

1. INTRODUCTION

The eMalahleni Local Municipality intends to install a new bulk sewer line from the Pine Ridge Pump Station to the Klipspruit Sewage Treatment Works. The pipeline will be approximately 15 km long and between 825 mm - 1350 mm in diameter. The sewer line needs to be installed as part of the Klarinet Integrated Housing Project.

The proposed sewer line will be located on various portions of the farms Leeuwpoort 283 JS, Klippoort 277 JS, Harbeestspruit 281 JS and Nooitgedacht 300 JS and will be located northeast of eMalahleni and Pine Ridge. The proposed sewer line will extend through the Leeuwpoort Smallholdings to the Klipspruit Sewage Treatment Works

Alternatives will be investigated as part of the project, which may include the construction of a new regional sewage treatment works.

The Minister of Environmental and Water Affairs listed in terms of Sections 24(2), 24(5), 24D and 44, read with section 47A(1)(b) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), a number of activities that require an environmental impact assessment (either a Basic Assessment or a full Environmental Impact Assessment) before undertaking these activities.

The proposed development would involve the following listed activities as identified in terms of Section 24(2) and 24D of the National Environmental Management Act, 1998:

GN R983 – LISTING NOTICE 1 (REQUIRES A BASIC ASSESSMENT)	
Listed Activity	Description
10	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes - (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.
12	The development of (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square metres in size; (ix) slipways exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a water course;- excluding (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case

GN R983 – LISTING NOTICE 1 (REQUIRES A BASIC ASSESSMENT)	
Listed Activity	Description
	activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads and road reserves.
19	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from (i) a watercourse; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving – (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within ambit of activity 21 in this Notice, in which case that activity applies.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure (i) has an internal diameter of 0.36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion (aa) relates to transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve; or (bb) will occur within an urban area.

GN R984 – LISTING NOTICE 2 (REQUIRES A FULL EIA)	
Listed Activity	Description
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding – (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15 000 cubic metres or more.

GN R985 – LISTING NOTICE 3 (REQUIRES A BASIC ASSESSMENT)	
Listed Activity	Description
	Listing Notice No. 3 becomes applicable if the site is located within a specific geographical area (e.g. endangered ecosystems or critical biodiversity areas).
	Not applicable

In order to obtain environmental authorisation, a Scoping Report and an Environmental Impact Assessment Report must be compiled as described in Regulations 21 to 24 and Appendices 2, 3 and 4 of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of Section 24(5), 24M and 44 of the National Environmental Management Act, 1998 (Act 107 of 1998).

According to Appendix 2 of the Regulations, the objective of the scoping process is to, through a consultative process-

- a. identify the relevant policies and legislation relevant to the activity;
- b. motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- c. identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- d. identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- e. identify the key issues to be addressed in the assessment phase;
- f. agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- g. identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Clean Stream Environmental Services was appointed as independent environmental consultant to conduct the required Environmental Impact Assessment Process and compile the necessary documentation. This Scoping Report is compiled in accordance with Appendix 2 of the Environmental Impact Assessment Regulations, 2014 and indicates the environmental outcomes, impacts and residual risks of the proposed activity.

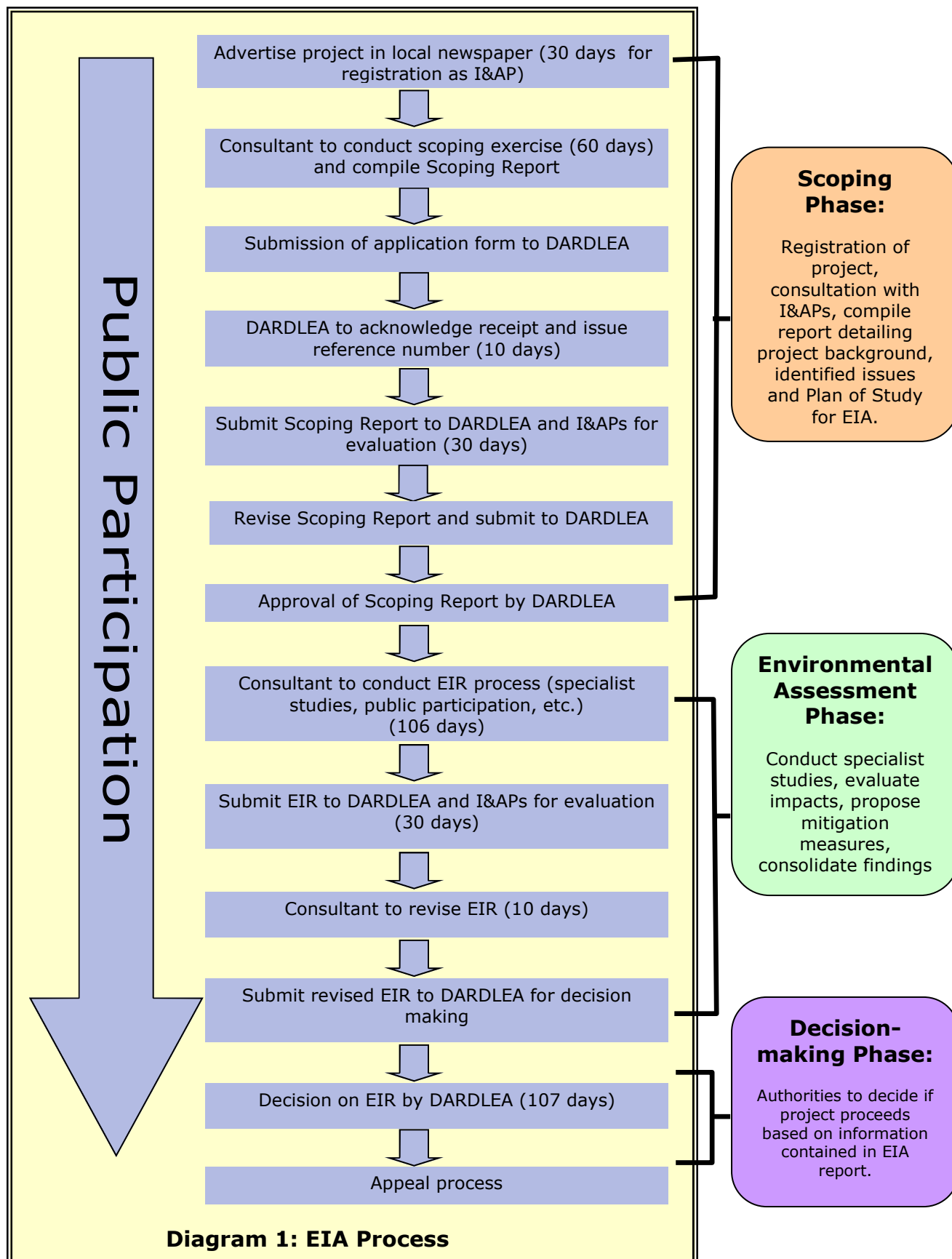
In essence, this scoping report provides the following information:

- details of the Environmental Assessment Practitioner and applicant (Section 2.1),
- an overview of the proposed project (Section 2.4),
- need and desirability of the proposed project (Section 2.3),
- an overview of the alternatives investigated (Section 5),
- an overview of the environmental features of the proposed site and immediate surrounding area (Section 3),
- an indication of the interested and affected parties (I&APs) identified to date (Section 4),
- an indication of issues of concern/comments received from interested and affected parties (I&APs) to date (Section 4),
- an indication of potential environmental impacts that could take place as a result of the proposed project (Section 6),
- plan of study for undertaking of the Environmental Impact Assessment process (Section 7),
- terms of reference of specialist studies to be conducted (Section 7),
- undertaking by Environmental Assessment Practitioner (see front of report).

Diagram 1 provides a schematic description of the Environmental Impact Assessment (EIA) process to be followed. This EIA process will be conducted strictly according to the above-mentioned Regulations. The aim of the process is to ensure that the environmental impacts are considered, the relevant I&APs are consulted and the decision making authorities are provided with sufficient information to make an informed decision.

The decision making authority is the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA). This Department will decide to grant or refuse the approval of the project. On approval, an Environmental Authorisation and Record of Decision will be issued in the name of the project applicant.

The project applicant will be responsible for complying with the conditions set in the Environmental Authorisation and Record of Decision.



2. DESCRIPTION OF THE ACTIVITY

2.1 Details of the project applicant and environmental consultant

Name and address of applicant: eMalahleni Local Municipality P.O. Box 3 Witbank 1035	
Contact person:	Mr. Shadrack Ndlovu
Telephone number:	013 – 690 6294
Cell number:	082 895 7787
e-mail address:	ndlovusc@emalahleni.gov.za

Bigen Africa Services (Pty) Ltd. (on behalf of the eMalahleni Local Municipality) appointed Clean Stream Environmental Services, an independent environmental consultancy, to undertake the Environmental Impact Assessment process for the proposed development in accordance with the Environmental Impact Assessment Regulations (EIA), 2014.

Name and address of environmental consultant: Clean Stream Environmental Services P.O. Box 647 Witbank 1035	
Contact persons:	Mrs. A. Erasmus <i>Pr. Sci. Nat.</i> Ms. R. Janse van Rensburg
Cell number:	083 271 8260
Telephone number:	(013) 697 5021
Fax number:	(013) 697 5021
e-mail address:	adie@cleanstreams.co.za riana@cleanstreams.co.za

Clean Stream Environmental Services has no vested interest (other than fair remuneration) in the approval of this project, and hereby declares its independence as required by the EIA Regulations, 2014.

A copy of the completed application form and the declaration of independence by the applicant and environmental consultant are provided in Appendix 1.

A copy of the Curriculum Vitae of both Mrs. A. Erasmus and Ms. R. Janse van Rensburg are provided in Appendix 2 together with a list of projects completed to date.

2.2 Nature of the activity/development

The eMalahleni Local Municipality intends to install a new bulk sewer line from the Pine Ridge Pump Station to the Klipspruit Sewage Treatment Works (Figure 2.1). The pipeline will be ± 15 km in length and between 825mm and 1350 mm in diameter.

Alternatives will be investigated as part of the project, which may include the construction of a new regional sewage treatment works.

The proposed development would involve the following listed activities as identified in terms of Section 24(2) and 24D of the National Environmental Management Act, 1998:

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In order to obtain environmental authorisation, a Scoping Report and an Environmental Impact Assessment Report must be compiled as described in Regulations 21 to 24 and Appendices 2, 3 and 4 of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of Section 24(5), 24M and 44 of the National Environmental Management Act, 1998 (Act 107 of 1998).

2.3 Reason for project (need and desirability)

According to the information provided, the regional sewer network extending from the Klarinet residential areas towards the Klipspruit Sewage Treatment Works needs to be upgraded in order to cater for the Klarinet Phase 2 development (a National Priority Project implemented in support of the Government’s Breaking New Ground Strategy) as well as other developments in the area.

Currently, sewage generated by the existing Klarinet developments and Pine Ridge is collected at the northern corner of Klarinet x6 via an existing 400mm diameter outfall sewer. It is then gravitated to Pine Ridge and pumped from Pine Ridge Pump Station to Klipspruit Sewage Treatment Works (STW) through an existing 315mm diameter pumping main.

The 315 mm diameter pumping main is insufficient for the current and future sewage flows in the area. In addition, the Pine Ridge Pump Station is not in good working order, resulting in sewage flowing into the adjacent Blesbokspruit.

In view of the above-mentioned, the proposed bulk sewer line will be installed in line with the Klarinet Phase 2 development programme, which requires the sewer line to be in place by the end of 2017.

2.4 Detailed description of the development and all relevant components

The eMalahleni Local Municipality intends to install a new bulk sewer line from the Pine Ridge Pump Station to the Klipspruit Sewage Treatment Works.

The proposed sewer line will be located on various portions of the farms Leeuwpoort 283 JS, Klippoort 277 JS, Hartbeestspruit 281 JS and Nooitgedacht 300 JS and will be located northeast of eMalahleni and Pine Ridge. The proposed sewer line will extend through the Leeuwpoort Smallholdings to the Klipspruit Sewage Treatment Works

Two alternatives are being investigated as part of the proposed project, namely:

- Alternative 1: Gravity sewer from Pine Ridge to Klipspruit Sewer Treatment Works (STW);
- Alternative 2: Gravity sewer from Pine Ridge to a new Regional STW north of Pine Ridge.

2.4.1 Alternative 1: Gravity sewer from Pine Ridge to Klipspruit Sewer Treatment Works (STW)

Figure 2.1 provides the layout plan of the proposed bulk sewer line route.

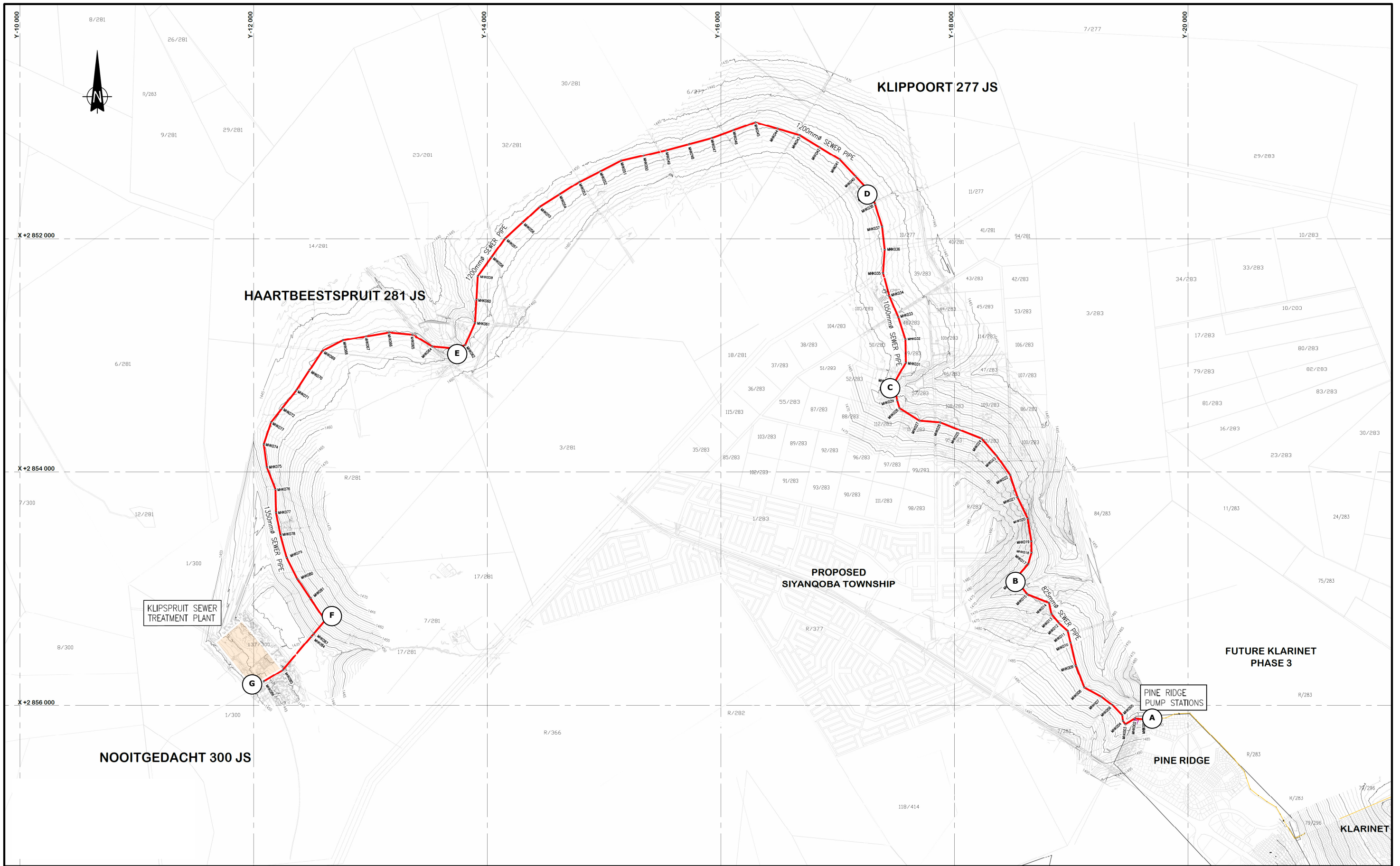
The pipeline will be \pm 15 km in length and between 825mm and 1350 mm in diameter. The sewer line will connect to the existing Klarinet outfall sewer at Pine Ridge and gravitate to the Klipspruit Sewage Treatment Works (STW).

In order for the sewage to flow through the system by means of gravitation, the sewer line will have to follow a single contour line, namely 1450 meters above mean sea level (mamsl) (Figure 2.1).

The design flow will range from 400 lt/s (at starting point) to 1000 lt/s (at the discharge point).

As part of the project, the Pine Ridge Pump Station will be decommissioned and all existing and future flows will be diverted to the new sewer line.

For ease of description, the sewer line route has been divided into various sections, namely Point A to Point G as indicated in Figure 2.1). Point A is the connection point at the Pine Ridge Pump Station and Point G is located at the Klipspruit STW.



AS-BUILT RECORD			
CONTRACT No.	DESCRIPTION	CERTIFIED BY	DATE

CERTIFIED AS-BUILT FOR CONTRACT :

ENGINEER _____ DATE _____

Figure 2.1
Alternative 1: Layout plan of gravity sewer from Pine Ridge to Klipspruit STW

BIGEN AFRICA Services (PTY) LTD
 Allan Cormack Street
 The Innovation Hub Perskor Pretoria
 PO Box 29 The Innovation Hub Pretoria 0087
 Tel: +27 (0) 12 842 8700
 Fax: +27 (0) 12 843 9000/9001
 E-mail: pretoria@bigenafrica.com
 www.bigenafrica.com

BIGEN AFRICA
 Engineering solutions

PROJECT TITLE:
KLARINET INTEGRATED HOUSING PROJECT

DRAWING TITLE:
KLIPSPRUIT OUTFALL SEWER LAYOUT PLAN

EMALAHLENI LOCAL MUNICIPALITY

0 50 100
 100mm ON ORIGINAL DRAWING

ORIGINAL DRAWING SCALE: 1:15 000 ORIGINAL DRAWING SHEET SIZE: A1

APPROVED:

CLIENT OR ASSIGNEE: _____ DATE: _____

CLIENT DRAWING No.: _____ CLIENT REF No.: _____

SURVEYED	DESIGNED	N. Thambo
DRAWN	CHECKED	M.A. Matyeka
CO-ORDINATE SYSTEM:	WC29	DATE: October 2015
APPROVED ON BEHALF OF BIGEN AFRICA:		
ENGINEER:	DATE:	
DRAWING No.:	1037.00.ZB.06.A004	VERSION: A.0

Point A to Point C (Figure 2.1)

The proposed bulk sewer line will connect to the existing sewer network at Point A, which is the Pine Ridge Pump Station (Figure 2.1). The Pine Ridge Pump Station will be decommissioned and all existing and future flows will be diverted to the new sewer line.

The sewer line between Point A and Point C will be 825 mm in diameter (Figure 2.1). Various manholes will be provided along the route for maintenance purposes.

Point C to Point D (Figure 2.1)

The sewer line between Point C and Point D will be 1050 mm in diameter (Figure 2.1). Various manholes will be provided along the route for maintenance purposes.

Point D to Point E (Figure 2.1)

Between Point D and Point E, the sewer line will be 1200 mm in diameter and will extend through agricultural land (Figure 2.1). Various manholes will be provided along the route for maintenance purposes.

Point E to Point F (Figure 2.1)

The sewer line between Point E and Point F will be 1350 mm in diameter (Figure 2.1). Various manholes will be provided along the route for maintenance purposes.

Point F to Point G (Figure 2.1)

The sewer line between Point E and Point F will be 1350 mm in diameter (Figure 2.1). Only 4 manholes will be provided along this section of the route for maintenance purposes. At Point F, the sewer line will connect to the Klipspruit STW (Figure 2.1).

2.4.2 Alternative 2: Gravity sewer from Pine Ridge to a new Regional STW north of Pine Ridge

Alternative 2 also entails the installation of a gravity sewer line from the existing Pine Ridge Pump Station. However, this proposed sewer line will end at a proposed new regional sewage treatment works located north of the Leeuwpoort Smallholdings (Figure 2.2; Point D). This sewer line will be approximately 6.5 km in length.

As in Alternative 1, the Pine Ridge Pump Station will be decommissioned and all existing and future flows diverted to the new sewer line.

Figure 2.2 provides an indication of the sewer line route and the position of the proposed STW. It should be noted that the proposed sewer line route from Point A to Point D (Figure 2.2) is exactly the same as that of Alternative 1: Point A to Point D (Figure 2.1).

As in the case of Alternative 1, the sewer line will follow a single contour line, namely 1450 meters above mean sea level (mamsl; Figure 2.1) in order for the sewage to flow through the system by means of gravitation. The sewer line will be 700 mm in diameter with a throughput capacity of 550 l/s (Figure 2.2). Various manholes will be provided along the route for maintenance purposes.

The proposed new regional sewage treatment works site (Figure 2.2) is indicated as 500m x 500m (i.e. 25 ha) in extent. It is envisaged that a

20MI/day sewage treatment works be constructed. It is possible that the entire 25 ha may not be utilized for the construction of the new regional sewage treatment works.

More information with regards to the type of sewage works (e.g. conventional, package plant, etc.) will be provided in the EIA report.

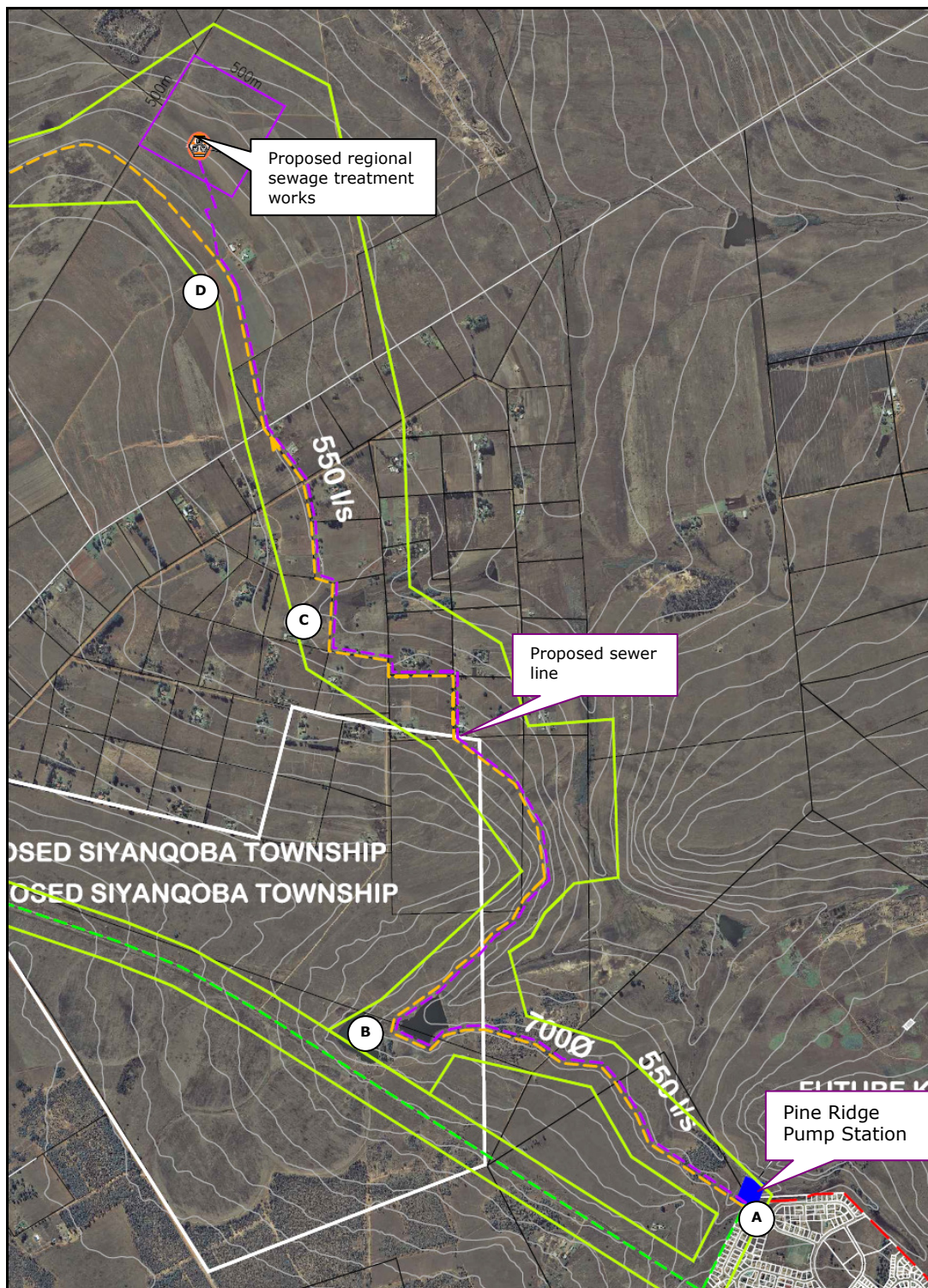


Figure 2.2: Alternative 2: Gravity sewer from Pine Ridge to a new Regional STW north of Pine Ridge (taken from Bigen Africa Services (Pty) Ltd, 2015)

2.5 Services required

The new sewer line itself will not require services. However, basic services (i.e. potable water, chemical toilets, waste disposal, generator, access road and storm water control measures) will need to be provided by the contractors during the construction phase of the project.

Alternative 1:

The proposed gravity sewer line will connect to the existing Pine Ridge Pump Station and Klipspruit STW, which are already provided with services.

Alternative 2:

The proposed new regional sewage treatment works will have to be provided with services (i.e. ablutions for staff, water, electricity, storm water control measures, access road and waste management measures).

2.6 Phases of development

2.6.1 Estimated start and completion dates of construction

Construction will commence after all the relevant approvals have been obtained. The bulk sewer line will be installed in line with the Klarinet Phase 2 development programme, which requires the sewer line to be in place by the end of 2017.

2.6.2 Construction phase

The construction phase for Alternative 1 would involve the excavation of the trenches and the installation of the gravity sewer line and manholes.

Alternative 2 would also involve the excavation of trenches and installation of a new sewer line. In addition, it would involve the levelling of a site for the construction of the proposed new regional sewage treatment works.

A contractor will be responsible for the installation of the sewer line and the construction of the regional sewage treatment works as well as the overall management of the construction site and construction activities. The contractor will be responsible for providing suitable accommodation for construction personnel.

2.6.3 Operational phase

The operational phase would involve the utilization of the sewer line (Alternative 1 or Alternative 2) and the new regional sewage treatment works (Alternative 2).

2.6.4 Decommissioning phase

As part of the project, the Pine Ridge Pump Station will be decommissioned and all existing and future flows will be diverted to the new sewer line. The decommissioning of the said pump station would have to be addressed.

If the situation of decommissioning in terms of the overall project does arise, an Environmental Management Plan (EMP) will need to be compiled in order to manage the activities associated with the decommissioning of the site.

2.7 Applicable legislation, policies and/or guidelines

The table below provides an indication of legislation, policies and/or guidelines applicable to the said project.

Applicable legislation, policies and/or guidelines

Title of legislation, policy or guideline:	Administering authority:	Aim of legislation, policy or guideline
The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)	Department of Justice and Constitutional Development	To establish a Constitution with a Bill of Rights for the RSA. It sets out of a number of fundamental environmental rights (Section 24).
Development Facilitation Act, 1995 (Act 67 of 1995) and amendments	Department of Rural Development and Land Reform	To provide for planning and development.
Environment Conservation Act, 1989 (Act 73 of 1989) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
National Environmental Management Act, 1998 (Act 107 Of 1998) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African Biodiversity Institute; and for matters connected therewith.
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law regulating waste management in order to protect health and the environment by providing for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) and amendments	Department of Environmental Affairs	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; and

Title of legislation, policy or guideline:	Administering authority:	Aim of legislation, policy or guideline
		for matters in connection therewith.
Environmental Impact Assessment Regulations, 2014 (Government Gazette No. 33306 of 18 June 2010) and amendments	Department of Agriculture, Rural Development, Land and Environmental Affairs	Regulations pertaining to environmental impact assessments.
National Water Act, 1998 (Act 36 of 1998) and amendments	Department of Water and Sanitation	To control water management aspects.
National Veld and Forest Fire Act, 1998 (Act 101 of 1998) and amendments	Department of Agriculture, Forestry and Fisheries	To prevent and combat veld, forest and mountain fires throughout South Africa.
National Heritage Resources Act, 1999 (Act 25 of 1999) and amendments	South African Heritage Resources Agency	This legislation aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations.
Protection of Personal Information Act, 2013 (Act 4 of 2013)	Department of Justice and Constitutional Development	The purpose of this act is to give effect to the constitutional right to privacy by safeguarding personal information and to regulate the manner in which personal information may be processed.
Promotion of Access to Information Act, 2000 (Act 2 of 2000) and amendments	Department of Justice and Constitutional Development	To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) and amendments	Department of Justice and Constitutional Development	The Act aims to make the administration (e.g. Government and Parastatals) effective and accountable to people for its actions.
Conservation of the Agricultural Resources Act, 1983 (Act 43 of 1989) and amendments	Department of Agriculture, Forestry and Fisheries	To provide control over the utilization of the natural resources of the Republic in order to promote the conservation of soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
Occupational Health and Safety Act, 1993 (Act 85 of 1993) and amendments	Department of Labour	To provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.
Health Act, 1977 (Act 63 of 1977) and amendments	Department of Health	To promote public health.
Mpumalanga Nature Conservation Act, 1998 (Act 10 of 1998) and amendments	Mpumalanga Tourism and Parks Agency	To control nature conservation.
National Building Regulations and Standards Act, 1977 (Act 103 of 1977) and amendments	Department of Trade and Industry	To provide for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities; for the prescribing of building standards; and for matters connected therewith.
Various by-laws of the eMalahleni Local Municipality, e.g.: <ul style="list-style-type: none"> o Inflammable liquids; o Refuse and solid waste; o Waste; o Noise; o Rates. 	eMalahleni Local Municipality	To regulate land use within the eMalahleni Local Municipal area.
Integrated Development Plan for the eMalahleni Local Municipality	eMalahleni Local Municipality	Broad spatial framework guidelines for the eMalahleni Local Municipality.
Spatial Development Framework for the eMalahleni Local Municipality	eMalahleni Local Municipality	Spatially based policy guidelines whereby changes, needs and growth in the region can be managed to benefit the whole community.

Title of legislation, policy or guideline:	Administering authority:	Aim of legislation, policy or guideline
Integrated Environmental Management Guideline Series (Guideline 5 – 10 October 2012) – Companion to the Environmental Impact Assessment Regulations, 2010	Department of Economic Development, Environment and Tourism	To provide clarity on the processes to be followed when applying for an environmental authorisation in terms of the EIA Regulations and gives a comprehensive interpretation of the listed activities.
Nkangala District Municipality Climate Change Response Strategy	Nkangala District Municipality	A strategy in response to climate change.
Nkangala District Municipality Integrated Waste Management Strategy	Nkangala District Municipality	A strategy dealing with waste.
National Protected Areas Expansion Strategy (NPAES, 2008)	Department of Environmental Affairs	To achieve cost-effective expansion of the protected area network that enhances ecological sustainability and resilience to climate change
National Biodiversity Framework (NBF, 2008)	Department of Environmental Affairs	To co-ordinate and align the efforts of the organisations and individuals involved in conserving and managing South Africa's biodiversity
Convention on Biological Diversity (29 December 1993)	Party to International Convention	Develop strategies, plans or programs for conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plant or programs which shall reflect, inter alia, the measures set out in this Convention.
United Nations Framework Convention on Climate Change - Kyoto Protocol (23 February 2005)	Party to International Convention	To further reduce greenhouse gas emissions by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries and through the clean development mechanism (CDM) where developed countries can invest in developing country clean technology to offset emissions).

3. BIOPHYSICAL DESCRIPTION OF THE PROPOSED SITE

3.1 Location of the site

The proposed sewer line will be located on various portions of the farms Leeuwpoot 283 JS, Klippoort 277 JS, Hartbeestspruit 281 JS and Nootgedacht 300 JS and will be located northeast of eMalahleni and Pine Ridge. The proposed sewer line will extend through the Leeuwpoot Smallholdings to the Klipspruit Sewage Treatment Works

As indicated in Section 2.4, two alternatives are being investigated as part of the proposed project, namely:

- Alternative 1: Gravity sewer from Pine Ridge to Klipspruit Sewer Treatment Works (STW) (Figure 2.1);
- Alternative 2: Gravity sewer from Pine Ridge to a new Regional STW north of Pine Ridge (Figure 2.2).

Alternative 1: Gravity sewer from Pine Ridge to Klipspruit Sewer Treatment Works (STW) (Figure 2.1)

The proposed sewer line will be located on various portions of the farms Leeuwpoot 283 JS, Klippoort 277 JS, Hartbeestspruit 281 JS and Nootgedacht 300 JS and will extend through the Leeuwpoot Smallholdings to the Klipspruit Sewage Treatment Works (Figure 3.1). The sewer line will be approximately 15 km in length.

The co-ordinates of the route are:

	Latitude (S):		Longitude (E):			
• Starting point	25°	48'	46.41"	29°	11'	44.26"
• Middle point	25°	46'	00.29"	29°	09'	44.83"
• End point	25°	48'	36.09"	29°	07'	13.95"

Alternative 2: Gravity sewer from Pine Ridge to a new Regional STW north of Pine Ridge (Figure 2.2).

The proposed sewer line will only be located on various portions of the farm Leeuwpoot 283 JS (Figure 5.1). The proposed regional sewage treatment works and last section of the sewer line (Point D to STW; Figure 2.2) will be located on the Remaining Extent of the farm Klippoort 277 JS (Figure 5.1).

The co-ordinates of the sewer line route and regional sewage treatment works site are:

	Latitude (S):		Longitude (E):			
• Starting point (Point A)	25°	48'	46.41"	29°	11'	44.26"
• End point (Point D)	25°	46'	03.16"	29°	10'	08.03"
• Sewage treatment works	25°	46'	03.16"	29°	10'	08.03"

The Surveyor-General 21 digit site reference numbers for the proposed sewer line and regional sewage treatment works are as follows:

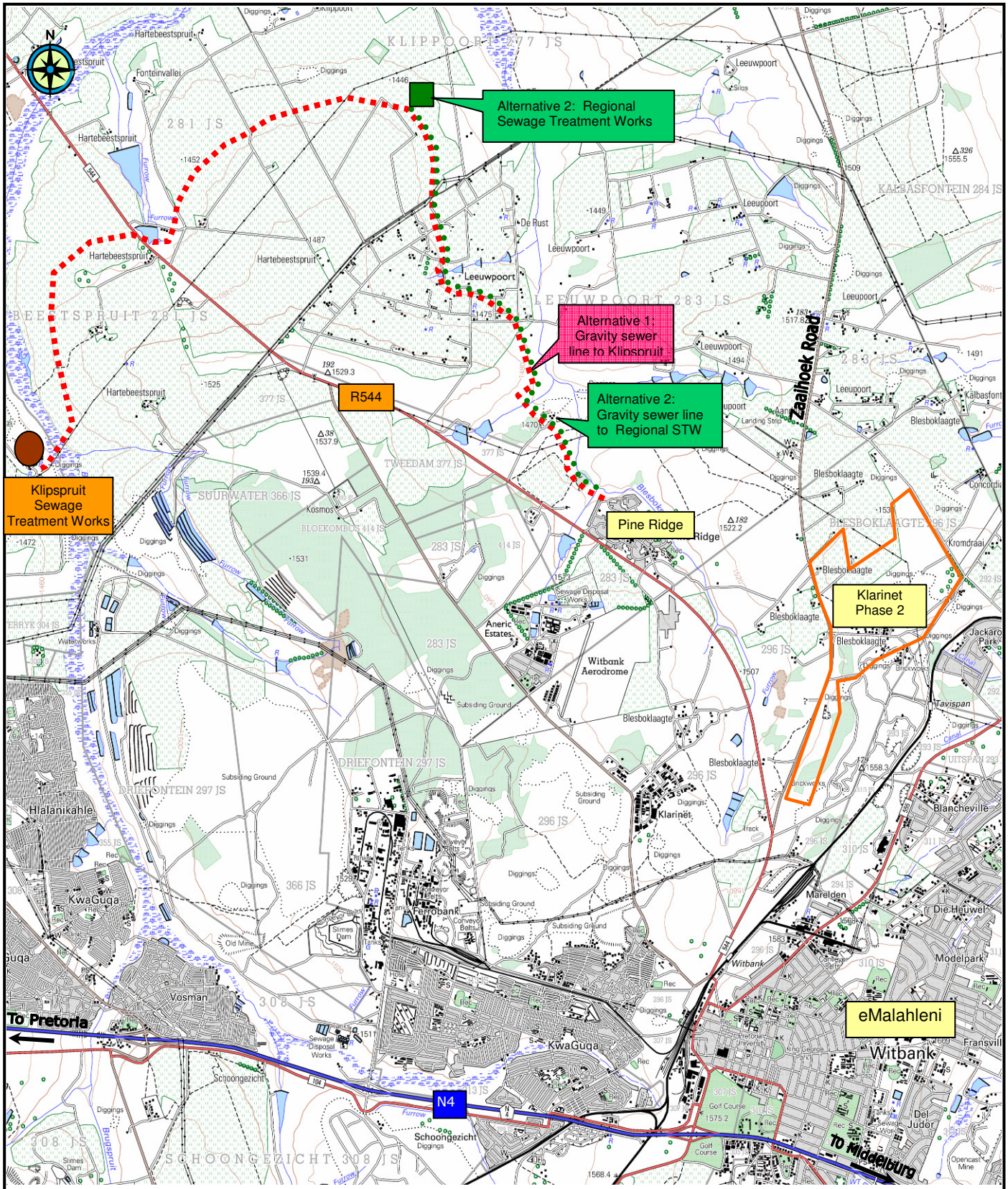


Figure 3.1: Location of site (taken from 1: 50 000 2529CC and 2529 CD)

ALTERNATIVE 1: Gravity sewer from Pine Ridge to Klipspruit STW (Figure 2.1)																				
Portion	SG 21 Digit Code																		Owner	
Leeuwpoot 283 JS																				
Remainder	T	O	J	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sarovic Investments cc
Portion 1	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Siyangoba (VIPCON Pty Ltd.)
Portion 7	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	National Government of RSA
Portion 48	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Sylvia Monroe Natlhong
Portion 49	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 54	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Johanna S.D. Ellis
Portion 57	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 84	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Louw Family Trust
Portion 95	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Willem Pieter Wallis
Portion 108	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Amanda Suzette Minnaar
Portion 110	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Khensani Aaron Khumalo
Portion 112	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Susi-Martina Moritz
Portion 113	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 116	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Mpho Petrus Mothoa
Klippoort 277 JS																				
Remainder	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	7	7	0	0	National Government of RSA
Portion 6	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	7	7	0	0	National Government of RSA
Portion 10	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	7	7	0	0	Ansa Nel
Hartbeetspruit 281 JS																				
Remainder	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	National Government of RSA
Portion 3	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	National Government of RSA
Portion 14	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	National Government of RSA
Portion 17	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	Sarovic Investments cc
Portion 30	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	Josua F.B. Kleynhans
Portion 32	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	1	0	0	Gert Ignatius van Rooyen
Nooitgedacht 300 JS																				
Portion 1	T	O	J	S	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	Catherina Botha

ALTERNATIVE 2: Gravity sewer from Pine Ridge to new regional STW (Figure 2.1)																				
Portion	SG 21 Digit Code																		Owner	
Leeuwpoot 283 JS																				
Remainder	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Sarovic Investments cc
Portion 1	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Siyangoba (VIPCON Pty Ltd.)
Portion 7	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	National Government of RSA
Portion 48	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Sylvia Monroe Natlhong
Portion 49	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 54	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Johanna S.D. Ellis
Portion 57	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 84	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Louw Family Trust
Portion 95	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Willem Pieter Wallis
Portion 108	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Amanda Suzette Minnaar
Portion 110	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Khensani Aaron Khumalo
Portion 112	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Susi-Martina Moritz
Portion 113	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Manala Mgibe CPA
Portion 116	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	8	3	0	0	Mpho Petrus Mothoa
Klippoort 277 JS																				
Remainder	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	7	7	0	0	National Government of RSA
Portion 10	T	O	J	S	0	0	0	0	0	0	0	0	0	0	2	7	7	0	0	Ansa Nel

3.2 Climate

The climate is typically "Highveld", with summer temperatures ranging from 9°C to 32°C and winter temperatures from -6°C to 22°C.

The site falls in the summer rainfall region, which is characterized by thunderstorm activity and relatively low average rainfall. The mean annual rainfall is 735 mm compared to the mean annual potential evaporation of 1500 mm.

Being located on the Highveld, the area is prone to extreme weather on a regular basis. These weather conditions include droughts, floods and strong gusty winds prior to and during thunderstorms. Frost also occurs on an average of 120 to 150 days between April and September.

3.3 Geology

According to the 1:250 000 geology map (2528 Pretoria), the majority of the Alternative 1 and 2 routes is underlain by sandstone, quartzite and conglomerate of the Wilgerivier Formation, Waterberg Group (Figure 3.2). This geology is also present at the proposed new regional sewage treatment site of Alternative 2 (Figure 3.2).

A west to east trending diabase intrusion crosses the Alternative 1 route in two places and the Alternative 2 route once.

The last section of the Alternative 1 route (i.e. at the Klipspruit STW) is underlain by shale, shaly sandstone, grit, sandstone and conglomerate of the Ecca Formation, Karoo Sequence (Figure 3.2).

No dolomites are indicated to be present within the said area (i.e. Alternative 1 and Alternative 2).

No opencast or underground coal mines are present along the route of Alternative 1 or 2, or directly adjacent thereof. However, a new opencast coal mine (belonging to Eyethu Coal), is present south of the R544 provincial road, near the Leeuwoort Smallholdings. An opencast coal mine (Kromdraai Colliery) is located west of the site, opposite the R544 provincial road and the Klipspruit STW.

3.4 Topography

Figures 2.1 and 3.1 provide an indication of the topography of the Alternative 1 and 2 routes.

Alternative 1 will be located at 1450 m above mean sea level (mamsl). The proposed sewer pipeline will follow the 1450 contour line all the way from the Pine Ridge pump station, through the Leeuwoort smallholdings and agricultural land, across the R544 provincial road to the Klipspruit Sewage Treatment Works (Figure 3.1).

Alternative 2 will also be located at 1450 mamsl, since the sewage will be gravity fed from the Pine Ridge Pump Station. The proposed new regional sewage treatment works will be located at 1445 mamsl (Figure 3.1).

According to the AGIS Comprehensive Map drafted by the Department of Agriculture, Forestry and Fisheries, the terrain type for both Alternatives 1 and 2 is indicated as plains with open low hills or ridges (Figure 3.3).

The topography of the area has been impacted in terms of the development of Pine Ridge, Leeuwoort Smallholdings, Siyanqoba residential development, Klipspruit STW, the R544 provincial road, various gravel roads, Eskom power lines, and agricultural activities.

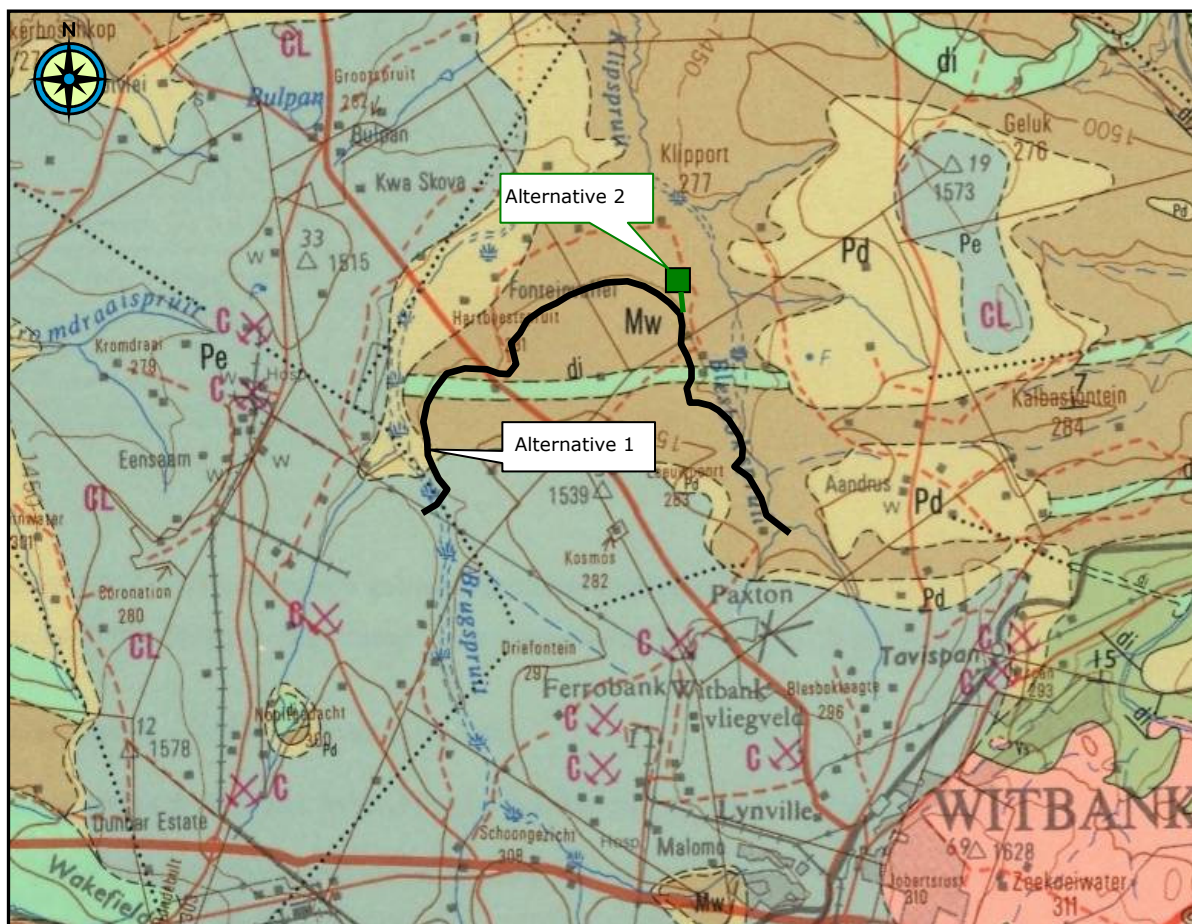


Figure 3.2: Geology of Alternatives 1 and 2 (taken from 1:250 000 geology map, 2528 Pretoria)

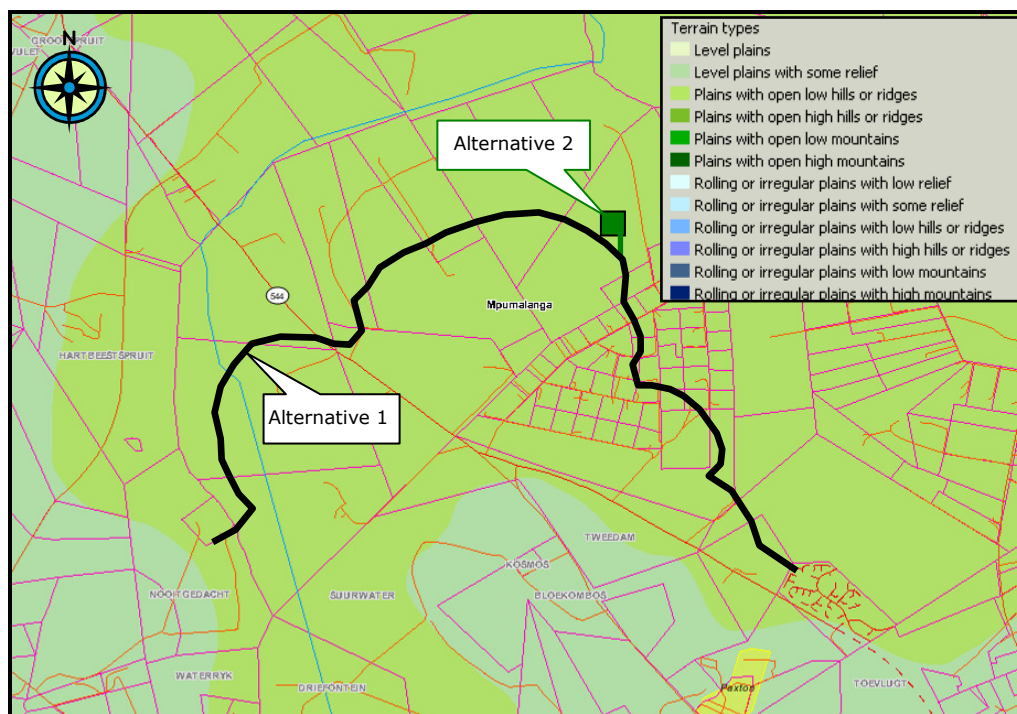


Figure 3.3: Terrain type of Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

3.5 Soils/land capability/agricultural potential

Soils

According to the AGIS Comprehensive Map drafted by the Department of Agriculture, Forestry and Fisheries, the soil of both Alternatives 1 and 2 is indicated as red, yellow and/or greyish soils with low to medium base status (PT1; Figure 3.4).

Wetland soils (e.g. Wasbank 21 and 31, Longlands 21 and 31, Avalon 14, Glencoe 14, Kroonstad 14, Katspruit 10 and Fernwood 31) would be present along the route of Alternative 1 and 2 where the sewer line crosses streams namely near the Blesbokspruit, the tributary of the Blesbokspruit in Leeuwpoort Smallholdings and the Brugspruit (Figure 3.1).

From field observations, it is evident that the route between Point A to Point D is rocky with shallow soils while the route from Point D to Point E has deeper soils used for agricultural purposes.

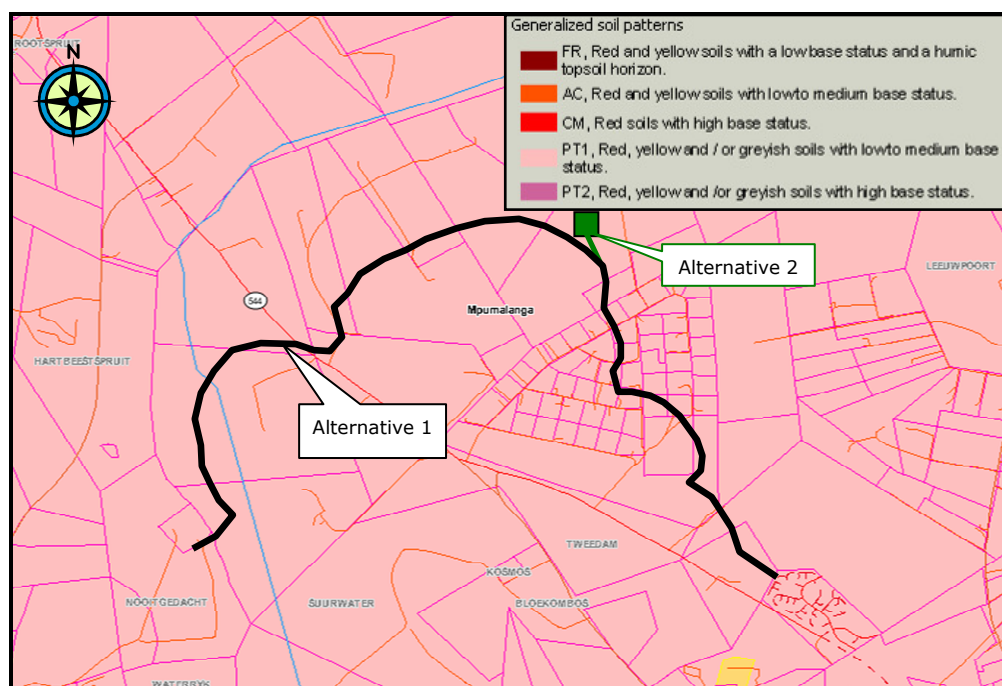


Figure 3.4: Generalised soil patterns of Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

The route (Alternatives 1 and 2) is indicated as of the Bb land type (Figure 3.5), which is characterised by a plinthic catena where upland duplex and marginalitic soils are rare. Red soils are not widespread.

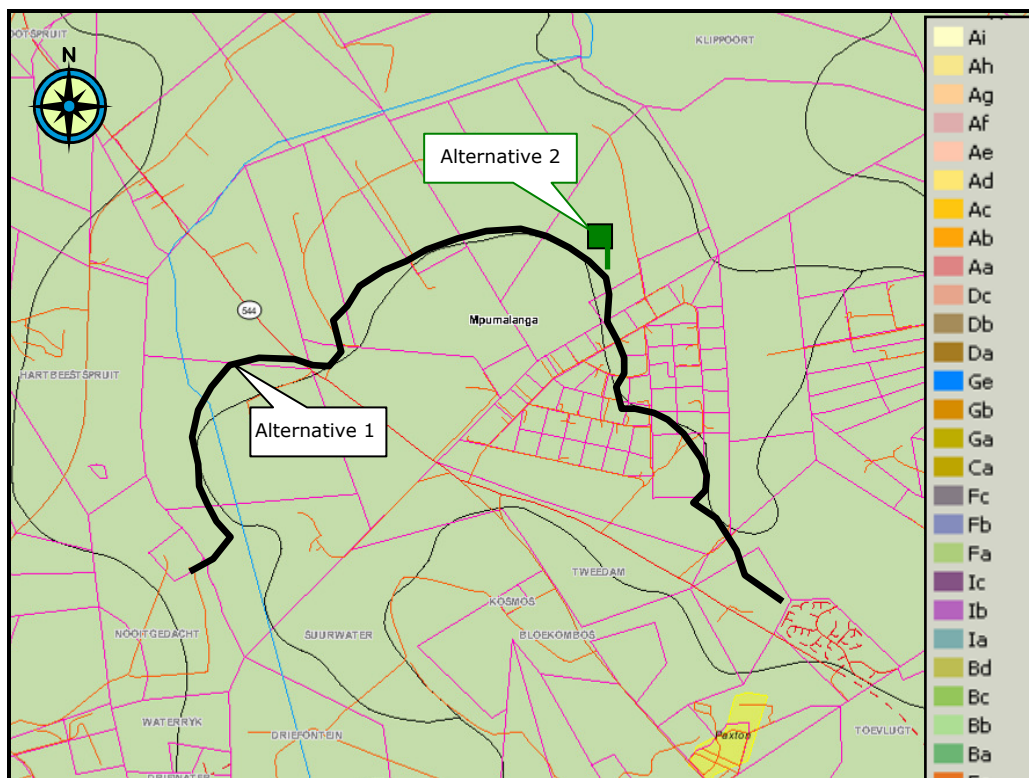


Figure 3.5: Land type associated with Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

Agricultural potential/land capability

According to the AGIS Comprehensive Map drafted by the Department of Agriculture, Forestry and Fisheries, the route (i.e. Alternatives 1 and 2) is indicated as of High potential arable land (Figure 3.6a). The estimated maize yield is 3 - 4 tons per hectare (Figure 3.6b).

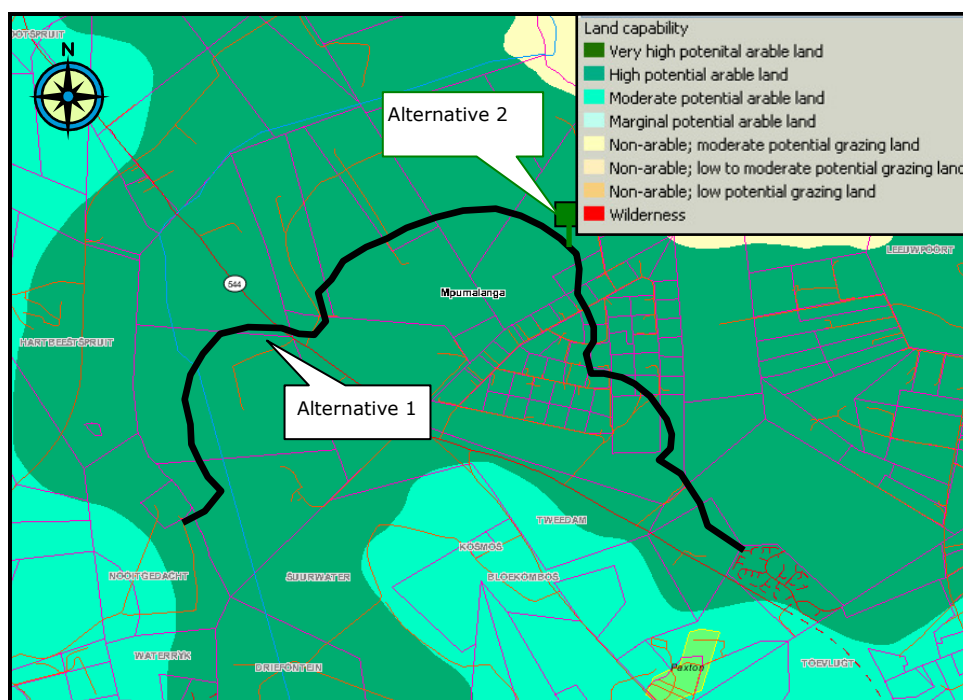


Figure 3.6a: Land capability of Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

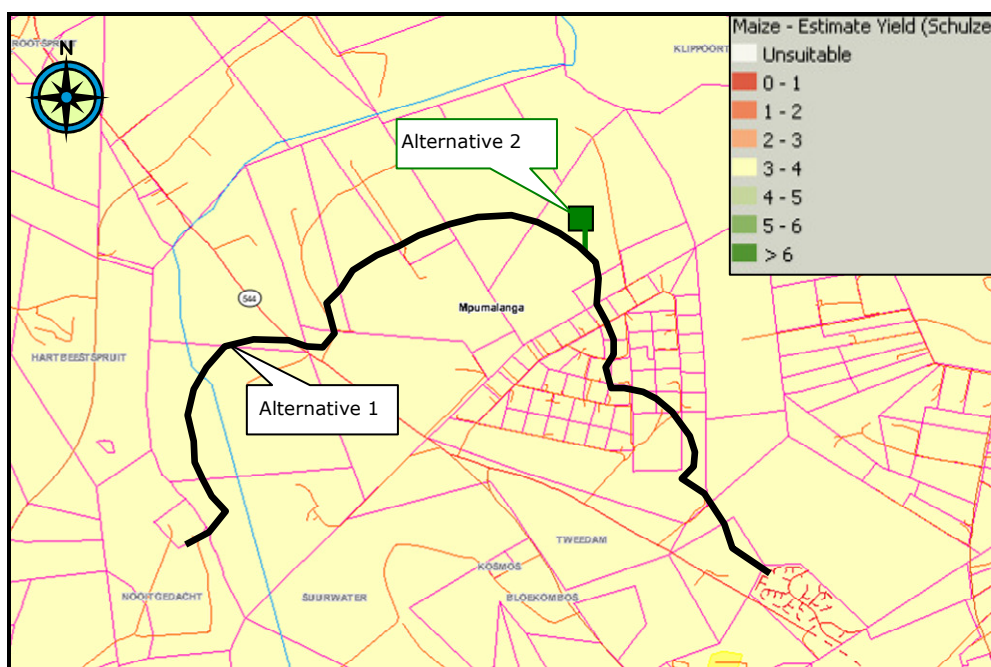


Figure 3.6b: Estimated maize yield of Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

As indicated in Figure 3.7, the grazing capacity along the route (i.e. Alternatives 1 and 2) is between 8-10 and 11 - 13 hectares per animal unit. A large portion of the area of Alternative 1 is however, indicated as transformed rangeland, since it has been cultivated (Figure 3.7).

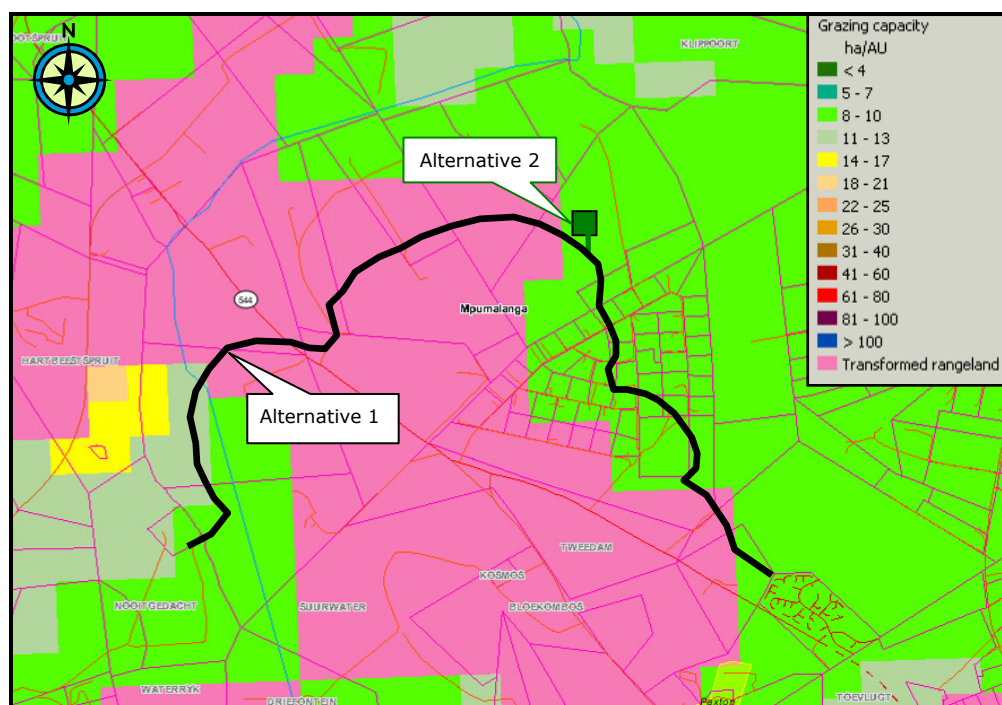


Figure 3.7: Grazing capacity of Alternatives 1 and 2 (taken from Department of Agriculture, Forestry and Fisheries)

The soil, agricultural potential and land capability of a large portion of the route (i.e. Alternatives 1 and 2) have been impacted in terms of the

development of Pine Ridge, Leeuwpoot Smallholdings, Siyanqoba residential development, R544 provincial road, gravel roads, etc.

The central and western portion of the Alternative 1 route will extend through cultivated land (mainly maize and lucerne) and grassland (grazing).

The proposed new regional sewage treatment works would be located within a cultivated area.

3.6 Land use

3.6.1 Zoning of the site

The majority of the route (i.e. Alternatives 1 and 2 - including proposed new sewage treatment works) is zoned agricultural (farms and smallholdings).

A small section (± 1.6 km) of the route (Alternative 1 and 2) will extend through the new Siyanqoba residential area (construction in progress). The said property (Portion 1 of the farm Leeuwpoot 283 JS) is however, still indicated as a farm portion on the Windeed system (Appendix 1).

3.6.2 Land ownership

The properties to be affected by the route (Alternative 1 and 2) is registered to private landowners and the National Government of RSA as indicated in the table below.

Portion	Owner	Alternative
Leeuwpoot 283 JS		
Remainder	Sarovic Investments cc	Alternatives 1 and 2
Portion 1	Siyanqoba (VIPCON Pty Ltd.)	Alternatives 1 and 2
Portion 7	National Government of RSA	Alternatives 1 and 2
Portion 48	Sylvia Monroe Nathlong	Alternatives 1 and 2
Portion 49	Manala Mgibe CPA	Alternatives 1 and 2
Portion 54	Johanna S.D. Ellis	Alternatives 1 and 2
Portion 57	Manala Mgibe CPA	Alternatives 1 and 2
Portion 84	Louw Family Trust	Alternatives 1 and 2
Portion 95	Willem Pieter Wallis	Alternatives 1 and 2
Portion 108	Amanda Suzette Minnaar	Alternatives 1 and 2
Portion 110	Khensani Aaron Khumalo	Alternatives 1 and 2
Portion 112	Susi-Martina Moritz	Alternatives 1 and 2
Portion 113	Manala Mgibe CPA	Alternatives 1 and 2
Portion 116	Mpho Petrus Mothoa	Alternatives 1 and 2
Klippoot 277 JS		
Remainder	National Government of RSA	Alternatives 1 and 2
Portion 6	National Government of RSA	Alternative 1
Portion 10	Ansa Nel	Alternatives 1 and 2
Hartbeestspruit 281 JS		
Remainder	National Government of RSA	Alternative 1
Portion 3	National Government of RSA	Alternative 1
Portion 14	National Government of RSA	Alternative 1
Portion 17	Sarovic Investments cc	Alternative 1
Portion 30	Josua F.B. Kleynhans	Alternative 1
Portion 32	Gert Ignatius van Rooyen	Alternative 1
Nooitgedacht 300 JS		
Portion 1	Catherina Botha	Alternative 1

The consultation process followed with the individual landowners and their comments are described in Section 4 of this report.

3.6.3 Servitudes

According to Eskom Distribution (letter dated: 22 February 2016; Appendix 7), the following power lines and associated servitudes will be affected by the proposed route (Alternative 1 and 2):

- Old Douglas-Hertzog 22 kV;
- Paxton-Paxton Rural 22 kV;
- Kumba Resources 22 kV.

A 9 meter building and tree restriction is applicable on either side of the centre line of these power lines.

The R544 provincial road and associated servitude will also be affected in terms of Alternative 1 crossing this road.

Telkom has an existing network adjacent to the R544 provincial road (letter dated: 15 February 2016; Appendix 7), which could also be affected by the Alternative 1 route.

Right-of-way servitudes could be registered against the two main gravel access roads leading into Leeuwpoot Smallholdings as well as the internal access roads.

3.6.4 Major existing infrastructure

Figure 3.8 provides an aerial view of the Alternative 1 and 2 routes and immediate surroundings.

As indicated, Alternatives 1 and 2 will connect with an existing bulk sewer line at the Pine Ridge Pump Station at Point A (Figure 3.8). Alternatives 1 and 2 will then cross a stream (tributary of the Blesbokspruit; Point B, Figure 2.1) and extend through the new Siyanqoba residential development (Figure 3.8). No houses have been constructed as of yet. However, some of the services have been installed and construction of the internal road network is underway.

The Siyanqoba residential development is located directly adjacent to the Leeuwpoot Smallholdings (Figure 3.8). Alternatives 1 and 2 will continue in a north westerly direction through the Leeuwpoot Smallholdings, and across another tributary of the Blesbokspruit (Figure 3.8; Point C). Infrastructure associated with the Leeuwpoot Smallholdings include residences and outbuildings, animal camps, roads, fences, telephone lines, power lines, etc.

As part of Alternative 2, a regional sewage treatment works is proposed just north of the Leeuwpoot Smallholdings (Figure 3.8). No infrastructure is present here as the site is cultivated.

For approximately 6 km, Alternative 1 will extend through agricultural land (between Point D and Point E; Figure 3.8) before it crosses the R544 provincial road. Infrastructure such as fences, power lines, telephone lines, gravel access roads and farm buildings are present within this area.

The last section of Alternative 1 (\pm 4 km; Point E to Point F; Figure 3.8) will also extend through agricultural land, after which it will cross the Brugspruit and connect to the Klipspruit Sewage Treatment Works at Point G (Figure 3.8). No major infrastructure (except for some fences and the existing sewage treatment works) are present here.

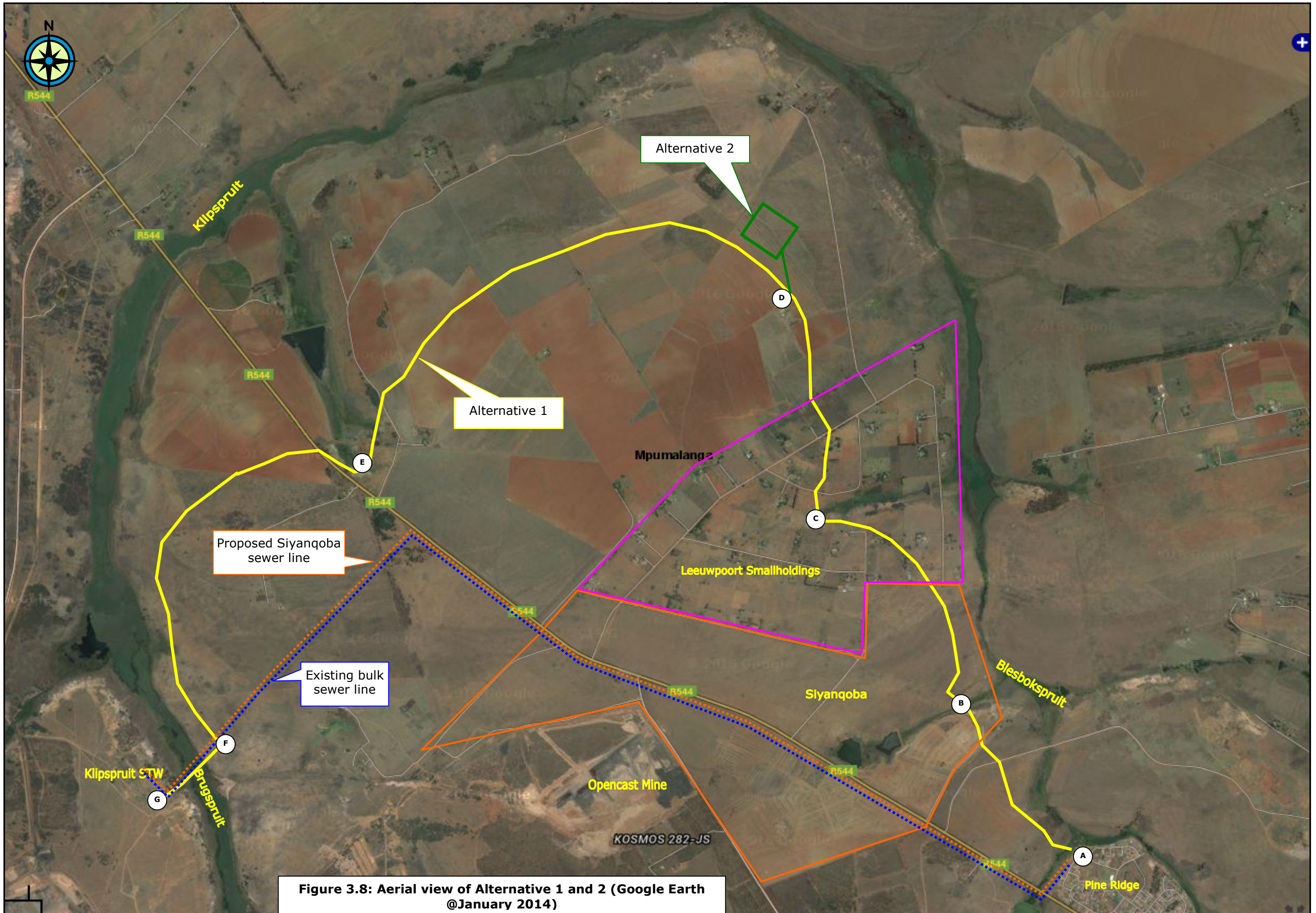


Figure 3.8: Aerial view of Alternative 1 and 2 (Google Earth @January 2014)

The existing bulk sewer line from Pine Ridge to the Klipspruit Sewage Treatment Works is located adjacent to the R544 provincial road (Figure 3.8). A new bulk sewer line for the Siyanqoba residential development will be installed adjacent to the road and the existing bulk sewer line (Figure 3.8).

3.6.5 Surrounding land uses

As indicated in Figure 3.9, the majority of the surrounding area is indicated as cultivated in terms of the Terrestrial Biodiversity Plan of the Mpumalanga Tourism and Parks Agency. Some mining (opencast and underground coal mines, sand quarries, etc.) has also taken place.

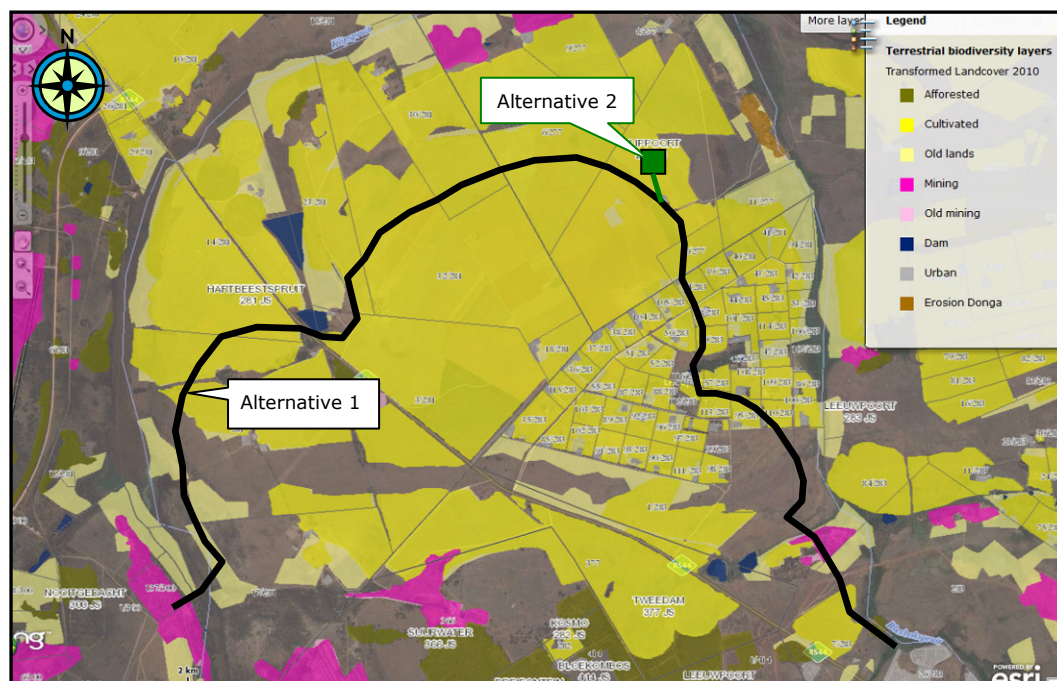


Figure 3.9: Landcover map of Alternatives 1 and 2 (Mpumalanga Biodiversity Sector Plan, 2013)

The residential area of Pine Ridge is located at the starting point of the sewer line (Point A; Figure 3.8). A new residential development (Siyanqoba) is currently being constructed northwest of Pine Ridge (Figure 3.8).

As indicated above, Alternatives 1 and 2 will extend through the Leeuwoort Smallholdings (Figure 3.8). The smallholdings are used for various purposes, including country living, small businesses, small scale agriculture, workshops, etc.

The R544 provincial road between eMalahleni and Verena is located southwest of Leeuwoort Smallholdings (Figure 3.8). The Leeuwoort Smallholdings, Siyanqoba residential development and numerous farms in the area are accessed from this road. Alternative 1 will cross the R544 provincial road north west of Leeuwoort Smallholdings (Figure 3.8).

The central and western portions of Alternative 1 will extend through agricultural properties, which are used for cultivation and grazing purposes (Figure 3.8). The proposed regional sewage treatment works (Alternative 2) will also be located on cultivated land.

Eskom power lines and Telkom lines are also present in the area. An opencast coal mine (belonging to Eyethu Coal) is located south of the R544 provincial road, near Leeuwpoot Smallholdings. Another opencast mine (Kromdraai Colliery) is located north of the Klipspruit STW.

3.7 Natural vegetation

According to 'The vegetation of South Africa, Lesotho and Swaziland', the study area falls within the Mesic Highveld Grassland Bioregion, specifically the **Rand Highveld Grassland** (veld type Gm11; Figure 3.10) (Mucina & Rutherford, 2006). The vegetation type was previously referred to by Low and Rebelo (1998) as Moist Sandy Highveld Grassland (38) and Rocky Highveld Grassland (34) and by Acocks (1953) as Bankenveld (61).

This grassland is found at an altitude of 1 300 metres above mean sea level (mamsl) to 1 635 mamsl in areas between rocky ridges from Pretoria to eMalahleni (Witbank). It also extends onto ridges in the Stoffberg and Roosenekal regions as well as west of Krugersdorp.

This vegetation type is species-rich and comprises wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. The most common grasses on the plains belong to the genera *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*. A high diversity of herbs, many of which belong to the *Asteraceae* family, is also a typical feature. Rocky hills and ridges carry sparse woodlands with *Protea caffra* subsp. *caffra*, *Acacia caffra* and *Celtis africana*, accompanied by a rich suite of shrubs among which the genus *Rhus* is most prominent.

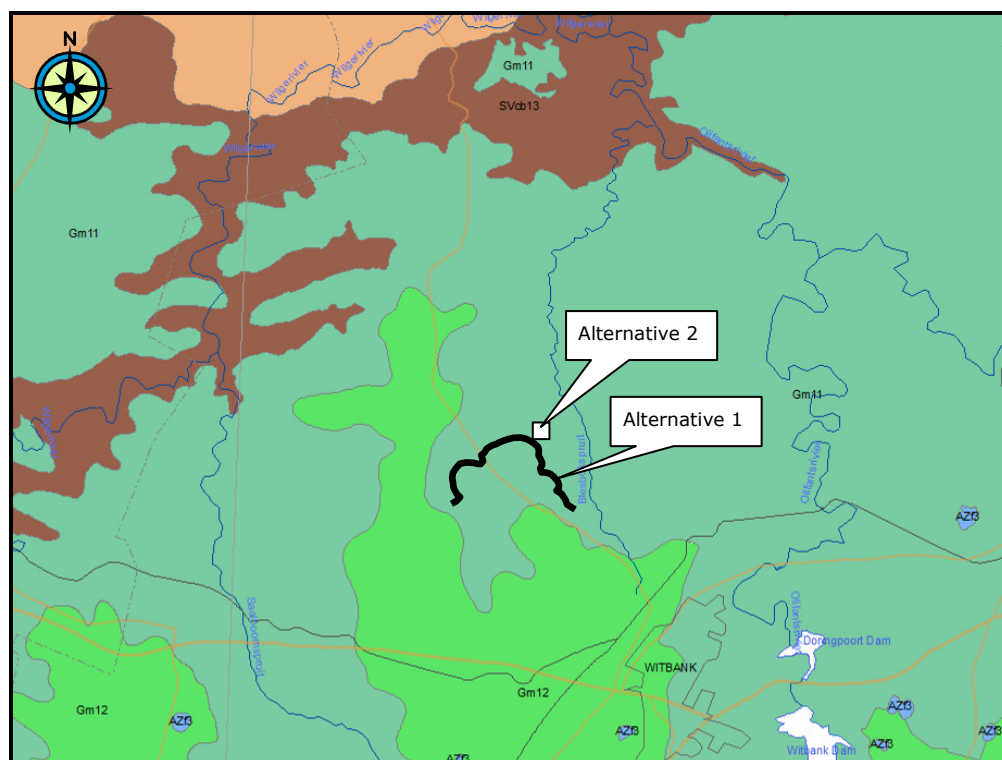


Figure 3.10: Vegetation type of Alternative 1 and 2 (taken from Mucina and Rutherford, 2006)

The National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists this vegetation type as **Vulnerable**.

Vulnerable (VU) ecosystems - being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems.

The stated purpose of listing 'threatened ecosystems' is primarily to reduce the rate of ecosystem degradation and species extinction.

The route (Alternative 1 and 2) is not situated within any of the South African centres of endemism recognised by Van Wyk and Smith (2001).

The Mpumalanga Biodiversity Sector Plan (MBSP, 2013) is a biodiversity planning tool that provides the most recent spatial biodiversity information to inform land-use and development planning (Lotter *et al.*, 2014). The main mapping categories used in the MBSP (in descending order of importance in terms of meeting conservation targets), are:

- Protected Areas;
- Critical Biodiversity Areas (Irreplaceable and Optimal);
- Ecological Support Areas;
- Other Natural Areas;
- Modified (Heavily Modified and Moderately Modified-old lands).

According to the Mpumalanga Biodiversity Sector Plan (MBSP, 2013), the majority of the route (Alternative 1 and 2) falls within the category – Heavily Modified (Figure 3.11).

'Heavily Modified' areas are defined as:

All areas currently modified to such an extent that any valuable biodiversity and ecological function has been lost. Indirect polluting effects from modified surfaces or land-uses need to be assessed, particularly where modified areas occur with freshwater CBAs and ESA sub-catchments.

Moderately Modified (Old Lands) and Other Natural Areas (Figure 3.11) are also indicated to be present. The area adjacent to the Brugspruit (Alternative 1) is indicated as a CBA (Critical Biodiversity Area) Irreplaceable (Figure 3.11), whilst the area near the Blesbokspruit (Alternative 1 and 2) is indicated as CBA Optimal (Figure 3.11).

The 'CBA Irreplaceable' area (red) adjacent to the Brugspruit (Alternative 1; Figure 3.11) has been impacted upon by agricultural activities. Most of the 'CBA Optimal' area (yellow) adjacent to the Blesbokspruit (Alternative 1 and 2; Figure 3.11) will be destroyed as a result of the new Siyanqoba residential development.

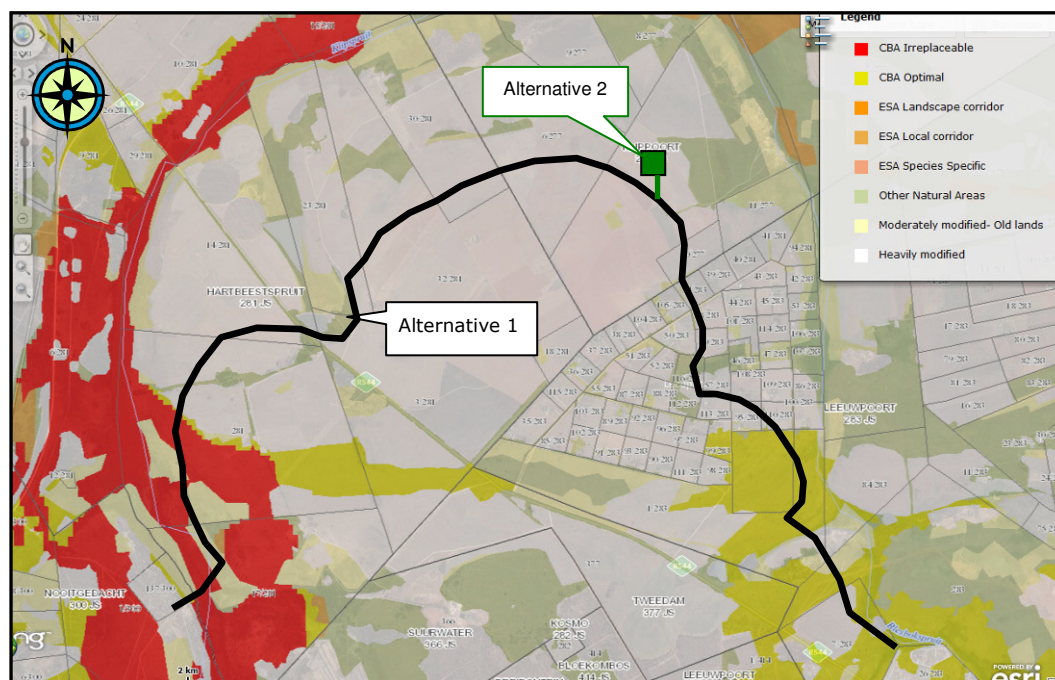


Figure 3.11: Terrestrial biodiversity assessment of Alternative 1 and 2 (taken from the Mpumalanga Biodiversity Sector Plan, 2013)

The natural vegetation along the Alternative 1 route has been impacted by the following:

- Pine Ridge;
- Siyanqoba residential development;
- Leeuwpoot Smallholdings;
- Agricultural activities (i.e. cultivation and grazing);
- Roads (i.e. R544 provincial road and gravel roads);
- Eskom power lines;
- Telkom lines;
- Klipspruit STW.

The Alternative 2 route has also been impacted upon by Pine Ridge, Siyanqoba residential development and the Leeuwpoot Smallholdings. Various species of alien trees have also been planted around homesteads and cultivated lands as windbreaks and for ornamental purposes.

The proposed regional sewage treatment works (Alternative 2) will be located in cultivated land (Figure 3.11).

Even though the route (Alternatives 1 and 2) have been impacted upon, it is anticipated that secondary grassland would be present adjacent to the Blesbokspruit, Brugspruit, Klipspruit and their tributaries, as well as in areas that were not recently cultivated. Wetland vegetation would be present where the sewer line crosses streams namely near the Blesbokspruit, the tributary of the Blesbokspruit in Leeuwpoot Smallholdings and the Brugspruit (Figure 3.1).

Dominant grasses like *Hyparrhenia hirta*, *Eragrostis chloromelas*, *Cynodon dactylon*, *Perotis patens*, *Eragrostis plana*, *Sporobolus africanus*, *Eragrostis curvula*, *Eragrostis gummiflua* and *Melinis repens* are expected to occur in the remaining grassland areas.

3.8 Animal life

As indicated in Section 3.7 and Figure 3.11, the natural vegetation within the study area has been impacted in terms of residential development and agriculture. In view of this disturbance, natural animal habitats would also have been impacted upon.

Natural animal habitats would however, be associated with secondary/disturbed grassland and wetland vegetation units present along the route (Alternative 1 and 2).

Natural aquatic habitats are present adjacent the Blesbokspruit and its tributaries, the Klipspruit and its tributaries and the Brugspruit (Figure 3.8). These aquatic habitats would be impacted upon in terms of the Alternative 1 and 2 crossings.

Various species of alien trees have also been planted around homesteads and cultivated lands as windbreaks and for ornamental purposes. These areas could provide artificial habitats for various species (e.g. birds).

3.9 Surface water

3.9.1 Catchment

The proposed route (Alternative 1 and 2) is located within the Upper Olifants Water Management Area (WMA) and more specifically the B11K quaternary catchment.

The Minister has, in terms of section 12 of the National Water Act, Act No. 36 of 1998, prescribed a system for classifying water resources by promulgating Regulation 810 (Government Gazette 33541, dated: 17 September 2010).

The Water Resource Classification System is intended to ensure the ecological sustainability of all the significant water resources taking into consideration the social and economic needs of competing interests by all who rely on the water resource.

The proposed water resource classes for the Olifants catchment were published in Notice 619 of 2015 (Government Gazette 39004, dated: 20 July 2015). In terms of this notice, the proposed water resource class of the B11K quaternary catchment is a D (i.e. largely modified).

The following Resource Quality Objectives (RQO) for the Olifants catchment applies:

- Low flows should be improved in order to maintain the river habitat for the ecosystem and ecotourism.
- Nutrient concentrations should be improved to prevent nuisance conditions for ecotourism.
- Instream habitat must be in a largely modified or better condition to support the ecosystem and for ecotourism users.
- Instream biota must be in a largely modified or better condition and at sustainable levels.
- Low and high flows must be suitable to maintain the river habitat for ecosystem condition and ecotourism.

- Salt concentrations must be maintained at levels where they do not render the ecosystem unsustainable.
- The riparian zone must be in a moderately modified or better condition to support the ecosystem and for ecotourism.
- Riparian vegetation must be in a moderately modified or better condition.
- Low and high flows must be in a largely modified or better condition to maintain the riparian habitat and for ecotourism.

The water quality of the Blesbokspruit, Klipspruit and Brugspruit is known to be of poor quality. The start of the Blesbokspruit is located to the north east of the defunct Station Colliery and has been highly impacted upon by acid mine water draining from the old mines.

The water quality of the Blesbokspruit is also impacted by sewage from the Klarinet and Pine Ridge residential areas, which flows into the river as a result of inadequate and old sewage infrastructure. The existing pump stations at Pine Ridge and Klarinet are also not functioning properly due to capacity issues, theft and vandalism. This results in the sewage not being pumped to the Klipspruit STW but ending up in the Blesbokspruit.

The Klipspruit and Brugspruit are also impacted by sewage from residential areas, mining activities and the Klipspruit STW.

According to the Mpumalanga Biodiversity Sector Plan (MBSP, 2013), the proposed route (Alternatives 1 and 2) falls within the category 'Heavily Modified' and 'Other Natural Areas' in terms of the freshwater assessment (Figure 3.12). The areas adjacent to the Blesbokspruit, Klipspruit, Brugspruit and their tributaries are indicated as Ecological Support Areas (ESAs): Wetlands (Figure 3.12).

No Critical Biodiversity Areas (CBA's) for aquatic species or Ecological Support Areas (ESA's) for fish are present on or near the route (Alternative 1 and 2).

It should be noted that the MBSP freshwater assessment includes information obtained from the National Freshwater Ecosystem Priority Areas (NFEPA) and threatened freshwater ecosystems databases (National Biodiversity Assessment 2011).

3.9.2 Floodline

As indicated in Figure 3.8, Alternative 1 will be located in close proximity to the Blesbokspruit, Brugspruit and Klipspruit. The gravity sewer line will also cross the following surface water environments:

- Tributary of the Blesbokspruit near Pine Ridge (Point B);
- Tributary of the Blesbokspruit in Leeuwoort Smallholdings (Point C);
- Wetland/tributary of the Klipspruit (Point E);
- Brugspruit (Points F to G).

Alternative 2 will be located in close proximity to the Blesbokspruit and will cross two tributaries of the Blesbokspruit near Pine Ridge and within the Leeuwoort Smallholdings (Figure 3.8). The proposed regional sewage treatment works (Alternative 2) will not be located near any surface water environments (Figure 3.12).

In view of the above-mentioned, Alternatives 1 and 2 will thus be affected by the 1: 100 year floodline. It is not anticipated that the proposed regional sewage treatment works will however, not be affected.

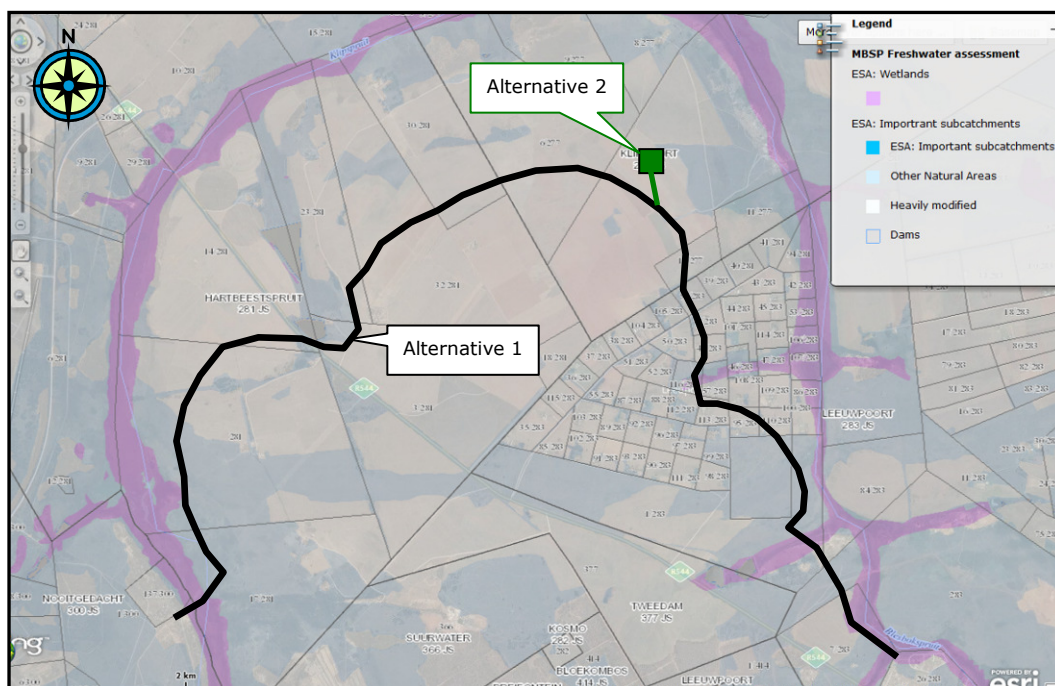


Figure 3.12: Mpumalanga Biodiversity Sector Plan freshwater assessment of Alternative 1 and 2 (taken from MBSP, 2013)

3.9.3 Surface water runoff

Storm water along the Alternative 1 route will drain towards the Blesbokspruit, Klipspruit, Brugspruit and their tributaries depending on the location along the route (Figure 3.1).

Along the Alternative 2 route, storm water will drain towards the Blesbokspruit and its two tributaries (Figure 3.12).

Surface water runoff along the route (Alternative 1 and 2) is currently affected by agricultural activities, the construction activities at Siyanqoba residential development as well as activities within the Leeuwpoot Smallholdings.

3.9.4 Wetlands

According to Figure 3.12, Alternative 1 will impact on 5 ESA: Wetlands, which are associated with the Blesbokspruit, Klipspruit, Brugspruit and their tributaries.

Alternative 2 will impact on 3 ESA: Wetlands associated with the Blesbokspruit and its tributaries (Figure 3.12).

No wetlands are indicated to be present near the proposed regional sewage treatment works site (Alternative 2; Figure 3.12).

3.10 Groundwater

Groundwater would be associated with rivers, streams and wetlands along the route (Alternative 1 and 2).

The residents of the Leeuwpoort Smallholdings and farmers in the area utilize groundwater for domestic and agricultural purposes as no municipal infrastructure is available. Groundwater quality is therefore very important to landowners/users.

Numerous boreholes are thus be present within the surrounding area. According to some landowners adjacent to the Blesbokspruit, the boreholes are relatively shallow (approximately 14 m), indicating a shallow groundwater table closer to the rivers.

Some landowners also indicated that the groundwater on their properties is of good quality.

Mining activities in the area and leaking sewage could however, have impacted on the groundwater in certain areas.

3.11 Air quality

The eMalahleni area forms part of a national air pollution hotspot known as the Highveld Priority Area (HPA; Republic of South Africa, 2011). This Priority Area comprises the eastern part of Gauteng and the western part of Mpumalanga and covers an area of 31.106 km². This Priority Area was declared in terms of Section 18(1) of the National Environmental Management: Air Quality Act 2004 (Act 39 of 2004) due to poor air quality and associated health risks.

The proposed route (Alternatives 1 and 2) is located in the eMalahleni air quality hot spot, which extends to Arnot in the east. This is an area where measured or modelled concentrations exceed, or are predicted to exceed, ambient air quality standards as identified in the Air Quality Management Plan for the Highveld Priority Area.

The air quality of the proposed route (Alternatives 1 and 2) is predominately governed by the various industrial and mining activities in and around eMalahleni. The following could impact upon the air quality along the proposed route (Alternative 1 and 2):

- Dust generated as a result of trucks and other vehicles utilizing the gravel road leading into Leeuwpoort Smallholdings;
- Dust generated as a result of the construction activities at the Siyanqoba residential development;
- Coal dust generated as a result of the open cast activities at the nearby mines (Eyethu Coal and Kromdraai Colliery);
- Smoke emitted from veld fires;
- Agricultural activities in the surrounding area and on the Leeuwpoort Smallholdings (ploughing, etc.);
- Emissions from vehicles travelling on the various roads in the area;
- Sewage flowing into the Blesbokspruit, etc;
- Sewage overflowing at the Pine Ridge Pump Station.

3.12 Noise

The following could impact upon the ambient noise level of the proposed route (Alternatives 1 and 2):

- Noise generated as a result of trucks and other vehicles utilizing the gravel roads within Leeuwpoort Smallholdings;
- Business and residential noise from Pine Ridge and the Leeuwpoort Smallholdings;
- Construction activities at the Siyanqoba residential development;
- Blasting as a result of nearby mining activities and Siyanqoba residential development;
- Noise generated as a result of agricultural activities in the surrounding area (including domestic and farm noise e.g. tractors, animals, etc.);
- Noise generated by vehicles utilizing the tarred Verena Road;
- Aircraft flying at high altitude as well as aircraft in the circuit above the Witbank Aerodrome - during the day and over the weekend period.

3.13 Sites of archaeological and cultural interest

Archaeology and cultural sensitivity:

It is currently not known if any sites of archaeological and cultural interest (including graves) are located along the proposed route (Alternatives 1 and 2) or at the proposed new regional sewage treatment works site (Alternative 2).

The presence of any sites of archaeological and cultural interest (including graves) will be determined through the Phase I Heritage Impact Assessment to be conducted as part of the Environmental Impact Assessment.

Palaeontological sensitivity:

According to the palaeontological map supplied by the South African Heritage Resources Agency (SAHRA, 2014), the palaeontological sensitivity of the route (Alternatives 1 and 2) is deemed to range from very high (area indicated in red near the Klipspruit STW (i.e. Alternative 1); Figure 3.13) to moderate (area indicated in green for most of Alternative 1 and the entire Alternative 2; Figure 3.13). In view of this, a desktop study, field assessment and protocol for finds are required as indicated in Figure 3.13.

The required palaeontological study will be conducted as part of the Environmental Impact Assessment.

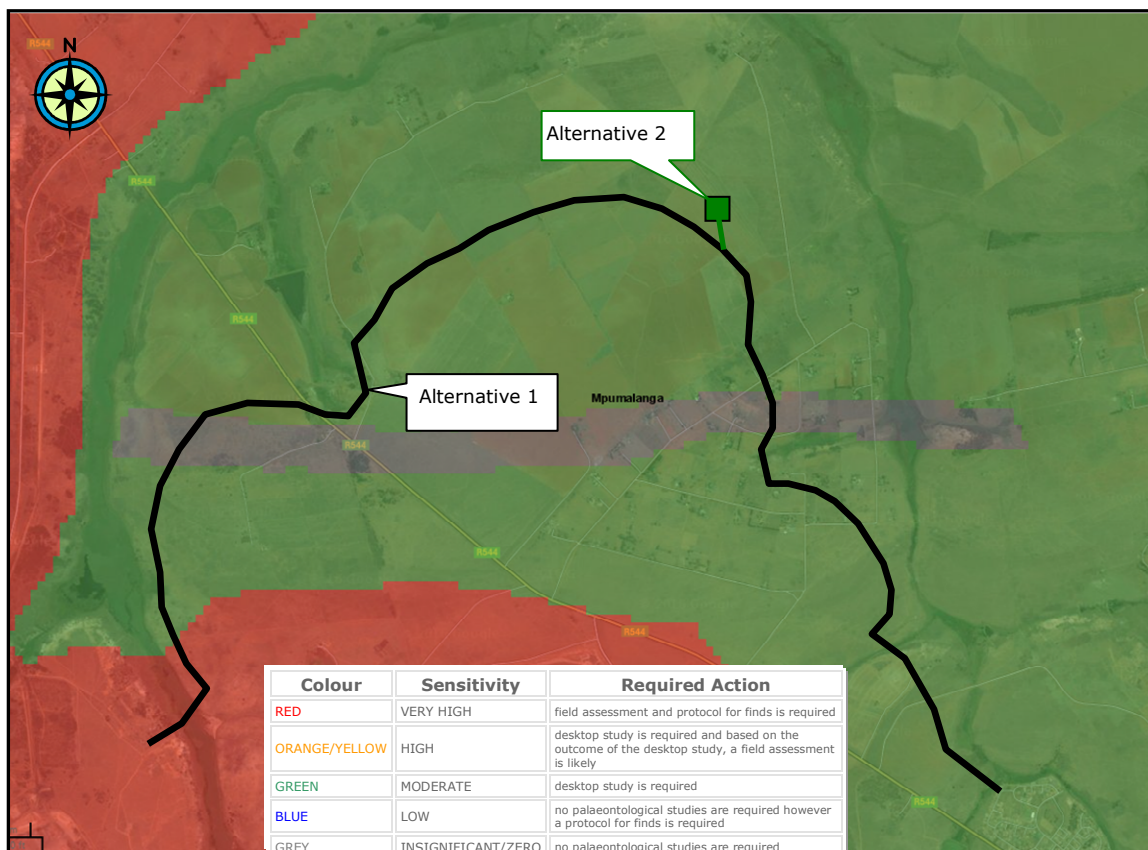


Figure 3.13: Requirement for palaeontological study w.r.t. Alternative 1 and 2 (taken from SAHRA, 2014)

3.14 Sensitive landscapes

As indicated in Figure 3.8, Alternative 1 will be located in close proximity to the Blesbokspruit, Brugspruit and Klipspruit. The sewer line will cross the following surface water environments, which are seen as sensitive landscapes:

- Tributary of the Blesbokspruit near Pine Ridge;
- Tributary of the Blesbokspruit in Leeuwpoort Smallholdings;
- Wetland/tributary of the Klipspruit;
- Brugspruit.

According to Figure 3.12, Alternative 1 will impact on 5 ESA: Wetlands, which are associated with the Blesbokspruit, Klipspruit, Brugspruit and their tributaries.

Alternative 2 will cross 2 tributaries of the Blesbokspruit, which are seen as sensitive landscapes. In addition, it will impact on 3 ESA: Wetland associated with the Blesbokspruit and its tributaries.

No wetlands are indicated to be present near the proposed regional sewage treatment works site (Alternative 2; Figure 3.12).

3.15 Visual aspects

In general, the route (Alternative 1 and 2) is visible from the Verena Road, Pine Ridge Pump Station, the adjacent farms and smallholdings, Siyanqoba residential development, Klipspruit STW and the various gravel roads that extend through the area (Figure 3.8). The degree of visibility however depends on the location along the route.

The proposed regional sewage treatment works site (Alternative 2), is only visible from the adjacent cultivated land.

3.16 Traffic

The R544 Verena Road (Figure 3.7), a tarred provincial road, provides access to the residential areas of Klarinet x6, x7 and x8, Pine Ridge, Siyanqoba, Leeuwpoot Smallholdings and the surrounding farms. In addition, it provides access to the Eyethu Coal mine located near Leeuwpoot Smallholdings. Heavy vehicles (trucks) currently transport coal from the opencast mine to Inyanda Coal Mine using this road.

To the south of the Klarinet area, the Verena Road merges with the Zaaihoek Road and then crosses the Transnet railway line to the central district business area of eMalahleni.

Various gravel/farm roads are present within the area (Figure 3.8).

The proposed route (Alternative 1 and 2) will cross some of the gravel roads (e.g. access road to Leeuwpoot Smallholdings) as well as the R544 provincial road.

3.17 Sense of place

In terms of the eMalahleni Local Municipality Spatial Development Framework (2015), the Urban Edge is located along the southern boundary of the Leeuwpoot Smallholdings (Figure 3.14). The area between Pine Ridge and the Urban Edge is earmarked for residential infill development (Figure 3.14; e.g. Siyanqoba residential area).

The first section of the route (Alternatives 1 and 2) stretching from the Pine Ridge Pump Station, through the Siyanqoba residential development to the Leeuwpoot Smallholdings, will thus be located within the residential infill development area and within the Urban Edge (Figure 3.14).

The remainder of the route (Alternatives 1 and 2) and the proposed regional sewage treatment works site (Alternative 2) will be located outside of the Urban Edge, within the Leeuwpoot Smallholdings and agricultural land.

No residential development is indicated outside of the Urban Edge (Figure 3.14) according to the eMalahleni Local Municipality Spatial Development Framework (2015).

