

**APPLICATION FOR AUTHORISATION
IN TERMS OF THE
NATIONAL ENVIRONMENTAL
MANAGEMENT ACT, 1998
(ACT 107 OF 1998)**

**CONSULTATION
ENVIRONMENTAL IMPACT
ASSESSMENT (EIA) REPORT**

PROJECT:

**ESTABLISHMENT OF PROPOSED
HOUSING DEVELOPMENT (TO BE
KNOWN AS MARAPONG EXTENSION 7)
LOCATED ON THE REMAINDER AND
PORTION 1 OF THE FARM
NELSONSKOP 464 LQ,
LEPHALALE LOCAL MUNICIPALITY,
WATERBERG DISTRICT,
LIMPOPO PROVINCE**

**Applicant:
Exxaro Coal (Pty) Ltd**

**Date:
August 2017**

**Project Ref. No.: 12/1/9/2-W74
NEAS Ref. No.: LIM/EIA/0000303/2017**

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ACRONYMS

DEDET	Department of Economic Development, Environment and Tourism (Limpopo)
DWA	Department of Water Affairs
EMPr	Environmental Management Programme
I&AP	Interested and/or Affected Party (i.e. the public, adjacent landowners and the property owner)
EA	Environmental Authorisation

DEFINITIONS

Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.
Environmental incident	<p>a) Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that results in overly/unnecessary disturbance or damage to the environment.</p> <p>b) Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that could lead to (has potential for) overly/unnecessary disturbance or damage to the environment.</p> <p>c) Non adherence to environmental legal requirements/laws (including the stipulations of authorisations issued in respect of a proposed activity e.g. those contained in an Environmental Authorization).</p>
Environmental Management Programme (EMPr)	A guideline document/directive outlining the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts, as well as the actions needed to implement these measures.
Environmental Officer	Independent environmental consultant appointed to monitor compliance with the EMPr.
Grey water	Water contaminated by for example sewage, sediment, and/or chemical constituents.
Interested & Affected party	A person, group of people, an organization (public or private), a business, or other party that has an interest or is affected in terms of their health, property rights, or economy by a proposed activity.

Mitigation measures	Mitigation measures encompass all actions taken to eliminate, offset or reduce potentially adverse environmental impacts to acceptable levels (World Bank, 1999:1).
Process water	Water used during construction activities (e.g. water used for concrete mixing).
Project (life) cycle	Represents the various stages of which a project/activity consists including project identification, design, construction, operation as well as decommissioning.
Proponent	An individual and/or organisation that is of the intention to undertake an activity identified in terms of the EIA Regulations, 2014. Typically a proponent, <ul style="list-style-type: none"> a) stands to benefit directly from the proposed activity (e.g. a private developer gaining financially), or b) is duly sanctioned in terms of its legal mandate (e.g. a government department) to undertake such activities for the attaining of its objectives.
Visual Impact Assessments	A method used to estimate the potential visual impact of a proposed activity on the landscape, as well as to assess whether certain VQO's will be achieved.
Visual Quality Objectives (VQO's)	Objectives which reflect the desired level of visual quality, based on the physical characteristics and social concerns for an area.

SECTION 1: DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) AND PROJECT APPLICANT

1.1. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The application will be handled on behalf of the applicant by:

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POLOKWANE
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(Specializing in Environmental Management & Analyses))

This Report was compiled by:

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1.2. PROJECT APPLICANT

In this instance the applicant is:

Exxaro Coal (Pty) Ltd - Grootegeluk

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Lephalale
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Contact person: Mrs. Filomaine Swanepoel / Mr. Thabo Makhema

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SECTION 2: ACTIVITY INFORMATION

2. PREAMBLE

2.1 BACKGROUND

TEKPLAN Environmental Consultants was appointed by Exxaro Coal (Pty) Ltd to apply to the relevant authority (Limpopo Department of Economic Development Environment and Tourism) for environmental authorisation for the proposed establishment of a township development (to be known as Marapong Extension 7) located on the Remainder and Portion 1 of the farm Nelsonskop 464 LQ, Lephalale municipality area, Limpopo Province (see Annexure A – Layout plan of proposed development).

Before the proposed development can commence, it has to be authorised in terms of Regulation 982 of the EIA Regulations published in Government Notice No. 38282 of 2014 and Section 24(5) read with section 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). An Environmental Impact Assessment study, which included a public involvement programme and specialist investigations, has been undertaken to provide sufficient information to the Department of Economic Development, Environment and Tourism (DEDET) (Limpopo) to take an informed decision regarding authorisation of the proposed activity.

2.2 PURPOSE OF THIS REPORT

2.2.1 Purpose of this Environmental Impact Assessment (EIA) Report

This Environmental Impact Assessment (EIA) Report has been undertaken to satisfy the requirements of the EIA Regulations published in Government Notice No. 38282 of 2014 and Section 24(5) read with section 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The purpose of this Environmental Impact Assessment Report is to:

- highlight the potentially significant impacts (negative & positive), associated with the proposed development,
- to recommend further work/investigations (if necessary), and
- form part of the consultation process.

In addition to fulfilling the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998), this assessment was undertaken to inform the developer and the contractors who will be responsible for development of the proposed township, of environmental constraints and opportunities. This document will therefore enable the developer to address key environmental issues before construction commences.

In this way environmental inputs are thus pro-active in nature rather than re-active, as is often the case in impact studies coming too late in the project cycle. In this manner it is possible to avoid or limit impacts that might result from the proposed development.

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2.2.2 Listed activity

The proposed development project is listed in the Environmental Impact Assessment Regulations, as published in Government Notice No. 38282 of 2014.

The proposed development project is classified under the following section of this schedule:

Number and date of the relevant notice of EIA Regulations:	Activity No (s)	Describe each listed activity as per project description
R. 983, 08 December 2014	9	<p><i>The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water –</i></p> <p><i>(i) <u>With an internal diameter of 0,36 metres or more; or</u></i></p> <p><i>(ii) <u>With a peak throughput of 120 litres per second or more</u></i></p> <p><i>Excluding where-</i></p> <p><i>(a) Such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or</i></p> <p><i>(b) Where such development will occur within an urban area</i></p> <p>It is proposed that the internal water reticulation for Marapong Ext. 7 will be designed for an estimated peak flow of 54l/s and for <u>144l/s</u> including fire demand. The pipe sizes range between 90mm and <u>450mm</u> in diameter.</p>

R. 983, 08 December 2014	10	<p><i>The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewerage, effluent, process water, waste water, return water, industrial discharge or slimes –</i></p> <p><i>(iii) <u>With an internal diameter of 0,36 metres or more; or</u></i></p> <p><i>(iv) <u>With a peak throughput of 120 litres per second or more</u></i></p> <p><i>Excluding where-</i></p> <p><i>(c) Such infrastructure is for bulk transportation of sewerage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or</i></p> <p><i>(d) Where such development will occur within an urban area</i></p> <p>It is proposed that a bulk sewer pipeline of approx. <u>4.6 km</u> in length with a peak flow of <u>176ℓ/s</u> and varying in size ranging from <u>400mm to 500mm</u> in diameter be constructed from the proposed development across the Remainder of the farm Zongesien 467 LQ to the Zongesien WWTP.</p>
R. 983, 4 December 2014	23	<p><i>“The development of cemeteries of 2500 square metres or more in size.”</i></p> <p>The development includes a cemetery measuring approx. 5 ha in extent.</p>
R. 983, 4 December 2014	24	<p><i>“The development of-</i></p> <p><i>(i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</i></p> <p><i><u>(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;”</u></i></p> <p>The road reserve widths of the proposed development will be between 13 and 25 meters.</p>
R. 984, 08 December 2014	15	<p><i>“The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-</i></p> <p><i>(i) the undertaking of a linear activity; or</i></p> <p><i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan”</i></p> <p>The size of the area covered by the proposed township will measure approx. <u>220 hectares</u>.</p>

OTHER LEGISLATION, POLICY OR GUIDELINES

Title of legislation, policy or guideline:	Administering authority:	Date:
National Water Act (NWA), Act 36 of 1998	Department of Water and Sanitation	1998
National Forests Act, No 84 of 1998	Department of Agriculture, Forestry and Fisheries	1998
Application in terms of section 96 (1) (a) read with section 69(6) of the Town-Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986), read with the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013)	Lephalale Municipality	1986
Section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999)	SAHRA	1999

2.3 SCOPING REPORT AND PLAN OF STUDY FOR EIA

A Scoping Report and Plan of Study for EIA was submitted to DEDET, in order to satisfy the requirements of the Environmental Management Act, 1998 (Act No. 107 of 1998). The mentioned document was approved, subject to a number of conditions (See Annexure K - Comments received from authorities/parties on Scoping Report).

SECTION 3: PROJECT DESCRIPTION

3.1 PROJECT DESCRIPTION

The project consists of a proposed residential development (to be known as Marapong Extension 7), located on the Remainder and Portion 1 of the farm Nelsonskop 464 LQ, Lephalale Municipality area (See Annexure A – Proposed Draft Layout Plan). The township will consist of the following main components:

ZONING	NUMBER OF ERVEN	AREA (ha)	% OF TOWNSHIP
Residential 1 (average size of approx. 320 m ²)	718	24.569	11.14
Residential 4 (Approx. 7904 Residential Units - Approx. 1 unit per 125m ²)	4	114.3018	51.82
Business 1	8	13.2518	6.01
RSA (Police Station)	1	1.0680	0.48
Educational	2	2.7244	1.23
Special (Storm water dams/Coal conveyor belt)	2	8.7295	3.96
Public Open Space (Parks)	7	15.1059	6.85
Cemetery	1	5.0079	2.27
Municipal (Reservoirs)	1	0.9042	0.41
Roads		34.9126	15.83
Total	744	220.5751	100

The following Engineering services will be installation as part of the project (as indicated under Section 8.1 of this Report):

- water reticulation infrastructure,
- electricity infrastructure,
- roads,
- sewerage infrastructure (including proposed bulk pipeline across the Remainder of the farm Zongesien 467 LQ to the Zongesien WWTP), and
- storm water management infrastructure.

The size of the affected area measures approx. 220 hectares in extent. The proposed township will be developed in phases. Proposed Phasing Plan is also attached as Annexure A.

3.2 ZONING

Current zoning for the Remainder of the farm Nelsonskop 464 LQ is: Agricultural, Residential 4, Sewerage works and existing Public Roads.

Current zoning for Portion 1 of the farm Nelsonskop 464 LQ is: Agricultural and existing Public Roads.

The land that is to be developed is in the process of being rezoned appropriately. This will be done in terms of the relevant town planning legislation.

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4. LOCATION & ACCESSIBILITY

The project area is located approx. 12km west from Lephalale on a portion of the Remainder and Portion 1 of the farm Nelsonskop 464 LQ, Lephalale Local Municipality, Waterberg District Municipality, Limpopo Province.

The site is located to the north of provincial road D2816 (main access road to Marapong) and to the east of provincial road D2001 (road between Lephalale and Stockpoort). The site is adjacent to the existing Marapong town located to the east and to the north of the Matimba Power station. Part of the site is also currently being used for Eskom contractor's housing. See enclosed locality map (Annexure B).

The co-ordinates where the proposed development will take place are as follow:
S 23° 39' 20.2" E 27° 36' 26.9"

The Surveyor-general 21 digit site reference numbers for properties that are part of the application are as follow:

- TOLQ00020000464000000
- TOLQ00020000464000001
- TOLQ00020000467000000

5. EXISTING DEVELOPMENT AND SURROUNDING LAND USES

5.1 EXISTING DEVELOPMENT

Remainder of the farm Nelsonskop 464 LQ;

The Remaining Extent of the farm Nelsonskop measures 848.1985 hectare and can be divided into two portions namely the part that falls outside the application site and the part that falls within the application site. The part that falls outside the application site measures ± 666.5 hectares and the part which falls within the application site measures ± 181.6 hectares.

The portion of the Remaining Extent of the farm Nelsonskop which falls outside the application area is game fenced and used for game farming purposes in conjunction with other farms to the north which are owned by Exxaro. Except for the Nelsonskop Sewage Farm (being operated by the Lephalale municipality) this part of the property is devoid of any other manmade structures.

In respect to the part of the Remaining Extent of the farm Nelsonskop, which falls within the application area there are several land uses. The following infrastructure is located on this portion;

- The coal conveyor belt from the Grootegeluk Coal Mine to Matimba Power Station,
- The Eskom contractor's camp,
- A waste water dam with pump station,
- Open stormwater channel which is not in use anymore,
- Power line serving the Nelsonskop sewerage works,
- Smaller stormwater channel
- Informal settlement consisting out of ± 780 dwellings.

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The remainder of the property on which the proposed township will be established is currently vacant. The area can be classified as veldt that is in a “fairly” natural state. The description “fairly” is used due to the fact that,

- there are signs that the local community sources their fire wood from this area thus impacts related to the chopping and removal of trees are evident.
- the area is also used for the illegal dumping of household waste.

Portion 1 of the farm Nelsonskop 464 LQ:

Portion 1 of the Farm Nelsonskop measures 256.9596 hectare and can be divided into two portions namely the part that falls outside the application area and the portion that falls within the application area.

The part that falls outside the application area measures ± 218 hectares and the part which falls within the application area measures ± 38.9 hectares.

Portion 1 of the farm Nelsonskop which falls outside the application area can be divided in two portions. The part east and north of the conveyor belt is game fenced and makes part of the area used for Game farming by Exxaro. The part of Portion 1 of the farm Nelsonskop, west of the conveyor belt is not game fenced and is not used for any specific purpose. The Stockpoort provincial road (road D2001) and the railway siding that serves the Grootegeluk Coal Mine is situated on this portion.

Portion 1 of the farm Nelsonskop which falls within the application area houses the old Exxaro contractor’s camp and worker’s accommodation.

5.2 SURROUNDING LAND USES

The application property is situated in an area with a variety of land uses. The eastern boundary of the application area is formed by Marapong Town and the Remainder of the farm Zongesien 467 LQ. Marapong Town consist of several erven with different zonings. The Remainder of the farm Zongesien 467 LQ belongs to Eskom and is developed and also used as a game farm. The northern boundary of the application site is formed by the Remaining Extent and Portion 1 of the farm Nelsonskop. Both these properties belong to Exxaro and are used for game farming. The Nelsonskop sewage works is situated on a part of the Remaining Extent of the farm Nelsonkop. This sewage works is located ± 1.5 kilometers north of the application area. The southern boundary of the application area is formed by Marapong Town and the Remainder of the farm Grootestryd 465 LQ. The Matimba Power Station is located on the Remainder of the farm Grootestryd 465 LQ. The western boundary of the application area is formed by Portion 1 of the farm Nelsonskop. This part of Portion 1 of the farm Nelsonskop is not used for any specific purposes although it forms part of the Grootegeluk Coal Mine area. The railway line serving the mine runs over this portion.

The proposed development of a township will thus be in line with the existing land uses within the area as it will be an extension of the existing Marapong town.

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6. METHODOLOGY EMPLOYED FOR ENVIRONMENTAL IMPACT ASSESSMENT

6.1 METHODOLOGY EMPLOYED

The methodology adopted in the compilation of this document is that of an Environmental Impact Assessment (EIA) in accordance with Regulation 982 of the Environmental Impact Assessment Regulations, 2014 read with section 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

An environmental impact analysis must always include some statement, definition and delineation of specific environmental 'problems'. Some judgements necessarily have to be made during the steps of predicting, analyzing, and judging, environmental impacts – therefore this impact assessment has taken into account the following parameters during evaluation of the potential impacts that might result from the proposed development:

- the geographical area/extent of the impact (e.g. local, immediate, regional or national),
- status & intensity (positive (beneficial) or negative (detrimental)),
- significance (an impact of low significance will have only a limited effect on the environment, whereas an impact of high significance will have a major impact on the environment),
- The probability of an impact (for example “definite”, “highly probable”, “probable” or “improbable”), and
- The duration of an impact.

In order to undertake the identification of the key issues (significant potential impacts) that might result from the proposed development the writer relied on the following;

- Inputs from interested & affected parties,
- Inputs from various specialists,
- The CIDA Handbook on Environmental Assessment: Checklists for determining environmental effects: Building construction, Water supply, Waste management, Roads, 1999.

In this document the writer will allude to alternatives. The purpose of this is to ensure that the developer considers other approaches to the project (that could assist in preventing significant environmental damage). If unforeseen difficulties arise, for example during the operation of the project, re-examination of these alternatives may help to provide rapid and cost-effective solutions.

The reader is referred to Section 6 (Description of Environmental Issues Identified) of this document for more information on methodology and identified impacts.

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6.2 SPECIALIST INPUTS

Various specialist inputs have been obtained, in order that,

- a justifiable and scientifically correct assessment of the potential impacts of the development could be made by the environmental consultant, and
- that appropriate (suitable) mitigation measures could be identified.

Specialist input was obtained regarding the following aspects;

- The impact of the proposed development on the various biological components of the environment,
- The impact of the proposed development on heritage resources,
- The prevailing geo-technical conditions on the area that is to be developed,
- The suitability, availability and capacity of engineering infrastructure in the area where the development will take place.
- Whether the proposed development is in concert with existing planning frameworks that apply to the area via the Integrated Development Plan of the Local Authority, Provincial Planning Frameworks, etc.

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SECTION 4: NEED AND DESIRABILITY

7. NEED AND DESIRABILITY

Status Quo – Lephalale Town:

Lephalale Town consists out of three settlements which are relatively close to each other. It is the main growth point in the municipal area. The three settlements are Ellisras, Onverwacht and Marapong. The current population of Lephalale Town is estimated at 30,048 people, of which \pm 14 803 reside in Ellisras / Onverwacht and \pm 15 245 reside in Marapong. Economic activities are mostly in the form of commerce, administration, mining and electricity generation.

The growth rate is estimated 2.40%. The average household size is 4 people per household. Approximately 27% of the residents in the Lephalale municipal area reside in Lephalale Town. The unemployment rate is estimated at 22,9%. Currently there is a housing backlog in the low cost, bonded and GAP market.

Lephalale Town functions as the main development point. The Provincial Spatial Framework earmark Lephalale Town as a provincial growth point which is the highest order of settlement area. The Lephalale SDF also earmarks Lephalale Town as a municipal growth point.

Marapong consists out of six extensions namely:

Marapong Town which is a formal proclaimed township made up of 854 erven of which the majority is residential erven. This township was established by Exxaro and Eskom and accommodates mostly their staff.

Marapong Extension 1 was developed by the state as part of the reconstruction and development program. This extension consists of 533 erven of which 516 is residential erven.

Marapong Extension 2 was developed by the municipality and consists of 695 erven. This extension was also developed as part of the reconstruction and development program.

Marapong Extension 3 was also developed by the municipality and consists of 338 erven. This extension was also developed as part of the reconstruction and development program with the view to get rid of the old dilapidated "TPA Hostels". This project was never concluded as the contractor passed away during the redevelopment of the hostels.

Marapong Extension 4 followed. This extension was also developed by the municipality and consists of 1539 erven. This extension was also developed as part of the reconstruction and development program.

The above mentioned extensions are all developed and except for Marapong Town fully occupied.

Marapong Extension 5 followed with the view to accommodate Eskom staff working at the Medupi Power Station. This extension although approved and surveyed was never developed.

Marapong Extension 6 which is only an amendment of Marapong Extension 3 is currently in the process of being developed. The same as Marapong Extension 1 to 4, this development focus also on the poorest of the poor.

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Marapong can therefore be divided into two categories namely the formal standard township area with all amenities which comprises of Marapong Town and the remainder of Marapong which comprises of low cost housing areas.

There are approximately 60 vacant residential erven in Marapong Town. Most of these erven belongs to private owners and will be developed over time. Formal middle to high income erven is scarce in Marapong and is reflected in the high value of the erven in Marapong Town.

There is a third residential component present in Marapong. Approximately 80 hectares of developable land in Marapong is occupied by squatters. This creates a big problem as there is currently no other developable land available for formal housing developments in Marapong.

Except for the proposed township there are two other major housing developments planned for Marapong namely the upgrading of the single quarters which is situated on the Remainder of Erf 175 in Marapong and the development of some residential units in Marapong Extension 6. Both these developments will not cater for ownership and will not relieve the demand that exist for normal residential erven in Marapong.

Lephalale Town has experienced vast growth and huge development over the past eight years. All the developments took place in Ellisras and Onverwacht except for some minor business development which took place in Marapong. Marapong did not benefit from the vast growth and huge development.

Lephalale Integrated Project Scoping Report:

The Lephalale municipal area is rich in coal reserves and natural gas. The coal reserves are situated a short distance west of Lephalale Town. Several new industrial projects are planned for the Lephalale area of which some will be in close vicinity of the town.

Because of this and to be able to accommodate these planned developments the Department of Co-Operative Governance, Human Settlements and Traditional Affairs in conjunction with the Lephalale Municipality and the Development Bank of South Africa have conducted a study named the Lephalale Integrated Project Scoping Study. The study was completed in 2011 and subsequently approved by both the Lephalale Municipality and the Limpopo Provincial Government.

The study concentrated on three distinct areas in the municipal area referred to in the study as focus areas. Focus Area 1 refers to Lephalale Town which as mentioned includes Marapong. Focus Area 2 refers to the 44 villages situated \pm 40 kilometers north east of Lephalale Town and Focus Area 3 refers to the Steenbokpan area.

Focus area 1 is the core of the Lephalale municipal area and measures \pm 13 800 hectare. The \pm 13 800 hectares is divided between the industrial area and the three settlements as discussed previously.

Population growth within Lephalale Town is among the highest in Limpopo and reflects the influx of people working on the construction of the Medupi Power Station and expansions at the Grootegeluk Coal Mine.

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It is estimated that almost 80% of the gross value added is currently being produced in this focus area (Lephalale town, Grootegeeluk Mine and Matimba Power Station). Significant investments in electricity generation (R120 billion) and in coal mine expansion (R10 billion) that are currently underway, have led to a rapid increase in the economic growth rate from 2012 onwards. However, the structure of the local economy will remain concentrated on coal mining and electricity generation, as it is at present. It is anticipated that 9,000 new houses need to be constructed in focus area one during the next ten years (2011 to 2021).

Currently Matimba Power Station employs 700 persons permanently and 300 on contract. New power station technology is more efficient and it is therefore assumed that once completed Medupi will employ 800 persons in total. The first of six generating units at Medupi is already operational. The current estimated completion date of the Medupi Power Station is 2020. Recruitment is likely to be done evenly over this period.

The Exxaro project development pipeline 2 indicates that they are planning for additional char and coking coal production. A total employment figure of 300 persons has been indicated for these projects.

Currently, accessibility to Marapong is poor which constrains the economic development and spatial integration of the area with the other two settlements. To ensure the integration of this township with Onverwacht and Ellisras, a link road between the three settlements that forms Lephalale Town is needed. To stimulate the public and business land in Ellisras Extension 102 (Altoostyd Development), the link road to Marapong is proposed through this extension from Nelson Mandela Drive. This link road is regarded as a high priority road to improve the functioning and integration of the three settlements.

Another major link which is needed is a link between Marapong and the R510. Planning for this link named the northern bypass was done and is it regarded as the most important road infrastructure to be developed.

Another intervention needed is to make business land in Marapong available.

It is clear from the above that there is a dire need for additional residential and business erven in Marapong and that this need will only increase as time go by.

The Lephalale Spatial Development Framework

Contained in the SDF is several elements which is affecting and present in respect of the application site. Important elements and aspects in the SDF is the development edge, development corridor activity zones, strategic links, development zones, strategic development areas, activity nodes and infill development.

In broad terms a development edge is a demarcated line and interrelated policy that serves to manage, direct and limit urban expansion. The Development Edge can further be described as boundaries between phases or edges of development. A development edge is defined in the SDF as boundaries between developed areas and undeveloped areas, or between settlements (urban areas) and the agricultural areas or areas used for purposes other than urban development. The SDF is clear that no new housing projects or townships for residential purposes or demarcation of sites should take place outside this development edges. The development edges are thus applied as boundaries where development may occur (urban area or specialised use associated with urban area) and

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will be allowed, and areas where it shall not be established under normal circumstances. This urban edge is a regional boundary which mandates that the areas inside the boundary be used for urban development or human settlement, and the area outside be used for low density development of human settlement or human settlement associated with farming or tourism activities.

The application site is situated within the development edge. Areas inside the development edge are areas where township development should be promoted to ensure the principle of compact towns.

The SDF also makes provision for Development corridors (DC) and Strategic links (SL). The proposed township is not affected by any DC but by two SL's namely SL 9 and SL 12. Whilst development corridors provide connectivity and opportunity for development between nodal points and routes of greater importance, strategic links provides connectivity between nodal points and other land uses. Provincial road, D2001 from Lephalale town to Stockpoort and which forms the western boundary of the application site is marked as SL 12. The access road to Marapong, provincial road D2816 which forms the southern boundary of the application site is marked as SL 9. Both are high order roads with specific important functions. Accesses on these two roads are limited to 500 meter intervals and the design of the township was done in such a way that all accesses will be safe with unobstructed sight distance. The function of the two roads as strategic links is therefore respected and enhanced.

The intersection of provincial road D2001 and D2816 is at the south-western corner of the application site and forms a perfect DZAC position in the light of the access to the mine, Marapong and future development further along the Stockpoort provincial road. There are no businesses in the area around this DZAC and will a filling station with a proper kiosk be ideal to develop on this erf. In the design of a township a business erf was created at the intersection of these two strategic links.

The SDF also make provision for Strategic development areas (SDA's) or growth area. SDA's are specific demarcated areas or precincts with unique opportunities to give form to a desired objective, and further represent areas/precincts where future growth opportunities is identified, which includes intensities of development and infill development. In terms of the SDF the provision of housing, especially subsidized housing, in the municipal area should be focused on the higher order nodes and specifically be provided in the SDA's as described herein above.

Marapong which includes the application site falls within SDA 7 where intensities of development and infill development is to be promoted. The principle of infill development is to use space within the delineated development edge and between existing settlements to complete the urban form.

Looking at the application site the approval of this Township will lead to infill development. The township will fill in the undeveloped parts between Marapong Town and the Stockpoort provincial road. Considering the current situation on the application site, Marapong Town forms the eastern boundary, adjacent to what is a vacant undeveloped portion of land zoned Agricultural which ends at the Eskom contractors camp already zoned Residential 4, then the coal conveyor belt, then the Exxaro contractors camp on land zoned Agricultural and then the eastern boundary of the application site which is formed by the Stockpoort provincial road.

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The proposed township respects the existing developments mentioned here and fill in the vacant spaces. In the process a compact town with no vacant spaces is created, which is in line with this principle or concept.

In respect of businesses the SDF stipulates that where business land is created the principles of the hierarchy of shopping centres of the SDF must be followed. Following these stipulations, the scale of development in Marapong allows for the development of a Community Centre. Such centres vary in size of between 12 and 25 hectares, serve mostly suburban communities and are situated with access from a major arterial road. Such a centre normally accommodate a large supermarket, convenience stores, small national clothing outlets, restaurants, take away and other service related businesses.

Provision was made for eight business erven in the township covering an area of ±13.2518 hectare. In the proposed township, this land type was created adjacent and along the access road to Marapong namely provincial road D2816. The erven designed is of adequate size to accommodate the types of shops mentioned in the previous point. As it is along the provincial road and within the high order roads of the township this area will be highly accessible. It also borders on the public open spaces which not only separate it from the residential erven but also make it easily accessible and convenient for pedestrians. Public transport serving Marapong uses provincial road D2816 to convey people between the three settlement areas of Lephalale Town. The approval of this application will therefore enhance the public transport system.

In the planning of this area the size of the proposed erven, the trade area, the number of households served, the service area (radius), travel time, the socio-economic profile of the target market, the difference in household's size, access and public transport was all considered.

One of the many purposes of an SDF is to ensure that all communities have equal access to essential social and community services. Provision was also made in the design of the township for this. Certain land use types were not provided in the town to prevent duplication thereof which will lead to vacant unused land. Where a shortage exists for example a cemetery, provision was made for a cemetery as the existing one in Marapong have reached the end of it lifespan. Provision was also made for a police station erf, crèche and primary school as such land uses do not exist or are in a shortage in the "greater" Marapong.

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SECTION 5: DESCRIPTION OF THE ENVIRONMENT

8. ENVIRONMENTAL COMPONENTS

8.1 ENGINEERING INFRASTRUCTURE

The Engineering Services Report is attached as Annexure O to this EIA Report. The objective of the report is to identify the availability of bulk services required for the development of the proposed Marapong Ext. 7 and to outline the preliminary design (level of service and design standards) of the internal engineering services.

With respect to engineering services the following can be said;

8.1.1 Roads

All roads and stormwater handling facilities will be designed in accordance with the following standards:

- Guidelines for Human Settlement Planning and Design (Red Book)
- Guidelines for the Provision of Engineering Services (Blue Book)
- Guidelines for Lephalale local municipality.

All roads will be tarred. The developer will be responsible for the full cost of the internal Township roads. The developer will also be responsible for the cost of the construction of intersections with main roads. The different types of roads which will be provided within the Township and the design standards are set out in detail in table 4.4.1 of the Engineering Services Report (Annexure O).

Existing Road Access:

Marapong Ext. 7 can be accessed via the Provincial Road D2816 (main access to Marapong), which runs along the southern boundary of the site.

Future Road Access:

A second access road is earmarked in future for the proposed Marapong Ext.7 development in the form of a tarred road, which is going to come off the Provincial Road D2001 to Lephalale and will run along the northern boundary (as indicated on the Layout Plan included in Annexure A).

The future access road will be constructed to prevent congestion on the existing Road D2816 to Marapong.

8.1.2 Stormwater drainage

A Stormwater Management Plan has been compiled and is attached as Annexure N. The proposed development area has a gentle slope to the east with no defined natural drainage channels, except for the manmade channels created to discharge stormwater from both the Matimba Power Station and Marapong Town.

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Main Stormwater Channel:

The proposed development area currently has an existing stormwater diversion channel running across the proposed development area. The discharge into this main stormwater channel originates from the Matimba Power Station. It has also been confirmed that all stormwater originating from the Matimba Power Station is now collected in pollution control dams on Matimba Power Station property and is not discharged into the main stormwater channel any longer.

The current capacity of the channel section of the existing stormwater channel is calculated to be approximately 210m³/s, which is considerably more than the post-development 1:50 year run-off of 24,5 m³/s from the proposed development area.

It is proposed to extend the existing stormwater diversion channel, in order to accommodate and manage stormwater generated from the proposed new township development.

Secondary Stormwater channel:

The proposed development area currently also has an existing secondary stormwater diversion channel running south to north across the proposed development area and which originates from Marapong Town.

The current capacity of the channel section of the existing stormwater channel is calculated to be approximately 75m³/s, which is considerably more than the post-development 1:50 year run-off of 24,5 m³/s from the post-development area.

The constructed stormwater channels (as indicated above) have been incorporated within the proposed township development. These channels have additional capacity to convey stormwater that's going to be generated from the proposed site. The development area will not be affected by both the 1:50 year & 1:100 year flood events.

Stormwater runoff within the development will be managed by a conventional drainage system consisting of open side channels next to streets in conjunction with roadways. The street design will also allow for stormwater management for bigger floods.

The runoff shall be safely discharged into the existing stormwater channels.

Design Standards:

The internal stormwater system has been designed based on runoffs calculated by using the Rational Method.

Standards:

Recurrence Interval: According to road classification in Table 4.4.1 of the Engineering Services Report

Major Channels: Open lined with concrete to handle 1:10 year storm

Minor Channels: 2,0m wide open lined to handle 1:2 year storm

Lined Side Drains: 25MPa concrete on 100mm sub-base

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8.1.3 Water Supply

Bulk Water Supply:

The average daily water demand for the whole development is calculated as 5925kl/day with a peak flow of 274l/s.

The town of Lephhalale is currently getting its bulk water supply from Zeeland WTW. Zeeland WTW has just been upgraded from 20Ml/d to 40Ml/d. However, Marapong township within which Marapong Ext. 7 lies, gets its bulk water supply from the 1.6M l /d Matimba Water Treatment Works located at Matimba Power Station through the 3.5ML and 8Ml Marapong Reservoirs in Marapong. However, the Matimba WTW can no longer meet the water demand of the growing township of Marapong and hence cannot support the additional 6Ml/day demand for the proposed development.

It has been established from the available reports that the upgraded 40Ml/d Zeeland WTW has additional capacity to support future developments in Marapong (which include Marapong Ext 7.) for the 20 year horizon. Bulk water pipeline upgrades to Marapong will be required. The proposed bulk pipeline upgrade starts from Zeeland WTW (800mm in diameter) and runs generally in the northerly direction to supply the proposed industrial development next to Matimba Power Station from where it will be pumped to Marapong Reservoirs via a 315mm diameter pipeline. The 315mm portion of the bulk pipeline traverses along the southern boundary of the proposed development on its way to Marapong. The Lephhalale Municipality is in the process of soliciting funds to construct the pipelines and the project is planned for completion in 2020 (See services confirmation letter from Lephhalale Municipality – Annexure S).

It is clear from above that a dedicated storage will be required for the proposed development. A 2 day storage of 12Ml capacity is therefore being proposed to supply the proposed Housing Development. This will be in the form of two (2) 6Ml reservoirs to be located at the highest elevation of the proposed development (Erf 1 on the Layout Plan). Due to the flat nature of the terrain, an elevated water tank will be built to boost pressure to the proposed development. Initial indications are that a 1.2Ml elevated tank will be required.

It is proposed that supply to the 12Ml storage facility for the proposed development be taped off the 350mm diameter bulk water pumping main discussed above. The tap off will be in the form of a 315mm diameter uPVC pipeline to convey a peak flow of 104l/s.

Internal Services:

It is proposed for that the highest level of service be provided with house connections. All stands will be connected to a comprehensive piped water network to be installed in the street reserves.

The internal water reticulation for Marapong Ext. 7 will be designed for an estimated peak flow of 54l/s and for 144l/s including fire demand. A preliminary layout of the internal water reticulation system for Marapong Ext. 7 is indicated in Annexure D of the Engineering Services Report. The pipe sizes range between 90mm and 450mm in diameter. The bigger diameters being the distribution mains from the reservoir complex and the smaller diameters reticulating inside the proposed development.

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8.1.4 Sewage

The average daily sewage flow from the whole development is calculated as 5303kl/day with a peak flow of 176l/s (refer to section 4.3.2 of this report).

The bulk waste water provisions to the proposed Marapong Ext. 7 development will be provided by Lephalale Local Municipality who are overall responsible for bulk waste water functions.

Existing Bulk Sewer Infrastructure:

Marapong Township currently discharges to two Waste Water Treatment Plants (WWTPs), Nelsonskop (2.4ML/d) and Zongezien (0.5ML/d). This is achieved through pumping via a number of booster pump stations located around Marapong. Also discharging to Nelsonskop WWTP is Matimba Power Station.

The municipality entered into a contract with Ledjadja Coal Mine for reuse of the treated effluent, as the Zongezien WWTP is currently operating over the designed capacity. Ledjadja Coal Mine is going to build a 16ML/d plant next to the oxidation ponds of the Zongezien WWTP which will be able to accommodate the 5.30Ml/day sewage generated from the proposed Housing Development (See services confirmation letter from Lephalale Municipality – Annexure S).

Proposed Bulk Sewer Infrastructure:

The Development of Marapong Ext. 7 currently does not have bulk sewer pipelines servicing it according to the available reports. A bulk sewer pipeline will therefore be required to support this development. The proposed bulk sewer pipeline which is approximately 4.6km long will need to be constructed to the Zongezien WWTP (See layout included in Annexure E of the Engineering Services Report).

The bulk sewer pipeline will be designed for a peak flow of 176l/s and it is estimated that this bulk sewer pipeline will vary in size ranging from 400mm to 500mm in diameter and laid at an average slope of 0.5%. The indications from the preliminary modelling are that the bulk sewer pipeline will be 2.5m deep when it gets to Zongezien WWTP.

Internal Sewer Infrastructure:

All stands in the proposed development will be connected to a gravitational pipe network draining into the proposed bulk sewer pipeline.

A preliminary layout of the internal sewer reticulation system for Marapong Ext. 7 is detailed in Annexure E of the Engineering Services Report. The pipe sizes are estimated to range between 160mm and 250mm in diameter.

8.1.5 Electricity supply

Eskom Electrification Planning Guideline, the CSIR Red Book and NRS 034 give an average power consumption of 2.7kVA per household for low income households, and an

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average annual energy consumption of 165kWh/sq.m¹ is assumed for the Commercial centres, assuming a power factor of 0.9 and load factor of 0.35.

Total demand for the full development is 30.926MVA. Allowing for 25% spare capacity, the total load that needs to be catered for is 38.66MVA for the full development. Currently the area where the development will take place has 22kV lines which traverse the area.

Phases 1 to 4 will be developed from 2019 and completed in 2022.

Bulk Power Supply Options:

Given the amount of power that will be required, 3 power supply options have been put forward. These options will need to be discussed with Eskom, to determine which the preferred power supply option for the development is.

a.) Extend the existing 22kV Lines to cover the whole development This option entails extending the existing 22kV lines to cover the whole development.

b. Extend the existing 132/22kV substations and build new lines to cover the whole development and uprate the 132/22kV transformers.

c. Extend the existing 132kV line network into the new development and create a new 132/22kV substation and build new 22kV lines to cover the whole development.

A meeting was held with Eskom to discuss the 3 options. Eskom will carry out network studies to confirm the technical feasibility of each of the 3 options as well as select the least life cycle cost option of providing power to the proposed development.

Internal Electrical Network:

The electrical network will be overhead, with the service connections to the houses both overhead and underground. Due to the density of this development the partial installation of underground medium voltage cables will be investigated and if financially viable, will be done.

The network will consist of wooden poles, medium voltage ACSR Hare and Fox conductor, distribution class 11kV/415V transformers, and Low Voltage Aerial Bundled Conductor (35mm² and 70mm² sizes) incorporating streetlight conductors. The electrical network will be designed in accordance with the ESKOM Distribution Standards.

Alternative Energy Sources:

The use of alternative energy sources and power savings lamps are strongly recommended. Alternative energy sources that can be investigated include the following:

Solar Energy

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

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Gas Appliances

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

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

8.1.6 Summary and conclusions

The Municipality is in the process of upgrading the water supply to Marapong and the proposed bulk water pipeline will have sufficient capacity to support the proposed development. Construction of this bulk pipeline is earmarked to commence shortly and will be completed well before the first phase of the development is complete.

Commencement of works on the Zongezien WWTW earmarked to commence shortly and the first phase of the upgrades will be completed well ahead of the proposed development. The sewage flows from the proposed development can be accommodated by the Zongezien WWTW once the upgrading works are completed.

The development traffic can be accommodated on the existing road network together with the proposed future access.

8.2 DRAINAGE

The proposed development area has no natural drainage channels. The area currently has an existing stormwater diversion channel running across the proposed development area. The discharge into this main stormwater channel originates from the Matimba Power Station. It has also been confirmed that all stormwater originating from the Matimba Power Station is now collected in pollution control dams on Matimba Power Station property and is not discharged into the main stormwater channel any longer.

The discharge channel (that was constructed to divert any overflow from the Matimba Power Station into the surrounding environment) connects to other first order drainage systems in the area which drains towards the Mogol River, located approx. 14km from the site. The natural drainage of the area was disrupted by the placement of the Matimba Power Station and the drainage channels diverted to allow space for the stormwater original control dams to be constructed in natural occurring depression. These stormwater control dams have been decommissioned and replaced with new ones which are located on Eskom property at the Matimba Power Station. A cut of drain have also been excavated (close to the eastern boundary of the site) from the road northwards to protect the houses east of it from potential flooding. As indicated the stormwater dams located on southern portion of the site is no longer in use and does not contain any water.

The natural drainage on site occurs as sheetwash towards the north east, in the direction of the Mogol River, but due to local disruption of the natural drainage, local flooding of low lying areas can occur after heavy rainfall.

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Stormwater runoff within the development will be managed by a conventional drainage system consisting of open side channels next to streets in conjunction with roadways.

8.3 GEOLOGY, SOILS AND GEO-TECHNICAL SUITABILITY

A Geotechnical Assessment was carried out at the site (See Annexure P). The investigation was undertaken in terms of the normal requirements for township proclamation in which particular attention has to be devoted to the possible presence of expansive clays and/or collapsing sand.

The site is underlain by a sandstone member of the Swartrand Formation for the largest area of the site and in the north eastern corner by the Clarens Formation which is a mostly massive, well sorted, fine grained sandstone separated by the Daarby Fault. The area is covered by a blanket of unconsolidated sand ranging from fine clayey reddish sand to a fine grained yellowish sand up to 3m thick.

The Daarby Fault, which connects the Eenzaamheid and the Zoetfontein Faults has a maximum throw of 300m and a plunges at 55° in a north eastern direction in the vicinity of the site. The fault is however not active.

The geotechnical investigation report made the following findings and recommendations:

- The site is underlain by transported and reworked residual sandstone, calcrete and building rubble fill.
- Four soil profiles have been identified on site:
 - Profile 1: Aeolian sand
 - Profile 2: Reworked residual sandstone
 - Profile 3: Calcrete
 - Profile 4: Uncompacted building rubble fill
- All the trial pits excavated in Profiles 1 and 2, reached the reach limit of the machine without refusal. Refusal on hardpan calcrete was achieved in Profiles 3 and 4.
- The side walls of deep excavations was stable but could collapse if left open for more than a few hours.
- No shallow groundwater conditions were encountered but a seasonal perched water table can be expected in the calcrete profile and the area surrounding the drainage structures.
- Construction materials should be sourced off site.
- No Mining activities past or present will influence the planned structures.
- The geotechnical risk classification for the site is:
 - Profile 1: Class A2 D2, Soil compressibility and collapse potential
 - Profile 2: Class A2 D3, Soil compressibility and collapse potential
 - Profile 3: Class F3 L3, Excavatability and flooding
 - Profile 4: Class D2 F3 L3, Compressible, excavatability and flooding
- The NHRRC Site Class designation for the three profiles are:
 - Profile 1: C1, Modified normal/ compaction of in situ soils below individual footings / deep strip foundations / soil raft
 - Profile 2: C2, Stiffened strip footings, stiffened or cellular raft / deep strip foundations / compaction of in situ soils below individual footings / piled or pier foundations / soil raft
 - Profile 3: R, Reinforced strip foot foundations
 - Profile 4: P, Stiffened strip footings, stiffened or cellular raft / deep strip foundations / compaction of in situ soils below individual footings

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- The cemetery site classification assessment for Soil Profile Areas 1 and 2 indicate that the site is satisfactory but the sidewalls may collapse if left open for too long. Profile areas 3 and 4 is poor due to proximity to watercourses and seasonal high water tables and excavatability.
- Land Use Classification: The majority of the site, Area 3 and 4, and the northwestern part of Area 2 is classified as developable with pre cautions due to the settable characteristics of the soil and the thickness of the soil profile. Area 1 and the area south of the diverted drainage channel on Area 2 is regarded as developable with high risk due to the likelihood of flooding and seasonal perched water levels and the presence of uncompacted fill. Special drainage and flood protection measures are required to develop the area for high density housing.

8.4 CLIMATE

The climate of Lephalale, located 13 km east of Marapong is regarded as representative for the site and normally receives approximately 400mm of rain per year, with most rainfall occurring mainly from October to April. It receives the lowest rainfall (0mm) in June and July and the highest (81mm) in January. The monthly distribution of average daily maximum temperatures indicate that the average midday temperatures for Lephalale range from 22.3°C in June to 31.9°C in January. The region is the coldest during July when the minimum temperature drops to 3.7°C on average during the night.

The Weinert climatic N-number for the area is 6. This indicates that the climate is semi-arid and that physical mineral grain disintegration is predominant.

8.5 FAUNA AND FLORA

An Ecological investigation was conducted which consisted of a study on the Flora (vegetation units) and general Ecology of the site according to guidelines and criteria set by the Department of Environmental Affairs. A concise description of the findings of the mentioned study is presented below (See Annexure Q for the full report).

8.5.1 Flora

The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). The environmental factors delimiting the biome are complex and include altitude, rainfall, geology and soil types, with rainfall being the major delimiting factor. Fire and grazing also keep the grassy layer dominant. The vegetation type occurring on site is described as Limpopo Sweet Bushveld as recently reclassified by Mucina & Rutherford (2005). The conservation importance of the veld type according to Mucina and Rutherford (2005) is "least threatened" with approximately 5% transformed by cultivation and urban and built up areas.

Only one plant community was identified in the area of the proposed township development namely the *Sclerocarya birrea* / *Combretum apiculatum* / *Terminalia sericea* plant community that forms open dense stands of trees up to 10m in height. Trees such as *Acacia tortilis*, *Ziziphus mucronata*, *Spirostachys africana*, *Acacia tortilis*, *Peltophorum africanum*, *Acacia erubescens* and shrubs including *Grewia species* are common. Shrubs such as *Dichrostachys cinerea* (sickle bush) also form dense stands in the northern

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portion of the site. The grass species composition includes grass species such as *Panicum maximum*, *Eragrostis rigidior*, *Digitaria eriantha*, *Brachiaria nigropedata*, *Cenchrus ciliaris*, *Eragrostis pallens* and *Urochloa mossambicensis*. Bush clumps of large *Spirostachys africana* trees occur in the western half of site.

A large part of the site is developed (Eskom contractors camp, old Exxaro contractor's camp and some worker's accommodation) and already disturbed. The vegetation in the eastern portion of the site (area adjacent to Marapong) is in a poor state and this area is used to dump waste as well as cutting of trees for firewood (See Annexure C – Photos). A number of old earth dams occur on the southern part of the site in the *Sclerocarya birrea* plant community.

Only one plant community was identified in the area affected by the sewerage pipeline route namely the *Commiphora pyracanthoides/ Grewia flava* Shrubveld that forms open to dense stands of small trees and shrubs less than 3 m in height. Small trees of *Boscia albitrunca*, *Acacia erioloba* and *Acacia tortilis* are sparsely distributed whilst shrubs of *C. pyracanthoides* are dominant with encroachment of *D. cinerea*, *A. erubescens* and *A. mellifera* in some areas. It is believed that large trees were removed for firewood by the adjacent community of Marapong. Trees such as *Spirostachys africana* bush clumps borders this plant community. The grass species composition includes grass species such as *Panicum maximum*, *Eragrostis rigidior*, *Digitaria eriantha*, *Brachiaria nigropedata*, *Cenchrus ciliaris*, *Schmidtia appophorioides* and *Urochloa mossambicensis*.

No endemic plant species according to Mucina and Rutherford (2005) was identified on the proposed demarcated area. Protected trees according to the National Forest Act of 1998 (Act 84 of 1998) that occur on the proposed site include the following:

<i>Boscia albitrunca</i>	Shepherds' tree
<i>Acacia erioloba</i>	Camel thorn
<i>Adansonia digitata</i>	Baobab
<i>Sclerocarya birrea</i>	Marula
<i>Combretum imberbe</i>	Leadwood

Special care needs to be taken in order for these species not to be disturbed by the development (as far as possible). A permit must be obtained from the Department of Forestry should these trees be removed or cut.

Protected trees in terms of the Limpopo Environmental Act of 1998 (Act 84 of 1998) include the following:

<i>Spirostachys africana</i>	Tamboti
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No Protected trees or plants in terms of section 97 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) was noted.

The following declared weeds and invaders according to the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) have been identified on site:

<i>Agave sisalana</i>	Sisal (Invader – Category 2) in township area
<i>Cereus jamacara</i>	Queen of the night (Weed – Category 1) in township area
<i>Ricinus communis</i>	Caster-oil plant (Weed Category 1) on pipeline route

The proposed township development site was divided into four areas. The site sensitivity in terms of the ecology can be regarded as low in Area 1 (already transformed). The site

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sensitivity can be regarded as low in Area 3 (mostly transformed). The occurrence of other protected trees should also be regarded as special. The site sensitivity of Areas 2 and 4 can be regarded as low to medium although the high occurrence of protected trees has a high sensitivity. The drainage line (manmade) in Area 2 is sensitive regarding the functionality for transport flood water. The dense *Spirostachys africana* woodland in Areas 3 and 4 can be regarded as sensitive. The occurrence of other protected trees should also be regarded as special. The development will be take place within the demarcated area that forms open areas as well as dense areas. The character of the woodland should be kept as part of the mitigation measures during the development to ensure the greening policy of the Limpopo Province is also reflected when development takes place.

The site sensitivity of the pipeline route is regarded as low and of no concern. The plant community scores are low due to the low occurrence of protected trees and the location of the site within the develop area and the area forms part of the infrastructure development. The bush clumps of *Spirostachys africana* trees can be regarded as sensitive. It however falls outside the route. The area near the existing treatment plant subjected to waste pollution is a health risk that needs rehabilitation.

8.5.2 Fauna

A healthy environment is inhabited by animals that vary from micro-organisms to the birds and mammals. The species composition and diversity are often parameters taken into consideration when determining the state of the environment. A comprehensive survey of all animals is a time consuming task that will take a long time and several specialists to conduct. The alternative approach to such a study is to do a desktop study from existing databases and conduct a site visit to verify the habitat requirements and condition of the habitat. If any rare or endangered species are discovered in the desktop study that will be negatively influenced by the proposed development, specialist surveys can be conducted.

- Mammals

Only small game species including duiker and warthogs were observed during the site visit. The site is located adjacent to an existing residential area (Marapong Town).

Large mammals such as elephant, lion, buffalo and rhinoceros species that occurred historically at the site, are absent from the area, owing to anthropogenic impacts in recent centuries. This loss of large species means that the mammal diversity at the site is far from its original natural state not only in terms of species richness but also with regards to functional roles in the ecosystem.

The properties to the north of the site is currently used as game farms and support game species such as kudu, impala, warthog, giraffe and blue wildebeest.

Any animals occurring on site which will be affected by the proposed development will therefore be able to move to the available habitat located to the north of the site. A game management plan will therefore not be required.

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- Avifauna

The main bird habitat system that was identified within the borders of the study site consists of mixed woodland (*Sclerocarya birrea* / *Combretum apiculatum* / *Terminalia sericea* plant community as indicated above).

The woodland biome covers the greater part of Southern Africa, although it is largely restricted to the north and east of the region. Woodland is defined as vegetation with tree cover from sparse to almost closed canopy cover, and generally with a grassy understory. The woodland biome in Southern Africa supports the highest diversity of bird species of all the vegetation types in the sub region. This includes such characteristic and colourful woodland birds as rollers, bee eaters and waxbills, as well as large birds of prey such as vultures and eagles. The Golden-breasted Bunting is apparently unique in being found throughout the entire woodland biome, from the Eastern Cape Province northwards to dry woodland in Namibia, and it is even found in the extremely arid Kalahari. Most other woodland species show complex patterns of presence, absence and changes in relative abundance in the various woodland vegetation zones.

Broad-leaved, winter-deciduous woodlands typically occur on nutrient poor (leached) soils in the wetter (>600 mm/annum) eastern regions compared with acacia woodlands but the two woodland types are often mixed, with acacia woodlands on the alluvial plains and broad-leaved woodlands on the higher slopes. Examples of typical broad-leaved woodland trees are *Combretum apiculatum* and *Faurea saligna*. Broad-leaved woodlands typically show lower bird numbers, but higher bird diversity, than acacia woodlands. Examples of typical broad-leaved-woodland birds are Pale Flycatcher and Green-capped Eremomela. The broadleaved woodland occurring in the study area has quite a higher diversity of birds as a result of the crossover of habitats. Typical examples of broadleaved-woodland birds are Pallid Flycatcher, Greencapped Eremomela, White-bellied Korhaan and Meyer's Parrot.

Acacia dominated, semi-deciduous, fine-leaved woodlands typically occur on nutrient rich, often alluvial, soils in the drier (<650 mm/annum) western regions compared with broadleaved woodlands but the two woodland types are often mixed, with acacia woodlands on the alluvial plains and broad-leaved woodlands on the higher slopes. Acacia woodlands typically show higher bird numbers, but lower bird diversity, than broad-leaved woodlands. Examples of typical acacia-woodland birds are Ashy Tit, Southern Pied Babbler, Kalahari Scrub-Robin, Burnt-necked Eremomela, Barred Wren-Warbler, Marico Flycatcher, Pirit Batis, Crimson-breasted Shrike, Magpie Shrike, Brown-crowned Tchagra, Great Sparrow, White-browed Sparrow-Weaver, Scaly-feathered Finch, Violet-eared Waxbill and Waxbill.

The open disturbed areas occur on small isolated sections of the study area. Bird species such as crowned plovers, crested guineafowls, francolin species as well as the birds of prey and the smaller bird species may utilize these areas. Although this microhabitat is in a degraded state, the area is a popular habitat for bird species, especially as foraging area, while species such as crowned plover and other smaller non-passerine birds can also breed on the ground in this area.

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- Reptiles and Amphibians

Species such as the southern rock python, the black mamba, puff adder, boomslang, vine snake, spotted bush snake and several members of the green snakes (*Philothamnus* spp.) is expected to occur in the study area, although the presence of these snakes is dependent on the presence of their prey species (rodents, frogs etc.). The general habitat type for reptiles consists of open to very dense bushveld, with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks and other reptiles. Arboreal species are the more prominent components of the local herpetofauna.

The amphibians appear to be poorly represented on site. The only near threatened amphibian which has been recorded from the larger area is the giant bullfrog (*Pyxicephalus adspersus*). This species has been recorded from this quarter degree grid cell, while the African bullfrog (*P. edulis*) has not, although one might expect it also to occur here.

- Invertebrates

Insects and spiders are very good indicators of the plant diversity and ecological sensitivity of an area. Butterflies can be used in the field as indicators of biodiversity.

All of the potential invertebrate habitats are well represented by a high family richness of insects and spiders. Spiders occur throughout all the habitats, and both web builders and active hunters find their ways in trapping and actively hunt around for potential food.

A number of invertebrate taxa are currently protected by Schedule B1 of the list of threatened and protected species issued in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 and likely to occur on the study site.

- Red data Species

According to the existing databases the following number of fauna species included in the IUCN red data lists can potentially be found in the study area:

English Name	Conservation Status	Probability of occurrence
BIRDS		
African Finfoot	Vulnerable	Very low
Bateleur	Vulnerable	High
Black Stork	Near Threatened	Medium
Black-winged Pratincole	Near Threatened	Low
Cape Vulture	Vulnerable	High
Collared Pratincole	Near Threatened	Low
Greater Flamingo	Near Threatened	Very Low
Greater Painted -snipe	Near Threatened	Moderate
Kori Bustard	Vulnerable	Medium to high
Lappet-faced Vulture	Vulnerable	High
Lesser Flamingo	Near Threatened	Very Low
Marabou Stork	Near Threatened	Medium
Martial Eagle	Vulnerable	High
Pallid Harrier	Near Threatened	Moderate
Pink-backed Pelican	Vulnerable	Very low

Red-billed Oxpecker	Near Threatened	Medium
Saddle-billed Stork	Endangered	Very low
Secretarybird	Near Threatened	High
Short-clawed Lark	Near Threatened	Medium
Southern Ground-Hornbill	Vulnerable	Low
Tawny Eagle	Vulnerable	High
White-backed Night-Heron	Vulnerable	Low
White-backed Vulture	Vulnerable	High
White-crowned Lapwing	Near Threatened	Medium
White-headed Vulture	Vulnerable	High
Yellow-billed Stork	Near Threatened	Very Low

MAMMALS

African wild dog	Endangered	Low
Black Rhinoceros	Vulnerable	Low
Brown hyena	Near Threatened	Moderate
Cheetah	Vulnerable	Low
Honey badger	Near Threatened	Moderate
Pangolin	Vulnerable	Moderate
Roan Antelope	Vulnerable	Low
Rusty bat	Near threatened	Marginal
Sable Antelope	Vulnerable	Low
Serval	Near Threatened	Low
South African Hedgehog	Near Threatened	Moderate
Spotted Hyaena	Near Threatened	Moderate
Tsessebe	Endangered	Low
Welwitsch's hairy bat	Near threatened	Moderate

HERPETOFAUNA

South African Python	Vulnerable	Moderate
Giant bullfrog	Near threatened	Moderate

INVERTEBRATES

Horned baboon spider	Protected	Moderate
Burrowing Scorpion	Protected	Moderate
Monster Tiger Beetle	Protected	Moderate

Mitigation and management actions for fauna:

The cumulative negative impact of the development on the fauna has the potential to be moderate. However, considering the following general mitigation and management actions taken on site, the impact on faunal populations should be low.

- Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process.
- A speed limit should be imposed on the access roads to minimise road kills. Speed humps should be constructed at strategic places along the access road to enforce lower speeds.
- Roads should be designed without high pavements (as far as possible) to allow for the movement of small mammals.
- Hunting, trapping, poisoning and shooting of animals should be prevented. This will necessitate negotiations with the local inhabitants and informal settlers.
- Do not feed any wild animals on site.

- Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the birds of prey occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist.
- Waste bins and foodstuffs should be made scavenger proof.
- Control of vehicles in and out of the properties involved during construction.
- Camp fires at construction sites must be strictly controlled to ensure that no veld fires are caused.
- Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases.
- Information on the rare species should be provided to workers to make them more aware of these species and their behaviour.

8.5.3 Conclusion

The importance of rehabilitation and implementation of mitigation processes to prevent negative impacts on the environment during and after the development phase should be considered a high priority.

The conservation value and site sensitivity of the proposed township development areas is low to medium except for the unique *Spirostachys africana* closed canopy woodland. The drainage line, although man-made, has an important function in transporting excess water. The high abundance of other protected trees can be regarded as special and should selectively be removed, if necessary, to ensure an open woodland appearance for the housing development plan. The conservation value and site sensitivity of the sewerage pipeline route is low except for the unique *Spirostachys africana* bush clumps that is north of the route.

The following is recommended:

- Development should blend in the open woodland plant community.
- All protected trees and other large trees should be left intact as far as possible.
- Sensitive areas should be conserved.
- Waste water spill on approximately 5 ha, adjacent to the Wastewater Treatment Plant and south of the route, should be restored and treatment should be implemented as this is a health risk.

The unique *Spirostachys africana* closed canopy woodland has been incorporated in the proposed township layout plan – Grey areas on attached Layout Plan (Annexure A) and will be preserved as far as possible.

8.6 CULTURAL/HISTORICAL ATTRIBUTES

An archaeological-cum-heritage (including the palaeontological Heritage Impact) assessment was conducted to ascertain whether there are any remains of significance in the area that will be affected by the proposed township development and associated sewerage pipeline. See report attached as Annexure R.

The following findings and recommendations are given in the report:

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No raw material suitable for stone tool manufacture occurs in the study area and no ceramics or stone walls attributed to the Iron Age were recorded within the study area. No further mitigation is recommended in terms of Section 35 of the National Heritage Resources Act of 1999 (Act 25 of 1999) for the proposed development to proceed.

In terms of the built environment of the area (Section 34), no standing structures older than 60 years occur within the study area. From the 1943 topographic map of the study area it is clear that no features of significance occurred in the area.

In terms of Section 36 of the Act no burial sites were recorded. However if any graves are discovered in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No public monuments are located within or close to the study area. The proposed development will not impact negatively on significant cultural landscapes or viewsapes. During the public participation process conducted for the project no heritage concerns was raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following chance find procedure are implemented as part of the EMP and based on approval from SAHRA:

Chance find procedure:

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Palaeontological Heritage:

Any negative impacts to the palaeontological heritage of the region will be limited to the footprint area of the construction activities and, as such, the extent of any impact is accordingly characterised as local.

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The construction of the proposed township extension will primarily affect the Cenozoic regolith, with a reduced possibility of any effects occurring to the strata of the Karoo-age Swartrant and Clarens Formations. This assumption is based on the expectation that the planned infrastructure is expected to have relatively shallow impacts (i.e., < 3 m) and should mostly affect the Cenozoic regolith due to its extensive and thick occurrence throughout the region. Where the construction activities impact directly upon the Cenozoic regolith or Clarens Formations the probability of any negative impact upon the palaeontological heritage of these units is assessed as low. In those locations where the Swartrant Formation will be impacted the probability of any negative impact upon the palaeontological heritage is assessed as being medium. The rocks of the Letaba Formations are unfossiliferous and, as such, any disruption of these units will result in nil possibility of any negative impact upon their palaeontological heritage.

Despite the characterisation of the risk of a negative impact resulting upon the palaeontological heritage of the either the Cenozoic regolith or Clarens Formation being assessed as low and that of the Swartrant Formation being assessed as medium any fossil materials that they may contain will potentially be of high scientific and cultural importance. It has been identified that the underlying strata of the Karoo Supergroup and the Cenozoic cover sequences are fossiliferous elsewhere in South Africa. As such, fossils are potentially present beneath the planned construction project (particularly in the Karoo Supergroup which is completely covered by the regolith and, as such, could not be directly investigated). Any damage, destruction or inadvertent movement of these fossils will result in permanent and irreversible damage. Similarly, any fossil materials that remain undiscovered after the construction of the project and which are located beneath the maximum depth of the anticipated excavations associated with the construction will only be negatively affected in so far as they will be unavailable for scientific study for the life expectancy of the infrastructural elements that comprise the project.

The potential negative impact to the palaeontological heritage of the area can be minimised by the implementation of appropriate mitigation processes. It recommended that:

- An appropriate staff member (e.g., the environmental officer) of the company responsible for the construction process be trained in recognition of the types of fossils that may be expected to be encountered in the envisioned excavations.
- The relevant employee should make regular and thorough examinations of all excavations that occur within the sediments of the Karoo Supergroup and Cenozoic regolith.
- Should any fossil materials be identified, the excavations in that area should be halted in that location and SAHRA informed of the discovery.
- A palaeontologist must then be appointed by the company to evaluate the fossil deposits and make the necessary recommendations regarding damage mitigation of the fossils materials.
- The excavations associated with the project should be inspected by a palaeontologist 3 times a year (i.e., once every 4 months) while they are occurring to ensure that no fossil materials are being damaged or destroyed.

The social benefits of the project have been classified as beneficial, herein, as the project aims to provide low cost housing to low-income people. As such, the study has not

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identified any palaeontological reason to prejudice the construction of either the Marapong Township extension project, subject to adequate mitigation programs being put in place.

8.7 VISUAL ENVIRONMENT

The surrounding visual environment of the area to be developed for the proposed township can be described as follows:

- The existing Marapong town is located towards the east directly adjacent to the application site.
- Provincial road D2816 (main access road to Marapong) is located to the south of the site and forms the southern boundary of the site.
- The Matimba Power Station is also located to the south of the site opposite road D2816 (approx. 800m from the site).
- Provincial road D2001 (road between Lephalale and Stockpoort) forms the western boundary of the site.
- The area opposite road D2001 is not used for any specific purposes although it forms part of the Grootegeluk Coal Mine area. The railway line serving the mine also runs over this portion.
- The area to the north of the proposed development site belongs to Exxaro and is used for game farming. The Nelsonskop sewage works is located \pm 1.5 kilometers north of the application area.

The potential of the proposed development to impact negatively on the character of the area is anticipated to be minimal, due to the already developed nature of the surrounding areas. It is also important to note that an area within the proposed area is already used for residential purposes (Eskom contractor's village).

Change of land use from relatively natural veld to a suburban environment will occur. This must however be seen in the context of the existing developments located to the south (Matimba Power Station) and east (Marapong Town).

The development of a township that is similar in nature of the already developed areas to the east (i.e. existing Marapong town) will serve to lessen the overall negative impact on the environment.

The topography of the area is also relatively flat and long distance view to and from the proposed township will not be possible.

Mitigation measures to reduce the visual impact of the proposed development include;

- Communal facilities in the proposed development should be designed so as to blend in with the prevailing architectural character of the area.
- Excessive loss of vegetation should be avoided. Especially existing indigenous trees should be retained where possible especially within street reserves, parks and other communal facilities.

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SECTION 6: DESCRIPTION OF ENVIRONMENTAL ISSUES IDENTIFIED

9. ENVIRONMENTAL ISSUES AND EVALUATION OF IMPACTS

9.1 METHODOLOGY FOR ASSESSMENT OF IMPACTS

This section examines key issues/impacts which may be predicted to occur as a result of the proposed development. Where necessary, proposals for mitigation or optimisation of an impact will be noted. A brief discussion of the impact and the rationale behind the assessing of its significance is also included in this section.

The team of consultants/specialists identified potential issues and reached consensus regarding the significance and duration of potential negative and positive impacts. During the assessment of impacts, the following was taken into account:

- the extent,
- the duration,
- the intensity (positive/detrimental and minor/moderate/major),
- the probability, and
- the significance of impacts.

Each impact was assessed according to the project stages, viz;

- site preparation/construction, and
- operation.

An impact of “low significance” will have only a limited affect on the environment, whereas an impact of “high significance” will have a major impact on the environment.

A “positive impact” is one which enhances the existing environment, whereas a “negative impact”, is one which degrades the environment. Where impacts are of high or low significance, the degree of probability has been evaluated and includes the terms “definite”, “probable”, “possible” or “improbable”.

The assessment of the effects of an impact hereunder assumes that mitigation measures have been implemented. If this is not done a range of negative impacts will have a greater effect and positive impacts would not be enhanced.

The duration of an impact is assumed to be short term (less than one year); medium term (one to three years) and long term (beyond three years). Sensitive or vulnerable environments or features as well as secondary and cumulative impacts were also taken into account during evaluation of impacts.

Interested and affected parties were also consulted and their concerns were addressed as potential issues. Impacts that may arise during the different stages of the proposed project lifecycle are addressed below in this section and the mitigatory measures recommended in the attached Environmental Management Programme (Annexure U).

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9.2 DESCRIPTION OF KEY ISSUES

Certain actions will take place during the planning & construction and operational phases of the proposed development, which relate to the environment. These actions have potential to impact on adjacent land uses and the natural environment.

In view of this a preliminary list of potential environmental impacts (issues) were identified – these issues can be summarized as follows:

- a) Potential for the proposed development to impact on the biological environment (i.e. fauna & flora) - especially red data species, biological communities, bio-diversity, etc.,
- b) Potential for the proposed development to impact on the current utilisation of the application property,
- c) Availability of engineering infrastructure to support the sustainability of the proposed development (water, sewerage, solid waste, stormwater, electricity, roads and others),
- d) Potential for the proposed development to impact upon current adjacent land uses (i.e. **during construction** e.g. nuisances, erosion, pollution, etc.),
- e) Potential for the proposed development to impact upon current adjacent land uses (i.e. **after establishment** e.g. social conflicts, pollution, visual quality of the landscape, waste generation, architectural styles/customs, etc.),
- f) Potential for the proposed development to impact on heritage resources,
- g) Potential for the proposed development to impact on the physical environment (air e.g. dust, water e.g. increased storm water, land e.g. soil compaction),
- h) Potential for the proposed development to impact on "quality of life" and character of the surrounding area,
- i) Potential for the proposed development to impact on accessibility & traffic patterns,
- j) Potential for the proposed development to impact on natural resources (specifically the agricultural potential of the land),
- k) Potential for the proposed development to contribute to "urban sprawl"/incremental development and urban densification,
- l) Potential for the proposed development to create waste, pollution, etc.,
- m) Potential for the proposed development to provide improved access to engineering services,
- n) Social dimensions of the proposed development (e.g. crime, security management, etc.).

9.3 DEFINABLE IMPACTS – CAUSES, DESCRIPTION, EVALUATION & MITIGATION

9.3.1 Planning & construction phase impacts

9.3.1.1 Introduction

During the construction phase (i.e. during the installation of the engineering services, there will be severe impacts on the bio-physical environment). Special care should be given to protected trees.

Ideally flora such as medicinal plants and firewood should be removed by local traditional healers prior to construction if possible. Large trees should be retained where possible. Unnecessary removing of vegetation from areas which will not be utilised, should be avoided at all costs.

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Contractors should remove all waste generated by themselves during the construction period and it should be disposed of at a suitable solid waste disposal site – “dumping in the bush” should not take place.

Concerns are likely to range around the impacts caused by;

- destruction of habitat/biodiversity,
- construction traffic in and around the construction site (e.g. heavy vehicles delivering materials for construction),
- noise and air pollution, and
- the security of adjacent properties (e.g. children).

9.3.1.2 Predicted planning & construction phase impacts (negative impacts)

- a) Primary impact component: Natural environment
Secondary impact component: Biological environment (vegetation)
Potential impact:
The destruction of natural vegetation during initial investigations, due to induced vehicular movement e.g. surveyors vehicles etc.
Significance/certainty: Low, Probable.
Spatial influence: The site.
Duration: Short term.
Mitigation / Optimisation: Existing tracks/roads should be used when accessing the site for planning purposes. Sampling rather than removal of existing plant material should take place (and then only if essential).
Discussion: The immediate proximity of other available habitat means that this impact is of low significance.
- b) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Risks & hazards – Effects in the workplace
Potential impact:
Potential injury to construction workers
Significance/Certainty: Moderate, Possible
Spatial influence: Local
Duration: Short term
Mitigation/Optimisation: Implementation of safety measures and work procedures and first aid facilities should be required of contractors.
- c) Primary impact component: Social environment
Secondary impact component: Direct project inputs – Public safety
Potential impact:
Unsocial activities at construction site (e.g. crime)
Significance/Certainty: Moderate, Possible

Spatial influence: Site and immediate surrounding residential areas.

Duration: Short term

Mitigation/Optimisation: Appointed contractors should be required to implement security measures at construction camps/material laydown areas. Security gate control measures should be implemented in order that only labourers and authorised persons obtain access to the construction camps/material laydown areas.

Discussion: Unfenced construction camps/material laydown areas may present a greater security risk – such sites should be fenced/secured.

- d) Primary impact component: Infrastructure and community services
Secondary impact component: Infrastructure services – transport (local roads)
Potential impact:

Construction traffic and access

Significance/Certainty: Moderate, Probable.

Spatial influence: Local.

Duration: Medium term.

Mitigation / Optimisation: Damping down of unsurfaced roads should take place. Trucks should avoid travelling unnecessarily through residential areas or private land.

Discussion: Adverse impacts from construction traffic can be minimised by good planning and by effectively controlling site activities. Construction routes should be clearly defined and sign posted. Working hours to be controlled by site engineer. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).

- e) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Existing pollution/environmental degradation - impact of noise
Potential impact:

Impact of construction noise on adjacent residential areas

Significance/Certainty: Moderate, Possible.

Spatial influence: Construction site and immediate adjacent areas.

Duration: Medium term.

Mitigation / Optimisation: Keep residents of surrounding properties informed if any unusually noisy activities are planned. Noise impacts are reduced

over distance at a rate of 1db (decibel) per 13 metres. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).

- f) Primary impact component: Natural environment
Secondary impact component: Earth/land – compressive strength of soils
Potential impact:
Construction impacts on soils (upsetting of soil horizons through groundworks and/or compaction by vehicles)
 Significance/Certainty: Low to moderate, Definite.
 Spatial influence: Construction site and immediate adjacent areas.
 Duration: Long term.
 Mitigation / Optimisation: Selective stripping of topsoil, subsoil and overburden should take place. Stockpiling of removed earth (separately) should take place and be returned for backfilling in the correct soil horizon order. In all construction areas (e.g. material laydown areas), topsoil and subsoils should be protected from contamination/pollution (e.g. by fuel etc.). Stockpiling of removed earth should not occur in drainage lines or impede surface water runoff.
 Discussion: Potential contaminants such as fuel stores (“skid tanks”) should be carefully sited with adequate spillage containment measures.
- g) Primary impact component: Natural environment:
Secondary impact component: Water underground – quality of groundwater
Potential impact:
Pollution of groundwater
 Significance/Certainty: Low, Unlikely
 Spatial influence: Local.
 Duration: Medium to long term.
 Mitigation / Optimisation: Controlled usage and or storage of all fuels and chemicals during construction is advised. Due to very limited amounts of the aforementioned substances being used during construction, leaching thereof into the underground water is highly unlikely. Adequate fuel containment facilities should however be used. Adequate sanitary facilities and ablutions must be provided for construction workers.
 Discussion: The potential degradation of groundwater is unlikely to result from construction activities.

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- h) Primary impact component: Natural environment:
Secondary impact component: Earth/land - erosion
Potential impact:
Soil erosion due to vegetation clearance
Significance/Certainty: Low to moderate, Possible.
Spatial influence: Construction site and adjacent areas.
Duration: Medium to long term.
Mitigation / Optimisation: When soil is cleared of vegetation, management techniques to prevent water erosion should be employed (e.g. reduction of water velocity and the diversion of surface water runoff down slope).
Discussion: The area in general possesses a low to medium risk for erosion (this will be increased if grass cover is removed for construction purposes). The congregation of storm water should be avoided.
- i) Primary impact component: Natural environment:
Secondary impact component: Biological environment - vegetation
Potential impact:
Damage to flora due to site clearing
Significance/Certainty: Moderate to high/Definite.
Spatial influence: Site and immediate adjacent areas.
Duration: Short term threat, but damage permanent.
Mitigation / Optimisation: Existing indigenous trees should be retained where possible. Great emphasis should be placed on retaining large and protected trees. Excessive loss of vegetation should be avoided. Vehicular access should be restricted to essential areas only. Grass occurring on and near construction sites should be retained where possible, to assist in retarding erosion. During excavations, the area that is disturbed should be kept as small as possible, so as to minimise disturbances to the environment.
Discussion: The potential for the significant alteration of habitats resulting from the proposed development of the township is high. The area resembles a pristine state only to a certain extent - as certain areas are already developed (Eskom contractor's camp) or was disturbed by past activities (old Exxaro contractors camp) and other parts has been subjected to wood chopping and dumping of household waste, etc.

- j) Primary impact component: Natural environment
Secondary impact component: Biological environment - vegetation
Potential impact:
Plant collection, utilising of trees for firewood, etc. by construction workers
Significance/Certainty: Low to moderate, Possible.
Spatial influence: Construction site and immediate surrounding areas.
Duration: Short term.
Mitigation / Optimisation: Effective site control and monitoring by site engineer should take place.
Discussion: No fires should be allowed on site except in designated areas. Access to the site should be controlled - local disadvantaged residents should be allowed to collect firewood (only where bush is to be cleared).
- k) Primary impact component: Natural environment:
Secondary impact component: Biological environment - animals
Potential impact:
Hunting and capture of birds and other fauna by construction workers
Significance/Certainty: Moderate, Possible.
Spatial influence: Site and local.
Duration: Short term.
Mitigation / Optimisation: Capture or snaring of birds or other fauna must be strictly prohibited on site - especially w. r. t. contractors' employees.
Discussion: Birds (e.g. guinea fowl and francolin) might be snared - this must be prevented. Fauna (especially avifauna) may be temporarily displaced from the area during construction due to the noise and activity. The immediate proximity of other available habitat towards the north means that this impact is of moderate significance.
- l) Primary impact component: Natural environment
Secondary impact component: Biological environment - vegetation
Potential impact:
Proliferation of alien plant species during and after construction
Significance/Certainty: Low to moderate, Possible.
Spatial influence: Construction site and immediate surrounding areas.
Duration: Short to medium term.
Mitigation / Optimisation: Regulation 15 of the Act on the Conservation of Agricultural Resources (as amended), Act No. 43 of 1983, determines that the establishment of declared weeds

and invasive plants during and after development should be prohibited. It is recommended that alien species be removed and destroyed, preferably burned, before commencement of any construction activities.

Discussion:

The removal of exotic plants including declared weeds and invaders i.e. *Agave sisalana* (Sisal) & *Cereus jamacara* (Queen of the night), could be a positive result of the proposed development.

- m) Primary impact component: Land use and landscape character
Secondary impact component: General – aesthetic quality
Potential impact:

Visual impact of construction activities

Significance/Certainty: Moderate, Possible.
 Spatial influence: Local.
 Duration: Medium term.
 Mitigation / Optimisation: Retain as many existing trees as possible to screen construction works.

Discussion:

Change of land use from natural (disturbed) veld to a construction site will occur. This must however be seen in the context of the fairly short duration of the construction phase. Construction activities should be kept clustered on site at all times.

- n) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Pollution/environmental degradation
Potential impact:

Impact of nuisances resulting from construction (e.g. dust, smoke & noise)

Significance/Certainty: Moderate, Possible.
 Spatial influence: Construction site and areas immediately adjacent to the site.
 Duration: Medium term.
 Mitigation / Optimisation: Damping down of graded roads and cleared areas should take place during construction. As much natural vegetation should be retained as is possible (especially natural occurring trees). As a mitigatory measure, construction should be limited to normal working hours. Construction shall be restricted to limited working hours (6h00 to 17h00 from Monday to Saturdays only). No work shall

be conducted on Sundays. Adjacent residents shall be informed of unusually noisy activities that will be undertaken. Works instructions shall be issued regarding the minimisation of noise to all workers (especially those using noisy equipment).

Discussion:

Construction activities could create larger amounts of atmospheric dust, thus causing a nuisance when it settles on adjacent properties.

- o) Primary impact component: Socio-Economic environment
Secondary impact component: Historic/cultural characteristics
Potential impact:

Uncovering of heritage or archaeological sites/resources/graves

Significance/Certainty:

Moderate to high, Possible.

Spatial influence:

Construction site

Duration:

Short to medium term.

Mitigation / Optimisation:

In the case of an archaeological/heritage resources "find", all excavation work should be halted and a heritage resources practitioner should be consulted (or alternatively the nearest SAHRA office). If found, graves shall be relocated in accordance with the stipulations of the South African Heritage Resources Act and its relevant regulations pertaining to graves.

Discussion:

An archaeological/heritage resources survey has been conducted (See Annexure R). No sites or finds with heritage value or significance were identified in the indicated study area.

- p) Primary impact component: Natural environment:
Secondary impact component: Biological environment – natural watercourses
Potential impact:

Development within floodline area

Significance/Certainty:

High, Unlikely

Spatial influence:

Site.

Duration:

Short term, damage permanent.

Mitigation / Optimisation:

The detailed analysis of the development revealed that the total catchment upstream is approximately 2,5km² (See Annexure N – Stormwater Management Plan). This implies that the delineation of the 1:50 & 1:100 year floodlines is not required as set out in the National Water Act (Act No. 36,

1998), as the catchment is less than 5km². The proposed town planning development layout was planned in such a way that the (manmade) storm water channels are excluded and far away to prevent flooding (See Annexure A – Layout Plan). Stormwater runoff within the development will be managed by a conventional drainage system consisting of open side channels next to streets in conjunction with roadways.

Discussion:

The development area will be not be affected by both the 1:50 year & 1:100 year flood events.

9.3.1.3 Predicted planning & construction phase impacts (positive impacts)

- a) Primary impact component: Social environment
Secondary impact component: Community social organization - Distribution of resources

Potential impact:

High positive expectations regarding employment opportunities

Significance/certainty: Moderate, Definite.

Spatial influence: Local.

Duration: Medium term.

Mitigation / Optimisation: Local employment and procurement should receive priority when embarking upon planning and construction activities.

Discussion: Contractors should be required to make use of local labour and suppliers where possible. The proposed development will enable the local authority to levy rates and taxes on the proposed erven, thus enabling it to extend its engineering infrastructure networks in the area, to the benefit of its residents.

- b) Primary impact component: Socio-Economic environment
Secondary impact component: Direct project inputs - employment

Potential impact:

Temporary employment creation

Significance/Certainty: High, Definite.

Spatial influence: Local and sub-region.

Duration: Medium term.

Mitigation / Optimisation: Where appropriate, labour intensive construction methods should be used. Where possible training of labour should take place to improve benefits to individuals well beyond this project. Use of emerging contractors should take place where possible.

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9.3.2 Operational phase impacts

9.3.2.1 Introduction

The most significant (potential) environmental impacts during operation of the proposed township relate to effects resulting from;

- solid waste disposal,
- sewerage,
- lighting,
- resulting noise,
- induced traffic.

Basic requirements (considerations) for minimising the above include:

- Identifying potential impacts and already providing for them during the planning phase of the development,
- Appropriate site planning (considering factors such as sensitive biological communities/areas, catchments, etc.),
- Early hazard assessment (heavy rains, floods, earthquakes, etc.),
- Selection of appropriate mitigation measures (e.g. through implementation of adequate engineering and/or other measures),
- Consideration of long-term measures that would contribute towards (environmental) sustainability of the proposed development (e.g. prohibiting certain actions within the township, etc.),
- Regular monitoring of potential environmental threats (e.g. the introduction of alien plants, pedestrian access to biologically sensitive areas, etc.).

9.3.2.2 Operational phase impacts (negative)

a) Primary impact component: Socio Economic environment

Secondary impact component: Land use potential

Potential impact:

The proposed township will impact on the potential to utilise the application property for other purposes (e.g. agriculture, etc).

Significance/Certainty: Moderate, Definite.

Spatial influence: Local.

Duration: Long term.

Mitigation / Optimisation: -

Discussion: Development of the proposed township will eliminate the current as well as any potential (future) agricultural use of the property. Although the application properties are used for farming purposes

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the application site / township area is not used for such purposes. Part of the site is already used for housing purposes i.e. Eskom contractor's camp. The proposed development will therefore not affect food production. The application properties especially the application site is not classified as high potential or unique agricultural land. The Department of Agriculture regard the application properties as agricultural land with marginal production value. The carrying capacity is 9 to 13 hectares per large stock animal unit (cattle). The development site can therefore only accommodate approx. 20 large stock animal units. The planting potential is also low. The proposed township will therefore not compromise valuable agricultural land. Other portions of the application site with zonings like Residential 4 and Special and which is used for purposes of contractor's camps and infrastructure services is also excluded from agricultural. The total area of the application site which is affected by other land uses are ± 141.7 hectares leaving ± 78.8 hectares of agricultural land. The township therefore has a small influence on low potential agricultural land.

- b) Primary impact component: Social environment
Secondary impact component: Community social organization
 Potential impact:
Potential for the proposed development to impact on the character of the surrounding area and the visual quality of the landscape
 Significance/certainty: Low to moderate, Definite.
 Spatial influence: Local.
 Duration: Long term.
 Mitigation / Optimisation: The development of a township that is similar in nature of the already developed areas to the east (i.e. Marapong town) will serve to lessen the overall negative impact on the environment. Communal facilities in the proposed development should be designed so as to blend in with the prevailing architectural character of the area.
- Discussion: Change of land use from relatively natural veld to a suburban environment will occur. This must however be seen in the context

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of the existing developments located to the south (Matimba Power Station) and east (Marapong Town). The potential of the proposed development to impact negatively on the character of the area is anticipated to be minimal, due to the already developed nature of the surrounding areas.

- c) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Existing pollution/environmental degradation – generation of waste

Potential impact:

Generation of waste by the proposed development

Significance/Certainty: Moderate, Definite.
 Spatial influence: Site.
 Duration: Long term.
 Mitigation / Optimisation: The Zongezien WWTP will be upgraded to 16Ml/d and will be able to accommodate the 5.30Ml/day sewage generated from the proposed development. It is foreseen that a proposed bulk sewer pipeline will be constructed to connect the proposed development with the Zongezien WWTP. Solid waste should be dumped at the municipal dumping site. The Municipality is responsible for the disposal of solid waste of its proclaimed township areas.

Discussion: An engineering services agreement will be entered into between the local authority and the developer regarding this aspect. Disposal of waste is regulated by the by-laws of the local authority.

- d) Primary impact component: Infrastructure and community services
Secondary impact component: Infrastructure services – transport (local roads)

Potential impact:

Congestion along access roads leading to the development area

Significance/Certainty: Moderate to High, Probable.
 Spatial influence: Access roads leading to the development area
 Duration: Long term.
 Mitigation / Optimisation: Implement traffic engineering measures to ensure effective traffic flows. Entrances to the site should be designed according to suitable civil engineering in accordance with the specifications of the local

municipality's department/section overseeing traffic engineering (especially along the access roads, which links the site with Lephalale town).

Discussion:

The proposed development will contribute to more trips along the main access roads (road D2816 and D2001). A second access road is earmarked in future for the proposed Marapong Ext.7 development in the form of a tarred road, which be connecting to Provincial Road D2001 to Lephalale and will run along the northern boundary of the site. The future access road will be constructed to prevent congestion on the existing Road D2816 to Marapong.

- e) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Existing pollution/environmental degradation – lighting

Potential impact:

Impact of additional lighting in the area (e.g. through installation of street lights and lighting at communal facilities)

Significance/Certainty:

Moderate, Possible.

Spatial influence:

Site and immediate adjacent areas

Duration:

Long term.

Mitigation / Optimisation:

The potential impact of street lighting upon houses in the adjacent areas should be minimised by directing lighting downwards and away from adjacent houses.

Discussion:

Lighting is deemed desirable from a security management point of view. This will also facilitate safer traffic movement at night.

9.3.2.3 Operational phase impacts (positive impacts)

- a) Primary impact component: Infrastructure and community services
Secondary impact component: Infrastructure services – utilisation of land and infrastructure.

Potential impact:

Development of the proposed township will impact positively on the local economy and land values

Significance/Certainty:

High, Definite.

Spatial influence:

Local.

Duration:

Long term.

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Mitigation / Optimisation:

None

Discussion:

Change of land use from (relatively) natural veldt to a suburban environment will occur. This must however be seen in the context of the existing residential area that are located in the adjacent area. The proposed development will contribute towards the strengthening of the character (as it will be in concert with the existing character of the surrounding areas).

b) Primary impact component: Infrastructure and community services

Secondary impact component: Infrastructure services – utilisation of land and infrastructure.

Potential impact:

Development of the proposed township contribute to urban densification as it will lead to more intensive utilisation of land and infrastructure and subsequently to “economy of scale”

Significance/Certainty:

High, Definite.

Spatial influence:

Local.

Duration:

Long term.

Mitigation / Optimisation:

-

Discussion:

The development of the proposed township will contribute to urban densification, as it will lead to the more intensive utilisation of vacant land and existing engineering infrastructure in the area. The proposed development will accommodate approximately 744 erven – the proposed development will facilitate the more intensive use of land than is currently the case. This is highly desirable as land is considered a scarce commodity in the urbanised environment. The proposed development will facilitate the more intensive utilisation of existing bulk engineering infrastructure in the area – this is highly desirable, as it lessens the operational unit costs of this infrastructure (i.e. maintenance costs, etc.). This is due to the fact that more individual residential units will make use of the same infrastructure (the result is economy of scale – which directly benefits the local authority and subsequently its ability to provide engineering services to its residents). The local authority will also be advantaged by the proposed development as it would be able to levy rates and taxes on the proposed erven, thus enabling itself to extend its engineering infrastructure networks in the area.

- c) Primary impact component: Infrastructure and community services
Secondary impact component: Infrastructure services – housing
Potential impact:
Development of the proposed township will contribute towards providing housing in the Marapong area
- | | |
|----------------------------|---|
| Significance/Certainty: | High, Definite. |
| Spatial influence: | Local. |
| Duration: | Long term. |
| Mitigation / Optimisation: | Development of the proposed township will contribute to urban densification as it will lead to the more intensive utilisation of land and infrastructure. |
| Discussion: | The natural population growth and increase in job opportunities is currently outstripping the rate at which housing is supplied by the local authority. The proposed development will mean that approximately 744 erven can be developed. |

9.3.3 Decommissioning phase

Should the site for any reason be closed, an Environmental Management Programme shall be submitted to DEDET for approval.

SECTION 7: ALTERNATIVES

10. DESCRIPTION OF ALTERNATIVES

10.1 IDENTIFYING ALTERNATIVES

The IEM procedure (Department of Environmental Affairs) stipulates that the environmental investigation needs to consider feasible alternatives for proposed developments. This means that for any one development proposed there should consist of a number of possible proposals or alternatives for accomplishing the same objectives or meeting the same need. These guidelines suggest that alternatives be evaluated according to the following criteria:

- location,
- demand,
- activity,
- process,
- scheduling, and
- input.

The environmental assessment practitioner embarked on an extensive analysis of “feasible” alternatives as part of this EIA - an account of the alternatives that have been considered, is provided below.

During the scoping phase a number of alternatives have come to light - some alternatives were already known prior to the scoping phase and some came to light during the specialist investigations that have been conducted. Hereunder a description is given of such feasible alternatives.

Alternatives are discussed in the following manner;

- the extent and significance of each identified environmental impact (only “significant issues”), will be elaborated upon, and
- the possibility for mitigation of each identified environmental impact will be elaborated upon.

In each instance below, the identified alternatives that are provided are linked to a number of significant potential impacts that might result from the proposed development.

For clarification purposes, the writer will first define the following terms, in order that the reader has a clear understanding what is meant by these terms.

- *alternative,*
- *mitigation.*

Alternative: *A possible course of action, in place of another, that would meet the same purpose and need (of a proposal). Alternative proposals can refer to any of the following but are not limited to:*

- *alternative sites for development,*

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- alternative projects for a particular site,
- alternative site layouts,
- alternative designs,
- alternative processes,
- alternative materials.

Mitigation: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of a proposed action. Proposed mitigation measures can influence (reduce) the significance of an impact (if designed and implemented correctly). Mitigation should specify how, where and when measures to reduce adverse impacts or enhance beneficial impacts, should be implemented.

10.2 LOCATION ALTERNATIVES

10.2.1 Introduction

Location alternatives were considered on account of the following impacts that might result from the establishment of the proposed township:

- **Impact / Issue:** Impact resulting from damage to fauna & flora.
- **Impact / Issue:** Impact upon the visual environment (visual resource) and “sense of place”.
- **Impact / Issue:** Proliferation of development (urban sprawl).
- **Impact / Issue:** Various impacts resulting from development within floodline area.

The extent of the above impacts are respectively: **Immediate, Immediate adjacent areas, Sub-regional & site.**

The significance of the above impacts are respectively: **Medium, Low-Medium, Low & Medium**

10.2.2 Feasible alternatives

Alternative positions (locations) for the components of the proposed township were considered based on the biophysical attributes of the area where the township is to be developed.

Strictly it cannot be said that location alternatives had been assessed “rigorously” mainly due to the fact that the proposed township is located directly adjacent to an existing residential area.

There are a number of factors pertaining to the site which endorses (supports) the proposed development namely;

- existing engineering services (i.e. bulk connector services such as water, electricity & access roads, are available and can be connected to fairly easily (refer Engineering Services Report – see Annexure O),
- enough space for the housing project is available (sufficient land is available),
- the condition of the site (in terms of geo-technical suitability), is of such a nature that it can be developed (refer Geotechnical Assessment Report – see Annexure P),

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- the proposed development is in concert with the policy of the local authority,
- The unique *Spirostachys africana* closed canopy woodland has been incorporated in the proposed township layout plan – Grey areas on attached Layout Plan (Annexure A) and will be preserved as far as possible.
- unnecessary stressing/impacting of the environment can be mitigated through the implementation of the recommendations contained in this document.

When different development alternatives were analysed, it came to light that the location of the components of the development (e.g. roads, parks, communal facilities, etc.), are bound to have the same environmental impact, no matter where they are located. In view of this it was decided to provide for the following alternative courses of action in order to minimise impacts on flora;

- Excessive loss of vegetation should be avoided. Especially existing indigenous trees should be retained where possible especially within street reserves, parks and other communal facilities;
- Natural occurring grasses should be retained on these erven so as to minimise disturbance to the environment as far as possible.

The following alternative courses of action should be implemented in order to minimise impacts on natural storm water flows;

- Storm water that originates on the site will be channelled via a conventional drainage system consisting of open side channels next to streets towards the adjacent manmade drainage channel
- The construction of suitable outlet structures (i.e. where collected stormwater will be discharged into water courses/existing storm water channels), should be done, so as to prevent erosion at the point of discharge.
- It is also recommended that measures be implemented at the outlet structures, to prevent solid waste from being washed into the water course/existing storm water channels where the collected stormwater will be discharged (e.g. grids should be installed at the outlet structures).

10.3 ACTIVITY ALTERNATIVES

10.3.1 Introduction

Activity alternatives were considered on account of the following impacts that might result from the establishment of the proposed township:

- **Impact / Issue:** Impact resulting from damage to fauna & flora.
- **Impact / Issue:** Impact upon the visual environment (visual resource) and “sense of place”.
- **Impact / Issue:** Impacts resulting from the generation of waste
- **Impact / Issue:** Impacts resulting from the generation of traffic
- **Impact / Issue:** Impacts resulting from the generation of lighting and noise

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The extent of the above impacts are respectively: **Immediate, Immediate adjacent areas, Immediate, Sub-regional** and **Immediate adjacent**.

The significance of the above impacts are respectively: **Medium, Low-Medium, Medium-High, High** and **Medium**.

10.3.2 Feasible alternatives

Construction activity:

During the construction phase there are “activity alternatives” that should be considered, in order to limit the impact on the environment.

The most significant impact upon the biological environment will manifest during the construction period when disturbance of the natural environment will take place. As an alternative to conventional construction methods, an “*Environmental Management Programme for construction*” have been compiled that provide guidelines to contractors on alternative ways of conducting construction activities and to lessen the overall impact of construction.

Alternatives allow people who are not directly involved in the project (e.g. I&AP’s), to evaluate various aspects of the proposed project and how they were arrived at. It also provides a framework for the relevant authority’s (DEDET’s) decision-making process. If unforeseen difficulties arise during the construction or operation of the project, re-examination of these alternatives may help to provide rapid and cost-effective solutions.

Contractors should remove all waste generated by themselves during the construction period and it should be disposed of at a suitable solid waste disposal site – “dumping in the bush” should not take place.

The standards and level of services in the township shall be in accordance with the “Guidelines for the Provision of Engineering Services and Amenities in Residential Township Development’ (the “Red Book”).

Activity alternatives during operational phase:

Activity alternatives (for the operational phase) were identified by the respective specialist studies that have been conducted.

Sewerage:

Marapong Township currently discharges to two Waste Water Treatment Plants (WWTPs), Nelsonskop (2.4ML/d) and Zongezien (0.5MI/d). This is achieved through pumping via a number of booster pump stations located around Marapong. Also discharging to Nelsonskop WWTP is Matimba Power Station.

The municipality entered into a contract with Ledjadja Coal Mine for reuse of the treated effluent, as the Zongezien WWTP is currently operating over the designed capacity. Ledjadja Coal Mine is going to build a 16MI/d plant next to the oxidation ponds of the

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Zongezien WWTP which will be able to accommodate the 5.30M³/day sewage generated from the proposed Housing Development.

Proposed Bulk Sewer Infrastructure:

The Development of Marapong Ext. 7 currently does not have bulk sewer pipelines servicing it according to the available reports. A bulk sewer pipeline will therefore be required to support this development. The proposed bulk sewer pipeline which is approximately 4.6km long will need to be constructed to the Zongesien WWTP (See layout included in Annexure E of the Engineering Services Report).

Internal Sewer Infrastructure:

All stands in the proposed development will be connected to a gravitational pipe network draining into the proposed bulk sewer pipeline.

A preliminary layout of the internal sewer reticulation system for Marapong Ext. 7 is detailed in Annexure E of the Engineering Services Report. The pipe sizes are estimated to range between 160mm and 250mm in diameter (See Engineering Services Report – Annexure O).

Solid waste:

Refuse will be collected, removed and disposed at the municipal dumping site namely the Groothoek dumping site which is situated ± 7 kilometers south east of the township. This will be done by the municipality.

Transport, traffic noise and vibration:

Marapong Ext. 7 can be accessed via the Provincial Road D2816 (to Marapong), which runs along the southern boundary of the development as shown on the attached Layout plan – Annexure A.

Future Road Access:

A second access road is earmarked in future for the proposed Marapong Ext.7 development in the form of a tarred road, which will connect with the Provincial Road D2001 to Lephalale and will run along the northern boundary (also shown on the attached Layout plan – Annexure A).

The future access road will be constructed to prevent congestion on the existing Road D2816 to Marapong.

Options which can serve to reduce this impact are;

- introduce measures to lower the speeds of vehicles entering the proposed township area,
- allow construction vehicles to enter and leave the site only at designated points.

10.4 PROCESS ALTERNATIVES

No process alternatives were considered.

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10.5 INPUT ALTERNATIVES

10.5.1 Introduction

Input alternatives were considered on account of the following impact that might result from the establishment of the development:

- **Impact / Issue:** Impact upon the visual environment (visual resource) and “sense of place”.

The extent of the above impact is: **Immediate adjacent areas.**

The significance of the above impact is: **Medium.**

10.5.2 Feasible alternatives

Alternatives relating to the use of alternative materials were identified during the conducting of the Environmental Impact Assessment study. Alternatives relating to the following were identified:

- building materials (e.g. use of building materials that complement the existing architectural character of the surrounding area).

Options that exist with regards to inputs include;

- Communal facilities in the proposed development should be architect designed so as to blend in with the prevailing architectural character of the area.
- Especially existing large indigenous trees should be retained where possible.
- Only permitting the planting of indigenous trees within the township, especially on road reserves, parks and other communal facilities,
- Use of plants for landscaping which have low water requirements (indigenous plants normally require less watering compared to imported varieties).

10.6 DEMAND ALTERNATIVES

No demand alternatives were considered.

10.7 SCHEDULING ALTERNATIVES

10.7.1 Introduction

Scheduling alternatives were considered on account of the following impact that might result from the establishment of the development:

- **Impact / Issue:** Impact resulting from damage to fauna & flora.

The extent of the above impact is: **Immediate.**

The significance of the above impact is: **Medium-High.**

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10.7.2 Feasible alternatives (timing of the project activities)

Hereunder the writer will allude to the “timing” of the project actions and its environmental implications.

The following conditions (mitigation measures) be included into the EMP of the project;

- *The timing of construction activities must take into account the likely impacts on the environment.*
- *The timing of construction should coincide with seasons in which environmental elements are at smallest risk.*
- *Protected species were observed during the assessment of the site, site clearing/preparation (prior to construction), should be scheduled to coincide with the flowering period of most endangered species of plants.*

10.8 NO ACTION ALTERNATIVE

The “no-action: alternative was considered as an alternative. It was found that certain mitigation measures can reduce the significance of impacts on the respective environmental components. Therefore, the no-action alternative was found not to be a feasible alternative. The reader is also referred to par. 10.9.

The consequences of “non-approval”/“non-establishment” of the proposed township:

- a) The potential for the proposed development to have a positive impact on the economic and social environments/sectors stems from the need that presently exists for housing in the Marapong area. (see par. 9.3.2.3, Operational phase impacts (positive impacts)).

The consequences of the “no-go” option or the “non-establishment” of the proposed township would mean that this need for housing would not be addressed. The need for housing will remain and will in fact only increase. Therefore it can be stated that the proposed development would provide in much needed housing (see Section 4 - Need and Desirability of proposed development).

- b) The non-establishment of the proposed development would mean that the proposed erven would have to be provided elsewhere – the need for housing will not be relieved.
- c) The non-establishment of the proposed development would mean that the municipality would forfeit a potentially large amount of income that would be generated from rates and taxes paid by residents of the proposed development (refer par. 9.3.2.2 Operational phase impacts (negative)).

The development of the proposed township will contribute to urban densification, as it will lead to the more intensive utilisation of land and infrastructure. This is highly desirable as land is considered a scarce commodity in the urbanised environment.

- d) Due to the proposed development enabling the establishment of a larger number of residential units per area of land, it will facilitate the more intensive utilisation of existing bulk engineering infrastructure in the area – this is highly desirable, as it

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lessens the operational unit costs of this infrastructure (i.e. maintenance costs, etc.). This is due to the fact that more individual residential units will make use of the same infrastructure (the result is economy of scale – which directly benefits the local authority financially and consequently its ability to provide engineering services to its residents). The local authority will also be advantaged by the proposed development as it would be able to levy rates and taxes on the proposed erven, thus enabling itself to extend its engineering infrastructure networks in the area.

If the proposed development does not take place the following will prevail;

- the land will still be used for uneconomical land use purposes (i.e. illegal dumping and wood chopping),
 - the local authority will be disadvantaged as it would not be able to levy rates and taxes (due to the property not being a proclaimed township),
 - uneconomical use of existing engineering infrastructure will take place.
- e) The non-establishment of the proposed development would mean that the land would remain as is and that ecological processes would remain intact. However, large parts of the site to be developed is already disturbed (existing Eskom contractor’s village, old stormwater control dams etc.).
- f) It can therefor be said that the potential for the significant alteration of habitats resulting from the proposed development of the township, is high, however due to the disturbed nature of the area, it is not deemed to have a “high significance”. The ecological state of the area is bound to worsen due to wood chopping and illegal dumping.
- g) The non-establishment of the proposed development would mean that the purposes for which the land is used, would remain as is. In the comparative assessment of different land uses (see par. 9.3.2.2 (a) Operational phase impacts (negative)), it can be seen that the property does not constitute a “viable farming unit”. This would mean that land that has a high potential for residential use, would be relegated to low intensity use as a grazing area (which can be conducted elsewhere just as effectively).

10.9 THE ENVIRONMENTAL COSTS ASSOCIATED WITH THE PROPOSED TOWNSHIP

Certain actions will take place during the planning & construction and operational phases which have potential to impact on the environment (i.e. the bio-physical environment, social & economic environment).

The main environmental costs associated with the proposed development include;

- a) The proposed development has potential to impact negatively on the biological environment (i.e. fauna & flora) - biological communities & bio-diversity. It can be said that the potential for the significant alteration of habitats resulting from the proposed development of the township, is high, however due to the already disturbed nature of the area, it is not deemed to have a “high significance”.

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- b) The proposed development has potential to impact negatively on the current utilisation of the application property. The part of the property on which the proposed township will be established is currently not being used for any specific purpose except for the existing contractor's camp.
- c) Development of the proposed township will eliminate the current as well as potential (future) use of the property for other purposes e.g. agricultural. See par. 9.3.2.2(a) Operational phase impacts (negative).
- d) The proposed development has potential to impact negatively on adjacent properties and land uses (especially during construction through the creation of nuisances, erosion, pollution, etc.). Construction activities will create larger amounts of atmospheric dust, thus causing a nuisance when it settles on adjacent properties. Noise will result during construction as well as during the operational phase of the proposed development. Construction impacts will last only for a period. Traffic noise and increased traffic volumes will be long term impacts resulting from the proposed development. Noise generated by the development will be "community noise" – which has been accepted in the existing adjacent township.
- e) The proposed development has potential to impact negatively on accessibility & traffic patterns. Adverse impacts from construction traffic can be minimised by good planning and by effectively controlling site activities. The proposed development will cause additional vehicle trips along main access roads leading to the site but an additional access road on the northern boundary of the site is planned to prevent congestion on the existing Road D2816 to Marapong.
- f) The proposed development has potential to impact negatively on the "quality of life" and character of the surrounding area as undeveloped veldt will be replaced with a residential development. This should be seen against the backdrop of the existing residential areas located in the immediate surrounding area.
- g) The proposed development has potential to contribute to "urban sprawl"/incremental development and urban densification. This should be seen against the backdrop of the existing residential areas located in the immediate surrounding area and the high need for housing in the area.

10.10 CONCLUSION

Through the implementation of the recommendations outlined in this report, as pertaining to the proposed development, the overall impact upon the environment can be reduced as follows:

- a) Impacts on the **Biological Environment** could potentially be *Definite, Medium and Negative* if mitigatory measures are not implemented. The overall potential impact that will result, can be mitigated to acceptable levels.
- b) Impacts on the **Physical Environment** could potentially be *Definite, Low to Moderate and Negative* if mitigatory measures are not implemented. The potential overall impact can be mitigated to acceptable levels by the implementation of certain engineering measures.

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- c) Impacts on the **Visual/Aesthetic Environment** could potentially be *Definite, Low to Moderate and Negative*. The potential overall impact can be mitigated to acceptable levels by the implementation of certain mitigation measures.
- d) Impacts on the **Cultural/Heritage Environment** could potentially be *Definite, Low and Negative* if mitigatory measures are not implemented. The overall potential impact can be mitigated to acceptable levels.

SECTION 8: PUBLIC PARTICIPATION

11. PUBLIC PARTICIPATION

Comments, concerns and feedback that was received from I&APs during the public participation process, were factored into this EIA report.

The public participation process as pertaining to this application for authorization, consisted of the following elements:

11.1 SITE NOTICE

Several Site Notices were placed on the site and along main access road to Marapong in order to inform passers-by of the proposed development and the associated EIA process (see Annexure D).

11.2 NEWSPAPER

An advertisement giving notice of the EIA process appeared in a local newspaper, The Mogol Post, on 11 November 2016 (see Annexure H – Newspaper Advertisement).

11.3 CONSULTATION WITH OTHER PARTIES/AUTHORITIES

The following authorities and/or other parties, were informed in writing, in the form of Background Information Documents, of the proposed development:

- Waterberg District Municipality
- Lephalale Local Municipality
- Ward Councillor for Ward 2 (Marapong/Grootgeluk area)
- Department of Agriculture Forestry and Fisheries - Land Use & Soil Management
- Department of Water and Sanitation - WQM Section (Limpopo Management Area)
- Department of Rural Development and Land Reform
- Regional Land Claims Commissioner: Limpopo
- Department of Mineral Resources
- Department of Sports, Arts and Culture (Limpopo Heritage Resources Agency)
- Roads Agency Limpopo
- Department of Public Works, Roads and Infrastructure
- Eskom Holdings SOC Ltd - Land and Rights (Mr. Xander Neethling)
- Eskom Holdings SOC Ltd (Mr. John Geeringh)

The following registered adjacent property owners were informed in writing, in the form of Background Information Documents, of the proposed development:

- Professional Imaging CC
- Matimba Power Station (Mr. Christopher Mamabolo)
- Phegelelo High School
- Mashamaite Malose Aniel
- Nematomboni Fhedzisani Victor
- Sekalo Malose Silas

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See Annexure E – Letters to Interested and Affected Parties.

Notices were also distributed by hand to adjacent residents in Marapong (See Annexure F – Photos of notices distributed to adjacent residents).

Interested and Affected Parties and adjacent property owners were also invited to a public consultation meeting. The meeting was however only attended by representatives of the applicant indicating that there are no major issues/concerns by Interested and Affected Parties and adjacent property owners (see Annexure G – attendance register of consultation meeting).

Comments received from Interested and Affected Parties are attached as Annexure I. The following comments were received:

1. Roads Agency Limpopo (Mr. P.E. Montjane) indicated that RAL has no objection to the EIA process for the proposed development on condition that a request for comments on the application for township development be lodged with RAL for further consideration before commencement of any development.

Response: RAL received a copy of the Consultation Scoping Report to comment on. An Application in terms of section 96 (1) (a) read with section 69(6) of the Town-Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986), read with the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) will be undertaken by a town planner and RAL will receive the opportunity to comment on the application as requested.

2. Eskom – Matimba Power Station (Mr. Chistopher Mamabolo) indicated the following interest/concerns with regard to the proposed development:

- Water Management (source of potable water)
- Waste Management (handling of sewerage from the proposed development)

It was also indicated that Lerato Mokonopi be informed of the EIA process.

Response: Mr. Chistopher Mamabolo received a copy of the Consultation Scoping Report to comment on. Water and Waste management have been included in the report as potential impacts. An Engineering Services Report have been compiled in which Water and Waste management associated with the proposed development have been investigated (also see 8.1 – Engineering Infrastructure for more details). Lerato Mokonopi was also informed about the EIA process.

3. Department of Public Works, Roads and Infrastructure (Mr. Joseph Tshikonelo) indicated that he is interested in the access to the proposed development in relation to the two provincial roads i.e. D2001 and D2816. His concern is regarding the maintenance needs of the two provincial roads from the activities of the proposed development.

Response: Mr. Joseph Tshikonelo received a copy of the Consultation Scoping Report to comment on. The impact of additional traffic resulting from the proposed development has been included as a potential impact in the report. An Engineering Services Report have been compiled in which the access and road management associated with the proposed development have been investigated (also see 8.1 – Engineering Infrastructure for more details).

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A copy of the Consultation Scoping Report was submitted to the following stakeholders/registered I&AP's to comment on (see Annexure J):

- Waterberg District Municipality
- Lephalale Local Municipality
- Ward Councillor for Ward 2 (Marapong/Grootgeluk area)
- Department of Agriculture, Forestry and Fisheries - Land Use & Soil Management
- Department of Water and Sanitation - Limpopo Management Area (Mrs. Pulane Matswi)
- Department of Mineral Resources
- Department of Sports, Arts and Culture (Limpopo Heritage Resources Agency)
- Roads Agency Limpopo (Mr. P.E. Montjane)
- Department of Public Works, Roads and Infrastructure (Mr. Joseph Tshikonelo)
- Eskom Holdings SOC Ltd - Land and Rights (Mr. Xander Neethling)
- Eskom Holdings SOC Ltd (Mr. John Geeringh)
- Matimba Power Station (Mr. Christopher Mamabolo)

Scoping Report and Plan of Study for EIA:

Comments received from Interested and Affected Parties on the Consultation Scoping Report are attached as Annexure K. The following comments were received:

1. Department of Water & Sanitation (Mr. L.E. Hlekane) indicated the following:
 - The Department doesn't have any objection on the proposed development, provided mitigation measures are applied to prevent negative impact on the water resources if there's any prior implementation of the Project.
 - On page 43 it has been stated that Zongezien WWTP is currently being upgraded to 16MI/d and will be able to accommodate the 5.30Mℓ/day sewage generation from the proposed development. Please note that the disposal of wastewater must be disposed at an authorized disposal facility.
 - On page 6 it has been stated that the proposed township development (to be known as Marapong Extension 7 located on the remainder and portion 1 of the Nelsonskop 464 LQ) will require water reticulation infrastructure, therefore clarity is required with regard to the source of water and the quantity of water required for the development.
 - On page 7 it has been indicated that the remainder of the farm Zongesien 467 LQ falls within the application area where there are several land uses and portion 6 of the farm Nelsonskop 464 LQ is outside the application area. Therefore clarity is required in respect to the property ownership as it has been indicated in the report that the development will encroach to the Grootegeluk Coal Mine (Exxaro) and Matimba Power Station.
 - Please note that taking water from a water resource is a water use in terms of the National Water Act, Act no 36 of 1998 that needs to be applied for water authorization.

Response:

- Department of Water & Sanitation (Mr. L.E. Hlekane) received a copy of the Consultation EIA Report to comment on. Mitigation measures including mitigation measures indicated as part of the specialist investigations have been included in the EIA report. The report also includes an Environmental Management Programme which indicate measures to reduce the impact of the development (during construction and operation) on the environment.

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- The Consultation EIA Report includes an Engineering Services Report. The report assesses the availability of services and recommends the required designs of services. The average daily water demand for the whole development is calculated as 6Mℓ/day. The town of Lephalale is currently getting its bulk water supply from the Zeeland WTW. Zeeland WTW has just been upgraded from 20Mℓ/d to 40Mℓ/d and will be able to support the 6Mℓ/day demand for the proposed development. Bulk water pipeline upgrades to Marapong will be required. The proposed bulk pipeline upgrade starts from Zeeland WTW (800mm in diameter) and runs generally in the northerly direction to supply the proposed industrial development next to Matimba Power Station from where it will be pumped to Marapong Reservoirs via a 315mm diameter pipeline. The 315mm portion of the bulk pipeline traverses along the southern boundary of the proposed development on its way to Marapong. Water supply to the proposed development will connect to the 315mm portion of the bulk pipeline. The Lephalale Municipality is in the process of soliciting funds to construct the pipelines and the project is planned for completion in 2020.
- The Remainder of the farm Zongesien 467 LQ does not fall within the township development area it is located on the eastern boundary of the proposed development area. The proposed new bulk sewage line will however run across this property to the Zongesien WWTP. The Matimba Power Station is located on the Remainder of the farm Grootestryd 465 LQ and forms the southern boundary of the site. The western boundary of the application area is formed by Portion 1 of the farm Nelsonskop. This part of Portion 1 of the farm Nelsonskop is not used for any specific purposes although it forms part of the Grootegeluk Coal Mine area. The development will not encroach on the properties being used for the Matimba Power Station or the Grootegeluk Coal Mine. The application properties are registered in the name of Exxaro Coal (Pty) Ltd.
- It is anticipated that no water will be taken from a water resource and that the development will connect to existing bulk water supply infrastructure.

Consultation Environmental Impact Assessment Report:

Stakeholders and registered I&AP's (as listed above) will get the opportunity to comment on the Consultation Environmental Impact Assessment Report (Annexure L – Letters requesting comments from authorities/parties on EIA Report. A copy of the Consultation EIA Report will also be made available at the Marapong Public Library for residents in the area. Notices will be placed in Marapong informing residents that they have the opportunity to comment on the EIA Report.

Any comments received will be included in the final EIA Report before it will be submitted to DEDET for approval (Annexure M - Comments from authorities/parties on EIA Report)

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SECTION 9: CONCLUDING REMARKS

12. CONCLUDING REMARKS

In conclusion it can be stated that several negative and positive impacts/effects can potentially arise from the proposed development. These can however be mitigated through the implementation of a number of mitigation measures (as contained in the *Environmental Management Programme*) - see Annexure U of this document. The mentioned EMP provides guidelines to contractors on alternative ways of conducting construction activities and to lessen the overall impact of construction.

The proposed development possesses the potential to have a negative impact on the natural environment (if appropriate mitigatory measures not be implemented). During the operational phase various types of pollution could result, this can however be avoided through adherence to the proposed mitigatory measures as contained in this report.

It is of vital importance that the proponent takes note of the recommendations contained in this document in order that it can be included into the contracts of the parties that will be responsible for construction.

Full engineering services will be available to the proposed township development.

The Department of Economic Development, Environment and Tourism (DEDET) (Limpopo Province) is respectfully requested to approve this Environmental Impact Assessment Report, which forms part of the application that has been lodged in terms of Regulation 982 of the EIA Regulations published in Government Notice No. 38282 of 2014 and Section 24(5) read with section 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) - the said application specifically pertains to the activities that are to be undertaken as described in Section 3, in this document.

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