessment Practitioner (EAP):<sup>2</sup>

|  |  |       |              |
|--|--|-------|--------------|
| <b>Mrs JE du Plooy of AB Enviro Consult CC</b> |  |       |              |
| Contact person:                                | Mrs JE du Plooy  |       |              |
| Postal address:                                | 7 Louis Leipoldt Street  |       |              |
| Postal code:                                   | 2531   | Cell: | 071 202 4027 |
| Telephone:                                     | 018 294 5005   | Fax:  | 018 293 0671 |
| E-mail:  | <a href="mailto:hannieduplooy@abenviro.co.za">hannieduplooy@abenviro.co.za</a> |       |              |




---

## 10.4 Expertise of the Environmental Assessment Practitioner

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

### PERSONAL PARTICULARS AND CAREER HISTORY OF PROF DE VILLIERS

#### ACADEMIC AND PROFESSIONAL QUALIFICATIONS

Post-Matric Qualifications

| YEAR | Qualification | Institution | Field of Study     |
|------|---------------|-------------|--------------------|
| 1968 | B.Sc.         | PU FOR CHE  | Geography, Geology |
| 1970 | HONNS. B.Sc.  | PU FOR CHE  | Soil Science       |
| 1974 | M.Sc.         | PU FOR CHE  | Geography          |
| 1981 | Ph.D.         | UOFS        | Geography          |

#### PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

| YEAR | Qualification/ Registration           | Institution                         | Field of Study         |
|------|---------------------------------------|-------------------------------------|------------------------|
| 1986 | Professional Natural Scientist        | S.A. Council for Natural Scientists | Environmental Science  |
| 1994 | Quality Auditor                       | ESKOM                               | Auditing               |
| 1998 | Personnel & Verifying Auditor         | SAATCA                              | Environmental Auditing |
| 2006 | Environmental Assessment Practitioner | Interim Certification Board EAPSA   | Environmental Science  |

#### MEMBERSHIP AND PARTICIPATION IN SOCIETIES, COUNCILS, ETC.

| Name of professional societies                                  | YEAR                     | Capacity                |
|---|--------------------------|-------------------------|
| S.A. Geographical Society.                                      | 1967-1996                | Board Member            |
| Society for Geography   | 1968-2004                | Member                  |
| SAGS Western Transvaal  | 1985-1989 1987-1989 1996 | Chairman                |
| Africa Geographical Association                                 | 1993-1995                | Vice-President.         |
| Society for the Vaal River Catchment                            | 1980-1999                | Member                  |
| S.A. Society for Photogrammetry, Remote Sensing and Cartography | 1984-1996                | Member                  |
| Dendrological Society   | 1986-2005                | Member                  |
| Birdlife South Africa   | 2003-present             | Member                  |
| British Geomorphological Research Group                         | 1985-1997                | Member                  |
| Int Com on Water Resource Systems                               | 1985-1997                | Member                  |
| Int Com on Continental Erosion                                  | 1986-1990                | Member                  |
| Int Com on Remote Sensing and Data Transmission                 | 1986-1991                | Member                  |
| Society for S.A. Geographers                                    | 1995-2005                | Member                  |
| SA Photogrammetrical and Geo. Info.                             | 1995-2003                | Member                  |
| S.A. Association of Geomorphologists                            | 1994-1999                | Board Member and member |
| SADC Mine Dump Study Group                                      | 1996-2005                | Member                  |

---

## ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

| <u>YEAR</u> | <u>Qualification</u>      | <u>Institution</u>    | <u>Field of Study</u>    |
|-------------|---------------------------|-----------------------|--------------------------|
| 1993        | BA                        | PU FOR CHE            | Geography, Economics     |
| 1994        | HED                       | PU FOR CHE            | Geography Economics      |
| 2006        | B.Sc.(Honns)<br>Cum Laude | North-West University | Environmental Management |
| 2007        | M.Sc.                     | North-West University | Geography                |

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## PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

| <u>YEAR</u> | <u>Qualification/ Registration</u>                             | <u>Institution</u>  | <u>Field of Study</u>     |
|-------------|--|---|---------------------------|
| 2008        | Basic Principles of Ecological Rehabilitation and Mine Closure | Centre for Environmental Management (North West University) | Ecological Rehabilitation |
| 2019        | EAPASA   | Registered EAP  | EAPASA 2019/808           |

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## ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

| <u>YEAR</u> | <u>Qualification</u>                      | <u>Institution</u> | <u>Field of Study</u>    |
|-------------|---|--------------------|--------------------------|
| 1999        | BA  | PU FOR CHE         | Geography, Tourism       |
| 2000        | BA (Honns)<br>Cum Laude                   | PU FOR CHE         | Geography                |
| 2002        | Master's degree: Environmental Management | PU FOR CHE         | Environmental Management |
| 2001        | Aquabase Intro                            | AQUABASE           | Hydrology                |
| 2001        | Geomedia Professional                     | INTERTECH          | GIS                      |
| 2001        | Map Info                                  | SPATIAL TECHNOLOGY | GIS                      |

## PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

| <u>YEAR</u> | <u>Qualification/ Registration</u>                         | <u>Institution</u>                                     |
|-------------|--|--|
| 2020        | Registered Environmental Assessment Practitioner 2019/1573 | Environmental Assessment Practitioners of South Africa |

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## EXPERIENCE OF THE CONSULTANCY

Over a period of 24 years (1996-2021) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than **375** projects. Environmental Control Officer's duties are also performed on various projects.

The company was involved (from 1992-1994) in evaluation of 114 applications for the subdivision of land, 23 applications for resort developments, and 54 applications for business rights for the Department of Agriculture, Conservation and the Environment - North West Province.

The consultancy is qualified to undertake professional studies in waste management and is still involved in the development of waste disposal- (solid and liquid effluent), and emission studies. These studies are

conducted both academically and practically. This work relates to mine waste, domestic waste and effluent as well as to the monitoring of waste disposal. Environmental audits in this respect are undertaken on a regular basis.

## 10.5. DESCRIPTION OF THE ACTIVITY

AB Enviro was appointed during August 2019 to submit an application for Environmental Authorization for the proposed township establishment on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.

Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020. Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.

In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

The Applicant was not aware that they required Environmental Authorization before starting with provision of essential services in the area. The intension of this application is thus to legalise the commencement of the provision of services to the informal housing by the provision of water. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty

The site is influenced by a number of design factors that were considered for the proposed layout plan to be acceptable. These factors include the slope of the site, environmental sensitivity, service provision, erf size, access, road layout, as well as the geotechnical features presented in the Geotechnical Report. To ensure that the proposed development do not infringe on any design principles and the environmental sensitive areas, development will only be allowed to take place according to the prescribed methods: subsequently a buffer area has been established around the wetlands area and no residential development may take place beyond the 1:100 year flood line. A Bridge is proposed to allow road access within the north western corner of the development over a non-perennial watercourse.

### Tigane Extension 7:

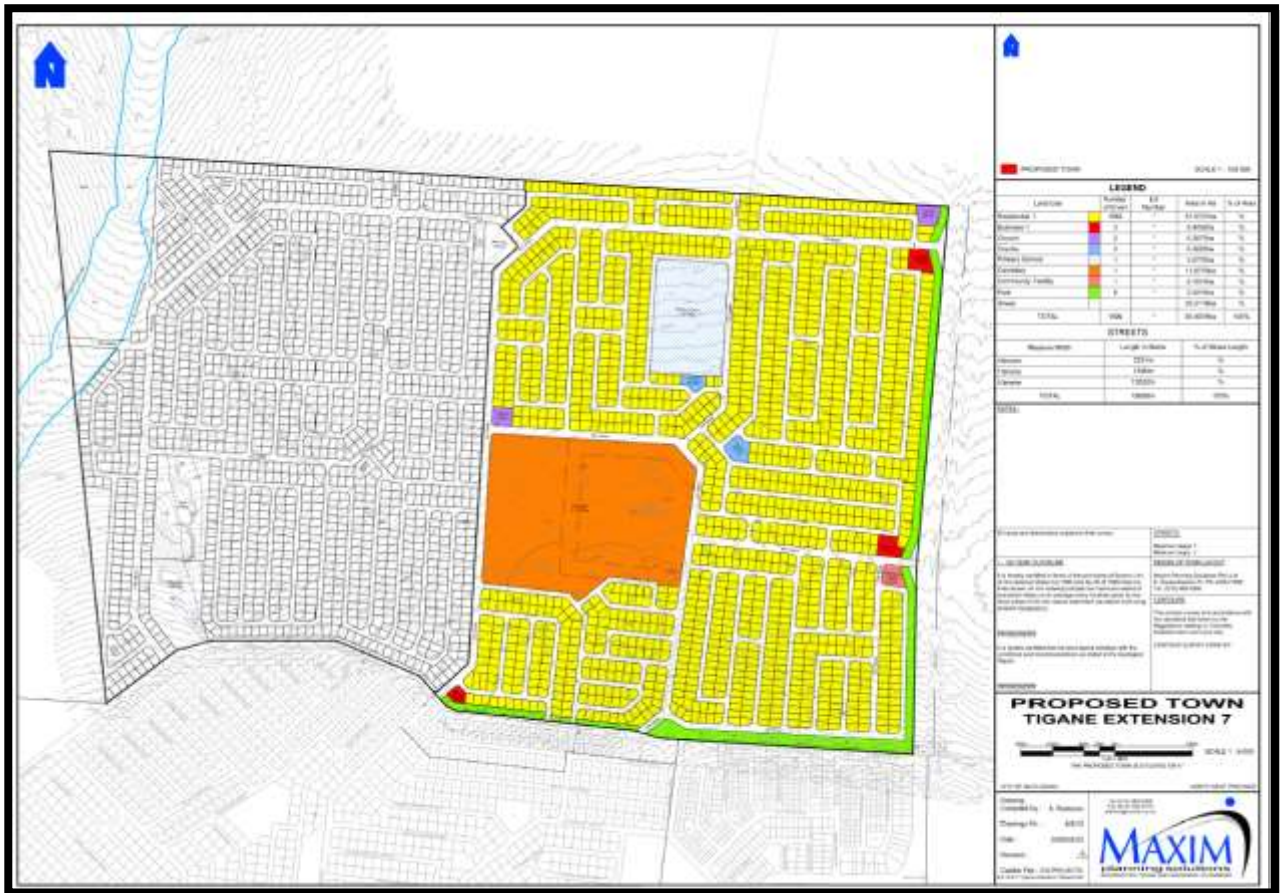
- **Residential 1**, to be utilized for housing purposes
- **Business 1**, to be utilized for business purposes.
- **Churches**, for the purpose of religious activities
- **Chreches and school**, to be utilized for educational purposes
- **Cemetery** for burial purposes
- **Park**, to be utilized for public open space purposes and

- **Streets**, for access to facilities.

The township will consist of a mixed us: See Figure 1 for a copy of the proposed Layout Plan.

| <b>TIGANE EXTENSION 7</b> |                     |                         |
|---------------------------|---------------------|-------------------------|
| <b>Proposed Zoning</b>    | <b>No. of Erven</b> | <b>Area in hectares</b> |
| <b>Residential 1</b>      | 1583                | 51.573                  |
| <b>Business1</b>          | 3                   | 0,4452                  |
| <b>Church</b>             | 2                   | 0,3073                  |
| <b>Chreche</b>            | 2                   | 0,3025                  |
| <b>Primary school</b>     | 1                   | 3.0755                  |
| <b>Cemetery</b>           | 1                   | 11,075                  |
| <b>Community facility</b> | 1                   | 0,1614                  |
| <b>Park</b>               | 6                   | 3,3475                  |
| <b>Streets</b>            |                     | 20,2118                 |

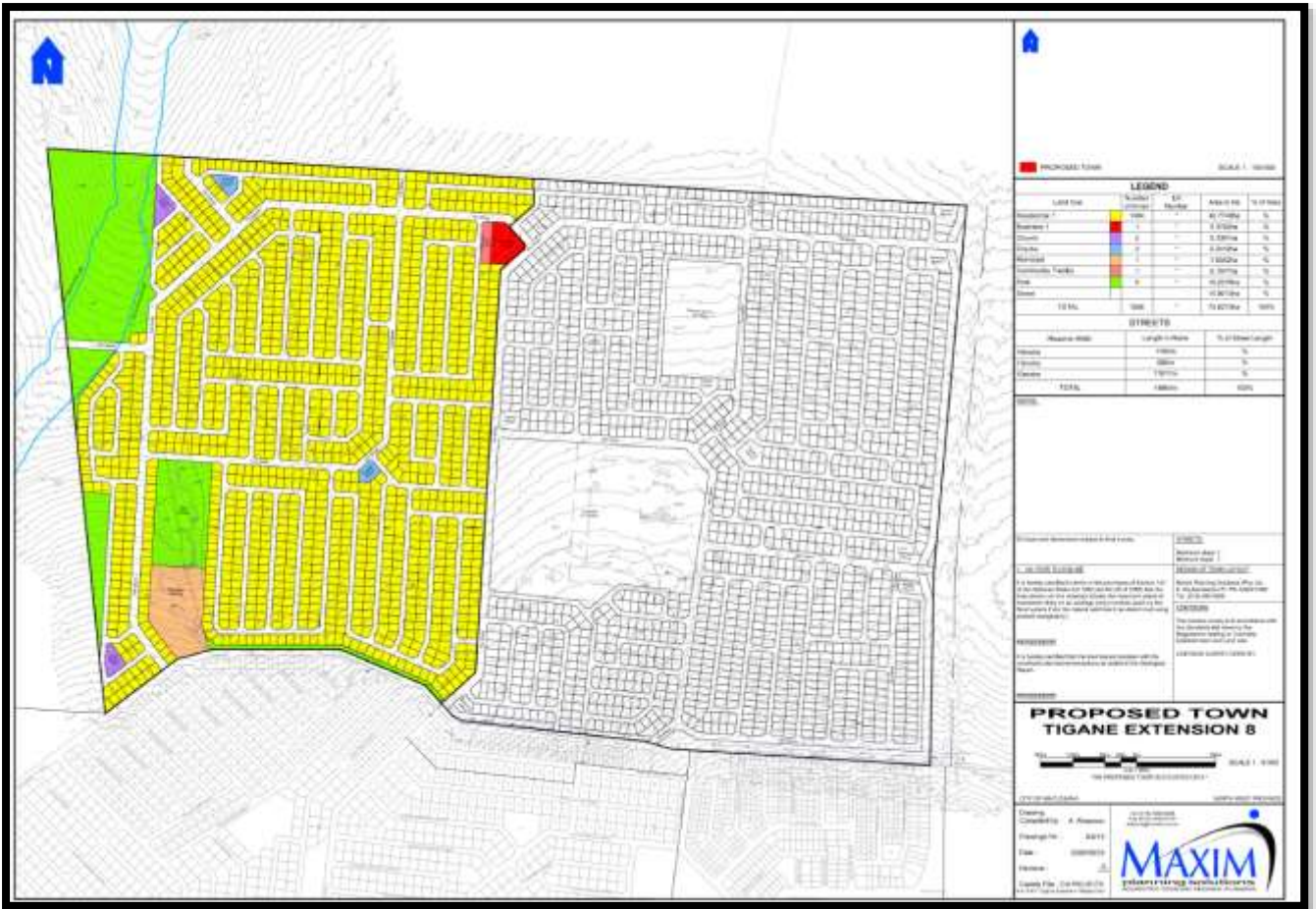
FIGURE 1. Proposed layout plan Tigane Extension 7.



Tigane extension 8. See Figure 2 for a copy of the proposed Layout Plan

- **Residential 1**, to be utilized for housing purposes
- **Business 1**, to be utilized for business purposes.
- **Churches**, for the purpose of religious activities
- **Chreches**, to be utilized for educational purposes
- **Municipal**, for municipal services
- **Park**, to be utilized for public open space purposes and
- **Streets**, for access to facilities.

| TIGANE EXTENSION 8 |              |                  |
|--------------------|--------------|------------------|
| Proposed Zoning    | No. of Erven | Area in hectares |
| Residential 1      | 1494         | 46,7749          |
| Business1          | 1            | 0,3742           |
| Church             | 2            | 0,3361           |
| Chreche            | 2            | 0,2419           |
| Community facility | 1            | 0,1571           |
| Park               | 5            | 10,2376          |
| Streets            |              | 15.9013          |



**FIGURE 2. Proposed layout plan Tigane Extension 8.**

A buffer area has been established around the wetlands area and no residential development may take place beyond the 1:100 year flood line. A Bridge is proposed to allow road access within the north western corner of the development over a non-perennial watercourse.

### **Availability of Bulk Services**

#### **Water**

##### *Water Source*

The potable water for the Tigane is obtained from the Midvaal Water Company purification works next to the Vaal River near Vaal Reefs town.

##### *Water Purification works*

The treatment works which abstracts raw water from the Vaal River has enough extra capacity to cater for the demand of the proposed new Tigane Ext 7 and Ext 8 development.

##### *Service reservoirs*

Tigane is serviced by the Hartbeesfontein Reservoirs. The total capacity of the reservoirs is 18.5ML broken down as follows;

- iv i. Reservoir 1 - 3.5ML
- v ii. Reservoir 2 – 5ML
- vi iii. Reservoir 3 – 10ML

The Hartbeesfontein Reservoirs have been designed to provide in the future development of Tigane.



There are two existing elevated steel water towers in Tigane for pressure with the following capacities;

- iii i. Tank 1 - 0.25ML
- iv ii. Tank 2 – 0.5ML

#### *Supply pipelines and pump systems*

The rising main conveying potable water to the Hartbeesfontein reservoirs has a pipe diameter of 300mm. From the outlet of the Hartbeesfontein Reservoir, water gravitates to the Tigane Pump station through a 250mm diameter gravity main. From the Tigane Pump Station, the water is pump to the Tigane Pressure Tanks through a 200mm diameter rising main. The water from the tanks gravitates to Tigane through a 160mm diameter gravity main.

#### **Sewer**

The proposed Tigane Extension 7 and 8 settlements fall within an area serviced by the Hartbeesfontein Wastewater Treatment Plant (WTP). The Hartbeesfontein Wastewater Treatment Plant is owned and operated by City of Matlosana. The proposed Tigane Extension 7 and 8 settlements will discharge their sewer into the Hartbeesfontein WTP. The Hartbeesfontein WTP was upgraded to 8 ML/day in 2013. Currently it is receiving 3.8 ML/day. This implies that it has spare capacity of 4.2 ML/day.

#### *Bulk Services*

Through our site visit and inspection that was conducted on the 29th of June 2020 in the company of municipal personnel, it was established that the Hartbeesfontein/Tigane outfall sewer is in a fair condition

#### **Roads**

Access to the proposed development through intersections and primary roads according to the town planning layout is indicated on the attached plan which is self-explanatory. More than one access is available to each of the development areas via the Hartbeesfontein Provincial road (R503), and various other primary and secondary routes interlinked with the existing road network of Hartbeesfontein.

The pavement design of the Primary Roads marked as Roads marked in red on the attached plan will be designed for category UB s described in the UTG Design manuals but modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. All other secondary roads will be designed to category UC and again modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. Where possible surface runoff exceeds the permissible cross-section capacity of the Primary Roads, sub-surface pipe drainage system shall be installed.

#### **Stormwater**

The proposed development will drain storm water run-off towards the natural low lying water-course on the north-western side of the development through the road network in combination with sub-soil drainage pipe network system. A formalised system will discharge the bulk storm-water in a north western direction as indicated on the appended plan.

#### **Solid Waste**

The Matlosana Municipality will extend its existing refuse removal service to include the new development areas. The refuse will be dumped and managed at the formal licenced dumping site of Klerksdorp which has the capacity to receive the additional refuse.

## 10.6. DESCRIPTION OF THE PROPERTY

The development is located towards the North of the existing formalized township of Tigane on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. See Figure 3 for a copy of the Locality Map. The development is proposed to be known as Tigane Extension 7 and Tigane Extension 8. Tigane Extension 7 is located on a portion of Portion 100 of the farm Nooitgedacht No.434-IP. Tigane Extension 8 is located on a portion of the Remaining Extent of the farm Uraan No. 295-IP. The Tigane Extension 7 & 8 Precinct Area is situated approximately 31km's north-west of the CBD of Klerksdorp, adjacent to R503 provincial road, in the jurisdiction of City of Matlosana Local Municipality. All the properties are owned by City of Matlosana Local Municipality.



FIGURE 3. LOCALITY MAP



**FIGURE 4. SENSITIVITY MAP**

People have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. The following Figures are illustrations of the general view of the site. Vegetation at the site appears to be degraded. Disturbances that have caused extensive impacts to vegetation include numerous tracks. An erosion gully in the eastern section of the terrain as well as a non-perennial stream and excavations are evident. Some informal settlement, an unfenced graveyard as well as a pumping station are some more of the features on the proposed development site.



**Photograph 1. Degraded vegetation**



**Photograph 2. One of the tracks on site**



**Photograph 3. Erosion gully**



**Photograph 4. Excavation of soil**



**Photograph 5. Informal settlements and dumping of waste**



**Photograph 6. Unfenced graveyard**



**Photograph 7. Pumping station**

|                   |                                      |      |              |
|-------------------|--------------------------------------|------|--------------|
| <b>Landowner:</b> | City of Matlosana Local Municipality |      |              |
| Contact person:   | Mr TSR Nkhumise                      |      |              |
| Postal address:   | PO Box 99, Klerksdorp                |      |              |
| Postal code:      | 2570                                 | Cell | N/A          |
| Telephone:        | 018 487 8009                         | Fax  | 018 487 1652 |
| E-mail:           | dnkosi@klerksdorp.org                |      |              |

In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application.

|   |                                      |
|---|--------------------------------------|
| <b>Local authority in whose jurisdiction the proposed activity will fall:</b> | City of Matlosana Local Municipality |
| <b>Municipal Ward No:</b>   | 1                                    |

**Site Co-ordinates**

**Latitude (S):**

**Longitude (E):**

**Alternative S1 (preferred or only site alternative)**

Uraan 295-IP

Vogelstruisfontein 273-IP

Vogelstruisfontein 273-IP

Uraan 295-IP

|                           | Latitude (S) |     |         | Longitude (E) |     |        |
|---------------------------|--------------|-----|---------|---------------|-----|--------|
| Uraan 295-IP              | 26           | 44' | 3.13"   | 26            | 24' | 38.9"  |
| Vogelstruisfontein 273-IP | 26           | 43' | 37.56"  | 26            | 26' | 17.39" |
| Vogelstruisfontein 273-IP | 26           | 43' | 22.135" | 26            | 25' | 36.61" |
| Uraan 295-IP              | 26           | 43' | 33.16"  | 26            | 24' | 51.51" |

## 10.7. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

### 10.7.1 BIO-PHYSICAL ASPECTS

#### 10.7.1.1 GEOLOGY AND SOIL

The site is underlain by quartzite, conglomerate and greywacke of the Bothaville Formation, Platberg Group, of the Ventersdorp Supergroup. Surficial deposits include quaternary hillwash covering the lithology. No dolomite occurs in the area therefore no stability investigation is needed.

Some problems are foreseen regarding the collapsible properties associated with the quartzite with an expected total collapse of up to 15mm measured at the surface. The site is mainly classified as Site Class 2.

The engineering geological site classification indicating special development was as follows:

#### **Modified Normal to Special Development: Site Class C2/2A:**

Hillwash comprising orange to dark reddish brown silty clayey sand sometimes with fine gravel represents a medium to highly collapsible soil, with thickness in excess of 0,75m, and an expected range of up to 15mm of total soil movement measured at surface, form this zone on site. Foundations will therefore require modified normal foundation techniques such as lightly reinforced strip footings or reinforced boxed steel in slightly widened strip foundations, the use of split construction techniques or articulation joints at all internal and external doors and openings with light reinforcement (brickforce) in masonry, or soil replacement by an engineered fill soil raft with a COLTO classification of G5 or better, by removing all or part of the expansive horizon to 1,0m beyond the perimeter of the structure and replacing with inert backfill, compacted to 93%MOD ASSHTO density at or near optimum moisture content, where after normal strip footing foundations can be used. Site drainage, a concrete apron of 1,0m around all structures and plumbing and service precautions are advised. It is classified as C2 in terms of the NHBRC guidelines (1995) or the SAICE Code of practice (1995) and 2A after the classification for urban development (Partridge, Wood & Brink).

#### **Suitable for development with precaution Site Class PR:**

Quartzite rock outcrop and sub-outcrop will restrict excavatability required during service installation as well as foundation excavations. Blasting or difficult excavation operations will dramatically increase the development cost in this zone.

#### **Site Class PQ:**

Areas where small quarries or filling or dumping of spoil were identified must be rehabilitated before any construction can be allowed, and backfilling with an engineer's material with a COLTO classification of G5 or better may improve the developability of these zones, but these operations will dramatically increase the development cost in this zone.

#### **Undevelopable: Site Class PD/PDM:**

Perennial drainage features where the 1:100 year flood line will determine or specify the allowable distance of development from rivers, usually at least 32m from the center of the river (PD), with adjacent areas subject to perennial wetness where seasonal marshy conditions may be encountered (PDM).

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### 10.7.1.2 TOPOGRAPHY

The site is located on a plain surface dipping from southeast to northwest. The highest elevation occur along the southern border where a maximum of around 1550 meters is reached. The lowest point in the development occur at the extreme northwest where the non-perennial stream cross the site. Slight undulations occur. The maximum elevation difference is approximately 45m over a distance of 2140. The gradient is therefore at maximum 2%.

A detailed site survey has been carried out to establish levels. The Engineering report and the Layout plan address issues regarding drainage of the site

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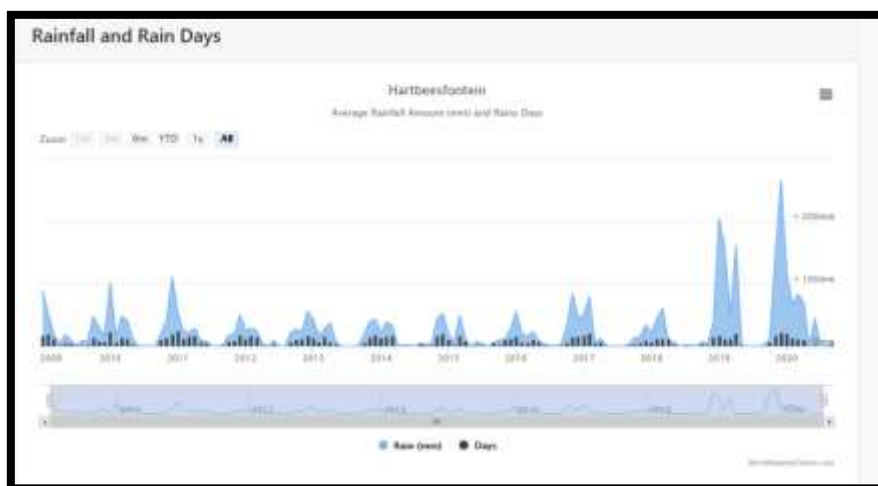
### 10.7.1.3 CLIMATE

The climate of the area is typical of the South African interior. In the discussion of this variable, certain aspects of rainfall, temperature and wind that can influence the project will be highlighted.

It must be noted that the climatic data are recorded in the Department of Environmental Affairs (1988) climatic data records. Data for Klerksdorp weather station (0436/292 ) is available. This records were only taken between 1903-1952.

#### 10.7.1.3.1 Rainfall

The average annual rainfall for the area is 625mm per annum. The highest annual rainfall recorded during the period for which the record is available is 980 mm (1976), while a yearly low of 365mm was recorded in 1903. Of note is the maximum-recorded daily rainfall of 140mm that was recorded during December 1943. Of importance is the fact that monthly minima of zero rainfall have been recorded for 6 months of the year. More recent data (last 10 years' average rainfall) is indicated below for Hartbeesfontein:



Source: <https://www.worldweatheronline.com/hartbeesfontein-weather-averages/north-west/za.aspx>

Site visited: 15/10/2020

The variability of rainfall as well as the high intensity events will definitely influence the project. On average however, the impact of rainfall can be considered as positive, as sufficient water is generally available for sustaining vegetation. Extreme dry conditions during dry spells will negatively affect the project due to the secondary effects on vegetation as well as the possibility of fire hazards. Extreme maximum events can also have a negative effect on the project during all its phases.



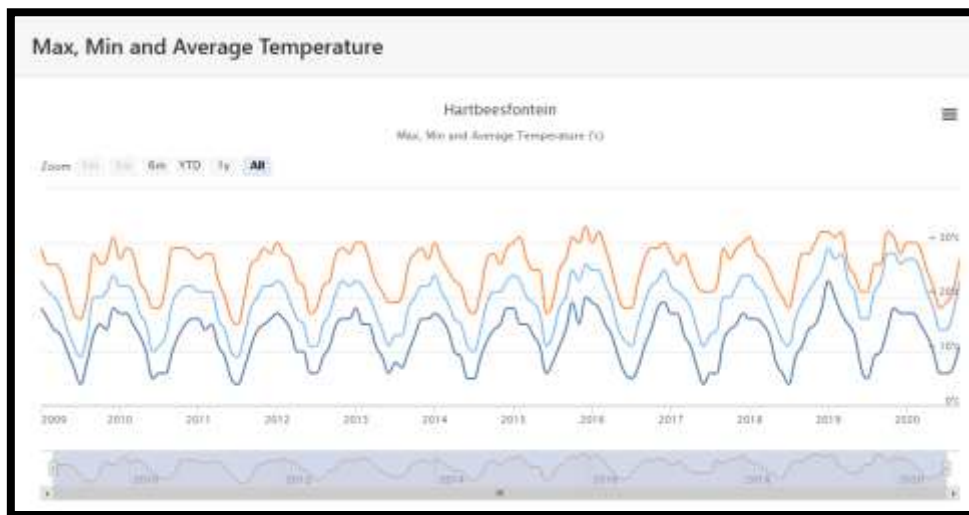
The overall impact can therefore be considered to be “variable” during the construction and operational phases (local in extent and long term in duration). The likelihood that these impacts may occur is probable, medium in intensity and significance. Steps to mitigate negative effects will be described in various sections of the Management Plan.

Due to the scale of the operation, the rainfall of the area cannot be affected by the project and is therefore “Not Applicable”.

#### 10.7.1.3.2 Temperature

The average daily maximum temperature for the winter months for the area is approximately 20° C. The average daily minimum for that time of the year is in the order of 2,0° C.

During the summer months, the average daily maximum is in the order of 28° C and the daily average minimum approximately 14°C. The highest daily maximum recorded was 39,2°C while the lowest recorded temperature was -10,2°C. More recent data (last 10 years' average temperatures) is indicated below for Hartbeesfontein:



Source: <https://www.worldweatheronline.com/hartbeesfontein-weather-averages/north-west/za.aspx>  
Site visited: 15/10/2020

In combination with a dry spell, such hot temperatures may be favourable for the spreading of veldfires.

The general impact of this variable on the project can be considered as positive during the construction and operational phases. The impacts can however be considered as having low intensity impacts of low significance. The extent is local and short term in duration.

Due to the scale of the project, it is clear that it will have no impact on the environment”.

#### 10.7.1.3.3 Wind

The average wind direction for the area during the summer months is from the north-to-north easterly quadrant, while during the early spring the direction is more north westerly. Southerly winds generally occur during the winter, but are not frequent. Normally very little wind is experienced during the winter due to the presence of the high-pressure cell situated over the country during that time of the year.

The wind speeds are normally fairly low, but high wind speeds may occur during early spring and during of thundershowers.

Wind can be considered as having a low intensity, and a low significance negative impact on the construction and operational phases of the project. The probability is probable and the impacts are local but short in duration. The project can have no influence on the wind and is therefore “not applicable.

#### **10.7.1.3.4 Climate Change**

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

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

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#### **10.7.1.4 SURFACE DRAINAGE, WETLANDS AND RIPERIAN ZONES**

The area lies within the drainage basin of the Schoonspruit. The study area itself is situated on an area drained by overland flow. A single non-perennial stream drains from south to north where it joins a northeast flowing stream (Buisfontein Spruit) that eventually turns southeast to join the Schoonspruit. Visible erosion occurs where a small donga at the southern part of the site, is a concern. If the development is approved an opportunity exists to address this problem of erosion with a proper stormwater system. Plate flow is the dominant drainage pattern on site.

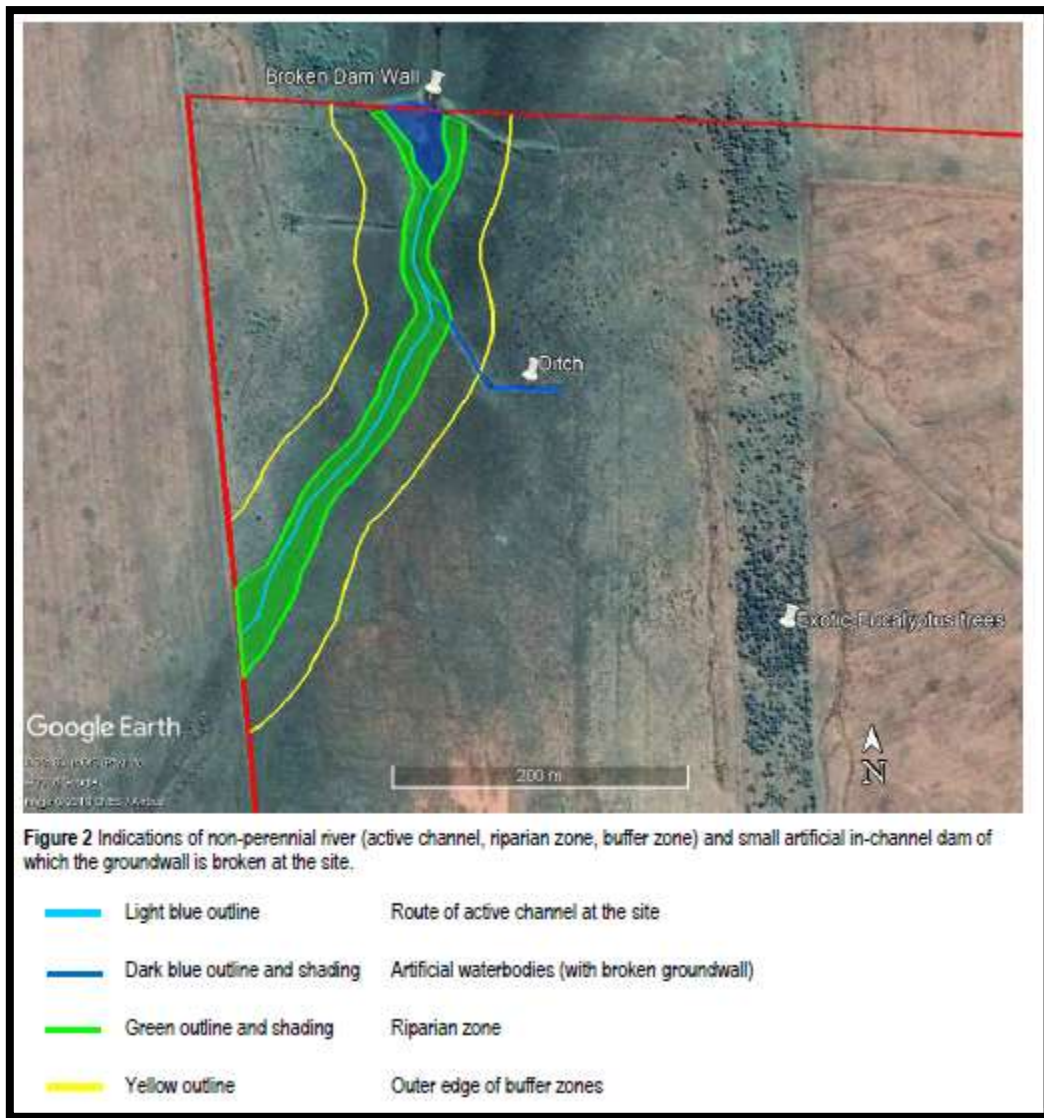


**FIGURE 5: 1:100 Year Floodline of the Buisfontein Spruit**

No erosion by sheet flow is evident on site. Surface drainage will have an influence on the project on a local scale and long in duration. The influence is positive in the sense that no major ground works are necessary to overcome possible erosion by sheet flow. The intensity and significance is low and of a probable probability.

The project will have a negative influence on the environment during the construction phase as the natural overland flow will be disturbed during this phase. If the prescribed management plan for the operational phase is adhered to, no undue stress will be placed on the environment - a positive impact can be expected. The likelihood of these impacts occurring is probable, but the intensity and significance, are judged low. The extent is local and the duration long.

A small non-perennial streambed, with its active channel and riparian zone, is present at the northwestern parts of the site. A small artificial waterbody, which is an in-channel dam (with a broken groundwall), is present in this tributary at the northwestern parts of the site. Wet areas at the active channel and small dam contains exotic plant species such as the grass *Paspalum dilatatum* and the herb *Oxalis corniculata*. Indigenous plant species such as *Stachys spathulata* and *Helichrysum aureonitens* occur near or at the outer parts of the watercourse at the site. *Persicaria* species (Knotweeds) occur at the permanent zone of the small artificial waterbody (small dam). Megagraminoids (large grasses such as reeds) are absent.



**FIGURE 6: Non Perennial River and small artificial in channel dam of which the ground wall is broken**

### 10.7.1.5 GROUND WATER

The permanent or perched water table on site is deeper than 1, 5 m below ground surface. The underground water table in the area is normally deep because of the geology of the area. The likelihood of problems arising from it is not very large if proper steps are taken to prevent possible pollution infiltration into the groundwater.

The impact and significance of this variable is considered low, probable but with a low significance.

The project could adversely affect ground water if proper steps are not implemented in order to prevent pollution from reaching the groundwater. If proper mitigation and pollution prevention steps are taken during the planning, implementation and post-construction phases it is highly unlikely that the groundwater will be affected. The eventual influence should therefore be one of low significance, probability and intensity.

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

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#### 10.7.1.6 FLORA

The site is situated at the Grassland Biome which is represented by the Vaal-Vet Sandy Grassland vegetation type (Mucina & Rutherford, 2006). A brief overview of the vegetation type, which serves as an outline of the ecological context of the site, follows.

##### Gh 10 Vaal-Vet Sandy Grassland

Distribution: In South Africa the Vaal-Vet Sandy Grassland is present in the North-West Province and Free State Province. Vaal-Vet Sandy Grassland ranges from south of Lichtenburg and Ventersdorp to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort areas north of Bloemfontein. Altitude ranges from 1 220 – 1560 m for the entire vegetation type (Mucina & Rutherford 2006).

Vegetation and landscape features: Plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element are present. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *Themeda triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. Geology and soils: Aeolian and colluvial sand overlying sandstone, mudstone, and shale of the Karoo Supergroup (mostly the Ecca group) as well as older Ventersdorp Supergroup and basement gneiss in the north (Mucina & Rutherford 2006).

Important taxa of the Vaal-Vet Sandy Grassland listed by Mucina & Rutherford (2006): Graminoids: *Anthephora pubescens*, *Aristida congesta*, *Chloris virgata*, *Cymbopogon caesius*, *Cynodon dactylon*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis chloromelas*, *Eragrostis lehmanniana*, *Eragrostis plana*, *Eragrostis trichophora*, *Heteropogon contortus*, *Panicum gilvum*, *Setaria sphacelata*, *Themeda triandra*, *Tragus berteronianus*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *Eragrostis obtusa*, *Eragrostis superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*. Herbs: *Stachys spathulata*, *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespititium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*. Geophytic Herbs: *Bulbine narcissifolia*, *Ledebouria marginata*. Succulent Herb: *Tripteris aghillana* var. *integrifolia*. Low shrubs: *Felicia muricata*, *Pentzia globosa*, *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Helichrysum paronychioides*, *Ziziphus zeyheriana*.

**Note:** Not all of the above listed plant species for the vegetation types occur at the site in the study area. No threatened, critically rare, rare, declining Red data listed species or species of particular conservation occur in the study area.

Vegetation at most of the site is visibly degraded and cover of vegetation in many areas is conspicuously poor. Most of the site contains hitherto cultivated fields. Informal settlements have transformed vegetation in some areas. Some areas have been cleared, exposing soil. Free roaming goats and cattle likely cause overgrazing. Old plantation with relatively short alien invasive *Eucalyptus camaldulensis* is also present

at the site. Overall the site is characterized by a highly modified or transformed grassland where the soil is exposed in many areas.

A *Seriphium plumosum* (Bankrupt Bush) is noticeable at some areas. Very few indigenous trees remain at the site which include *Vachellia karroo* (Sweet Thorn) and *Ziziphus mucronata* (Buffalo-thorn). The indigenous shrub *Protasparagus laricinus* (Wild Asparagus) is found at disturbed places at the site. Indigenous grass species include *Aristida congesta*, *Aristida adscensionis*, *Eragrostis lehmanianna*, *Eragrostis superba*, *Elionurus muticus*, *Pogonarthria squarrosa*, *Heteropogon contortus*, *Melinis repens* and *Tragus berteronianus*. Indigenous forb species and shrublets include *Tripteris aghillana*, *Helichrysum caespititium*, *Bulbine narcissifolia*, *Barleria macrostegia*, *Hibiscus pusillus*, *Chamaesyce inaequilatera*, *Berkheya onopordifolia* and *Hilliardiella oligocephala*. Herbaceous shrub *Gomphocarpus fruticosus* is also at the site. Dwarf shrubs and shrublets at the site include *Felicia muricata*, *Pentzia globosa* and *Ziziphus zeyheriana*.

A number of alien invasive weed species are present at previously cleared and perviously cultivated areas. These alien invasive weeds include *Argemone ochroleuca* (Mexican Poppy), *Gomphrena celosioides* (Globe Amaranth), *Schkuhria pinnata* (Dwarf Marigold), *Tagetes minuta* (Khaki Weed), *Conyza bonariensis* (Flea Bane), *Datura ferox* (Large Thorn-apple), *Datura stramonium* (Common Thorn Apple), *Verbena aristigera* (Fine-leaved Verbena), *Richardia brasiliensis* (Mexican Richardia), *Acanthospermum australe* (Prostrate Starbur), *Physalis viscosa* (Sticky Gooseberry), *Xanthium spinosum* (Spiny Cocklebur) and *Plantago lanceolata* (Buckhorn Plantain).

Most of the site contains hitherto cultivated fields. Informal settlements, clearings, informal dumping, and old *Eucalyptus* plantation with relatively short alien invasive *Eucalyptus* trees (Gums), extensive erosion from stormwater run-off of residential areas, free roaming goats and cattle and a conspicuous high frequency of alien invasive weeds are examples of human induced ecological impacts at the site.

### 10.7.1.7 FAUNA

#### ASSESSMENT OF VERTEBRATE SPECIES OF CONSERVATION CONCERN

##### Mammals

Mammals of particular high conservation priority

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

| Species   | Threatened Status           | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-----------------------------|--------------------------------|--|
| <b><i>Chrysospalax villosus</i></b><br>Rough-haired golden mole | Vulnerable                  | No                             | No   |
| <b><i>Cloeotis percivali</i></b><br>Short-eared Trident Bat     | Vulnerable/ Near-threatened | No                             | No   |

|  |                       |    |    |
|--|-----------------------|----|----|
| <b><i>Diceros bicornis</i></b><br>Black rhinoceros           | Critically Endangered | No | No |
| <b><i>Lycaon pictus</i></b><br>African wild dog              | Endangered            | No | No |
| <b><i>Loxodonta africana</i></b><br>African elephant         | Vulnerable            | No | No |
| <b><i>Mystromys albicaudatus</i></b><br>White-tailed mouse   | Endangered            | No | No |
| <b><i>Neamblysomus julianae</i></b><br>Juliana's Golden Mole | Critically Endangered | No | No |
| <b><i>Panthera leo</i></b><br>Lion                           | Vulnerable            | No | No |
| <b><i>Rhinolophus blasii</i></b><br>Blasi's Horseshoe Bat    | Vulnerable            | No | No |
| <b><i>Smutsia temminckii</i></b><br>Ground Pangolin          | Vulnerable            | No | No |

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

| Species   | Threatened Status | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|--------------------------------|--|
| <b><i>Ceratotherium simum</i></b><br>White Rhinoceros | Near threatened   | No                             | No   |

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

| Species                                       | Threatened Status | Recorded at site during survey | Likely be a resident at the site |
|---|-------------------|--------------------------------|----------------------------------|
| <b><i>Myosorex varius</i></b><br>Forest shrew | Uncertain         | No                             | No                               |

#### **Mammals of particular conservation concern**

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

| Species   | Threatened Status         | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|---------------------------|--------------------------------|--|
| <b><i>Chrysospalax villosus</i></b><br>Rough-haired golden mole | Vulnerable                | No                             | No   |
| <b><i>Cloeotis percivali</i></b><br>Short-eared Trident Bat     | Vulnerable/<br>threatened | Near- No                       | No   |
| <b><i>Diceros bicornis</i></b><br>Black rhinoceros              | Critically Endangered     | No                             | No   |
| <b><i>Lycaon pictus</i></b><br>African wild dog                 | Endangered                | No                             | No   |
| <b><i>Loxodonta africana</i></b><br>African elephant            | Vulnerable                | No                             | No   |
| <b><i>Mystromys albicaudatus</i></b><br>White-tailed mouse      | Endangered                | No                             | No   |
| <b><i>Neamblysomus julianae</i></b><br>Juliana's Golden Mole    | Critically Endangered     | No                             | No   |
| <b><i>Panthera leo</i></b><br>Lion                              | Vulnerable                | No                             | No   |
| <b><i>Rhinolophus blasii</i></b><br>Blasi's Horseshoe Bat       | Vulnerable                | No                             | No   |
| <b><i>Smutsia temminckii</i></b><br>Ground Pangolin             | Vulnerable                | No                             | No   |

**Near Threatened** mammal species of the North West Province. Main source: Skinner & Chimimba (2005 with updates by several authors per species. With mammal species which normally needs a large range their residential status does not implicate that they are exclusively dependent on the site or use the site as important shelter or for reproduction. No = Not recorded at site/ Unlikely to be resident at the site. Yes: Recorded at the site/ likely to be resident at the site.

| Species   | Threatened Status | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|--------------------------------|--|
| <b><i>Ceratotherium simum</i></b><br>White Rhinoceros | Near threatened   | No                             | No   |

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



| Species                                | Threatened Status | Recorded at site during survey | Likely be a resident at the site |
|--|-------------------|--------------------------------|----------------------------------|
| <i>Myosorex varius</i><br>Forest shrew | Uncertain         | No                             | No                               |

## Birds

### **Birds of particular high conservation priority**

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

| Species                        | Common name                       | Threatened Status     | Recorded at site during survey | Likely to use site as breeding area or habitat |
|--------------------------------|-----------------------------------|-----------------------|--------------------------------|--|
| <i>Aegypius tracheliotos</i>   | <b>Lappet-faced Vulture</b>       | Vulnerable            | No                             | No   |
| <i>Anthropoides paradiseus</i> | <b>Blue Crane</b>                 | Vulnerable            | No                             | No   |
| <i>Aquila rapax</i>            | <b>Tawny Eagle</b>                | Vulnerable            | No                             | No   |
| <i>Ardeotis kori</i>           | <b>Kori Bustard</b>               | Vulnerable            | No                             | No   |
| <i>Balearica regulorum</i>     | <b>Grey Crowned Crane (Mahem)</b> | Vulnerable            | No                             | No   |
| <i>Botaurus stellaris</i>      | <b>Eurasian Bittern</b>           | Critically Endangered | No                             | No   |
| <i>Circus ranivorus</i>        | <b>African Marsh- Harrier</b>     | Vulnerable            | No                             | No   |
| <i>Crex crex</i>               | <b>Corn Crake</b>                 | Vulnerable            | No                             | No   |
| <i>Eupodotis senegalensis</i>  | <b>White-bellied Korhaan</b>      | Vulnerable            | No                             | No   |
| <i>Falco naumanni</i>          | <b>Lesser Kestrel</b>             | Vulnerable            | No                             | No   |
| <i>Geronticus calvus</i>       | <b>Southern Bald Ibis</b>         | Vulnerable            | No                             | No   |
| <i>Gorsachius leuconotus</i>   | <b>White-backed Night-heron</b>   | Vulnerable            | No                             | No   |
| <i>Gypaetus barbatus</i>       | <b>Bearded Vulture</b>            | Endangered            | No                             | No   |
| <i>Gyps africanus</i>          | <b>White-backed Vulture</b>       | Vulnerable            | No                             | No   |
| <i>Gyps coprotheres</i>        | <b>Cape Vulture</b>               | Vulnerable            | No                             | No   |
| <i>Pelecanus rufescens</i>     | <b>Pink-backed Pelican</b>        | Vulnerable            | No                             | No   |
| <i>Polemaetus bellicosus</i>   | <b>Martial Eagle</b>              | Vulnerable            | No                             | No   |
| <i>Rhynchops flavirostris</i>  | <b>African Skimmer</b>            | Endangered            | No                             | No   |

|                                 |                               |                       |    |    |
|---------------------------------|-------------------------------|-----------------------|----|----|
| <i>Sagittarius serpentarius</i> | <b>Secretarybird</b>          | Vulnerable            | No | No |
| <i>Sarothrura ayresi</i>        | <b>White-winged Flufftail</b> | Critically Endangered | No | No |
| <i>Tyto capensis</i>            | <b>African Grass-Owl</b>      | Vulnerable            | No | No |

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

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

| Species                       | Common name                   | Threatened Status | Recorded at site during survey | Likely to use site breeding area or habitat |
|-------------------------------|-------------------------------|-------------------|--------------------------------|---|
| <i>Certhilauda chuana</i>     | <b>Short-clawed Lark</b>      | Near threatened   | No                             | No  |
| <i>Charadrius pallidus</i>    | <b>Chestnut-banded Plover</b> | Near threatened   | No                             | No  |
| <i>Ciconia nigra</i>          | <b>Black Stork</b>            | Near threatened   | No                             | No  |
| <i>Circus macrourus</i>       | <b>Pallid Harrier</b>         | Near threatened   | No                             | No  |
| <i>Eupodotis caerulescens</i> | <b>Blue Korhaan</b>           | Near threatened   | No                             | No  |
| <i>Falco biarmicus</i>        | <b>Lanner Falcon</b>          | Near threatened   | No                             | No  |

## Beetles

### **Beetles of particular conservation priority**

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

| Species                      | Threatened Status | Recorded at site during survey | Likely to be resident based on habitat assessment |
|------------------------------|-------------------|--------------------------------|---|
| <i>Ichneustoma stobbiai</i>  | Uncertain         | No                             | No  |
| <i>Trichocephala brincki</i> | Uncertain         | No                             | No  |

## Scorpions

### Scorpion species of particular conservation priority

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

| Species                   | Threatened Status | Recorded at site during survey | Likely to be resident at site based on habitat assessment |
|---------------------------|-------------------|--------------------------------|---|
| <i>Hadogenes gracilis</i> | Uncertain         | No                             | No  |
| <i>Hadogenes gunningi</i> | Uncertain         | No                             | No  |

## Reptiles

### Reptiles of particular high conservation priority

The following tables list possible presence or absence of threatened reptile or near threatened reptile species in the study area. The Atlas and Red List of Reptiles of South Africa, Lesotho and South Africa (Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers, 2014) has been used as the main source to compile the list for assessment.

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

| Species                                       | Threatened Status | Resident at site | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|------------------|--------------------------------|--|
| <i>Crocodylus niloticus</i><br>Nile Crocodile | Vulnerable        | No               | No                             | No   |

| Species   | Threatened Status | Resident at site | Recorded at site during survey | Likely to be found based on habitat assessment |
|---|-------------------|------------------|--------------------------------|--|
| <i>Homoroselaps dorsalis</i><br>Striped Harlequin Snake | Near threatened   | No               | No                             | No   |

### Amphibians of particular conservation concern

No frog species that occur in the North West are listed as Threatened species (Vulnerable, Endangered or Critically Endangered) or Near Threatened species according to IUCN Amphibian Specialist Group (2013). Table 4.17 lists *Pyxicephalus adspersus* (Giant Bullfrog) as Least Concern globally. According to the Biodiversity Management Directorate of GDARD (Gauteng Department of Agriculture and Rural Development) (2014) there are no amphibians in Gauteng that qualify for red listed status (red listed here indicates a category of special conservation concern such as threatened or near threatened). Suitable habitat for Giant Bullfrog at site appears to be absent.

Near threatened amphibian species in North West Province. No = Amphibian species is not a resident on the site; Yes = Amphibian species is found to be resident on the site.

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

### Assessment of invertebrate species of particular conservation concern

#### Butterflies of particular conservation concern

Studies about the vegetation and habitat of threatened butterfly species in South Africa showed that ecosystems with a unique combination of features are selected by these often-localised threatened butterfly species (Deutschländer and Bredenkamp 1999; Edge 2002, 2005; Terblanche, Morgenthal & Cilliers 2003; Lubke, Hoare, Victor & Ketelaar 2003; Edge, Cilliers & Terblanche, 2008). Threatened butterfly species in South Africa can then be regarded as bio-indicators of rare ecosystems.

Four species of butterfly in Gauteng Province and North West Province combined are listed as threatened in the recent butterfly conservation assessment of South Africa (Mecenero *et al.*, 2013). The expected presence or not of these threatened butterfly species as well as species of high conservation priority that are not threatened, at the site is listed in the following Tables.

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

| Species  | Threatened Status | Recorded at site during survey | Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely |
|--|-------------------|--------------------------------|---|
| <i>Aloeides dentatis dentatis</i><br>Roodepoort Copper | Endangered        | No                             | Highly unlikely   |
| <i>Chrysoritis aureus</i>                              | Endangered        | No                             | Highly unlikely   |

|                                  |            |    |                 |
|----------------------------------|------------|----|-----------------|
| Golden Copper                    |            |    |                 |
| <i>Lepidochrysops praeterita</i> | Endangered | No | Highly unlikely |
| Highveld Blue                    |            |    |                 |
| <i>Orachrysops mijburghi</i>     | Endangered | No | Highly unlikely |
| Mijburgh's Blue                  |            |    |                 |

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

| Species  | Threatened Status         | Recorded at site during survey | Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely |
|--|---------------------------|--------------------------------|---|
| <i>Colotis celimene amina</i><br>Lilac Tip       | Rare (Low density)        | No                             | Highly unlikely   |
| <i>Lepidochrysops procera</i><br>Savanna Blue    | Rare (Habitat specialist) | No                             | Highly unlikely   |
| <i>Metisella meninx</i><br>Marsh Sylph           | Rare (Habitat specialist) | No                             | Highly unlikely   |
| <i>Platylesches dolomitica</i><br>Hilltop Hopper | Rare (low density)        | No                             | Highly unlikely   |

### Beetles of particular conservation priority

Fruit chafer species (Coleoptera: Scarabaeidae: Cetoninae) in the Gauteng Province and North-West Province which are of known high conservation priority. No *Ichnestoma stobbiai* or *Trichocephala brincki* were found during the surveys. There appears to be no suitable habitat for *Ichnestoma stobbiai* or *Trichocephala brincki* at the site. There appears to be no threat to any of the fruit chafer beetles of particular high conservation priority if the site were developed.

| Species                      | Threatened Status | Recorded at site during survey | Likely to be resident based on habitat assessment |
|------------------------------|-------------------|--------------------------------|---|
| <i>Ichnestoma stobbiai</i>   | Uncertain         | No                             | No  |
| <i>Trichocephala brincki</i> | Uncertain         | No                             | No  |

### Scorpion species of particular conservation priority

Rock scorpion species (Scorpiones: Ischnuridae) species that are of known high conservation priority in the Gauteng Province and North-West Province. None of these rock scorpions have been found at the site and the habitat does not appear to be optimal.

| Species                   | Threatened Status | Recorded at site during survey | Likely to be resident at site based on habitat assessment |
|---------------------------|-------------------|--------------------------------|---|
| <i>Hadogenes gracilis</i> | Uncertain         | No                             | No  |
| <i>Hadogenes gunningi</i> | Uncertain         | No                             | No  |

### Ecological Sensitivity at the site

Ecological sensitivity at the site is low. Informal dumping, trampling, tracks, likely overgrazing by free roaming cattle and clearings are widespread human induced impacts at the site. Informal settlements are present at some parts of the site. Soil compaction is noticeable at many places at the site. Pylons run through the site. Vegetation at the site appears to be degraded, modified or in some areas transformed. Hitherto cultivated fields cover most of the site. Threatened species appear to be absent. The scope for the vegetation at the site to be restored and conserved is small.

### Summary of risks and impacts

Vegetation at the site appears to be degraded, modified or in some areas transformed. Disturbances that have caused extensive impacts to vegetation include hitherto cultivated fields at large parts of the site, possible overgrazing by free roaming cattle and goats, clearings, trampling, informal dumping and informal settlements. Plant cover at many areas is visibly poor which lead to soil compaction and lower rainfall efficiency. Patches of degraded grassland with some indigenous grass species, herbaceous species and few trees remain at the site. The shrub *Protasparagus laricinus* is conspicuous at the site and its concentrations approach bush encroachment at some places.

Wetlands and rocky ridges appear to be absent at the site.

Grassland at the site is represented by the Vaal-Vet Sandy Grassland vegetation type (Gh 10) which is listed as a Threatened Ecosystem, Endangered, according to the National List of Threatened Ecosystems (2011). Terrestrial vegetation at the site has been modified and transformed at parts, in the past and is currently considerably degraded. The scope for the restoration and conservation of natural grassland at the site is small.

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site. The site is regarded as low ecological sensitivity. There is little scope for the degraded and increasingly isolated site to be part of a corridor of particular conservation importance. Following the mitigations, which will be upheld, and planned footprint for development all the impact risks listed above are moderate or low.

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### 10.7.1.8. AIR QUALITY

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

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

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

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

*Given the high volumes of pollutants emitted from fuel-burning within the industrial and power-generation sectors, their contribution to ambient concentrations and public health risks is often lower than might be expected. This is because these sources are generally characterized by constant releases, relatively high above ground level, and further away from residential settlements than are household fuel-burning and vehicle emissions.*

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

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

*Approaches adopted or considered for future implementation have included: regulation (for example, the use of Atmospheric Emission Licences for Listed Activities); market instruments (such as atmospheric user-charges and pollution taxes); the potential for voluntary agreements, education and awareness raising; and emissions trading. International experience shows that adopting a mix of instruments and*

*interventions is more effective than using a single instrument to improve air quality across various types of source. Although direct regulation remains important in controlling industrial sources, there is evidence that specifying emission limits is more effective than specifying the use of particular technologies, so as to give companies flexibility in selecting the method of achieving success that suits them best. This approach is advocated as being more cost-effective and more likely to stimulate technological advances in pollution control methods and production processes.*

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

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

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

[https://www.environment.gov.za/sites/default/files/docs/stateofair\\_airqualityand\\_sustainable\\_development.pdf](https://www.environment.gov.za/sites/default/files/docs/stateofair_airqualityand_sustainable_development.pdf) Date visited: 17/03/2020.

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

In addition to the above, it should be noted that the project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

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#### **10.7.1.9 NOISE**

It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any more noise during the operational phase than that already experienced on site.

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#### **10.7.1.11 ARCHAEOLOGY AND CULTURAL SITES**

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel. If any cultural heritage (archaeological and/or historical) sites, features or material did exist here in the past it would have been disturbed or even destroyed as a result.



## **IRON AGE SITES**

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa, the Stone Age can be divided into three periods. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago

Middle Stone Age (MSA) less than 300 000 – 20 000 years ago

Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125). According to Bergh there are no known Stone Age sites close to Klerksdorp, although a number of rock engraving sites are known to occur in the larger geographical area (Bergh 1999: 4-5). No Stone Age sites, features or material were found in the study area during the assessment.

## **HISTORICAL SITES**

Only one site with features or material of cultural heritage historical in nature, origin or significance was identified and recorded in the study area during the field assessment. The area has been heavily impacted and disturbed in the recent past by agricultural and current ongoing residential and related activities. If any did exist here in the past, it would have been disturbed or destroyed as a result. The only site of Cultural Heritage Significance found in the area is a large (in) formal cemetery. The proposed development should incorporate this cemetery in its planning and management and any negative impacts on it should be avoided at all costs.

## **SUMMARY**

It should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

## **PALAEONTOLOGY**

In terms of Palaeontology a Palaeontological desktop assessment was done and the specialist found the following:

The entire area is underlain by mainly igneous rocks of the Precambrian Ventersdorp Supergroup. Although not indicated on the geological map there is a possibility that Quaternary surficial deposits could be present.

There is no possibility that these igneous rocks could contain fossils. In my opinion this development will not negatively affect palaeontological heritage. If, in the extremely unlikely event that fossils are exposed in superficial Quaternary deposits in the process of development activities, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

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## 10.7.2 SOCIOLOGICAL AND ECONOMIC ISSUES

The local municipality intends to promote the infilling of open spaces between existing townships in order to provide the necessary housing for people living within their jurisdiction. The Spatial Development Framework (SDF) addresses the scale of urban growth through planned extensions and redevelopment strategies. The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and basic services.

The SDF and the Land Use Management system of the Local Municipality has identified certain areas that must address previously disadvantaged areas and historically disadvantaged residents. There is a definite need for the residents to have reasonable access to opportunities and facilities that supports living in the urban Settlement. It is the responsibility of the local municipality to ensure that the residents have reasonable access to community services and amenities, as well as employment opportunities and that the form of land development need to provide for basic needs in an affordable way. The proposed development will be in line with this principle by ensuring that people living in the area do in fact have reasonable access to opportunities and facilities.

The proposed development addresses the need identified by the City of Matlosana Local Municipality, for the provision of additional mixed land use and social mix, such as the availability of housing for the people of the City.

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

### 10.7.2.1 AESTHETICS

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

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

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

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

The proposed development will change the scenic resources of the local area from an undeveloped site to a residential area. The visual intrusion is considered to be moderate as the proposed development partially fits into the surroundings but will be clearly noticeable.

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

### **10.7.2.2. TRAFFIC IMPACT AND ACCESS STUDY**

The Traffic Impact and Access Study investigated the expected transport related impacts of the proposed development . The study undertaken investigated the worst case potential impact of the development's external road network. Based on their site observations, the existing aand base traffic flow volumes indicates that the proposed development will have little impact on the external road network.

It is proposed that no external road and/intersection upgrades will be required. It is further proposed that the road to Geduld is surfaced from where it ends up in gravel up to the propsed access road No 2. Provision should also be made for sidewalks along the Primary School frontages

## 10.8. ENVIRONMENTAL MANAGEMENT OBJECTIVES AND TARGETS

The following table is a summary of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process.

| ENVIRONMENTAL ASPECTS   | MANAGEMENT OBJECTIVES  | MEASURABLE TARGETS   |
|---|--|--|
| <b>DOCUMENTATION AND TRAINING</b>   |  |  |
| The necessary documentation must be available in the site office  | Ensure that all concerned is aware of the EMPr and related environmental aspects   | Availability of documents<br>Trained and informed workforce.   |
| <b>SITE ACCESS &amp; TRAFFIC MANAGEMENT</b>   |  |  |
| Access roads may increase the construction footprints   | Construction vehicles, machinery and workers must be restricted to the designated access roads, and may not drive through undeveloped vegetation outside of the existing access route except where that vegetation falls within the authorised working area (development footprint) at the site.   | Minimizing eradication of vegetation.  |
| <b>VEGETATION CLEARING</b>  |  |  |
| Vegetation will be cleared from within the footprint of the working area, before earthmoving and construction activities commence.  | Vegetation clearing may only commence once the working area has been clearly demarcated to the ECO's satisfaction.   | Land clearing must be restricted to the demarcated working area, and no vegetation may be cleared outside of the demarcated working area.  |
| <b>TOPSOIL &amp; SUBSOIL MANAGEMENT</b>   |  |  |
| Topsoil (where present) will be removed from any area where physical disturbance of the surface will occur.                         | Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas on site  | The topsoil must be adequately protected from being blown away or eroded by storm water.<br><br>Removed subsoil should be stockpiled separately from topsoil.<br><br>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped on the site   |
| <b>EXCAVATIONS &amp; EARTHWORKS</b>   |  |  |
| It will be necessary to employ heavy machinery (excavators, back-actors, bulldozers, dump trucks etc.) for the earthmoving required | Use of heavy machinery can substantially increase the likelihood, intensity and significance of potential negative environmental impacts, and it is thus essential that earthworks be performed under constant supervision, and that operators must be made aware of all the environmental obligations, as there is always the potential to inflict damage to sensitive areas. | Use of machinery should be restricted to only that which is strictly required, and the unnecessary or excessive movement/ use of such machinery must be kept to a minimum.<br><br>Machinery must enter and exit the site via the indicated access roads, and may not enter/ exit the river channel at any other location.<br><br>Excavations and earth-moving may only take place within the demarcated working area |
| <b>CONSTRUCTION IN A WATERCOURSE: RIVER DIVERSION</b>   |  |  |

| <b>ENVIRONMENTAL ASPECTS</b>   | <b>MANAGEMENT OBJECTIVES</b>  | <b>MEASURABLE TARGETS</b>  |
|--|---|--|
| Given that construction will take place within the flood plain of rivers, it will be necessary to divert water flow around the active working area, so that construction activities can take place | It is recommended that construction be undertaken during the dry months when water flow in the river is low or non-existent, in order to reduce the magnitude of the diversion required and to reduce the potential disturbance to the aquatic environment. | The temporary diversion channel should take the shape and form of the stream, upstream and downstream of the diversion |
| <b>DANGEROUS AND TOXIC MATERIALS (CHEMICALS)</b>   |   |  |
| Safe storage of chemicals<br>See also below for further aspects on this subject  | Clean environment   | No spills of chemicals   |
| Availability of safety kits to prevent oils/toxic materials spreading in the environment   | Safe storage of materials   | Proper storage provided  |
| Proper storage must be provided for chemicals , paint and construction materials needed  |   |  |
| <b>STORAGE OF OIL AND FUEL</b>   |   |  |
| Safe handling of fuel and oil and prevention of spills.  | Clean environment   | No spills of oil or fuel<br><br>No leakages of oil   |
| <b>USE OF OIL AND CHEMICALS</b>  |   |  |
| Drip trays must be provided for vehicles in storage yard   | No spills of oil  | No oil spills from vehicles  |
| Wash bay and oil trap to be provided   | Cleaning area for vehicles  | No oil or fuel into environment due to cleaning of vehicles or equipment   |
| <b>STORAGE OF CEMENT</b>   |   |  |
| Safe handling of cement  | Clean environment   | No spills of cement  |
| <b>STORAGE OF EQUIPMENT AND MATERIALS</b>  |   |  |
| Safe and proper storage of equipment and material  | Safe and proper storage of equipment and material   | Neat, clean and ordered storage of material  |
| <b>CONCRETE</b>  |   |  |
| The contractors must provide information on proposed handling of concrete.   | Minimise the possibility of concrete residue entering into the surrounding environment  | No evidence of contaminated soil on the construction site  |
| <b>TOILETS AND ABLUTION FACILITIES</b>   |   |  |
| Clean sanitary environment   | Clean and sanitary environment  | Toilets for workers in accordance with the instructions in the EMP   |
| <b>WASTE MANAGEMENT</b>  |   |  |
| A clean and waste free environment   | Clean environment with waste handled in accordance with the EMP   | No waste in the environment  |
| <b>WORKSHOP EQUIPMENT, MAINTENANCE AND STORAGE OF MATERIAL</b>   |   |  |
| Clean and safe work area   | Clean and safe work area  | Safe and clean work and storage area   |
| <b>FIRES</b>   |   |  |
| No burning of waste and or fires originating from the construction area  | No burning of waste and or fires originating from the construction area   | No fire incidents  |
| <b>OTHER ENVIRONMENTAL ASPECTS</b>   |   |  |
| <b>Stockpiles</b><br><br>All stockpiled material must be easily accessible without any environmental damage to adjacent grasslands/farmlands.  | Properly constructed and well maintained stockpiles   | No erosion or spread of material from stockpiles   |

| ENVIRONMENTAL ASPECTS  | MANAGEMENT OBJECTIVES  | MEASURABLE TARGETS  |
|--|--|---|
| <p>All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised.</p> <p>The stockpiles may only be placed within the demarcated areas - the location of which must be approved by the ER or ECO.</p> <p>Stockpiled material at batching plant must be contained to prevent the spread of gravel in the area.</p> <p><b>Erosion, sedimentation and storm water</b><br/>No erosion and or sedimentation</p> <p><b>Vegetation</b><br/>The contractor must avoid vegetated areas that will not be cleared.</p> <p><b>Palaeontological and Cultural Historical Heritage</b><br/>Any potential finds must be demarcated and the appropriate specialist must be contacted in order to advise on necessary measures</p> | <ul style="list-style-type: none"> <li>• Minimise scarring of the soil surface and land features</li> <li>• Minimise disturbance and loss of soil</li> <li>• Minimise construction footprint</li> </ul> <p>Minimise impacts on vegetation</p> <p>Ensure finds are reported and necessary action taken to protect potential Heritage features</p>             | <p>Gravel stockpiles must be properly managed</p> <p>No erosion or sedimentation.</p> <p>Limit impact on vegetation</p> <p>Trained and informed workforce.</p>  |
| <p><b>Waste management</b></p> <p>Any illegal dumping of waste must not be tolerated. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request. Bins must be clearly marked for ease of management. Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's wastes generated on the site.</p>   | <ul style="list-style-type: none"> <li>• Sustainable management of waste; to keep the site neat and tidy. This will control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment. It will also minimise the potential to pollute soils, water resources and natural habitats</li> </ul> | <ul style="list-style-type: none"> <li>• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site</li> <li>• Sufficient containers available on site</li> </ul> |
| <p><b>Dust</b><br/>Dust production must be controlled by regular watering of roads and works area, should the need arise.</p>  | <p>Reduce dust fall out</p>  | <p>No visible signs of dust</p>   |
| <p><b>SAFETY</b></p>   | <p>Children's access to construction site controlled,</p> <p>Access to construction camp controlled</p> <p>Safety aspects considered</p>   | <p>No children on construction site</p> <p>Safety fence and controlled access available</p> <p>Safety signs with necessary information displayed</p>  |

## 10.9. ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

### 10.9.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology

| Nature of the potential impact |               | Description of the effect, and the affected aspect of the environment  |
|--------------------------------|---------------|--|
| <b>Duration (time scale)</b>   | Short term    | Up to 5 years  |
|                                | Medium term   | 6 – 15 years   |
|                                | Long term     | More than 15 years   |
| <b>Extent (area)</b>           | Local         | Confined to study area and its immediate surroundings  |
|                                | Regional      | Region (cadastral, catchment, topographic)   |
|                                | National      | Nationally (The country)   |
|                                | International | Neighboring countries and the rest of the world.   |
| <b>Magnitude (Intensity)</b>   | Low           | Site-specific and wider natural and/or social functions and processes are negligibly altered. (A low intensity impact will not affect the natural, cultural, or social functions of the environment).                          |
|                                | Medium        | Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).  |
|                                | High          | Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist). |
| <b>Probability</b>             | Improbable    | Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).   |
|                                | Possible      | There is a possibility that the impact will occur  |
|                                | Probable      | It is most likely that the impact will occur   |
|                                | Definite      | The impact will definitely occur   |
| <b>Significance</b>            | Insignificant | Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)   |
|                                | Very Low      | Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)   |
|                                | Low           | The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)  |
|                                | Medium        | The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)   |
|                                | High          | The impact will influence the decision regarding the proposed activity   |
|                                | Very High     | The proposed activity should only be approved under special circumstances  |

| Nature of the potential impact |        | Description of the effect, and the affected aspect of the environment   |
|--------------------------------|--------|---|
| <b>Reversibility</b>           | Low    | There is little chance of correcting the adverse impact   |
|                                | Medium | There is a moderate chance of correcting the adverse impact   |
|                                | High   | There is a high chance in correcting the adverse impact   |
| <b>Risk</b>                    | Low    | Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring. |
|                                | Medium | Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management  |
|                                | High   | High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.  |

Attributes associated with the alternatives were assessed and is outlined below:

### **Geographical attributes**

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

### **Physical attributes**

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

### **Biological attributes**

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be: Phytogeography is the branch of biogeography that studies the distribution of plants. Zoogeography is the branch that studies distribution of animals.

### **Social attributes**

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

### **Economic attributes**

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

### **Heritage attributes**

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

### **Cultural attributes**

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.



It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders' perceptions of the nature of the risk.

## 10.9.2 ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES

The following **Environmental Impact Management Outcomes** have been identified:

1. A complete copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPr as well as any amendments thereof must be available on site
3. A suitably qualified ECO must be appointed.
4. Impacts on the environment must be minimised during site establishment and the development footprint must be kept to the approved development area.
5. Vegetation clearing may not commence until such time as the development footprint has been clearly defined.
6. No clearance of vegetation outside of the development footprint may occur.
7. No construction workers or machinery will be allowed within the no-go area that is defined as the non-perennial river, including its riparian and buffer zone.
8. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any pollution that originated as a result of the construction activities.
9. No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.
10. No disturbance of topsoil & subsoil outside of the development footprint may occur.
11. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any chemical, fuel, oil and cement spills that originated as a result of the construction activities.
12. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any sewage that originated as a result of the construction activities.
13. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any hazardous or general waste pollution that originated as a result of the construction activities.
14. Dust prevention measures must be applied to minimise the generation of dust.
15. Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site.
16. Absolutely no burning of waste is permitted.
17. Fires will only be allowed in facilities especially constructed for this purpose.
18. No hunting of animals will be allowed.
19. No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.

20. All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

10.10. MITIGATION MEASURES

| ENVIRONMENTAL ASPECT                                 | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |  |                    | RESPONSIBLE PERSON  |
|--|---|--|--|--------------------|---|
|  |   | Pre-construction phase   | Construction phase   | Operational phase  |   |
| ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE | A complete copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development <b>must</b> be available on site | Obtain the Environmental Authorization and plan to have a copy of the signed EA on site.   | Ensure that a signed copy of the EA is available in the site office  | No action required | The Applicant, assisted by the EAP to be monitored by the ECO |
|  | A copy of the EMPr as well as any amendments thereof <b>must</b> be available on site   | Ensure that a site specific EMPr is compiled and approved and plan to have a copy of the approved document on site   | Ensure that a copy of the approved EMPr is available in the site office  | No action required | The Applicant, assisted by the EAP to be monitored by the ECO |
|  | A suitably qualified ECO <b>must</b> be appointed.  | Prior to the start of construction activities, an ECO must be appointed to ensure that an Environmental Control document is compiled. This document must explain the roles and responsibilities of | Ensure that the ECO document is available on site and that everyone on site is informed and trained regarding their Environmental obligations in terms of the EA and EMPr.<br><br>Records of training sessions must be kept on site. | No action required | The Applicant and the ECO                                     |

| ENVIRONMENTAL ASPECT      | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME  | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS   |   |                    | RESPONSIBLE PERSON   |
|---------------------------|--|---|---|--------------------|--|
|                           |  | Pre-construction phase  | Construction phase  | Operational phase  |  |
|                           |  | everyone involved and must also contain an Environmental awareness training manual.                       |   |                    |  |
|                           |  |   | ECO's report must be an item on monthly site meeting agenda   | No action required | The project manager.   |
|                           |  | The ECO must ensure that the contractor provides method statements for the various environmental aspects. | The method statements must be available in the site office  | No action required | The Applicant and the contractor must ensure that the method statements are developed and approved by the ECO  |
| <b>SITE ESTABLISHMENT</b> | Impacts on the environment <b>must</b> be minimised during site establishment and the development footprint must be kept to the approved development area. | A Land surveyor must peg the parameters of the development footprint.                                     | Construction vehicles, machinery and workers must be restricted to only operate within the approved development footprint.                    | No action required | The developer must ensure that a Land surveyor pegs the parameters of the development footprint and that all concerned are trained in this regard. The ECO |
|                           |  |   | The development footprint must be clearly demarcated and the extent of this area must be communicated to all contractors and sub-contractors. |                    |  |
|                           |  |   | Existing access roads must be utilised to access the site camp(s) and working/ construction areas   |                    |  |

| ENVIRONMENTAL ASPECT       | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS                               |  |                                   | RESPONSIBLE PERSON  |
|----------------------------|---|---|--|-----------------------------------|---|
|                            |   | Pre-construction phase  | Construction phase   | Operational phase                 |   |
|                            |   |   | Appropriate traffic management strategies must be implemented to ensure the safety of construction vehicles and other road-users. If needed, signage to warn other road users of the presence of construction vehicles should be erected at appropriate locations, where the signage will be clearly visible to potentially affected road users. |                                   | will monitor compliance.  |
| <b>VEGETATION CLEARING</b> | Vegetation clearing <b>may not commence</b> until such time as the development footprint has been clearly defined.            | A Land surveyor must peg the parameters of the development footprint. | Land clearing must be restricted to the demarcated working area, and no vegetation may be cleared outside of the demarcated working area.  | No action required                | The developer must ensure that a Land surveyor pegs the parameters of the development footprint and that all concerned are trained in this regard. The ECO will monitor compliance. |
|                            | No clearance of vegetation outside of the development footprint <b>may</b> occur.   |   |  |                                   |   |
| <b>NO-GO AREA</b>          | <b>No</b> construction workers or machinery will be allowed within the no-go area that is defined as the non-perennial river, | The no-go area must be clearly defined.                               | The no-go area that is defined as the non-perennial river, including its riparian and buffer zone must be clearly demarcated.  | The no-go area must be preserved. | The developer must ensure that a Land surveyor pegs the parameters of the no-go area and that all concerned   |
|                            |   |   | Construction workers must be informed of the no-go area and the need to protect this area from disturbance. This must form part of the environmental awareness training given to   |                                   |   |

| ENVIRONMENTAL ASPECT                    | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME  | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS                   |   |   | RESPONSIBLE PERSON   |
|---|--|---|---|---|--|
|   |  | Pre-construction phase                                    | Construction phase  | Operational phase   |  |
|   | including its riparian and buffer zone.  |   | <p>construction workers and the instruction must be emphasized and enforced throughout the construction phase.</p> <p>Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager</p> | <p>Signage should be put up to inform residents of the importance and function of the non-perennial river, including its riparian and buffer zone</p> | are trained in this regard. The ECO will monitor compliance.   |
| <b>STORM AND WASTE WATER MANAGEMENT</b> | At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) <b>must</b> be free from any pollution that originated as a result of the construction activities. | The developer must compile a storm water management plan. | All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility.   | No action required  | The developer must ensure that a storm water management plan is developed.<br><br>The ECO must monitor compliance. |
|   |  |   | Natural storm water runoff not contaminated by construction activities can be discharged directly into the non-perennial stream   |   |  |
|   |  |   | No wastewater may run freely into any naturally vegetated areas. Run-off containing high sediment loads must not be released into drainage channels   |   |  |
|   |  |   | Approval must be obtained from DW&S for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).  |   |  |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS |   |                   | RESPONSIBLE PERSON |
|----------------------|---|---|---|-------------------|--------------------|
|                      |   | Pre-construction phase                  | Construction phase  | Operational phase |                    |
|                      |   |   | <p>Surface water or storm water must not be allowed to concentrate, or to flow down cut or fill sloped routes without erosion protection measures being in place</p> <p>Ensure that storm water channels do not discharge straight down contours. These must be aligned at such an angle to the contours that they have the least possible gradient</p> <p>To reduce the loss of material by erosion, the contractor must ensure that disturbance on site is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed</p> <p>The non-perennial stream must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities</p> <p>Water that has been contaminated with suspended solids, such as soils and silt, may be released into the non-perennial stream only once all suspended solids have been removed from the water by settling out these solids in settlement ponds.</p> |                   |                    |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS                               |   |                    | RESPONSIBLE PERSON   |  |
|----------------------|---|---|---|--------------------|--|--|
|                      |   | Pre-construction phase  | Construction phase  | Operational phase  |  |  |
|                      |   |   | Land clearing must be restricted to the demarcated working area, and no disturbance of topsoil & subsoil outside of the demarcated working area will be allowed.  |                    |  |  |
| TOPSOIL & SUBSOIL    | No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined. | A Land surveyor must peg the parameters of the development footprint. | Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas.  | No action required | The developer must ensure that a Land surveyor pegs the parameters of the development footprint and that all concerned are trained in this regard. |  |
|                      |   |   | The topsoil must be adequately protected from being blown away or eroded by storm water. The topsoil storage area must be located on a level area outside of any surface drainage/ storm-water channels, and at a location where it can be protected from disturbance during construction and where it will not interfere with construction activities. |                    |  | The Contractor will be responsible for the removal and correct stockpiling of the topsoil and subsoil. |
|                      |   |   | Removed subsoil should be stockpiled separately from topsoil. Handling of topsoil should be minimized as much as possible, and the location of the  |                    |  |  |



| ENVIRONMENTAL ASPECT                 | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME  | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |  |                    | RESPONSIBLE PERSON   |
|--------------------------------------|--|--|--|--------------------|--|
|                                      |  | Pre-construction phase   | Construction phase   | Operational phase  |  |
|                                      | No disturbance of topsoil & subsoil outside of the development footprint <b>may</b> occur.   |  | <p>topsoil berm should be chosen carefully to avoid needing to relocate the topsoil berm at a later date. Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.</p> <p>The topsoil berm may be a few meters wide but should ideally not be more than 0.5m high to allow sufficient light and air penetration.</p> <p>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped.</p> <p>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped.</p> <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |                    |  |
| <b>DANGEROUS AND TOXIC MATERIALS</b> | At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) <b>must</b> be free from any | <b>CHEMICALS</b>   |  |                    | All hazardous substances must be stored in suitable containers as defined in the Method Statement; |
|                                      |  | The Contractor must provide method statements for the storage and handling of chemicals on site. | <p>Containers must be clearly marked to indicate contents, quantities and safety requirements</p> <p>All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers</p>   | No Action required |  |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS   |   |                    | RESPONSIBLE PERSON |
|----------------------|---|---|---|--------------------|--------------------|
|                      |   | Pre-construction phase  | Construction phase  | Operational phase  |                    |
|                      | chemical, fuel, oil and cement spills that originated as a result of the construction activities. |   | <p>Bunded areas to be suitably lined with a SABS approved liner</p> <p>An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis</p> <p>All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);</p> <p>All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet</p> <p>Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available</p> <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |                    |                    |
|                      |   |   | <b>FUEL AND OIL</b>   |                    |                    |
|                      |   | The Contractor must provide method statements for the storage and handling of fuel and oil on site. | Fuel storage tanks must be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses)   | No Action required |                    |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS |   |                   | RESPONSIBLE PERSON                      |
|----------------------|---|---|---|-------------------|---|
|                      |   | Pre-construction phase                  | Construction phase  | Operational phase |   |
|                      |   |   | <p>The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 110% of the total capacity of all the storage tanks/ bowsers</p> <p>The floor of the bund must be sloped, draining to an oil separator</p> <p>Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained</p> <p>All empty externally dirty drums must be stored on a drip tray or within a bunded area</p> <p>Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly)</p> <p>Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used</p> |                   | appropriate storage tanks or in bowsers |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS |  |                   | RESPONSIBLE PERSON               |
|----------------------|---|---|--|-------------------|----------------------------------|
|                      |   | Pre-construction phase                  | Construction phase   | Operational phase |                                  |
|                      |   |   | <p>The responsible operator must have the required training to make use of the spill kit in emergency situations</p> <p>In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008.</p> <p>During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil.</p> <p>Leaking equipment must be repaired immediately or be removed from site to facilitate repair</p> <p>Construction area must be monitored for oil and fuel spills</p> <p>Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised. The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing.</p> |                   |                                  |
|                      |   | <b>CONCRETE AND CEMENT</b>              |  |                   | The mixing of concrete must only |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |   |                    | RESPONSIBLE PERSON  |
|----------------------|---|--|---|--------------------|---|
|                      |   | Pre-construction phase   | Construction phase  | Operational phase  |   |
|                      |   |  |   |                    | be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils rocky outcrops, streams and natural vegetation                    |
|                      |   | The contractors must provide and maintain a <b>method statement</b> for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plants | Cleaning of cement mixing and handling equipment must be done using proper cleaning trays | No Action required | The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.<br><br>The ECO will monitor compliance. |
|                      | All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility                       |  |   |                    |   |
|                      | Any spillage that may occur must be investigated and immediate remedial action must be taken  |  |   |                    |   |
|                      | The visible remains either of concrete, solid, or from washings, must be physically removed immediately or disposed of as waste to a registered landfill site |  |   |                    |   |
|                      | Cement batching areas must be located in an area where residues are contained and that the location does not fall within storm water channels                 |  |   |                    |   |

| ENVIRONMENTAL ASPECT                   | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS   |  |                    | RESPONSIBLE PERSON  |
|--|---|---|--|--------------------|---|
|  |   | Pre-construction phase  | Construction phase   | Operational phase  |   |
|  |   |   | The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 30 persons and should include male and female toilets.   |                    |   |
| <b>TOILETS AND ABLUTION FACILITIES</b> | At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) <b>must</b> be free from any sewage that originated as a result of the construction activities. | The contractor must provide method statement for the operation and maintenance of toilets and ablution facilities | Sanitary arrangements must be to the satisfaction of the ECO. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper to all toilets at all times. Toilet paper dispensers must be provided in all toilets | No Action required | The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.<br><br>The ECO will monitor compliance. |
|  |   |   | The contractor must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor must ensure that no spillage occurs when the toilets are cleaned or emptied.   |                    |   |
|  |   |   | The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances   |                    |   |
|  |   |   | Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times   |                    |   |

| ENVIRONMENTAL ASPECT    | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |  |                    | RESPONSIBLE PERSON   |
|-------------------------|---|--|--|--------------------|--|
|                         |   | Pre-construction phase   | Construction phase   | Operational phase  |  |
|                         |   |  | <p>Waste must be separated into recyclable and non-recyclable waste, and must be separated as follows:</p> <ul style="list-style-type: none"> <li>• <b>Hazardous waste:</b> including (but not limited to) old oil, paint, etc.</li> </ul> <p><b>General waste:</b> including (but not limited to) paper, plastic, glass and construction rubble</p> |                    |  |
| <b>WASTE MANAGEMENT</b> | At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) <b>must</b> be free from any hazardous or general waste pollution that originated as a result of the construction activities. | The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on the proposed licensed facility to be utilised and details must be kept of record keeping for auditing purposes | <ul style="list-style-type: none"> <li>• Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request.</li> </ul>                                  | No Action required | <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |
|                         |   |  | Bins must be clearly marked for ease of management   |                    |  |
|                         |   |  | All refuse bins must have a lid secured so that animals cannot gain access   |                    |  |
|                         |   |  | Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's waste generated on the site   |                    |  |
|                         |   |  | Subcontractor(s) contracts must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the  |                    |  |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS |   |                   | RESPONSIBLE PERSON |
|----------------------|---|---|---|-------------------|--------------------|
|                      |   | Pre-construction phase                  | Construction phase  | Operational phase |                    |
|                      |   |   | <p>responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMP. Proof of this undertaking must be issued to the ECO</p> <p>All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the ECO</p> <p>Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site</p> <p>A suitably positioned and clearly demarcated waste collection site must be identified and provided The waste collection site must be maintained in a clean and orderly manner. A covered container (Like a skip, with a cover), must be used to contain refuse from campsite bins, rubble and other construction material</p> <p>All forms of dust pollution must be managed in terms of the National Environmental Management: Air quality Act, 2004 (Act No 39 of 2004)).</p> <p>Acceptable dust fall rates for residential areas are:</p> |                   |                    |



| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |  |                    | RESPONSIBLE PERSON   |
|----------------------|---|--|--|--------------------|--|
|                      |   | Pre-construction phase   | Construction phase   | Operational phase  |  |
|                      |   |  | <p>Dust fall rate (D) (mg/m<sup>2</sup>/day, 30 days average:<br/>D&lt;600</p> <p>Permitted frequency of exceeding dust fall rate:<br/>Two within a year, not sequential months</p> <p>A standard test method to be used for measuring dust fall rate and the guideline for locating sampling points shall be ASTM D1739. The latest version of this method shall be used.</p>   |                    |  |
| DUST                 | Dust prevention measures <b>must</b> be applied to minimise the generation of dust. | The contractors must provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised. | <p>Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be revegetated or stabilised as soon as is practically possible.</p> <p>Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present</p> <p>The construction camp must be watered during dry and windy conditions to control dust fallout.</p> <p>Dust production must be controlled by regular watering of roads and work area, should the need arise</p> <p>During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust damping</p> | No Action required | <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME  | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS                                 |   |                    | RESPONSIBLE PERSON   |
|----------------------|--|---|---|--------------------|--|
|                      |  | Pre-construction phase  | Construction phase  | Operational phase  |  |
|                      |  |   | <p>measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level</p> <p>Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind</p> <p>Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO</p> <p>Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas</p> <p>All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained.</p> |                    |  |
| <b>NOISE</b>         | Noise prevention measures <b>must</b> be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site. | The contractors must provide and maintain a method statement for noise. | <p>Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise Management.</p> <p>It is proposed that normal working hours are between 08h00 and 17h00 (Mondays to</p>   | No Action required | <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME  | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS   |   |                    | RESPONSIBLE PERSON   |
|----------------------|--|---|---|--------------------|--|
|                      |  | Pre-construction phase  | Construction phase  | Operational phase  |  |
|                      |  |   | <p>Saturdays). No work will be allowed on Sundays or outside of the abovementioned hours.</p> <p>Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers.</p> <p>Absolutely no burning of waste is permitted.</p>   |                    |  |
| FIRES                | Absolutely <b>no</b> burning of waste is permitted.                                      | The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what, fires will be utilised plus details on the fuel to be utilised | Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose.   | No Action required | <p>The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard.</p> <p>The ECO will monitor compliance.</p> |
|                      | Fires will <b>only</b> be allowed in facilities especially constructed for this purpose. |   | <p>Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air.</p> <p>The contractor must designate a smoking area for the labour force so as to prevent unanticipated incidents of veldt fires.</p> <p>No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation</p> <p>All construction workers must be informed that the intentional killing of any animal is not</p> |                    |  |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME                                   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS   |  |                    | RESPONSIBLE PERSON  |
|----------------------|---|---|--|--------------------|---|
|                      |   | Pre-construction phase  | Construction phase   | Operational phase  |   |
|                      |   |   | permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal.      |                    |   |
| FAUNA                | No hunting of animals will be allowed.                                    | Plan to ensure that all activities on site must comply with the regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962) | Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc. | No Action required | The Contractor will be responsible for providing method statements. He will also be responsible for training of staff in this regard. |
|                      |   |   | In terms of the National Heritage Act, 1999 (Act No. 25 of 1999), construction personnel must be alert and must inform the local heritage agency within 48 hours should they come across any signs of heritage resources.  |                    |   |
| HERITAGE             | No intentional destruction of any sites, features or material of cultural | Conduct a Phase 1 HIA for the development to identify any sites,  | Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance.  | No action required | The developer and applicant.  |

| ENVIRONMENTAL ASPECT              | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME   | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS  |  |                     | RESPONSIBLE PERSON  |
|-----------------------------------|---|--|--|---------------------|---|
|                                   |   | Pre-construction phase   | Construction phase   | Operational phase   |   |
|                                   | heritage (archaeological and/or historical) origin or significance may occur.   | features or material of cultural heritage (archaeological and/or historical) origin or significance<br>Conduct a Palaeontological Desktop assessment to determine likely presence of palaeontological heritage finds | Should any archaeological artefacts / fossils be exposed during site activities, work on the area where the artefacts / fossils were found must cease immediately and the ECO must be notified immediately.<br><br>All work must cease immediately, if any human remains are uncovered. Such material, if exposed, must be reported to the South African Police Services, so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences<br><br>The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations |                     | Study to be conducted by a suitable qualified specialist.<br><br>Findings to be monitored by the ECO. |
| <b>CRIME, SAFETY AND SECURITY</b> | All Contractors and sub-contractors <b>must</b> abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993. | Plan to appoint a health and safety officer for the construction site.   | The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc.   | No actions required | Health and safety officer.  |
|                                   |   | Compile an Emergency   | The contractor must ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all  |                     |   |

| ENVIRONMENTAL ASPECT | ENVIRONMENTAL IMPACT MANAGEMENT OUTCOME | ENVIRONMENTAL IMPACT MANAGEMENT ACTIONS                              |   |                   | RESPONSIBLE PERSON |
|----------------------|---|--|---|-------------------|--------------------|
|                      |   | Pre-construction phase   | Construction phase  | Operational phase |                    |
|                      |   | Response Action Plan (ERAP) prior to the commencement of the project | <p>numbers and names are posted at relevant locations throughout the construction site.</p> <p>Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc</p> <p>All unattended open excavations must be adequately fenced or demarcated.</p> <p>Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.</p> <p>Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS. The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area</p> <p>Workers must be instructed not to trespass onto adjacent land. Trespassers will be prosecuted.</p> |                   |                    |

## 10.11. ENVIRONMENTAL AWARENESS PLAN

### 10.11.1 INTRODUCTION

Training is essential for ensuring that the EMP provisions are implemented efficiently and effectively. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The Construction Contractor should make allowance for all construction workers, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing work on site. During this training, the ECO will explain the EMP and the conditions contained therein. Attention will be given to the construction process and how the EMP fits into this process.

In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness training and education should be ongoing throughout the construction phase, and should be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMP), or as new workers come to site. Translators should be utilized where needed.

Environmental awareness could be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site.
- Refresher courses as and when required.
- Daily toolbox talks at the start of each day with all workers coming on site, where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.

Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

### 10.11.2 ORGANISATIONAL STRUCTURE

This section describes the roles and responsibilities of the key stakeholders involved in the development, implementation and review of the EMP.

#### 10.11.2.1 PROJECT PROPONENT

The Project Proponent will be the **City of Matlosana Local Municipality**. Ultimately, they will be responsible for the development and implementation of the EMP and MMP and for ensuring that the conditions in the eventual Environmental Authorization (EA) are satisfied. Although construction activities will be contracted out, the liability associated with non-compliance still rests with the Project Proponent.

The Project Proponent (and not the Contractor) is therefore responsible for liaising directly with the relevant authorities with respect to the preparation and implementation of the EMP and meeting EA conditions.

The Project Proponent must inform the Contractor of the EA and EMP obligations, as well as **Method Statements** to be prepared and environmental training to be undertaken by the Contractor in terms of these obligations.

The Project Proponent must identify a **Project Manager (PM)** who has overall responsibility for managing the Project, Contractors and for ensuring that the environmental management requirements are met. During the construction phase, the Project Manager will be the Proponent's construction manager; during the operations phase this role will be fulfilled by the operations manager.

All decisions regarding environmental procedures and protocol must be approved by the Project Manager, who also has the authority to stop any construction activity in contravention of the EMP or EA.

An **Environmental Control Officer (ECO) must** be employed by the Project Proponent for the duration of the project. The ECO should have appropriate training and experience in the implementation of environmental management specifications. The ECO provides feedback to the Project Manager regarding all environmental matters. Contractors are answerable to the ECO (or Project Manager, depending on contractual arrangements) for non-compliance with the requirements stated in the EMP or EA.

#### **10.11.2.2 ENVIRONMENTAL CONTROL OFFICER (ECO)**

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals (including pre-construction set-up and final rehabilitation), in order to ensure that the provisions of this EMP is adhered to and that sound environmental management is ensuing on site.

The ECO must inspect all areas of the site that may be affected by construction-related activities, including the working area, site camp, stockpile areas and access roads. After each ECO inspection the ECO must compile an ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Applicant, the ER, Construction Contractor(s) and the Competent Authority. The ECO inspection reports should include both photographic and written records.

The ECO will have the following responsibilities:

- Maintenance, update and review of the EMP.
- Liaison between the Project Proponent, Contractors, authorities and other lead stakeholders on all environmental concerns.
- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective.
- Monitoring the performance of the Contractor (and Sub-contractors) and ensuring compliance with the EMP and associated Method Statements.



- Validating the regular site inspection reports, which are to be prepared by the Contractor's Environmental Officer (EO).
- Checking the EO's *record of environmental incidents* (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken.
- Checking the EO's *public complaints register* in which all complaints are recorded, as well as action taken.
- Issuing of site instructions to the Contractor for corrective actions required.
- Assisting in the resolution of conflicts.
- Communication of all modifications to the EMP to the relevant stakeholders.
- Conducting regular audits to ensure that the system for implementing the EMP is operating effectively.

### 10.11.2.3 CONTRACTOR

The Contractor should appoint a **Contractor's Representative**, who is responsible for the on-site implementation of the EMP and EA. The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. The Contractor's Representative ensures that all Sub-contractors working under the Contractor abide by the requirements of the EMP.

The Contractor is answerable to the Project Manager (PM) for all environmental issues associated with the project. Contractor performance will, amongst others, be assessed on health, safety and environmental management criteria.

The Contractor will be required to provide the following **Method Statements**, setting out in detail how the management actions contained in an EMP and EA will be implemented in order to ensure that the environmental management objectives are achieved. The Method Statements must be reviewed and approved by the Project Proponent.

- > Stockpiles
- > Excavation stabilisation
- > Oil and chemicals
- > Cement
- > Storage of fuel and oils
- > Use of dangerous and toxic materials
- > Toilets and ablution facilities

- > Waste Management
- > Dust
- > Workshop equipment, maintenance and storage
- > Noise
- > Fires
- > Erosion and sedimentation
- > Flora and Fauna (Including no-go areas)
- > Crime, safety and security
- > Hydrology

The Contractor may appoint an **Environmental Officer (EO)**, or officers, if more than one is required. Their primary role is to coordinate the environmental management activities of the Contractor on site. The EO may be required to perform the following roles:

- Support the ECO in the monitoring and execution of the Contractors or Sub-contractors' Method Statements by maintaining a permanent presence on site.
- Inspect the site as required to ensure adherence to the management actions of the EMP, EA and the Method Statements.
- Complete Site Inspection Forms on a regular basis (eg. daily or weekly).
- Provide inputs to the regular (eg. monthly) environment report to be prepared by the ECO.
- Liaise with the construction team on issues related to implementation of, and compliance with, the EMP and EA.
- Maintain a *record of environmental incidents* (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken, for submission to the Project Proponent.
- Maintain a *public complaints register* in which all complaints are recorded, as well as action taken, for submission to the Project Proponent.

### 10.11.3 CHECKLISTS

The table below provide the main mitigation measures and/or management interventions to minimise or reduce the negative impacts and enhance positive impacts identified by the specialists associated with the proposed development.

The intent is for the document to be a live, dynamic document that should be maintained and updated throughout the project lifecycle, *inter alia*, by including the necessary Environmental Authorisation from the approving Authority as an attachment.

The table below provide the main mitigation measures and/or management interventions appropriate to the Planning and Construction Phases of the proposed project. The tables present the objectives to be achieved and the management actions that need to be implemented in order to reduce the negative impacts and enhance the positive impacts per management activity. The associated monitoring and implementation frequencies and the responsible person(s) are indicated.

| Activity/Impact                                     | Action Required  | Responsible Party          | Monitoring Frequency          |
|---|--|----------------------------|-------------------------------|
| 1. Construction and operational activities planning | The construction/operational activities must conform to the conditions of authorisation contained in the Environmental Authorisation and mitigation measures contained within this EMPr  | Proponent                  | Continuous                    |
| 2. Appointment of the ECO                           | The Proponent must appoint an independent Environmental Control Officer (ECO) who must monitor the Contractor's compliance with the EMPr and who must complete ECO checklist reports (audits) on a regular basis (at least once a month).  | Proponent                  | Once-off                      |
|   | The Proponent must provide the ECO with a copy of the EMPr.  | ECO                        | Once-off                      |
|   | The ECO must form part of the project management team and should attend the monthly project progress meetings.   | ECO                        | Continuous                    |
|   | The Contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.   | ECO, Contractor            | Once-off                      |
| 3. EMPr   | This EMPr must be made binding to the main Contractor and to individual Contractors, and must be included in the tender documentation for the construction contract.   | Proponent                  | Once-off                      |
| 4. Licences/ permits and permissions                | The Proponent must ensure that all pertinent licences/permits, certificates and permissions required for the project have been obtained prior to any activities commencing on site and ensure that they are strictly enforced/adhered to. These documents must be made available on site at all times, and the Contractor must be made aware of their content. | Contractor, Proponent, ECO | Prior to commencement of work |
|   | The Contractor must maintain a database of all pertinent permits and permissions required for the contract.  | Contractor, Proponent, ECO | Continuous                    |
| 5. Method Statements                                | The Contractor must submit written Method Statements to the PM and ECO for the activities identified during consultation.  | Contractor, PM, ECO        | As required                   |
|   | Method Statements must be submitted at least five working days prior to the proposed commencement of work on an activity to allow the PM (and/or ECO) time to study and approve the method statement.  | Contractor, PM, ECO        | As required                   |
|   | The Contractor may not commence work on that activity until such time as the Method Statement has been approved in writing.  | Contractor, PM, ECO        | Continuous                    |
|   | The Contractor must carry out the activities in accordance with the approved Method Statement.   | Contractor, PM, ECO        | Continuous                    |

| Activity/Impact                         | Action Required   | Responsible Party                     | Monitoring Frequency |
|---|---|---------------------------------------|----------------------|
|   | Under certain circumstances, the PM may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the PM, and appropriate records retained.   | Contractor, PM, ECO                   | Continuous           |
|   | Approved Method Statements must be readily available on the site and must be communicated to all relevant personnel. Approval of the Method Statement shall not absolve the Contractor from any of his/her obligations or responsibilities in terms of the EMPr specifications.   | Contractor, Proponent                 | Continuous           |
| 6. Existing services and infrastructure | The Contractor must ensure that existing services (e.g. roads, pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the PM, ensuring the necessary way-leaves; permissions and permits are in place.  | Contractor, PM, ECO                   | Continuous           |
|   | The Contractor must be responsible for the repair and reinstatement of any existing infrastructure that is damaged, or services which are interrupted, at his/her own cost.   | Contractor                            | As required          |
|   | The Contractor must adhere to any time limits for the repairs that may be stipulated by the PM in consultation with the Contractor.   | Contractor, ECO                       | As required          |
| 7. Environmental incidents              | The Contractor must take timeous corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves. The Contractor must adhere to any time limits for such corrective actions that may be stipulated by the ECO in consultation with the PM.   | ECO, Contractor                       | Continuous           |
| 8. Labour                               | Local labour must be used wherever possible to stimulate the local economy.   | Contractor                            | Once-off             |
|   | The Contractor should use labour intensive construction measures where appropriate, practical and financially feasible.   | Contractor                            | Once-off             |
|   | The workforce should be trained to benefit individuals beyond the completion of the project.  | Contractor                            | Once-off             |
|   | The Contractor should use local suppliers where possible.   | Contractor                            | Once-off             |
|   | The PM must ensure that all staff working on the project must be in possession of a South African Identity Document or a relevant work permit. A register must be kept on site of all staff working on site.  | PM                                    | Continuous           |
|   | Equal opportunities for employment should be created to ensure that all sectors of society (especially women) have equal access to such opportunities.  | Contractor                            | Continuous           |
| 9. Training of staff                    | The Contractor must ensure that all construction staff receive environmental awareness training concerning, amongst others, the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts, protection of any animals encountered on site, no-go areas, the use of toilets and basic sanitation, and basic health and safety on site. | Contractor, ECO                       | Once-off             |
|   | It is the Contractor's responsibility to provide the site foreman with environmental training (including explaining the content of the EMPr and any Conditions of Approval) and is to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.  | Contractor, ECO                       | Once-off             |
|   | Training must be provided to the staff members in the use of the appropriate fire-fighting equipment.   | Contractor, Health and Safety Officer | Once-off             |
|   | The Contractor must ensure that all staff operating machinery/construction vehicles are adequately trained to carry out the designated tasks.   | Contractor, Health and Safety Officer | Once-off             |

| Activity/Impact                      | Action Required   | Responsible Party                        | Monitoring Frequency |
|--------------------------------------|---|--|----------------------|
| 10. Worker health and safety         | <p>A Health and Safety Plan must be developed and implemented by the Contractor for the construction period to ensure worker safety.</p> <p>Should any injury be obtained as a result of work the Contractor must ensure the necessary medical attention is received.</p> <p>The necessary Health and Safety file and incident register must be kept on site at all times.</p>  | Contractor,<br>Health and Safety Officer | Continuous           |
| 11. Site access & traffic management | Construction vehicles, machinery and workers must be restricted to the designated access roads, and may not drive through undeveloped vegetation outside of the existing access route except where that vegetation falls within the authorised working area (development footprint) at the site.  | Contractor<br>ECO                        | Continuous           |
| 12. Vegetation clearing              | Vegetation clearing may only commence once the working area has been clearly demarcated to the ECO's satisfaction.  | Proponent<br>Contractor<br>ECO           | Once-off             |
| 13. EMPr                             | This EMPr must be made binding to the main Contractor and to individual Contractors, and must be included in the tender documentation for the construction contract.  | Proponent                                | Once-off             |
| 14. Topsoil & subsoil management     | <p>Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilized for the final landscaping and rehabilitation of disturbed areas on site.</p> <p>The topsoil must be adequately protected from being blown away or eroded by storm water.</p> <p>Removed subsoil should be stockpiled separately from topsoil.</p> <p>Topsoil should be the final layer applied during rehabilitation, after subsoil/ spoil material has been placed and shaped on the site</p>   | Contractor<br>ECO                        | Continuous           |
| 15. Excavations & earthworks         | <p>Use of heavy machinery can substantially increase the likelihood, intensity and significance of potential negative environmental impacts, and it is thus essential that earthworks be performed under constant supervision, and that operators must be made aware of all the environmental obligations, as there is always the potential to inflict damage to sensitive areas.</p> <p>Use of machinery should be restricted to only that which is strictly required, and the unnecessary or excessive movement/ use of such machinery must be kept to a minimum.</p> <p>Machinery must enter and exit the site via the indicated access roads, and may not enter/ exit the river channel at any other location.</p> <p>Excavations and earth-moving may only take place within the demarcated working area</p> | Contractor<br>ECO                        | Continuous           |
| 16. Groundwater contamination        | Ensure vehicles are serviced and refuelled in bunded areas  | Contractor                               | Continuous           |
|                                      | Ensure vehicles are checked weekly for faults and serviced timeously if faulty  | Contractor                               | As required          |
|                                      | Should any leaks occur ensure contaminated soil is dug up to 1 cm below the level of visible contamination and disposed of as hazardous waste   | Contractor                               | As required          |
|                                      | Drip trays should be placed under all vehicles remaining stationary for more than 24 hours  | Contractor                               | Continuous           |
| 17. Noise                            | Limit construction activities to normal working hours   | Contractor                               | Continuous           |
|                                      | Coincide any excessively noisy activities to minimise duration of inconvenience   | Contractor                               | As required          |

| Activity/Impact                                    | Action Required  | Responsible Party              | Monitoring Frequency  |
|--|--|--------------------------------|-----------------------|
|  | Ensure noise standards are complied with and that construction staff are provided with personal protective equipment when undertaking noisy operations   | Contractor                     | Continuous            |
| 18. Construction in a watercourse: river diversion | It is recommended that construction be undertaken during the dry summer months when water flow in the river is low or non-existent, in order to reduce the magnitude of the diversion required and to reduce the potential disturbance to the aquatic environment.<br>The temporary diversion channel should take the shape and form of the stream, upstream and downstream of the diversion   | Proponent                      | As required           |
| 19. Safety   | No children on construction site.<br>Safety fence and controlled access should be enforced<br>Safety signs with necessary information displayed  | Proponent<br>Contractor<br>ECO | Continuous            |
| 20. No go areas                                    | Any sensitive areas identified as such by the ECO need to be considered no-go areas.   | Contractor,<br>ECO             | Monthly               |
|  | The Contractor must, as advised by the ECO, erect temporary fencing along the perimeter of designated sensitive no-go areas. Temporary fencing must, as a minimum, consist of wooden or metal posts at 3 m intervals, with two plain wire/plastic strands tensioned horizontally at heights of 300 mm and 900 mm above the ground – it is essential that the strands are visible. The Contractor must maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed. Commercial type danger tape should not be used, as this perishes rapidly, and pollute the environment when torn and blown away by strong winds. | Contractor,<br>ECO             | Once-off, as required |
| 21. Stockpiles                                     | Soil stockpiles must not be situated within 50m of any water course.   | Contractor,<br>ECO             | Monthly               |
|  | If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.   | Contractor,<br>ECO             | Monthly               |
|  | Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.   | Contractor,<br>ECO             | Monthly               |
|  | Where contamination of soil is expected, analysis must be done prior to disposal of excess soil to determine the appropriate disposal method. Proof from an applicable waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur must be provided to the ECO upon request.  | Contractor,<br>ECO             | Monthly               |
|  | Stockpiles must not exceed 2m in height unless otherwise permitted by the PM and / or ECO.   | Contractor,<br>ECO             | Monthly               |
| 22. Erosion control                                | Wind screening and stormwater control must be undertaken where required by the ECO to prevent soil loss from the site.   | Contractor,<br>ECO             | Twice monthly         |
|  | The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if required by the ECO.<br>Other erosion control measures that can be implemented are as follows:   | Contractor,<br>ECO             | Twice monthly         |
|  | <ul style="list-style-type: none"> <li>• Brush packing with cleared vegetation;</li> <li>• Mulch or chip packing;</li> <li>• Planting of vegetation; and</li> <li>• Hydro-seeding / hand sowing.</li> </ul>  |                                |                       |
|  | Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented.  | Contractor,<br>ECO             | Twice monthly         |
|  | All erosion control mechanisms need to be regularly maintained.  | Contractor,<br>ECO             | Twice monthly         |
|  | Re-vegetation of disturbed surfaces must occur as soon as possible after construction activities are completed.  | Contractor,<br>ECO             | Twice monthly         |

| Activity/Impact                  | Action Required  | Responsible Party | Monitoring Frequency |
|----------------------------------|--|-------------------|----------------------|
|                                  | No impediment to the natural water flow on site other than approved erosion control or rehabilitation works is permitted.  | Contractor, ECO   | Twice monthly        |
|                                  | Stockpiles not used in three (3) months after stripping should be seeded to prevent dust and erosion, as advised by the ECO  | Contractor, ECO   | Twice monthly        |
| 23. Hazardous materials          | Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled.  | Contractor, ECO   | Monthly              |
|                                  | Any hazardous substances must be stored at least 50m from any of the watercourses on site in a bunded area.  | Contractor, ECO   | Monthly              |
|                                  | The Contractor must ensure that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry. Such materials may also be temporarily stored on drip-trays.  | Contractor, ECO   | Monthly              |
|                                  | Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp must be collected and removed from the site for appropriate disposal at a licenced waste disposal facility or sewage works.  | Contractor, ECO   | Monthly              |
|                                  | All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material. Such bunded areas must be regularly emptied of accumulated rainwater. Wastewater from such emptying, if contaminated, must be disposed at an appropriately licenced waste disposal facility or sewage works.   | Contractor, ECO   | Monthly              |
|                                  | In the event of a spill, the Contractor must take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor will be liable to arrange for professional service providers to clear affected areas, if required.   | Contractor, ECO   | As required          |
|                                  | Proper facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater. These pollution prevention measures for storage must include a bunded containment area with a wall high enough to contain at least 110% of any stored volume. This containment area must be sited at least 50m away from any drainage line, in a site approved by the ECO. | Contractor, ECO   | Monthly              |
|                                  | Cement storage and batching must only take place in a bunded area, and any runoff  |                   |                      |
|                                  | Any spillage, which may occur, must be investigated and immediate action must be taken. This must be reported to the ECO and to the relevant authorities if so required by the ECO.  | Contractor, ECO   | As required          |
| 24. Cement and concrete batching | Concrete must not be mixed on the ground, but in a bunded area with any runoff captured for disposal as hazardous wastewater.  | Contractor, ECO   | Continuous           |
|                                  | The batching area is to be located in an area of low environmental sensitivity, as approved by the ECO.  | Contractor, ECO   | Once-off             |
|                                  | Cement bags must only be stored in a covered, bunded area and not directly on the ground. Used cement bags must be disposed of as hazardous waste.   | Contractor, ECO   | Weekly               |
| 25. Hydrology and stormwater     | Silt fences must be used where required by the ECO to remove any suspended silt from stormwater before it enters the stormwater system.  | Contractor, ECO   | Monthly              |
|                                  | Temporary cut-off drains and berms must be used where necessary to capture stormwater and promote infiltration.  | Contractor, ECO   | Monthly              |
|                                  | Stormwater and surface water must be diverted away from excavation trenches, and care must be taken to avoid surface stormwater from the site running into the seasonal pan on the site.   | Contractor, ECO   | Monthly              |

| Activity/Impact  | Action Required   | Responsible Party                          | Monitoring Frequency  |
|--|---|--|-----------------------|
|  | No rubble, litter or sand may be deposited into any freshwater systems or water courses.  | Contractor, ECO                            | Monthly               |
| 26. General materials handling, use and storage  | Choice of location for storage areas must take into account prevailing winds, distances to the seasonal watercourses (50m minimum), general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.  | Contractor, ECO, Health and Safety Officer | Once-off              |
|  | Storage areas must be designated, demarcated and fenced. Storage areas must be secure so as to minimize the risk of crime. They must also be safe from access by unauthorised persons. Fire prevention facilities must be present at all storage facilities.  | Contractor, ECO                            | Monthly               |
|  | Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should include information on ecological impacts and measures to minimise negative environmental impacts during accidental spills.   | Contractor, ECO, Health and Safety Officer | Once-off, as required |
|  | Clear signage must be placed at all storage areas containing hazardous substances / materials.  | Contractor, ECO, Health and Safety Officer | Once-off              |
|  | The Contractor must be responsible for the training and education of all personnel on site who will be handling the hazardous material about its proper use, handling and disposal. The Contractor must ensure that information on the management of spill and accidental ingestion is kept on site. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. | Contractor, Health and Safety Officer      | Once-off              |
|  | The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practice must be adhered to. This applies to solvents and other chemicals possibly used in the construction time.  | Contractor, Health and Safety Officer      | Continuous            |
|  | The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.  | Contractor, Health and Safety Officer      | Continuous            |
|  | All excess cement and concrete mixes must be contained on the construction site prior to disposal off site.   | Contractor, ECO                            | Monthly               |
| 27. Fuel storage   | Hazardous substances must be stored at least 50m away from any water bodies on site to avoid pollution.   | Contractor, ECO                            | Monthly               |
|  | Topsoil and subsoil to be protected from contamination.   | Contractor, ECO                            | Monthly               |
|  | Fuel and material storage must be away from stockpiles on site in appropriate containers in a bunded area.  | Contractor, ECO                            | Twice monthly         |
|  | Chemicals must be mixed on an impermeable surface and provisions must be made to contain spillages or overflows into the soil.  | Contractor, ECO                            | Monthly               |
|  | Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. Drip trays may be used for temporary storage of such materials.  | Contractor, ECO                            | Monthly               |
| Contaminated soil must be contained and disposed of off-site at an approved hazardous waste disposal site. | Contractor, ECO   | Monthly                                    |                       |
| 28. Transportation   | Material must be appropriately secured to ensure safe passage between destinations during transportation. Loads must have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor must be responsible for any  | Contractor, ECO, Health and Safety Officer | Monthly               |



| Activity/Impact                | Action Required  | Responsible Party                              | Monitoring Frequency |
|--------------------------------|--|--|----------------------|
|                                | clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.  |  |                      |
| 29. General waste management   | Litter generated by the construction crew must be separated on site into general waste and recyclables and collected in covered rubbish bins. General waste is to be removed to a licenced landfill site on a weekly basis and recyclables must be taken to a recycling centre monthly.  | Contractor, ECO                                | Weekly/ Monthly      |
|                                | Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires shall be allowed on site, unless in designated areas approved by the PM and by the ECO or by the Health and Safety Officer.  | Contractor, ECO, PM, Health and Safety Officer | Monthly              |
|                                | The Contractor must supply waste bins/skips throughout the site at locations where construction personnel are working. The bins must be provided with lids and an external closing mechanism to prevent their contents blowing out and must be scavenger-proof to deter animals that may be attracted to the waste. The Contractor must ensure that all personnel immediately deposit all waste in the waste bins for removal by the Contractor. Bins must be emptied on a weekly basis and the waste removed to the construction camp where it must be properly contained in scavenger, water and windproof containers until disposed of. The bins must not be used for any purposes other than waste collection. | Contractor, ECO                                | Monthly              |
|                                | Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders waste generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project.  | Contractor, ECO                                | Monthly              |
|                                | If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled.   | Contractor, ECO                                | Monthly              |
| 30. Hazardous waste management | The waste, resulting from the use of hazardous materials, must be disposed of at a registered hazardous waste disposal site by a certified waste disposal Contractor as approved by the ECO. A disposal certificate must be obtained from the disposal Contractor.   | Contractor, ECO                                | As required          |
|                                | Staff must be trained in the identification of hazardous waste.  | Contractor, ECO                                | As required          |
|                                | Temporary storage and disposal of hazardous waste is regulated by legislation which must be complied with, i.e. the Occupational Health and Safety Act.  | Contractor, ECO                                | Monthly              |
| 31. Noise                      | The Contractor must aim to adhere to the relevant noise regulations and limit noise to within standard working hours.  | Contractor, ECO                                | Monthly              |
|                                | Construction site camp and other noisy facilities must be located well away from noise sensitive neighbours.   | Contractor, ECO                                | Once-off             |
|                                | Truck traffic must be routed away from noise sensitive areas, where possible.  | Contractor, ECO                                | As required          |
|                                | All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies.  | Contractor, ECO                                | Monthly              |
|                                | Noisy operations must be combined so that they occur where possible at the same time.  | Contractor, ECO                                | Monthly              |
|                                | Construction activities must be contained to reasonable working hours. Night-time activities near noise sensitive receptors must not be allowed.   | Contractor, ECO                                | Monthly              |
|                                | With regard to unavoidable noisy construction activities, the Contractor must liaise with local residents to inform them of such events.   | Contractor                                     | As required          |
|                                | As construction workers operate in a noisy environment, it must be ensured that their working conditions comply with the requirements of the Occupational Health and Safety Act (Act No  | Contractor, ECO, Health                        | Monthly              |

| Activity/Impact                   | Action Required  | Responsible Party                          | Monitoring Frequency |
|-----------------------------------|--|--|----------------------|
|                                   | 85 of 1993). Where necessary, ear protection gear must be worn.  | and Safety Officer                         |                      |
|                                   | Noise suppression measures must be applied to all construction equipment where required. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site. | Contractor, ECO, Health and Safety Officer | Monthly              |
| 32. Worker health and safety      | Safety measures, work procedures and first aid must be implemented on site.  | Contractor, Health and Safety Officer      | Monthly              |
|                                   | A Health and Safety Plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety.   | Contractor, Health and Safety Officer      | Once-off             |
|                                   | Workers must be thoroughly trained in using potentially dangerous equipment.   | Contractor, Health and Safety Officer      | As required          |
|                                   | Contractors must ensure that all equipment is maintained in a safe operating condition.  | Contractor                                 | Monthly              |
|                                   | A safety officer must be appointed.  | Contractor                                 | Once-off             |
|                                   | A record of health and safety incidents must be kept on site.  | Contractor, Health and Safety Officer      | Monthly              |
|                                   | Any health and safety incidents must be reported to the project manager immediately.   | Contractor, Health and Safety Officer      | As required          |
|                                   | First aid facilities must be available on site at all times. All incidents requiring first aid occurring on site must be recorded in the incidents book on site.   | Contractor, Health and Safety Officer      | Monthly              |
|                                   | A record must be kept of medication administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Contractor.  | Contractor, Health and Safety Officer      | Monthly              |
|                                   | Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.   | Contractor, ECO, Health and Safety Officer | Monthly              |
| 33. Personal Protective Equipment | Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc.   | Contractor, ECO, Health and Safety Officer | Monthly              |
|                                   | No person is to enter the portion of the site where construction activities are being undertaken without the necessary PPE.  | Contractor, ECO, Health and Safety Officer | Monthly              |
|                                   | SABS Standards and specifications governing dangerous processes such as welding must be strictly applied, with a view to proper protection of the public and workers.  | Contractor, ECO, Health and Safety Officer | As required          |
| 34. Fauna and Flora               | Implement the eradication programme for invasive species in terms of the Conservation of Agricultural Resources Act (Act No. 43 of 1983).  | Contractor, ECO                            | Monthly              |
|                                   | Institute the rehabilitation of areas as soon as construction activity allows it.  | Contractor, ECO                            | As required          |
|                                   | No disturbance, capture or injury of any fauna will be permitted. Should any fauna be found on site it must be removed from site by the ECO or a suitably qualified person.  | Contractor, ECO                            | Continuous           |

## 10.12. MONITORING, AUDITING AND REPORTING

The Developer (**City of Matlosana Local Municipality**) is responsible for ensuring that all environmental management measures prescribed in this EMPr as well as any other conditions specified by the relevant authorities, are implemented and adhered to during all phases of the proposed development. The Applicant may delegate the responsibilities for implementing the requirements to other persons/entities, however the Applicant remains responsible for ensuring that the delegated responsibilities are carried out.

It is the responsibility of the project team or their delegate to ensure that regular monitoring of environmental issues addressed in this management plan is undertaken. The applicant is responsible for the monitoring of the infrastructure.

Site inspections to determine maintenance needs during the operational phase are imperative for good housekeeping.

Internal environmental audits must be undertaken at regular monthly intervals throughout the construction phase to ensure compliance.

The applicant will be responsible for maintaining a database of all records pertaining to the environment for the study area.

All incidents such as spills of toxic or any other substance that may negatively affect the environment must be reported to the relevant authorities.

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### **FINES**

The ECO can impose fines on the Contractor for any contraventions of this EMPR. The imposition of fines will enable the ECO to ensure that the requirements of the EMPR are taken seriously by the Contractor.

For an alternative method of ensuring Environmental Compliance, it should be considered that the ECO must issue a "Compliance Certificate" once a month. This certificate must be attached to the Contractor's "Payment Certificate" and no Contractor will be paid without such a certificate. (Experience with this method of enforcement has proven very successful in the past.)

The Contractor shall be advised in writing of the nature of the infringement and the amount of the fine. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor.

In addition to the fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense.

## 11. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF SPECIALISTS

### 11.1 GEO-TECHNICAL REPORT (See Appendix A for a copy of this report)

#### 11.1.1 Terms of Reference

An engineering geological investigation was conducted for the proposed development on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province.

The aim of this investigation was to identify and evaluate any possible engineering geological problems before commencement of proper township proclamation.

#### 11.1.2 Methodology

The following was consulted during the investigation:

- The geological map 2626 West Rand. Scale 1:250 000. The Geological Survey of South Africa.
- 2.2 The topography map 2626C Klerksdorp Chief Directorate: Surveys and Land Information, Mowbray.

### SITE INVESTIGATION

All available information was studied before and during the site visit.

The investigation commenced with a desk study, where all relevant information is collected and compiled on a base map. The site was divided into land forms, after which the accuracy of the information was verified by means of a field visit.

Test pits were dug and representative disturbed samples collected and tested. The position of the test pits are represented in Figure 4 (Appendix A) of the Geotechnical Report. The soil profiles were described according to the methods described by Jennings *et al* (Jennings 1973). This method describes each horizon in terms of moisture content, colour, consistency, structure, type of soil and origin of the soil.

Disturbed samples of the soil materials were taken for laboratory analysis. The grading of the soils was determined by sieve and hydrometer analysis, resulting in cumulative grading curves.

The mechanical properties of the soil material are described in terms of the liquid limit and plasticity index (determined by means of the Atterberg Limit tests) and the linear shrinkage. These values can be used to calculate the potential expansiveness of the soils, and to evaluate the materials for use as construction material. The consistency of a soil is described by means of its Atterberg limits, where the effect of a change in the moisture content on the consistency of a cohesive soil is measured. According to Cernica (1982) these tests are useful "mostly for soil identification and classification". It can also be used to determine the mechanical properties of cohesive soil material. Note that cohesionless soils (i.e. sandy material) cannot be tested for plasticity or collapse potential as this material does not contain enough fines to exhibit consistency, and the taking of undisturbed samples is not possible due to disintegration.

The linear shrinkage test to determine the percentage shrinkage that can be expected, is performed by wetting a soil to approximately its liquid limit and drying the resultant paste in a linear shrinkage mould.

The potential expansiveness of a soil depends upon its clay content, the type of clay mineral, its chemical composition and mechanical character. A material is potentially expansive if it exhibits the following properties (Kantey and Brink, 1952):

- clay content greater than 12 percent,

- plasticity index of more than 12,
- liquid limit of more than 30 percent, and
- linear shrinkage of more than 8 percent.

The potential expansiveness (low, medium, high, very high) is calculated by means of Van der Merwe's method (Van der Merwe, 1964), where the equivalent plasticity index versus the clay content of the material is plotted on a graph divided into heave categories.

If any sample in the study area classifies as potentially expansive, the amount of heave or mobilization in mm measured on the surface will be calculated

## LABORATORY TESTS

Sampling was reduced according to the limited variability of the geotechnical character and simplicity of the entire sites as well as accessibility to the almost totally built up area comprising double and single story upmarket houses with associated infrastructure.

No consolidometer or potential collapse tests were done as it was impossible to secure any undisturbed soil sample required for these tests.

No soil chemistry samples were tested as all new developments use synthetic pipes not reactive to soil aggressiveness.

The disturbed samples taken during the investigation were tested by the accredited laboratory of Specialised Testing Laboratory in Pretoria to determine their physical properties.

Indicator tests include a grading analyses, the determination of Atterberg limits and linear shrinkage.

### 11.1.3 Recommendations and Conclusions

- The area is underlain by quartzite, conglomerate & greywacke, of the Bothaville Formation, Platberg Group of the Ventersdorp Supergroup. Surficial deposits include quaternary calcrete and colluvium, covering the lithology on site..
- Some problems are foreseen regarding the excavatability to 1,5m depth on portions of the site.
- Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures. A concrete apron of at least 1,0m around structures are prescribed, and we recommend no gardening around structures to keep the moisture content as stable as possible.
- Zoning of the site revealed zones with constraints regarding the compressibility, as well as the expansive properties of the soil, and shallow rock and core stones may hamper the placement of services.
- The following Zones were identified.

#### **Modified Normal to Special Development: Site Class C2/2A:**

Hillwash comprising orange to dark reddish brown silty clayey sand sometimes with fine gravel represents a medium to highly collapsible soil, with thickness in excess of 0,75m, and an expected range of up to 15mm of total soil movement measured at surface, from this zone on site. Foundations will therefore require modified normal foundation techniques such as lightly reinforced strip footings or reinforced boxed steel in slightly widened strip foundations, the use of split construction techniques or articulation joints at all internal and external doors and openings with light reinforcement (brickforce) in masonry, or soil replacement by an engineered fill soil raft with a COLTO classification of G5 or better, by removing all or part of the expansive horizon to 1,0m beyond the perimeter of the structure and replacing with inert backfill, compacted to 93%MOD ASSHTO density at or near optimum moisture content, where after normal strip footing foundations can be used. Site drainage, a concrete apron of 1,0m around all

structures and plumbing and service precautions are advised. It is classified as C2 in terms of the NHBRC guidelines (1995) or the SAICE Code of practice (1995) and 2A after the classification for urban development (Partridge, Wood & Brink).

**Suitable for development with precaution Site Class PR:**

Quartzite rock outcrop and sub-outcrop will restrict excavatability required during service installation as well as foundation excavations. Blasting or difficult excavation operations will dramatically increase the development cost in this zone.

**Site Class PQ:**

Areas where small quarries or filling or dumping of spoil were identified must be rehabilitated before any construction can be allowed, and backfilling with an engineer's material with a COLTO classification of G5 or better may improve the developability of these zones, but these operations will dramatically increase the development cost in this zone.

**Undevelopable: Site Class PD/PDM:**

Perennial drainage features where the 1:100 year flood line will determine or specify the allowable distance of development from rivers, usually at least 32m from the center of the river (PD), with adjacent areas subject to perennial wetness where seasonal marshy conditions may be encountered (PDM).

- **Special construction** techniques must be used to enable proper development including the use of **compaction techniques with steel reinforcement** or **soil rafts** and even **piled foundations** or **stiffened or cellular rafts** as described.

## 11.2 CIVIL SERVICES REPORT (SEE APPENDIX B)

### Availability of Bulk Services

#### **Water**

##### *Water Source*

The potable water for the Tigane is obtained from the Midvaal Water Company purification works next to the Vaal River near Vaal Reefs town.

##### *Water Purification works*

The treatment works which abstracts raw water from the Vaal River has enough extra capacity to cater for the demand of the proposed new Tigane Ext 7 and Ext 8 development.

##### *Service reservoirs*

Tigane is serviced by the Hartbeesfontein Reservoirs. The total capacity of the reservoirs is 18.5ML broken down as follows;

- vii i. Reservoir 1 - 3.5ML
- viii ii. Reservoir 2 – 5ML
- ix iii. Reservoir 3 – 10ML

The Hartbeesfontein Reservoirs have been designed to provide in the future development of Tigane.

There are two existing elevated steel water towers in Tigane for pressure with the following capacities;

- v i. Tank 1 - 0.25ML
- vi ii. Tank 2 – 0.5ML

##### *Supply pipelines and pump systems*

The rising main conveying potable water to the Hartbeesfontein reservoirs has a pipe diameter of 300mm. From the outlet of the Hartbeesfontein Reservoir, water gravitates to the Tigane Pump station through a 250mm diameter gravity main. From the Tigane Pump Station, the water is pump to the Tigane Pressure

Tanks through a 200mm diameter rising main. The water from the tanks gravitates to Tigane through a 160mm diameter gravity main.

### **Sewer**

The proposed Tigane Extension 7 and 8 settlements fall within an area serviced by the Hartbeesfontein Wastewater Treatment Plant (WTP). The Hartbeesfontein Wastewater Treatment Plant is owned and operated by City of Matlosana. The proposed Tigane Extension 7 and 8 settlements will discharge their sewer into the Hartbeesfontein WTP. The Hartbeesfontein WTP was upgraded to 8 ML/day in 2013. Currently it is receiving 3.8 ML/day. This implies that it has spare capacity of 4.2 ML/day.

### **Bulk Services**

Through our site visit and inspection that was conducted on the 29th of June 2020 in the company of municipal personnel, it was established that the Hartbeesfontein/Tigane outfall sewer is in a fair condition

### **Roads**

Access to the proposed development through intersections and primary roads according to the town planning layout is indicated on the attached plan which is self-explanatory. More than one access is available to each of the development areas via the Hartbeesfontein Provincial road (R503), and various other primary and secondary routes interlinked with the existing road network of Hartbeesfontein.

The pavement design of the Primary Roads marked as Roads marked in red on the attached plan will be designed for category UB s described in the UTG Design manuals but modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. All other secondary roads will be designed to category UC and again modified to use SoilTech MK III soil stabiliser, AsphaltTech polymer Seal and AsphaltTech Primer. Where possible surface runoff exceeds the permissible cross-section capacity of the Primary Roads, sub-surface pipe drainage system shall be installed.

### **Stormwater**

The proposed development will drain storm water run-off towards the natural low lying water-course on the north-western side of the development through the road network in combination with sub-soil drainage pipe network system. A formalised system will discharge the bulk storm-water in a north western direction as indicated on the appended plan.

### **Solid Waste**

The Matlosana Municipality will extend its existing refuse removal service to include the new development areas. The refuse will be dumped and managed at the formal licenced dumping site of Klerksdorp which has the capacity to receive the additional refuse.

## **11.3 TRAFFIC ENGINEER'S REPORT (SEE APPENDIX C)**

### **11.3.1. Terms of reference**

To undertake a Traffic Impact & Access Study for the proposed Tigane Ext 7 & 8 Townships on a Portion of the Remaining Portion of the Farm Uraan 295 IP & a Portion of the Remaining Portion of the Farm Vogelstruisfontein 273 IP.

The Traffic Impact Study is submitted in support of the Township Establishment on the sites to the relevant municipal-, transport- and planning authorities.

The application is mainly for Residential uses but also includes very small Business Erven, a School, a Cemetery and Community Facilities

### 11.3.2 Objectives of the Traffic Impact Study

The objectives of the study are as follow:

- To determine the impact of the additional traffic generated by the proposed development on the existing road network;
- To propose measures that could be put in place to mitigate the impact that the proposed development will have on the existing traffic and road conditions;
- To determine a suitable access regime for the proposed development; and
- To provide sufficient information for the approval of the proposed development

### 11.3.3 Scope of the report

The purpose of this report is to identify the potential traffic impact of the proposed Township Establishment. The study area, development trip generation, trip distribution, capacity analysis and site access requirements are assessed in the rest of this report

### 11.3.4 Conclusion & recommendations

The Traffic Impact & Access Study investigated the expected transport related impacts of the proposed Tigane Ext 7 & 8 Townships. The Township Application is for the departure from “Agricultural” use to various land uses of which Residential is mainly the use, but also includes subservient uses. This study investigates the worst case potential impact of the Townships on the external road network.

Based on our site observations, the existing and base traffic volumes shown in the figures, as well as the capacity analysis, it is concluded that the proposed development will have little impact on the external road network.

It is proposed and can be concluded:

- ***No external road and/or intersection upgrades will be required.***
- ***It is proposed that the Road to Geduld is surfaced from where it ends up in gravel up to the proposed Access Road 2.***
- ***It is recommended that provision is made for sidewalks along the Primary School frontages***

## 11.4 FLOOD LINE REPORT (See Appendix D for a copy of this report)

### 11.4.1 Terms of reference

**CWT Consulting** was appointed by **MAXIM PLANNING SOLUTIONS Town Planners** to calculate the 1:100 year flood lines for the proposed development of **Tigane Extension 8 of the City of Matlosana**.

According to section 144 of the National Water Act (ACT No. 36 of 1998), no person may establish a township unless the layout plan shows (in a form acceptable to the local authority concerned) lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years.

An unnamed non perennial stream exists on the property and the 1:100 year flood lines must therefore be shown on the layout plans.

### 11.4.2 Methodology



## FLOOD PEAKS

### The Effect of Dams on the Flood Peaks

The effect of any dam in the catchment was not taken into account because the flood peaks will **not** be attenuated by a dam with a smaller storage capacity than *6 times the total mean annual runoff* of the catchment draining into the dam.

### Methods used to calculate the Flood Peaks

Various different methods were used to calculate the flood hydrology for the catchment as this increases the accuracy of the final flood peak calculation. All the methods used take the following into account:

All factors relating to storm water run-off.

- Evaporation during rain storm
- Wind during rainstorm
- Depth of rainstorm
- Infiltration
- Flow roughness of area.

Most applicable methods for the catchment

Due to the size of the catchment the results obtained from the four mentioned methods are deemed to be applicable for this study.

### The following methods were considered:

1. Rational method as implemented by the Department of Water & Sanitation.
2. Rational method using an alternative implementation.
3. Standard Design Flood (SDF) method as developed at Pretoria University.
4. The Unit Hydrograph Method

## DESCRIPTION OF THE FLOOD LINE CALCULATION

### Hydraulic Model

The HEC-RAS model was used to perform the calculations of the water levels.

HEC-RAS is an integrated package of hydraulic analysis programs, in which the user interacts with the system through the use of a Graphical User Interface (GUI).

HEC-RAS is equipped to model a network of channels, a dendritic system or a single river reach. Certain simplifications must be made in order to model some complex flow

situations using the HEC-RAS one-dimensional approach. It is capable of modeling subcritical, supercritical, and mixed flow regime flow along with the effects of bridges, culverts, weirs, and structures.

### Procedure

The basic computational procedure of HEC-RAS for steady flow is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction and contraction / expansion. The momentum equation may be used in situations where the water surface profile is rapidly varied. These situations include hydraulic jumps, hydraulics of bridges, and evaluating profiles at river confluences.

For unsteady flow, HEC-RAS solves the full, dynamic, Saint-Venant equation using an implicit, finite difference method. The unsteady flow equation solver was adapted from Dr. Robert L. Barkau's UNET package.

## RIVER GEOMETRY

The geometry of the stream was obtained from **17 sections** to build the model and sections were interpolated at **1 m** intervals to facilitate the calculation. The small dam was included in the model.

### OUTPUT OF CALCULATION

The flooded area is shown in the **Figure** below.



**Figure 6: Flooded area**

The calculated water levels, flow velocities and flow depths are shown in the **Table** below.

| Section | Water level<br>1:100 yr<br>m | 1:100 yr<br>Flow<br>velocity<br>m/s |
|---------|------------------------------|-------------------------------------|
| 1       | 1504.53                      | 1.97                                |
| 2       | 1505.52                      | 1.87                                |
| 3       | 1507.03                      | 0.33                                |
| 4       | 1507.22                      | 1.88                                |
| 5       | 1508.50                      | 2.06                                |
| 6       | 1510.06                      | 2.03                                |
| 7       | 1511.23                      | 2.06                                |
| 8       | 1512.49                      | 2.82                                |
| 9       | 1514.64                      | 1.82                                |
| 10      | 1515.93                      | 1.90                                |
| 11      | 1517.68                      | 1.81                                |
| 12      | 1519.24                      | 1.80                                |
| 13      | 1520.60                      | 1.99                                |
| 14      | 1521.71                      | 2.05                                |
| 15      | 1523.11                      | 1.95                                |
| 16      | 1524.24                      | 1.83                                |
| 17      | 1525.31                      | 1.47                                |

**Table 2: Flow velocities and flow depths**

## 11.5 ECOLOGICAL HABITAT REPORT (SEE APPENDIX E)

### Objectives of the habitat study

The objectives of the habitat study are to provide:

- A detailed fauna and flora habitat survey;
- A detailed habitat survey of possible threatened or localised plant species, vertebrates and invertebrates;
- Recording of possible host plants or foodplants of fauna such as butterflies.
- Evaluate the conservation importance and significance of the site with special emphasis on the current status of threatened species;
- Literature investigation of possible species that may occur on site;
- Identification of potential ecological impacts on fauna and flora that could occur as a result of the development; and
- Make recommendations to reduce or minimise impacts, should the development be approved.

### Scope of study

- Surveys to investigate key elements of habitats on the site, relevant to the conservation of fauna and flora.
- Recording of any sightings and/or evidence of existing fauna and flora.
- The selective and careful collecting of voucher specimens of invertebrates where deemed necessary.
- An evaluation of the conservation importance and significance of the site with special emphasis on the current status of threatened species.
- Recording of possible host plants or foodplants of fauna such as butterflies.
- Literature investigation of possible species that might occur on site.
- Integration of the literature investigation and field observations to identify potential ecological impacts that could occur as a result of the development.
- Integration of literature investigation and field observations to make recommendations to reduce or minimise impacts, should the development be approved.

### Recommendations and Conclusions

- Vegetation at most of the site is visibly degraded and cover of vegetation in many areas is conspicuously poor. Most of the site contains hitherto cultivated fields. Informal settlements have transformed vegetation in some areas. Some areas have been cleared, exposing soil. Free roaming goats and cattle likely cause overgrazing. Old plantation with relatively short alien invasive *Eucalyptus camaldulensis* is also present at the site. Overall the site is characterized by a highly modified or transformed grassland where the soil is exposed in many areas.
- *Seriphium plumosum* (Bankrupt Bush) is noticeable at some areas. Very few indigenous trees remain at the site which include *Vachellia karroo* (Sweet Thorn) and *Ziziphus mucronata* (Buffalo Thorn). The indigenous shrub *Protasparagus laricinus* (Wild Asparagus) is found at disturbed places at the site. Indigenous pioneer grass species remain at the site. Some diversity of indigenous herbaceous plant species and a few dwarf shrub species are still present at the site. Alien invasive weeds are conspicuous at disturbed and hitherto cleared areas at the site.
- No wetlands or rocky ridges appear to be present at the footprint proposed for the development. A small non-perennial streambed, with its active channel and riparian zone, is present at the northwestern parts of the site. A small artificial waterbody which is an in-channel dam (with a broken groundwall) is present in this tributary at the northwestern parts of the site.
- Wet areas at the active channel and small dam contains exotic plant species such as the grass *Paspalum dilatatum*, the herb *Oxalis corniculata*. Indigenous plant species such as *Stachys spathulata* and *Helichrysum aureonitens* occur near or at the watercourses at the site. *Persicaria*

species (Knotweeds) occur at the permanent zone of the small artificial waterbody (small dam). Terrestrial plant species appear to encroach at the watercourse. Megagraminoids (large grasses such as reeds) are absent.

- Grassland at the site is represented by the Vaal-Vet Sandy Grassland vegetation type (Gh 10) which is listed as a Threatened Ecosystem, Endangered, according to the National List of Threatened Ecosystems (2011). Terrestrial vegetation at the site has been modified and transformed at parts, in the past and is currently considerably degraded. The scope for the restoration and conservation of natural grassland at the site is small.
- No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site.
- There is little scope for most of the site to be part of a corridor of particular conservation importance, excluding the watercourse at the northwestern part of the site.
- Non-perennial river at the northwestern part of the site is a corridor of particular conservation concern.
- Site is part of the Upper Vaal Water Management Area (WMA 9). The site is not part of a Freshwater Ecosystem Priority Area (FEPA) or wetland cluster (Nel et al., 2011a, 2011b).
- Ecological sensitivity at most of the site is low. The immediate surroundings outside the bufferzone of the riparian zone is considered to be of medium ecological sensitivity. Ecological sensitivity at the non-perennial active channel, in-channel dam and riparian zone is medium-high owing to its importance as a conservation corridor in the larger area (Figure 3).
- Continued monitoring and eradication of alien invasive plant species are imperative. It is in particular declared alien invasive species such as *Melia azedarach* (*Syringa*) and alien invasive Australian *Acacia* species (Australian wattles) that should not be allowed to establish.
- Extensive erosion is present at some parts of the site probably owing to stormwater from residential areas further up as well as exposure of soil owing to clearings and ecological disturbances. If the development is approved an opportunity presents itself to address these concerns.

## 11.6 WETLAND ASSESSMENT REPORT (See Appendix F for a copy of this report)

### Aims and objectives of the survey

A survey to investigate key elements of habitats on the site, relevant to the conservation of wetlands is conducted. The importance and significance of the site with special emphasis on the current status of biodiversity and ecological services of the wetland are evaluated. Literature investigations are integrated with field observations to identify potential ecological impacts that could occur as a result of the development and to make recommendations to reduce or minimise impacts, should the development be approved.

The objectives of the wetland habitat assessment are to provide:

- An indication of the existence of wetlands at the site and if so;
- An identification of major aspects of the hydro-geomorphic setting and terrain unit at which the wetland occur;
- An estimate of the size and roughness of the wetland
- An indication of the hydric soils at the site;
- An indication of erodability;
- An indication of the presence or absence of peat at the site;
- An outline of hydrological drivers that support the existence and character of the wetland;
- An assessment of the possible presence or absence of threatened or localised plant species, vertebrates and invertebrates of the region, at the site;
- A description of the functions provided by the wetland at the site;
- An interpretation of the priority of the wetland for local communities in the area;

- An interpretation of the priority of the wetland to biodiversity at the site

### Summary of risks and impacts

No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site.

There is little scope for most of the site to be part of a corridor of particular conservation importance, excluding the watercourse and bufferzone at the northwestern part of the site. The non-perennial river at the northwestern part of the site is a corridor of particular conservation concern.

The non-perennial river (with active channel, riparian zone and buffer zone) and the small artificial waterbody (with broken groundwall) are regarded as important conservation corridors in the larger area. Risks and possible impacts to the watercourses if the bufferzone is upheld, are not expected to be significant because excessive surface flow and erosion are not anticipated. There is no distinct indication that interflow plays an important role in the maintenance of the watercourse. The geomorphological setting and flow regime will not be impacted. Loss of any wetland animal or plant species are not expected.

Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate, low or very low.

### CONCLUSION

- Wetlands such as floodplain wetlands, channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, depressions, seeps and wetland flats appear to be absent at the site. In conclusion no wetlands are found at the site.
- A small non-perennial streambed, with its active channel and riparian zone, is present at the northwestern parts of the site. A small artificial waterbody which is an in-channel dam (with a broken groundwall) is present in this tributary at the northwestern parts of the site.
- Wet areas at the active channel and small dam contains exotic plant species such as the grass *Paspalum dilatatum*, the alien invasive weed *Oxalis corniculata*. Indigenous plant species such as *Stachys spathulata* and *Helichrysum aureonitens* occur near or at the watercourses at the site. *Persicaria* species (Knotweeds) occur at the permanent zone of the small artificial waterbody (small dam). Terrestrial plant species appear to encroach at the watercourse. Megagraminoids (large grasses such as reeds) are absent.
- No Threatened or Near Threatened plant or animal species appear to be resident at the site. No other plant or animal species of particular conservation concern appear to be present at the site.
- Non-perennial river at the northwestern part of the site is a corridor of particular conservation concern.
- Site is part of the Upper Vaal Water Management Area (WMA 9). The site is not part of a Freshwater Ecosystem Priority Area (FEPA) or wetland cluster (Nel et al., 2011a, 2011b).
- Continued monitoring and eradication of alien invasive plant species are imperative. It is in particular declared alien invasive species such as *Melia azedarach* (Syringa) and alien invasive Australian *Acacia* species (Australian wattles) that should not be allowed to establish.
- Extensive erosion is present at some parts of the site probably owing to stormwater from residential areas further up as well as exposure of soil owing to clearings and ecological disturbances. If the development is approved an opportunity presents itself to address these concerns.

## 11.7 HERITAGE IMPACT ASSESSMENT (HIA) (See Appendix G for a copy of this report)

### 11.7.1 Terms of Reference for Heritage Impact Assessment

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
5. Review applicable legislative requirements;

### **Legislative requirements of National Heritage Resources Act (NHRA), Act 25 of 1999**

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

#### **The National Heritage Resources Act**

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. *Grave yards and graves older than 60 years*
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and palaeontological importance
- g. *Graves and burial grounds*
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. *Any development or other activity that will change the character of a site and exceed 5 000m<sup>2</sup> or involve three or more existing erven or subdivisions thereof*
- d. Re-zoning of a site exceeding 10 000 m<sup>2</sup>
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

### **11.7.2 Recommendations and Conclusions**

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel. No sites, features or material of cultural heritage (archaeological and/or historical) nature, origin or significance was identified and recorded in the study area during the field assessment. The area has been heavily impacted and disturbed in the recent past by agricultural and current ongoing residential and related activities. If any did exist here in the past it would have been disturbed or destroyed as a result. Informal housing has already encroached onto sections of the study area as well.

The only site of Cultural Heritage Significance found in the area is a large (in) formal cemetery. The proposed development should incorporate this cemetery in its planning and management and any negative impacts on it should be avoided at all costs.

### **11.8 PALAEOLOGICAL IMPACT ASSESSMENT (PIA) (See Appendix H for a copy of this report)**

#### **Palaeontological Heritage**

As the rocks of the Precambrian Ventersdorp Supergroup are of igneous origin there is no possibility of fossils being present. The geological map does not indicate the presence of alluvial deposits but they are most probably present. Although the study area is covered by grassveld it has been affected by agricultural and informal township development

#### **Methodology**

The study area was located on the 1:250 000 geological map 2626 West Rand (Department of Mineral and Energy Affairs 1986) to determine the underlying geological strata and a literature survey was undertaken to determine the possibility of fossils being hosted by these rocks. As the study area is underlain by Precambrian rocks of the Ventersdorp Supergroup which has no palaeontological sensitivity, a desktop study was undertaken to determine whether the development will have any affect on palaeontological heritage.

#### **Recommendations**

From the documentation supplied regarding the development it is extremely unlikely that the proposed development will have any affect on palaeontological heritage. The underlying Precambrian rocks of the Ventersdorp Supergroup are not known to host fossils, and if Quaternary alluvial deposits are present it is unlikely that fossils will be preserved in these surficial deposits.

It is thus recommended that, in the unlikely event that fossils are exposed as a result of construction activities, a qualified palaeontologist must be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented (see Appendix A). Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

## Conclusion

The proposed township development on a Portion of the Remaining Extent of the farm Uraan 295IP and a Portion of the Remaining Extent of the farm Vogelstruisfontein 273IP in the City of Matlosana (Klerksdorp) is underlain by Precambrian aged rocks of the Ventersdorp Supergroup. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective, the proposed township development should proceed but, if fossils are uncovered in superficial soil deposits in the course of construction activities, the developer must immediately call in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

## 12. CONCLUSIONS AND RECOMMENDATIONS

AB Enviro Consult was appointed by the City of Matlosana Local Municipality to apply for the Legalization of the unlawful commencement of the clearance of 174 ha of indigenous vegetation, located within a critical biodiversity area (CBA 2) and within 30 meters of a non-perennial stream and the construction of a bridge over the watercourse, in order to establish a Township located on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province.

AB Enviro was initially appointed during August 2019 to submit an application for Environmental Authorization for the proposed township establishment on a portion of the Remaining Extent of the farm Uraan No. 295-IP and a portion of the Remaining Extent of the farm Vogelstruisfontein No 273-IP, City of Matlosana Local Municipality, North West Province. Initial site inspections and Specialist studies was conducted and results from these site inspections and Studies was provided to the Town and Regional planner to incorporate these findings into the final layout plan.

Once all of the relevant information was available, an application for Environmental Authorization was submitted to DEDECT on 23 September 2020 and was accepted on 13 October 2020. Once the acceptance letter was received, a full Public Participation Process was commissioned (Dated 16 October 2020). This process included the submission of a Draft Scoping Report to DEDECT (Received by them on 20 October 2020) and a site inspection undertaken by the Department Official Ms. Thembekile Makuwa and Ms. Hannie du Plooy of AB Enviro Consult cc on 03 November 2020.

In the meanwhile, people have started occupying the site in an informal manner to the north of the existing township. In addition to this, the Municipality has also started with the installation of water pipelines. This was revealed at the time of the site visit. Upon consultation with DEDECT, it was confirmed that this constitutes the commencement of the listed activities as was applied for and. As such, the unauthorised installing of Municipal services in the form of water pipelines are viewed as commencement of the listed activities and therefore, this triggered the necessity for a 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, application. This was confirmed in a letter from DEDECT dated 26 November 2020.

The Applicant was not aware that they required Environmental Authorization before starting with provision of essential services in the area as the dimensions of the pipelines fell below the threshold as described for this variable in the 2014 NEMA EIA regulations, as amended. The intention of this application is thus to legalise the commencement of the provision of services to the informal housing by the provision of water.

This Chapter of the Report provides a summary of the findings of the Assessment process, including the EAP's opinion as to whether the activity should or should not be authorised.

### 12.1 ENVIRONMENTAL IMPACT STATEMENT

The detailed environmental assessment for the proposed development, has not found any environmental impacts that *cannot* be mitigated to acceptable and manageable levels.



The fact that informal settlement has commenced on site is an indication of the housing shortage in the area. This is undesirable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty.

Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

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

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

The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and **basic services**.

The SDF and the Land Use Management system of the Local Municipality has identified certain areas that must address previously disadvantaged areas and historically disadvantaged residents. There is a definite need for the residents to have reasonable access to opportunities and facilities that supports living in the urban Settlement. It is the responsibility of the local municipality to ensure that the residents have reasonable access to community services and amenities, as well as employment opportunities and that the form of land development need to provide for basic needs in an affordable way. The proposed development will be in line with this principle by ensuring that people living in the area do in fact have reasonable access to opportunities and facilities.

The development addresses the need identified by the City of Matlosana Local Municipality, for the provision of additional mixed land use and social mix, such as the availability of housing for the people of the City.

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities, shops, schools, banking facilities, clinics, etc. and want

their living environment to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure as well as retail and commercial activities;
- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised settlements in the area. The commercial node will:
  - Promote entrepreneurial services and products;
  - Be within walking distance to places of refreshment and trade for residents;
  - Provide Job opportunities; and
  - Improve neighbourhood quality

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

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

The alternatives considered for the proposed development includes “Mixed land use township” (Alternative 1), “Single land use: Housing only” (Alternative 2) a “Layout Alternative” (Alternative 3) and the “No-go option.

Specialist studies were conducted and a full Public Participation Process was followed. This information was used to generate a sensitivity map that was used to assess the sustainability of the design and layout plan for the proposed development.

## **12.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)**

EMPR’s aim to identify and minimise the potential impacts that the proposed construction and operational phases of the project may have on the receiving environment. An EMPR has been developed which is contained in Appendix E and includes detailed mitigatory measures for the construction phase.

As a general guideline, the EMPR should be based on a comprehensive set of environmental aspects (elements of the facility that can interact with the environment), and hence, the EMPR compiled for this application includes the following key components:

- Mechanisms for the on-going identification and assessment of environmental aspects and impacts;
- Environmental management programmes; objectives and targets;
- Environmental monitoring and reporting framework;
- Environmental management procedures; and,
- Mechanisms for the recording of environmental incidents and implementing corrective and preventative actions.

## 12.3 EAP OPINION

The information contained in this Report and Specialist Studies, provides a detailed and comprehensive description of the proposed project, baseline environment and potential environmental impacts associated with the proposed development. As no significant impacts that cannot be mitigated were identified, AB Enviro Consult is of the opinion that the project should proceed, provided that the necessary mitigation and management measures are implemented.

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The Applicant therefore has overall and total environmental responsibility to ensure that the implementation of the construction phase of the EMPR complies with the relevant legislation and the conditions of the environmental authorisation. The applicant will thus be responsible for the implementation of the EMPR.

The environmental management programme (EMPR) should form part of the contract between the construction company and the applicant. This will help ensure that the EMPR is adhered to. It is suggested that a suitably qualified Environmental Control Officer (ECO) be appointed for the construction phase.

## 12.4 CONDITIONS RECOMMENDED TO BE INCLUDED IN ANY AUTHORISATION THAT MAY BE GRANTED BY THE COMPETENT AUTHORITY IN RESPECT OF THE APPLICATION

1. A complete copy of the signed EA from DEDECT in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPR as well as any amendments thereof must be available on site
3. A suitably qualified ECO must be appointed.
4. Impacts on the environment must be minimised during site establishment and the development footprint must be kept to the approved development area.
5. Vegetation clearing may not commence until such time as the development footprint has been clearly defined.
6. No clearance of vegetation outside of the development footprint may occur.
7. No construction workers or machinery will be allowed within the no-go area that is defined as the non-perennial river, including its riparian and buffer zone.
8. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any pollution that originated as a result of the construction activities.
9. No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.
10. No disturbance of topsoil & subsoil outside of the development footprint may occur.
11. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any chemical, fuel, oil and cement spills that originated as a result of the construction activities.
12. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any sewage that originated as a result of the construction activities.
13. At the end of the construction phase the site and its surrounding area (Including the non-perennial stream) must be free from any hazardous or general waste pollution that originated as a result of the construction activities.
14. Dust prevention measures must be applied to minimise the generation of dust.
15. Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site.
16. Absolutely no burning of waste is permitted.
17. Fires will only be allowed in facilities especially constructed for this purpose.

18. No hunting of animals will be allowed.
19. No intentional destruction of any sites, features or material of paleontological or cultural heritage (archaeological and/or historical) origin or significance may occur.
20. All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

### 13. AFFIRMATION BY EAP

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

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Signature of the Environmental Assessment Practitioner:

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Name of company:

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Date:

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Signature of the Commissioner of Oaths:

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Date

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Designation

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Official stamp:

**APPENDIX A:  
GEOTECHNICAL REPORT**

**APPENDIX B:  
SERVICES REPORT**

**APPENDIX C:  
TRAFFIC IMPACT ASSESSMENT REPORT**



**APPENDIX D:  
FLOOD LINE REPORT**

**APPENDIX E:  
FAUNA AND FLORA HABITAT IMPACT ASSESSMENT REPORT**

**APPENDIX F:  
WETLAND IMPACT ASSESSMENT REPORT**

**APPENDIX G:  
HERETAGE IMPACT ASSESSMENT REPORT**

**APPENDIX H:  
PALAEOLOGICAL IMPACT ASSESSMENT REPORT**

