ENVIRONMENTAL IMPACT ASSESSMENT (EIA): DRAFT EIA REPORT

PROPOSED TOWN DEVELOPMENT AT VERKYKERSKOP, FREE STATE

Applicant: **Verkykerskop Nedersetting Ontwikkeling (Edms) Bpk**

DETEA Ref No: **EMS/15/12/10**

Date: **April 2013**

mda Town & Regional Planners, Environmental & Development Consultants

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1. INTRODUCTION

1.1. BACKGROUND TO THE STUDY

The rural Village of Verkykerskop is situated between Harrismith and Memel along the S722 road in the Eastern Free State. The existing village of approximately 46 ha includes residences, tourist accommodation facilities, a general dealer with a restaurant, a police station complex, a boutique hotel, deli / coffee shop, butchery, liquor store and agri-retail store with fuel pumps.

Several landowners of Verkykerskop and surrounds formed the Verkykerskop Development Consortium and propose to develop business, tourist accommodation, small tourist and agri-industries, residential units and recreational facilities at Verkykerskop.

Subsequent to liaisons with the Phumelela Municipality, Free State Provincial Government and Verkykerskop Boerevereeniging, a Micro Spatial Development Framework for Verkykerskop was formulated and approved by the Council in 2009.

1.2 COMPILATION OF EIA REPORT

The following report was compiled by MDA on acceptance of the submitted scoping report and advice from the competent authority in terms of regulation 30(1)(a) to proceed with the tasks contemplated in the plan of study for environmental impact assessment, including the public participation process. The report was compiled according to regulation 31 (2)(a) – (s) of the Regulations No. 543 of 18 June 2010 promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No. 107 of 1998) stipulating the information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35.

1.3 TERMS OF REFERENCE

The objective of this study is to conduct an environment assessment exercise. The broad terms of reference for an assessment exercise are to:

- Conduct an in-depth investigation into biophysical and socio-economic aspects, focusing on key issues;
- Address the issues that were identified during the scoping process and investigation, which are associated with this planned project;
- Advise the proponent about the potential impacts (positive and negative impacts) of their planned development, as well as the implications for the design, construction and operational phases of the project;
- Facilitate public input on environmental and social matters;
- Identify possible measures to mitigate the potential impacts of the planned project;
- Address the cumulative impact of all aspects of the planned development as well as recommend possible mitigating measures.

1.4 INFORMATION ON THE METHODOLOGY OF EIA

This report addresses the biophysical as well as the socio-economic environments. The information was captured in the following manner:

- site visits to determine the setting, visual character and land-uses in the area;
- site surveys were conducted to identify any plant and animal populations that could be impacted by the development (scoping);
- the project plans were superimposed onto the gathered baseline environmental information to identify possible impacts;
- discussions were held with the client to identify specific aspects of the development which could affect the environment;
- I & APs were informed and consulted by phone, letters, notice boards and advertisements to capture issues that could affect the environment;
- identifying positive, as well as negative issues;
- specialist studies done by independent specialists in areas where impacts were identified;
- making recommendations and presenting guidelines for the mitigation of impacts identified during this exercise.

2. ENVIRONMENTAL ASSESSMENT PRACTITIONERS

2.1 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONERS (EAPS) WHO PREPARED THE REPORT

A multi-disciplinary team of specialists contributed to the information presented in this document:

Co-ordination, supervision, management

Mr. Neil Devenish - MDA Consultants

Biophysical and Visual Aspects

Prof. Johann du Preez - Eco-Care Consultancy

Public Participation & Report Writing

Me. Marguerite Cronje - MDA Consultants

2.2 EXPERTISE OF THE EAPS TO CARRY OUT THE EIA PROCEDURES

a) Mr. Neil Devenish

Key qualifications:

- Key competencies and experience include development control applications (applications and appeals pertaining to rezoning, consolidations, subdivisions etc.) township establishment applications, environmental management and control applications.
- Registered at the SACTRP [TRP(SA)]
- Registered at IAIAsa.

Education:

- B. A. (Sociology, Geography) University of the Free State, SA, 1994
- Master of Town and Regional Planning, University of the Free State, SA, 1996
- Managing the Environmental Impact Assessment Process, Environmental Management Unit, PU for CHE, 2000
- Environmental Management Consulting, South African Institute of Ecologists & Environmental Scientists, 2001
- Water Law of South Africa, The South African Institution of Civil Engineers (SAICE), 2006

b) Prof. Johann du Preez

Key qualifications:

- Key competencies and experience include research in vegetation ecology & data management, biomonitoring, impact assessment, environmental management and environmental education.
- Registered at the South African Institute of Ecologists and Environmental Scientists.
- Registered at IAIAsa.

Education:

- B. Sc. (Zoology and Botany), University of the Free State, SA, 1981
- B. Sc. Honnours (Plant ecology & Taxonomy), University of the Free State, SA, 1982
- Higher Education Diploma, University of the Free State, SA, 1983
- M.Sc. (Plant ecology), University of the Free State, SA, 1986
- Ph.D. (Plant ecology), University of the Free State, SA, 1991

c) Me. Marguerite Cronje

Key qualifications:

- Key competencies and experience include environmental management and research in zoology.
- Registered at IAIAsa.

Education:

- B.Sc. (Zoology), University of the Free State, South Africa, 2002
- B.Sc. Honnours (Zoology), University of the Free State, South Africa, 2003
- M.Sc. Diploma (Equine Science), University of Edinburgh, UK, 2005
- Masters in Environmental Management, University of the Free State, South Africa, 2008

Conferences:

- 10 years of Environmental Impact Assessments in South Africa – Somerset West (2008)
- Free State Provincial Waste Summit – Bloemfontein (2010)

3. PROJECT INFORMATION

3.1 PARTICULARS OF APPLICANT

Verkykerskop Nedersetting Ontwikkeling (Edms) Bpk

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3.2 DESCRIPTION OF THE PROPOSED ACTIVITY

The site for the proposed development comprises the following properties, either in ownership of the Verkykerskop Nedersetting Ontwikkeling (Edms) Bpk or the Verkykerskop Tourism cc:

- Farm Verkykerskop 1980
- Remainder of the Farm Verkykerskop C 1528
- Farm Annasdal 668
- Subdivision 15 of the Farm Verkykerskop A 1519
- Subdivision 2 of the Farm Zwartkoppie 1477

The proposed development entails 256 residential erven (55.87 ha), of which six erven (24.62 ha) will be zoned Medium Residential and four erven (0.58 ha) will be zoned General Residential. The remaining land uses include erven zoned for Resort, Service Industry, Public Facility, Small Holding, Roads and Streets, and Utilities. There are also 32 erven proposed for Private Open Space (28.61 ha). Table 1 below summarizes the proposed land uses.

Table 1: Summary of Land Uses for the proposed development (LMV, 2012)(Annexure B)

ZONING	NUMBER OF ERVEN	AREA (Ha)	%
Residential 1	25	2.29	1.91
Residential 2	28	7.99	6.66
Residential 3	24	3.94	3.29
Residential 4	56	9.55	7.96
Residential 5	113	6.90	5.75
Medium Residential 2	5	2.60	2.17
Medium Residential 3	1	22.02	18.36
General Residential	4	0.58	0.48
Business	14	1.08	0.90
Resort	1	1.47	1.23
Service Industry	7	12.94	10.79
Public Facility	2	0.33	0.28
Private Open Space	32	28.61	23.86
Small Holding	3	5.43	4.53
Roads and Streets		12.18	10.15
Utilities	8	2.02	1.68
TOTAL	**323**	**119.93**	**100.00**

The application site measures 119.93 ha in total, while the total development footprint (excludes open space areas) would be approximately 90 ha.

Refer to the proposed site development plan in **Annexure B**.

The following associated infrastructure is also envisaged for the development:

- Water provision

  To provide water to the proposed development, the use of boreholes and the construction of a water storage dam are envisaged. The proposed construction of a storage dam will be dealt with in a separate EIA Application, specifically for the construction of a dam. The interested and affected, as listed in this report, will however automatically be involved in the EIA process required for a dam. More detail on the water demand, alternative sources investigated, quality and purification as well as the reticulation network proposed can be found in the Engineering Report in **Annexure J**.

- Sewerage

  The average daily effluent generation and effluent peak flow rates have been determined by engineers and alternative means of disposal investigated. Septic tanks will be applicable for a few remote erven where ground conditions allow soak aways. A water borne sewerage system is proposed for the larger and more dense residential areas. Bio-Mite treatment package plants will be installed to treat sewage. It is a possibility for the Local Municipality to become the service provider for sewage treatment infrastructure. This would however be in agreement with the developer.

- Waste management

  A solid waste recycling and transfer site is planned in the south west corner of the village (location indicated in Engineering Report to accompany the EIA Report). The facility proposed will be for collection, separation, recycling and transfer of waste only and no waste will be land filled or stored for long periods of time on the site. A utility company will be responsible for rendering the service of waste collection, separation, transfer and for management of recycling at the site.

- Roads and traffic

  The peak traffic generation at the two main access points to the proposed development has been calculated and a road network planned according to these calculations. Provisions for taxi and bus bays, horses, bicycles and pedestrian have been taken into consideration and roads designed accordingly.

- Storm water infrastructure

  Storm water infrastructure has been designed to avoid marshy areas and rocky outcrops and follow natural contours as far as possible. The storm water discharge points will also be constructed in such as way as to break the speed of the water and to spread the water over a broad area in order to prevent erosion.

- Electricity provision

  The Phumelela Local Municipality has indicated that it does not have the capacity to become the supply authority for the proposed development and therefore ESKOM will provide electricity for the proposed development. Renewable energy sources have also been investigated.

3.3 NEED AND DESIRABILITY OF PROPOSED ACTIVITY

The applicant, namely the Verkykerskop Nedersetting Ontwikkeling (Edms) Bpk, consisting of several landowners in and surrounding Verkykerskop, recognized the tourism and economic growth potential of the historic village. It is the intention of the developer to establish a vibrant, lively mix of landuses (business, tourist accommodation, small tourist and agri-industrial, residential and recreational facilities) densely, but rustically arranged amongst the existing village (LMV, 2012).

Due to the central location of Verkykerskop between three towns 45 to 60 km away, the proposed development will also be able to provide economic and social services to farmers and farm workers in the area.

Negotiations with the Phumelela Municipality and the Free State Provincial Government (Spatial Planning Directorate) have been underway for some time now and a Micro Spatial Development Framework (MSDF) for the Verkykerskop area has already been approved (August 2009). Verkykerskop is therefore recognized as a rural development node in the Phumelela SDF (Spatial Development Framework) and as a tourism node with social facilities in the Provincial SDF.

The Phumelela Municipality has recently (4 March 2013) provided correspondence indicating approval of the Engineering Report, layout plan and relevant town planning processes applicable for the proposed town development and had no objections to the EIA Scoping process (letter included in **Annexure D6**). Obtaining Provincial approvals from the Department of Cooperative Governance and Traditional Affairs and the Department of Economic Development, Tourism and Environmental Affairs are currently underway.

3.4 FEASIBLE AND REASONABLE ALTERNATIVES

3.4.1 **Site alternatives:** Site alternatives are not applicable for this project due to the fact that the proposed development is an extension of the existing village, with outlying hamlets being created at selected vistas just outside the main village. The Verkykerskop settlement is situated along the Maloti Tourism route and the Verkykerskop has been identified in the SDF as a node earmarked for development. The site was also selected so that mainly disturbed land will be developed, excluding natural veld and sensitive areas, identified during the planning phase, as far as possible. The developer is a consortium consisting of landowners in and surrounding the existing Verkykerskop Village.

3.4.2 **Activity alternatives:** The proposed activity was identified by the developer to consist predominantly of a residential development, expanding the existing Verkykerskop Village. The option of not proceeding with the development is the only activity alternative. No other activities were considered in this application due to the assessed need and feasibility of the proposed activity. Various bulk engineering alternatives to service the proposed development were also investigated and are discussed in the Engineering Services Report in **Annexure J**. The most feasible with the least environmental impact, being the preferred options.

3.4.3 **Design alternatives:** The unique character and appeal of Verkykerskop were taken into consideration with the design philosophy. Various layout alternatives were considered by the applicant and town planners, also taking terrain and environmental constraints into account, the current design plan being the result. This urban design by Garry White & Associates Architects won an international prize at the Congress for the New Urbanism (CNU) 2012 awards.

3.4.4 **No-go option:** The no-go option means keeping the status quo, i.e. not transforming Verkykerskop Village into a town. A description of the existing village is given in section 1.1. As the Phumelela Municipality has already identified the area for a rural development and tourism node, development in the area is likely to occur. The no-go would not be the preferred alternative from a socio-economic perspective, as the development in general would result in a variety of employment opportunities and provide an economic boost to the area.

4. PUBLIC PARTICIPATION

4.1 INTRODUCTION AND OBJECTIVES

As an important component of the EIA process, the public participation process involves public inputs from interested and affected parties (I & APs) according to Section 56 of the NEMA 2010 Regulations. I & AP may comment during the planning phase of the proposed project.

The key objectives of the public participation process are to:

- Identify a broad range of I & APs, and inform them about the proposed project;
- Understand and clearly document all issues, underlying concerns and suggestions raised by the I & APs; and
- Identify areas that require further specialist investigation.

4.2 METHODOLOGY

The public participation process was undertaken in accordance with the plan of study accepted in terms of Regulation 30(1). The following actions have already been undertaken as part of this process:

- Advertisements in the local newspapers
- On-site notices
- Public meeting

Refer to **Annexure D5** for the list of interested and affected parties.

4.2.1 Notification of potential I &AP's of EIA:

i) Newspaper advertisements: (Annexure D1)

Vrystaat	25 November 2010
Maluti	16 February 2011
Vrystaat	17 February 2011

ii) On site notices: On site advertisements were also placed at the site on 26 November 2010 allowing 30 days for public response **(Annexure D2)**.

iii) **Public meeting:** A public meeting was held at the Verkykerskop Entertainment Centre on 19 February 2011 to discuss the proposed development and document issues and concerns. The minutes of the meeting are attached in **Annexure D3**.

4.2.2 Comments received

Refer to **Annexure D6** for comments received on the draft Scoping Report (circulated for comment from 13 April – 28 May 2012). The draft EIA Report is currently being circulated for comment.

4.3 SUMMARY OF KEY ISSUES RAISED BY THE I & AP's

- Visual impact of developments located on hills and ridges affecting the silhouette;
- Light pollution of the development;
- Definitions for various land uses to be included in the scoping document and in particular type of industries envisaged;
- No listed industries that require separate licensing by law should be approved under this environmental authorization process;
- All the existing rights in terms of access and public movement will be upheld;
- Increase in traffic to be managed on site and in region; has the impact been assessed with specific reference to driving of livestock in the road reserve and movement of pedestrians crossing the road?
- Management of hawking in the road reserve to be addressed;
- Influx of people into the Verkykerskop Rural node and the area;
- Prevention and containment of informal settlement;
- Potential of deterioration of security due to influx, settlement;
- Management of peaked influx of people e.g. during construction phase;

- Layout to be within the SDF parameters in terms of number of units: layout plan will cap number of units allowed per stand;
- Business restriction on land to be developed in favour of Boerevereniging, being addressed by BV lawyers;
- The valley and wetland to be a limited access area to protect wildlife;
- Wetlands are designated in the environmental framework as no-go areas;
- Impact of motorized access off-roads to be managed, and specifically motorized watercraft;
- Impact of stocking of streams with exotic species;
- Impact of impounding of streams and extraction of water on downstream land users and the environment;
- Water pollution from sewage French drains;
- Impact of town development on existing grasslands;
- Impact of town development on wetlands;
- Impact on biodiversity of wetlands, grasslands and shrub communities;
- Impact of development on red data and endangered and threatened species and their habitats;
- Noted by presenters that no long drops / VIP toilets are envisaged;
- Potential pollution of the electrical substation;
- Impact of solid waste and landfill and permit requirements;
- Permit requirements for waste transfer station.

4.4 MEMORANDUM OF UNDERSTANDING BETWEEN DEVELOPERS AND VERKYKERSKOP BOEREVEREENIGING

Supplementary to the EIA process, a memorandum of understanding was signed between the Verkykerskop Boerevereniging and the Developers upon the commencement of the development planning process. The memorandum inter alia entails that the development concept is supported by the parties, the concept will not be deviated from without the consent of all parties, and that as long as the development concept is maintained, neither party shall lodge an official compliant against the development application.

Following the signing of the memorandum the developer (applicant) has formally consulted on a continuous basis with the Boerevereniging with the view to obtain their inputs on improving the development plan and mitigating impacts from the point of view of the farming community as far as possible. Various changes have been made to the development plan throughout the planning process following requests and suggestions received in the liaison process.

The various planning drafts have been presented and work shopped with the Boerevereniging and hard copies of the various planning documents made available to them by the developer. Continuous liaison has therefore taken place between the developer and the Verkykerskop Boervereniging. Refer to **Annexure D4** for this Memorandum of Understanding.

5. ENVIRONMENTAL ASPECTS

5.1 LITERATURE REVIEW

Literature pertinent to this area and its immediate environs has been reviewed. The literature included published and unpublished reports: Branch, 1998, Bredenkamp, *et al.* 1996, Brooke 1984, Bulpin 1980, Golding, 2002, Harrison *et al.* 1997, Henderson 2001, Hilton-Taylor 1996, Low & Rebelo 1996, and Smithers 1986.

5.2 DESCRIPTION OF THE ENVIRONMENT

5.2.1 Biophysical Environment

The area is generally undulating, except for a steep sloped valley (creed) in the south east of the site. A low rise that dips sharply towards the west occurs on the north western side of the site. A number of plant communities are present on the site with a variety of plant species. Marshy seepage areas are present along the slopes of the valley and in the headwaters. The altitude in the area varies from 1 754 to 1 936 m.a.s.l.

5.2.1.1 Climate

The area lies within a summer rainfall region with an average annual rainfall of 700 mm. There is a large difference between summer and winter average temperatures with frost regularly occurring in winter.

5.2.1.2 Geology of area

The general geology of the area consists of dolerite intrusions that intersect sedimentary rock of the Beaufort Formation. Verkykerskop and Estcourt Formations are dominant, which are associated with the Tarkastad and Adelaide Subgroups, respectively.

5.2.1.3 Terrain forms & habitats

Table 2: Terrain form and habitats area to be developed

Terrain form		**Habitat types**	
Hill top	**X**	Grassland	**X**
Hill side	**X**	Karoo	
Flat		Karroid (scattered)	
Valley	**X**	Natural forest	
River bank		Plantations	
Wetland	**X**	Ploughed or fallow fields	**X**
Foot slope	**X**	Riparian	**X**
		Savanna	
		Shrub	**X**
		Wetland	**X**
		Other	

5.2.1.4 Soils of area

Fine sandy colluvial matrix soils are present at the site. On the slopes and in the valley the soils are deep and clayey.

5.2.1.5 Vegetation of area

Mucina & Rutherford (2006) describe this area's vegetation as Eastern Free State Sandy Grassland (Gm 4).

A number of vegetation communities were identified at the site. A search was also undertaken of the red data list of South African plant species occurring within five kilometres of the site.

Refer to the Ecological Assessment in **Annexure E**.

5.2.1.6 Animals (moths, butterflies, reptiles, fish, birds & mammals) of the area

A survey was also undertaken to assess the fauna occurring on the site and in adjacent areas, with particular emphasis on the detection of threatened species likely to occur.

No areas of faunal significance or sensitivity within the natural habitat were observed within the study area. This is likely due to the close proximity of the residential area and farming activities. A list of vertebrates that could occur in the area is included in the Ecological Assessment in **Annexure E**. Red listed faunal species that may occur in the region include the South African Hedgehog, African Weasel, Spring Hare and White-tailed mouse. Refer to the Ecological Assessment in **Annexure E** for their scientific names and threatened status.

There is a relatively high bird diversity in the area, but with a relatively low number if Red Data Species. The Secretary Bird, Black Harrier, Black Stork, Blue Crane, Mahem and Denham's Bustard are the prominent ones, while raptors in the area included the Steppe Buzzard and Booted Eagle.

5.2.1.7 Aquatic systems

Verkykerskop falls within the Vaal River catchment. The site drains mainly to the Meul River which eventually flows into the Wilge River south of Warden a number of seepage areas also occur on the various properties of the Verkykerskop development.

5.2.1.8 1 : 100 year flood line

All residential development is planned outside the 1:100 year flood line. Some infrastructure may be located below the 1:100 year flood line and cross drainage lines.

5.2.2 Socio-economic environment

The Village of Verkykerskop is located along the S722 road between Harrismith and Memel. Currently the village serves as a small service centre and social focal point to the surrounding community (LMV, 2012).

Agriculture is the main sector in the region. Verkykerskop is also seen as a tourism node with an Autumn Festival being held annually.

The proposed development is expected to promote and enhance the existing Verkykerskop tourism, economic and service sector. Work opportunities will also be created during the construction phases as well as during the operational phase of the proposed development.

It is not foreseen that the proposed development will have a negative socio-economic impact on the region. In fact it will act as catalyst for stabilising economic growth in the region by creating a wide variety of job opportunities during the construction and operational phases.

5.2.2.1 Surrounding land uses

The site proposed for development is surrounded by agricultural land, which will remain agricultural land. Refer to the locality plan in **Annexure A**.

5.2.2.2 Historical, archaeological or cultural sites

An Archaeological and heritage specialist was appointed to assess the site and determine whether any significant material or graves are present at or near the site.

Refer to the Archaeological Report in **Annexure I**.

5.3 SUMMARY OF FINDINGS AND RECOMMENDATIONS OF SPECIALIST STUDIES AND SPECIALIZED PROCESSES

The necessary specialist studies and specialised processes have been performed in areas where possible negative impacts were identified. This was done according to Section 32 of Regulations No. R. 543 published in the Government Notice No. 33306 of 18 June 2010 of NEMA. Specialised studies relevant to the project include:

5.3.1 Ecological Assessment

An ecological study to assess the area for protected and endangered plant and animal species.

Prof. P.J. du Preez

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E-mail: greenrsa@gmail.com

Area of expertise: Environmental Consultant, Botany and Ecology Specialist

Findings:

- The natural vegetation in the area of the site is characterised by grass-covered slopes with scattered bush clumps in the valleys and rocky outcrops as well as hillslope seeps and valley-bottom wetlands.
- Isolated pockets of wetland plants and soils indicating signs of wetness were detected on the Farm Annasdal. These include hill slope seeps, valley-bottom wetlands, drainage lines and seasonal streams.
- The site falls within the Mesic Highveld Grassland Bioregion and the specific vegetation types are classified by Mucina & Rutherford (2006) as Eastern Free State Sandy Grassland (Gm 4) and the pans, wetlands and riparian vegetation as Azonal vegetation (AZ).

- The Verkykerskop residential area will be constructed in clusters and in phases. These clusters are located in the mesic grassland, upstream and away from the drainage lines and seasonal streams.
- No areas of faunal or floral sensitivity were observed, however the shrub communities in the valleys as well as the wetlands can be regarded as sensitive.
- No rare and endangered habitats or species were found on the site.
- The site at Verkykerskop is considered to be suitable for the proposed residential development, as the footprint of the residential area and associated infrastructure are planned in such a way that sensitive communities are not impacted on. Large areas of natural vegetation will remain untouched by the proposed development. The site specific rating for the terrestrial habitat is 24-25, also indicating that the site is suitable for the proposed development.
- High run-off from the proposed development could have a negative impact especially in terms of erosion.

Recommendations:

- A search and rescue exercise must be conducted to remove protected plants that will be destroyed during construction activities and translocate them to similar habitats nearby.
- Permits must be obtained from the DETEA for the removal of protected plants and to translocate them.
- Care must be taken to rehabilitate disturbed areas after construction. The soils in the area and on site are dispersive and prone to serious erosion.
- The development should remain outside of the drainage lines, unless a Water Use Licence is obtained that authorizes encroachment.
- In areas where infrastructure such as electricity cables and pipes have to cross drainage lines, DETEA's guidelines to trench through drainage lines will have to be followed by the developer.
- Care should be taken to limit destruction of the natural vegetation unnecessarily.

- Taller tree species can be planted to act as screens to soften the visual impact, where necessary (e.g. reservoirs). In this region, no indigenous tall trees occur, therefore in order to plant tall trees one would have to use Beefwood, Bluegum or pine trees. To plant these trees, the developer must obtain a permit from the Department of Forestry.
- All human movement and activities must be contained within the designated construction areas in order to prevent peripheral impacts on surrounding natural habitat.
- No fire-wood may be collected in the veld.
- An alien plant control and monitoring programme must be developed staring during the construction phase and to be carried over into the operational phase.
- Lighting of fires on the site must not be allowed. The risk of accidental fires during the construction phase is considered to be high, especially during the dry months (winter and early spring).
- Fire-fighting equipment must be available on site.
- Species, especially grasses, trees and shrubs occurring in the region must be used to rehabilitate disturbed areas.

Refer to **Annexure E** for the Ecological Assessment.

5.3.2 Geotechnical Survey

A geotechnical study to assess the soil conditions of the site.

I.J. Breytenbach
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LYNNWOOD RIDGE
0040
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Fax: 012 9912555
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Area of expertise: Engineering Geologist

Findings:

- The geology of the area consists of sediments of the Verkykerskop and Escourt Formations, which belong to the Tarkastad and Adelaide Subgroups, respectively. The surrounding area contains dolerite intrusions.
- The presence of seasonal perched water is expected.
- With regard to seismicity, a 10% chance exists that an earthquake with Peak Ground Acceleration of 0.06g to 0.09g may occur once in 50 years.
- The area was divided into sites, where sites 1 and 2 are expected to present a soil profile of a fine sandy colluvial matrix with very course slope scree. Localised areas of alluvian can not be ruled out, particularly on site 2. Site 3 will most probably consist of colluvial material with cobbles and boulders, overlying shallow sandstone bedrock. Site 4 most likely comprises a clayey colluvium, also with cobbles and boulders and also corestones, overlying either dolerite or sandstone bedrock.
- The area is not subject to undermining.
- The sites are not subject to instabilities due to the presence of dolomite.
- The in-situ sandstone and dolerite material can be tested for possible use in layer work in road construction.

Recommendations:

- The areas earmarked for development were divided into zones based on geotechnical mapping.
- Sites 1 and 2 may be regarded as favourable for development, but slope and slope stability are issues that may superficially be regarded as detrimental.
- Sites 3 and 4 have certain zones that are not deemed favourable for residential development, while other zones are of intermediate favourability.
- Certain geotechnical constraints can be addressed and partially limited.

See **Annexure F** for the Geotechnical Survey.

5.3.3 Geohydrological Assessment

A geohydrological study to assess the groundwater conditions of the site.

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Findings:

- The planned Verkykerskop Township development requires a water supply of 263.8m³/day.
- If boreholes must function as the main supply, the two production boreholes can be recommended for 169m³/day if pumped on a duty cycle of 12h/day, and for a maximum yield of 233m³/day if pumped on a duty cycle of 24h/day.
- If the planned storage earth dam is built and functions as the main water supply with the two boreholes as backup supply, the additional groundwater recharge from the earth dam will increase the summer maximum abstraction volumes to 233m³/day + 86.3m³/day = 319.3 m³/day and increase the winter abstraction volumes to 233m³/day + 32.2m³/day = 265.2 m³/day.
- Without the planned dam the development would be limited accordingly.
- Abstraction of groundwater in the area by other users is minimal.

Recommendations:

- It is recommended that the earth dam is constructed as planned and that the groundwater source, as well as the surface water source, be used in tandem to supply the demand for the Verkykerskop development. This will ensure that the groundwater source can be used on a sustainable basis.
- The water level depths, rainfall figures and abstraction figures of the planned development must be measured on a monthly basis

prior to the start of abstraction to establish historic water level trends.

- Hydrogeological monitoring data should be evaluated bi-annually by a qualified hydrogeologist.
- A Groundwater Monitoring Plan with relevant Groundwater Monitoring and Reporting Protocol should be established and calibrated annually.
- Additional boreholes can be established if needed on the recommended site positions.
- Groundwater level monitoring in all the boreholes on the farm on a monthly basis is strongly advised, even before water abstraction for the development starts. The normal seasonal water level variation can be captured during this period. Once water abstraction for the development starts, this data will be lost.
- The information gathered during such a monitoring programme can be used to manage future abstraction figures.
- The implementation of a well managed groundwater monitoring system can therefore not be over emphasized.

See **Annexure G** for the Geohydrological Assessment.

5.3.4 Agricultural Potential

A study to determine the agricultural potential of the land proposed for development.

P.J. du Toit
Mlimisi Agricultural Consultants
P.O. Box 16637
NELSPRUIT
1200
Tel: 082 4442033
E-mail: pietagri@mweb.co.za

Findings:

- The withdrawal of 55ha grazing land for development has a small impact on the total production potential of the farm.
- The reclamation of the veld will contribute positively towards the income of the farm despite the impact of 55ha that will be lost to development.

- The farm consists of only natural grazing after reclamation and therefore mainly animal production can be practiced on the farm. Potato production will carry high price risk.
- The farm is too small to support a sustainable and economical livestock production unit and as such can be considered as an uneconomical unit: it will not survive economically on its own. Most of the soils are unsuited for crop production.
- The development may strengthen the economic situation by creating tourism attractions like Game and Bird Viewing as well as job opportunities for the workers who live on the farm.
- All calculations are based on the agricultural activities alone and therefore does not reflect the economical spin-offs of the development itself.
- The climate is marginal for crop production due to the low temperatures.
- The agricultural potential of the soils is poor to moderate.
- There is sufficient water for human consumption, livestock and environmental requirements.
- Reclamation of the veld and downward adjusting of the carrying capacity is crucial in restoring the veld.
- The farming enterprises are not viable on their own and a combination of all enterprises proves to be marginal.
- The economical potential of livestock and even the combination of potato production on the farm is marginal.

Recommendations:

- Consolidation of the portions.
- Selected enterprises must be compatible with the environment and climatic conditions.
- The animal enterprise must be appropriate for the farm resources.
- Preventive strategies, adopted early, can reduce inputs and help establish a sustainable production system.
- If irrigation is applied, the groundwater table should be monitored to prevent water logging.
- No agricultural activities should take place on wetland areas.

- The reclamation and enhancement of soil quality are very important and should start as soon as possible. Patches of erosion should be addressed appropriately.
- Catchments area should be managed well to ensure a sustainable water supply. Overgrazing and cultivation of riparian areas should not be allowed.
- It is recommended that lands around the wetlands are planted with *Eragrostis curvula* to attract water birds and land around the pan be increased by purchasing additional land.
- As the present and future agricultural and economic potential is shown to be uneconomical, it is recommended that the development proceed and viable agricultural activities should be implemented on the remaining area.

See **Annexure H** for the report on the Agricultural Potential.

5.3.5 Archaeological Assessment

An Archaeological Study to assess the significant historical and cultural findings. The study was undertaken by:

Mr. Cobus Dreyer
P.O. Box 12910
Brandhof
9324
Tel: 051 4441187
Fax: 051 4444395
Cell: 083 357 7982

Area of expertise: Archaeology and Heritage Specialist

Findings:

- The cluster of graves outside of the town fall beyond the proposed area for development and will not be affected.
- Historical buildings Historical buildings such as the old mill, school house, the post office, several residences and the general dealers' store are in a varying degree of decay or well maintained and preserved. Some of these buildings have been put to alternative use and others could be restored and preserved.
- The planned developments will have no serious effect on the cultural and historical heritage of the area. The proposed

residential developments at Verkykerskop demand the sensitive management of the project and could actually imply the rehabilitation and preservation of most of the built structures.

- The proposed improvements of Verkykerskop will have no major effect on the cultural and historical heritage of the area.

Recommendations:

- The residential developments at Verkykerskop will have an insignificant impact on the archaeological and cultural heritage of the village and surrounding area.
- Depending on the finds by other specialists, and based on the practical feasibility of the project, the residential development at Verkykerskop is recommended.
- Old buildings should be restored and preserved.

See **Annexure I** for the complete Archaeological Report.

5.3.6 Engineering Services Report

A report on the civil services, transportation, electrical and green energy options to demonstrate the provision of infrastructure required for the proposed development.

Dr Louis Grobler (Civil, transportation)
Mr Chris Germishuyzen (Electrical)
Dr Gawie v/d Merwe (Green Energy)

Reviewed by independent engineer appointed by the Phumelela Local Municipality:

Mr Mendel Eloff
EVN Africa Consulting Services

Findings:

Water:

- The design daily peak water demand for the proposed development was calculated as 422 kℓ/day.
- Possible sources of water were investigated and a storage dam for surface runoff and use of boreholes are planned (the EIA for the proposed construction of a storage dam is dealt with separately).

- Raw water from the boreholes and storage dam will be stored in a reservoir and due to the pristine quality of water, only chlorination of stored water before use, is required.
- The proposed reticulation network is demonstrated in the Water System Plan 9 in the Engineering Report in **Annexure J**.
- Water demand will be managed by incorporating a water wise water use regime into the rules of the home owners association.
- Necessary water use licences will need to be obtained for the proposed storage dam and water services provider.

Sanitation:

- The average daily effluent generation for the proposed development is calculated at 158 kℓ/day, while the effluent peak flow rate will be 5.9 ℓ/sec.
- Alternative sewerage options include septic tanks and soak-away systems, and central collection and treatment. Both decentralised and centralised options are considered feasible.
- Certain areas of the proposed development will be serviced by a decentralised system, where treatment package systems like the Bio-Mite system could be used. Waterborne sewerage is proposed for the centralised system areas.
- The main collection network and location of treatment plants is demonstrated in the Sewage and Solid Waste Plan 10 in the Engineering Report in **Annexure J**.
- With regard to the centralised treatment plant option, grey water could be used for irrigation purposes, on for example, horse sports fields, airfields, golf courses, etc.
- The Local Municipality could, by agreement with the developer, be the sewerage services provider for the village.

Solid waste disposal:

- The solid waste site is located in the south west corner of the village as indicated on the Sewage and Solid Waste Plan 10 in the Engineering Report in **Annexure J**.
- The facility is for collection, separation, recycling and transfer only and no waste will be landfilled or accumulated permanently or long term on site.

- A utility company will be responsible for rendering waste services and may contract a specialist contractor in this regard.
- A waste generation management plan is proposed as part of the home owners association rules.

Traffic and Roads:

- It is envisaged that the peak hour traffic generated by the proposed development would be 42 in and 46 out trips at the southern access and at the northern / main access: 260 in and 248 out (west) and 357 in and 224 out (east).
- The road network comprises a total of 1.2 km of Village Roads (of which 800 m will be cobble stone or seal surfaced), 8.5 km of Village Streets (of which 125 m surfaced) and 4.5 km Village Paths, and 10 km of shaped farm roads (see Transprotation Layout Plan 11 in the Engineering Report in **Annexure J**).
- A taxi / bus bay will be provided on both sides of the main road just south of the main northern intersection.
- Provision will be made for horses, bicycles and pedestrians by means of avenues on the internal road network, where vehicular traffic will be prohibited.
- A 80km/h speed restriction zone is proposed for the area with a 60 km/h speed restriction between the Warden turnoff in the south to just past the Vrede turnoff in the north.
- All public roads will be drivable by normal sedan vehicles, but some Farm Roads might only be utilizable by 4x4 vehicles.
- All roads except Farm Roads are public roads and all roads including Farm Roads will be owned by the Home Owners Association and maintained by the utility company.

Storm water:

- Route alignments were designed to avoid marshy areas and rocky outcrops, as well as follow natural contours as far as possible.
- The town's storm water infrastructure will be designed for the 1:10 year flood.
- A number of smaller dams are proposed between the village and the proposed main storage dam, to serve and retention ponds for flash floods and as silting dams for the rehabilitation of active erosion.

Electricity:

- The proposed town development will require a fairly small amount of power in addition to the current ESKOM network.
- The developer will be responsible for the cost of electrical reticulation to be installed to new developments and design drawings and layouts will be subject to approval by ESKOM.
- The completed network will be handed over to ESKOM which will be responsible for operation and maintenance of the system.
- Generally single phase connections will be permitted to use pre-paid metering, whist three phase connections may have to be provided with credit metering.
- The design philosophy applied for the provision of energy to the Verkykerskop development is based on extensive use of renewable energy sources and therefore three configurations of energy supply are applied: conventional grid electricity; self-sustained off-grid energy provision; and a hybrid system (see Engineering Report for more detail).
- The Energy Matrix in the Engineering Report in **Annexure J** tabulates the sources of energy to be applied for every Class of Living.
- Extensions will comprise both overhead reticulation and underground cable and will adhere to ESKOM standards.
- The anticipated additional load of about 700 – 750 kVA could be absorbed by the existing network without significant upgrading, still leaving room for expansion to other customers along the line in future.

Recommendations:

The following recommendations are made in the Engineering Report:

- The water utilization plan, comprising fitting of two boreholes and the construction of a storage dam as designed and presented herein be approved by DWAF.
- The integrated water use license application be favourably considered by DWAF.
- Existing water sources in the form of boreholes close to the village and the existing concrete water reservoir be accepted as interim

water infrastructure until such time as the growth of the development warrants the development of the main water sources and infrastructure.

- The storage dam, underground water sources, water provision, sewage treatment and waste management be licensed under the municipality's Water Service Provision licence.
- A not-for-profit service entity, governed by the owners association, be charged under a support agreement with the municipality, for the delivery of commercial services, the operation and maintenance of infrastructure, and the collection and administration of rates. This company must also be charged with the maintenance of the non-commercial services infrastructure such as roads, stormwater and common open spaces as well.
- The solid waste management plan and the waste disposal site in particular be approved by the relevant authority, and that the service entity negotiates with a specialist company for the managing of the waste site and recycling, and the removal of bulk waste.
- The finances of the commercial services be ring fenced and the owners association carrying the full cost of services without subsidy to or from the municipality.
- This report be used as basis for the negotiation of a services agreement with the municipality.
- This report be recognized as adequate technical substantiation that the proposed village development at Verkykerskop is feasible and viable from a services point of view.

Refer to the Engineering Services Report in **Annexure J** for the proposed bulk service infrastructure.

6. IMPACT ASSESSMENT

Impact assessment must take into account the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages from planning, through construction and operation to the decommissioning phase. Where necessary, the proposal for mitigation or optimisation of an impact is noted. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

A rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 3: Criteria for the classification of an impact

Nature	A brief description of the environmental aspect being impacted upon by a particular action or activity is presented.
Extent (Scale)	Considering the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. Site Within the construction site Local Within a radius of 2 km of the construction site RegionalProvincial (and parts of neighbouring provinces) National The whole of South Africa
Duration	Indicates what the lifetime of the impact will be. Short-term The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase Medium-term The impact will last for the period of the construction phase, where after it will be entirely negated Long-term The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter Permanent The only class of impact which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient
Intensity	Describes whether an impact is destructive or benign. Low Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected. Medium Effected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way High Natural, cultural and social functions and processes are altered to extent that they temporarily cease Very high Natural, cultural and social functions and processes are altered to

	extent that they permanently cease
Probability	Describes the likelihood of an impact actually occurring. Improbable — Likelihood of the impact materialising is very low Possible — The impact may occur Highly probable — Most likely that the impact will occur Definite — Impact will certainly occur
Significance	Significance is determined through a synthesis of impact characteristics. It is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. Low impact — No permanent impact of significance. Mitigatory measures are feasible and are readily instituted as part of a standing design, construction or operating procedure Medium impact — Mitigation is possible with additional design and construction inputs High impact — The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment Very high impact — The design of the site may be affected. Intensive remediation as needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw
Status	Denotes the perceived effect of the impact on the affected area. Positive (+) — Beneficial impact Negative (-) — Deleterious or adverse impact Neutral Impact is neither beneficial nor adverse It is important to note that the status of an impact is assigned based on the *status quo* – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

Issues identified during the Scoping process are discussed and assessed below:

6.1 VEGETATION DESTRUCTION

The natural vegetation in the area of the site is characterised by grass-covered slopes with scattered bush clumps in the valleys and rocky outcrops as well as hillslope seeps and valley-bottom wetlands. Crop fields and stands of exotic trees reflect the impact of human on the natural vegetation. A number of protected species are present on the farm. No extensive areas of particular faunal or floral sensitivity were identified. Most of the natural animal communities have already moved away due to farming practices by previous

landowners. The shrub communities in the valleys as well as the wetlands can be regarded as sensitive. The site at Verkykerskop is considered to be suitable for the proposed residential development because the footprint of the residential area as well as the associated infrastructure will be placed in such a way that these sensitive communities are not impacted upon. Large areas of natural vegetation will remain untouched by the proposed development.

High run-off from the proposed development could have a negative impact especially in terms of erosion. Refer to Annexure E for the Report or section 5.3.1 for the findings thereof.

6.1.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	Very high	Highly probable	High	Negative
With Mitigation	Site	Long term	Medium	Highly probable	Medium	Negative

6.1.2 Recommendations

See specialist report recommendations in section 5.3.1.

6.1.2.1 Planning phase

- A search and rescue exercise, to remove and transplant those protected plant specimens that will be destroyed during the construction phase, must be conducted before construction commences.
- The development areas should be demarcated before construction commences so that unnecessary destruction of natural vegetation is prevented.

6.1.2.2 Construction phase

- Care should be taken to limit destruction of the natural vegetation unnecessarily.
- All human movement and activities must be contained within designated construction areas in order to prevent peripheral impacts on surrounding natural habitat;
- No fire-wood may be collected in the veld.

6.1.2.3 Post Construction phase

- Species, especially grasses, trees and shrubs occurring in the region must be used to rehabilitate disturbed areas.
- An alien control and monitoring programme must be developed starting during the construction phase and to be carried over into the operational phase.
- Erosion should be prevented as far as possible and attended to, as serious erosion may occur at barren areas.

6.2 IMPACT ON WETLANDS

Isolated pockets of wetland plants were detected on the farm Annasdal. These include hill slope seeps, valley bottom wetlands, drainage lines and seasonal streams. The soils in these areas also indicate signs of wetness.

A riparian area, in terms of the National Water Act (Act 36 of 1998) is "the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas. A riparian vegetation occurs along the seasonal streams that drain the valley. The Verkykerskop residential area will be constructed in clusters and in phases. These clusters are located in the mesic grassland, upstream and away from the drainage lines and seasonal streams.

6.2.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Medium term	Medium	Possible	Medium	Negative
With Mitigation	Local	Short term	Low	Improbable	Low	Neutral

6.2.2 Recommendations

6.2.2.1 Planning phase

- Drainage of water on the site, as well as the water outlet drain to bordering areas, should be properly designed according to the nature of the site so that the existing flow pattern is not disturbed but copied.
- In areas where infrastructure such as electricity cables and pipes have to cross drainage lines, DETEA's guidelines to trench through drainage lines will have to be followed.

6.2.2.2 Construction phase

- All human movement and activities must be contained within the designated construction areas to prevent peripheral impacts on surrounding natural habitat.
- Care should be taken to limit destruction of the natural vegetation unnecessarily.

6.2.2.3 Post Construction phase

- Erosion control measures should be in place, especially for barren areas.
- Grass, tree and shrub species occurring in the region should be used to rehabilitate disturbed areas.

6.3 SOIL SUITABILITY

A geotechnical study, has been compiled and the survey is included in **Annexure F** and the findings summarized in section 5.3.2. The areas earmarked for development were divided into zones based on geotechnical mapping.

6.3.1 Assessment

Not applicable at present.

6.3.2 Recommendations

6.3.2.1 Planning phase

- Any possible geotechnical constraints that may be applicable to the development site requires further investigation prior to construction.
- Recommendations regarding construction methods for the various types of soil needs to be formulated.

6.3.2.2 Construction phase

- None at present.

6.3.2.3 Post Construction phase

- Erosion control measures should be in place, especially for barren areas.

6.4 BULK INFRASTRUCTURE

Refer to section 5.3.6 and the Engineering Services Report in **Annexure J** for details on the planned bulk infrastructure planned for the proposed development.

6.4.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Long term	High	Highly probable	High	Negative
With Mitigation	Site	Medium term	Medium	Possible	Medium	Positive

6.4.2 Recommendations

6.4.2.1 Planning phase

- All the relevant water use licences required for construction of bulk infrastructure should be in place.
- Design and construction of services must be according to the guidelines for the provision of engineering services and amenities in residential township development.

- Drainage of water on the site, as well as the water outlet drain to bordering areas, should be properly designed according to the nature of the site so that the existing flow pattern is not disturbed but copied. Marshy areas and rocky outcrops should be avoided as far as possible.

6.4.2.2 Construction phase

- Refer to the EMPr in **Annexure K** for recommendations during the construction phase.
- Building rubble and domestic waste generated during this phase must be removed by the contractor on a regular basis.

6.4.2.3 Post Construction phase

- Regular inspections along pipeline routes would help identify leakages before the leakage could cause major damage.
- Proper landscaping is necessary to minimize the impact of erosion.
- A waste generation management plan is recommended as part of the home owners association rules.

6.5 TRAFFIC IMPACT

The assessment of the roads of the proposed development and the envisaged traffic was undertaken as part of the Engineering Services Report (**Annexure J**). Refer to section 5.3.6 for the findings thereof. According to the report, it is envisaged that the peak hour traffic generated by the proposed development would be 42 in and 46 out trips at the southern access and at the northern / main access: 260 in and 248 out (west) and 357 in and 224 out (east).

6.5.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Regional	Long term	Medium	Highly probable	Medium	Negative
With Mitigation	Regional	Long term	Medium	Highly probable	Medium	Negative

6.5.2 Recommendations

6.5.2.1 Planning phase

- Design and construction of roads should adhere to relevant standards.
- Drainage of water should be properly designed according to the nature of the site so that the existing flow pattern is not disturbed but copied.

6.5.2.2 Construction phase

- Refer to the EMPr in **Annexure K** for recommendations during the construction phase.
- Building rubble and domestic waste generated during this phase must be removed by the contractor on a regular basis.

6.5.2.3 Post Construction phase

- None

6.6 VISUAL IMPACT

The visual impact of the proposed development in the landscape is the function of several factors of which the viewing distance, visual absorption capacity and landform are measurable. Other factors are difficult to categorize because they are subjective viewpoints.

The visual impact for the proposed development is largely due to:

- The topography in terms of elevation and aspect.
- The vegetative cover in terms of its extent and height.
- The extent of the proposed development.
- Distance from the proposed development.
- The low visual absorption capacity of the surrounding landscape.

Due to the nature of the visual catchment, the critical viewpoints for this development would be the high ground of the southern hill, to the north of the village and main road through the village (S722).

6.6.1 Factors of Visual Impact

Visual character:

The visual character of an area has different elements that provide an overall perceived ambience. In the consideration of the visual character of a site, it is important to include not only the internal land use but that of the surrounding land as well.

At this site the visual character is mainly the Verkykerskop Village and agricultural land. The main water reservoir on the plateau is existing, as well as the cell phone tower.

Scale of landscape:

Visual scale is the apparent size relationships between landscape components and their surroundings (Smardon, *et al.* 1986).

The topography of the site consists of undulating grass covered slopes with a steep sloped valley in the south east.

Visual analysis:

In this section the intensity of the visual impact of the development on the surrounding area is described. Aspects such as viewshed, visual absorption capacity and the appearance of the development from critical viewpoints will be used to determine this impact.

6.6.2 Site evaluation in terms of visual impact

Visual assessment ratings (Table 4) rates each criterion listed in the table from, high, medium to low according to specific characteristics of those criteria.

Table 4: Visual assessment criteria ratings

CRITERIA	HIGH	MEDIUM	LOW
Visibility	**Very visible from many places beyond 1km**	Visible from within 1km zone but partially obscured by intervening objects	Only partially visible within the 1km zone and beyond due to screening by intervening objects
Visual quality	**A very attractive setting**	A setting with some aesthetic and visual merit	A setting which has little aesthetic merit
Visible man-made structures	Buildings as a dominant visual element	**Buildings as a partial visual element**	Buildings as a minor visual element
Surrounding landscape compatibility	Usually suits or matches the proposed development	**Can accommodate the proposed development without appearing totally out of place**	Cannot accommodate proposed development without appearing totally out of place.
Character of site or surrounding area	**Exhibits a definite character**	Exhibits some character	Little or no character
Contrast between human scale and vertical & horizontal elements in the landscape	There is high contrast.	**Landscape with some contrast.**	Limited vertical variation. Most elements are related to human and horizontal scale.
Visual absorption capacity (VAC)	The ability of landscape to easily accept visually a particular development because of its diverse landform, vegetation and texture	**The lower ability of the landscape to visually absorb the development due to less diverse landform, vegetation & texture**	Inability of landscape to visually absorb a development because of a limited vegetation cover, flat slope and uniform texture
View distance (uninterrupted)	**More than 5km**	Between 5km & 1km	Between 1km & 500m
Critical views	**Views of the development are to be seen by many people passing on road routes and from prominent areas**	Some views of the development from surrounding routes and housing	Limited views to the development from roads and housing

Underlined visual assessment criteria ratings are those applicable to this proposed development (From Klapwijk 1998).

6.6.3 Results and conclusions on visual impact of development Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	High	Definite	High	Negative
With Mitigation	Local	Long term	Medium	Definite	Medium	Neutral

The proposed development would have a **high** visual impact. This is largely due to:

- The extent of the development.
- The surrounding agricultural area.
- Distance from roads and the existing town.
- The medium visual absorption capacity of the surrounding landscape.

6.6.4 Recommendations

6.6.4.1 Planning phase

- The locality and placement of the new residential areas were chosen so that they do not lie on the crest of ridges or on plateaus.

6.6.4.2 Construction phase

- Untidy construction sites could cause a negative visual impact and should therefore be kept tidy.
- Control measures over the contractor's plant and material storage area will ensure a neat impression from the road.
- The use of floodlights to illuminate construction sites must be limited. All floodlights must be installed in such a way that the light and glare does not increase light pollution.

6.6.4.3 Post Construction phase

- Visual impact could be softened by planting trees and shrubs. Indigenous species are recommended.
- Taller tree species can be planted to act as screens to soften the visual impact, where necessary (e.g. reservoirs). In this region, no indigenous tall trees occur, therefore in order to plant tall trees one would have to use Beefwood, Bluegum or pine trees. To plant these trees, the developer must obtain a permit from the Department of Forestry.

6.7 LIGHT POLLUTION

A development of this kind is expected to generate more light from general lighting by businesses, residences, street lighting etc. Lighting recommendations are made to minimize the impact of lighting on the surrounding rural area.

6.7.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Local	Permanent	Medium	Definite	High	Negative
With Mitigation	Local	Long term	Low	Possible	Medium	Neutral

6.7.2 Recommendations

6.4.2.1 Planning phase

- Careful planning is required for lighting of streets and general areas in order to lower light pollution without compromising safety.

6.7.2.2 Construction phase

- The use of floodlights to illuminate construction sites must be limited. All floodlights must be installed in such a way that the light and glare does not increase light pollution.

6.7.2.3 Post Construction phase

- Good shielding of lights, proper positioning and orientation will reduce light pollution from the proposed development.

6.8 SAFETY AND SECURITY

Due to the influx of people into the Verkykerskop area, especially during the construction phase, concerns regarding informal settlements, hawking and security were raised by interested and affected parties at the public meeting held at Verkykerskop on 19 February 2011 (**Annexure D3**). The issue of an increased risk of fires due to the development was raised from comments on the draft Scoping Report.

6.8.1 Assessment

	Extent	Duration	Intensity	Probability	Significance	Status
Without Mitigation	Regional	Long term	High	Possible	Medium	Negative
With Mitigation	Local	Medium term	Medium	Possible	Low	Neutral

6.8.2 Recommendations

6.8.2.1 Planning phase

- Liaisons with the local police is recommended.
- Safety and security measures should be included in construction contracts.

6.8.2.2 Construction phase

- Lighting of fires on the site must not be allowed. The risk of accidental fires during the construction phase is considered to be high, especially during the dry months (winter and early spring).
- Fire-fighting equipment must be available on site.

6.8.2.3 Post Construction phase

- None at present.

7. ENVIRONMENTAL IMPACT STATEMENT

7.1 SUMMARY OF THE KEY FINDINGS OF THE EIA

The results of this EIA report indicate that:

- Protected plant species were found on site, which will need to be translocated.
- Certain geotechnical constraints can be addressed.
- The agricultural potential of the soils is poor to moderate.
- The proposed development will have no serious effect on the cultural and historical heritage of the area.
- Necessary engineering services can be provided.
- The planned development would have a high visual impact.

7.2 COMPARATIVE ASSESSMENT OF THE POSITIVE AND NEGATIVE IMPLICATIONS OF PROPOSED ACTIVITY AND ALTERNATIVES

Table 5: Positive and negative implications of the proposed activity

POSITIVE IMPLICATIONS	NEGATIVE IMPLICATIONS
Socio-economic boost to the region.	Natural vegetation in the development footprint area will be destroyed.

7.3 ASSUMPTIONS AND LIMITATIONS

7.3.1 Assumptions

- The information obtained from all different specialist sources such as site inspections, desk studies, is accurate.

7.3.2 Limitations

In terms of specialist studies, limiting factors included:

- Current disturbances to the proposed site, vegetation cover, etc. limited complete inspection of the ground for surface remnants of archaeological and historical material.

7.4 SHOULD THE PROPOSED ACTIVITY BE AUTHORISED

One of the stated primary objectives of the applicant is to instate best-practice land use policies comprising the protection and rehabilitation of sensitive natural areas and the sustainable use of natural resources.

In light of the above and in the view of the environmental assessment practitioner, the information contained in this report and the documentation attached hereto is sufficient to make a decision in respect of the activity applied for. There is no obvious environmental reason why the proposed development should be denied.

7.5 CONDITIONS THAT SHOULD BE MADE IN RESPECT OF THE AUTHORISATION

The following is a list of recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

- It is recommended that the mitigation measures, suggested in this report for the planning, construction and operational phases be incorporated in the Environmental Authorisation, should this development receive authorisation to go ahead. Specific recommended mitigation measures are listed in Table 6.

Table 6: A summary of the specific recommended mitigation measures for the planned development.

RECOMMENDATION	MITIGATION MEASURES
Conservation of protected plant species	A search and rescue exercise should be undertaken to relocate protected plant species prior to construction.
Erosion Control	Refer to draft Environmental Management Programme (**Annexure K**) for erosion control recommendations.
Archaeological artefacts or human remains could be unearthed. In this case the contractor is obliged to cease the operation temporarily.	The project archaeologist must be contacted to conduct further investigations. Construction may resume with the consent of the archaeologist.
Storm water control	Drainage channels should be properly designed according to the nature of the site.

- An Environmental Management Programme (EMPr) is required for the activity to minimize any negative impacts during the different phases of the development, especially the construction phase. The EMPr contains guidelines and recommendations for minimizing the impacts identified during the EIA as well as address the rehabilitation of disturbed areas. A Draft EMPr is included in **Annexure K** of this report.

8. LITERATURE

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