PROPOSED DEVELOPMENT OF THE 42KM VENTERSBURG BULK WATER SUPPLY FROM KOPPIE ALLEEN TO VENTERSBURG, FREE STATE PROVINCE.

Draft Basic Assessment Report

November 2016

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destea
department of
economic, small business development,
tourism and environmental affairs
FREE STATE PROVINCE

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **08 December 2014**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

Executive Summary

Introduction and Background

Aryx Consulting Engineers appointed Enviroworks, an Independent Environmental Assessment Practitioner (EAP), on behalf of Sedibeng Water (The Applicant) to undertake the required Basic Assessment process for the Ventersburg Bulk Water Supply and Reservoir upgrades (hereafter referred to as the Proposed Project), Free State Province.

The proposed project is a listed activity in terms of Sections 24(2) and 24(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (as amended). The Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in terms of Chapter 5 of the NEMA provide for the control of certain activities that are listed in Government Notice Regulations No. (GN R) No. R983, R984 and R985. Activities listed in these notices must comply with the regulatory requirements listed in GN R No. R982, which prohibits such activities until written authorisation is obtained from the competent authority. Such environmental authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA regulations, 2014. GN R No. 982 sets out the procedure and documentation that need to be compiled with undertaking a Basic Assessment Report.

Project Description:

Ventersburg is located approximately 160km north-east of Bloemfontein along the N1 and is supplied with potable water by Sedibeng Water. The water is transferred via a pipeline from the Koppie Alleen Reservoir in Riebeeckstad. The water is abstracted from the Vaal River in Balkfontein and from the Sand River in Virginia. The current system in place is insufficient and Sedibeng Water is experiencing problems to reliably provide potable water to the Ventersburg and Henneman region. Therefore the upgrade of the existing service is required to ensure reliable water availability to the region.

The existing pipeline is 42 km long and runs in a south eastern direction from the Koppie Alleen Reservoir via Brabant Reservoir through Henneman to Ventersburg and transverse mostly agricultural land. It is made from steel, with a diameter of 500mm from Koppie Alleen to Henneman, with the rest of the pipeline having a 400mm diameter to Ventersburg. The current pipeline can transport 110 litres per second. According to information received from Aryx Consulting Engineers there is an existing servitude of 15m in width from Koppie Alleen Reservoir to Henneman and a 10m servitude from Henneman to Ventersburg in place, with the new pipeline to be located within the existing servitude.

The proposed project entails the construction of a 42km pipeline with a diameter of 600mm and a throughput capacity of 310 litres per second from the Koppie Allen Reservoir in Riebeeckstad, through the Brabant Reservoir and Henneman to the Ventersburg Reservoir in Ventersburg. Due to the project being in the design phase, the applicant is unsure of the material for the pipeline. The client will considerer the following materials:

- Glass-reinforced polyester (GRP);
- Polyvinyl Chloride (PVC);
- Steel; or
- Ductile-Iron.

Furthermore to the pipeline, Air Valves shall be constructed along the pipeline to accommodate access to the pipeline and enable maintenance of sections. The valves will also assist with the flow of the water through the pipeline and allow air to escape in order to ensure sufficient flow.

In addition to the 42km pipeline, the proposed project will also entail the upgrade of the Henneman Reservoir with the construction of two additional reinforced concrete reservoirs with 12 mega litres storage capacity each and one additional reinforced concrete reservoir with 5 mega litres storage capacity at the Ventersburg reservoir. Currently the Brabant reservoir has a total storage capacity of 2.5 mega litres, while the Ventersburg reservoirhas a total storage capacity of 5 mega litres. The total storage capacity and expansion of the Brabant and Ventersburg reservoirs will not exceed the thresholds as listed in Listing Notice 1.

The **upgrade is required to ensure the on-going provision** of potable water to the **Ventersburg area**.

Legislative Context

The proposed project constitutes the following listed activities in terms of the NEMA:

Government Notice 983 of 2014: Listing Notice 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

Activity 9: The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water –

(i) with an internal diameter of 0,36 metres or more; or

(ii) with a peak throughput of 120 litres per second or more.

Triggering reason: The proposed pipeline exceeds the 1000 meters in length, while the diameter of the pipeline exceed 0.36 meters and the throughput capacity exceed 120 litres per second.

Activity 12: The development of –

(xi) infrastructure or structures with a physical footprint of 100 m^2 or more; where such development occurs –

(c) if no development setback exists, within 32 m of a watercourse, measured from the edge of the watercourse;
Triggering reason: The proposed project will have a physical footprint of more than 100 m^2 and crosses three water course.

Activity 19: The infilling or depositing of any material of more than 5 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 m^3 from

–

(i) a watercourse.

Triggering reason: Due to the nature of the proposed project, more than 5 m^3 of excavations will take place.

Government Notice 985 of 2014: Listing Notice 3 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

Activity 12: The clearance of an area of 300 m^2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

(a) In Free State:

(ii) Within critical biodiversity areas identified in bioregional plans.

Triggering reason: The proposed project has an approximate footprint of ± 25 000m^2 within a critical biodiversity area and ecological support area as set out by the Biodiversity Plan of the Free State Province and will mostly traverse agricultural land.

Activity 14: The development of –

(xii) infrastructure or structures with a physical footprint of 10 m^2 or more,

where such infrastructure occurs –

(a) within a watercourse;

(c) if no development setback has been adopted, within 32 m of a watercourse, measured from the edge of the watercourse;

(a) In Free State:

ii. outside urban areas, in:

(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;

(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.

Triggering reason: The proposed project has an approximate footprint of ± 25 000m^2 within a critical biodiversity area and ecological support area as set out by the Biodiversity Plan of the Free State Province and will mostly traverse agricultural land.

National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Section 38(1): *Subject to the provision of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –*

(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear

development or barrier exceeding 300 m in length.

Triggering reason: The proposed project will cover a distance of 13 000 m.

Report Structure

This report is set out as followed:

- **Section A: Activity Description** provides an overview of the development proposal and listed activities which are triggered in terms of listing notices GN R. 983 and R. 985; of the EIA Regulations, 04 December 2014.
- **Section B: Description of Receiving Environment** provides detail on the affected landscape in its present state. A range of aspects relating to the biophysical (e.g. geology, soil surface and sub-surface water and biodiversity), socio-economic and historic and cultural character of the immediate route and surrounding area are described herein, whilst applicable legislation, policy and guidelines considered are recognised.
- **Section C: Public Participation** describes the consultation component of this study between the EAP and Interested or Affected Parties (I&APs) and organs of state. Regulatory requirements of this process are discussed, with a summary of consultation made with state departments and comments and response given. Comment periods were afforded to parties, with an initial registration period provided to parties.
- **Section D: Impact Assessment, Management, Mitigation and Monitoring Measures**, describe how the proposed development may impact on the geographical and physical, biodiversity, socio-economic and historical and cultural aspects of the receiving environment. Resource uses of the proposed development phases, attributed to waste and emissions, water use, power supply and energy efficiency are further discussed.
- **Section E: Recommendation of the EAP** provides, based on such findings as various site surveys, impact assessment, investigation of alternatives and the review of strategic policy to consider the needs and desirability, the outgoing opinion of the EAP is detailed. Any noteworthy recommendations emanating from the study are described here.
- **Section F: Appendices** lists all supportive documents enclosed with this report, after which declarations of the Applicant, EAP and Specialist Parties are given.

Public Participation Process

A comprehensive **public participation** was undertaken to engage stakeholders and interested and affected parties on the development proposal. I&AP's were informed of the Basic Assessment Process through an advertisement in the local newspaper and poster notices was placed at strategic locations. The surrounding landowners were informed of the project by means of the distribution of comment forms and the Basic Assessment Report (BAR), as well as relevant organs of state.

This BAR is being made available for a 30 day comment period from **10 November 2016 to**

9 December 2016. The Basic Assessment (BA) is also available on Enviroworks website (**www.enviroworks.co.za**) and a link to Enviroworks website was sent via email to all relevant stakeholders and organs of state. A hard copy of this BAR is also available at……..**Specialist Findings**

Below follow a summary of the specialist studies as per specialist reports attached to appendix D:

Ecological

The following recommendations with regard to the construction and operational phase of the project will apply:

The majority of the proposed pipeline route corridor is situated within the road reserve of the R 70 main road. The vegetation and conditions in this servitude are highly degraded and the servitude is also mostly isolated on either side by historic or current degraded cultivates lands (Lamprecht, 2016).

The areas where the route corridor goes through natural areas are also slightly more disturbed than the surrounding natural areas due to the previous disturbance and the existing pipeline. No Red Data Listed species or vegetation of conservational significance was identified along the route corridor. A number of provincially protected species were identified which can be relocated through a search and rescue process (Lamprecht, 2016).

The area where the route corridor goes through a CBA 1 is also slightly disturbed and the development of the new pipeline within the corridor of the existing pipeline should therefore not cause significant additional damage to the integrity of the CBA 1 if all the recommended mitigation measures are adequately implemented (Lamprecht, 2016)..

The proposed route corridor goes through three watercourses of which the latter two are permanent and significant in size. The first one is a small seasonal drainage line. Construction of a pipeline through these watercourses could result in damage to the integrity and functionality as well as impeding of the watercourses which could have further downstream negative effects on water supply and quality. Adequate mitigation measures as recommended in this report must be implemented to ensure the continued functionality and unimpeded flow of the watercourse after construction completion (Lamprecht, 2016)..

The following recommendations and requirements with regards to the proposed project apply:

- According to the National Environmental Management Act (No 107 of 1998) the proposed project triggers various listed activities of the Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985 in Government Gazette No. 38282 of 04 December 2014) and a Basic Assessment process (BA) therefore needs to be conducted. This is necessary in order to obtain the required Environmental Authorisation from the relevant departments prior to commencement of the proposed project.
- Mitigation, management and monitoring measures as recommended in this document must be strictly adhered to and implemented during the construction as well as operational phases. This must be strictly regulated by the appointment of a suitably qualified and

experienced independent Environmental Compliance Officer (ECO) who must conduct frequent environmental audits during the construction and rehabilitation phases.

- Three watercourses crossings are present on the proposed pipeline route corridor. A Water Use License Application (WULA) is to be submitted to the Department of Water and Sanitation.

It is the opinion of the specialist that all identified impacts can be mitigated to within acceptable levels and that this proposed development may continue in the event that all mitigation measures and recommendations as per this report are adhered to as well as all necessary authorisations and permits are successfully obtained (Lamprecht, 2016).

Heritage:

The following recommendations with regard to the construction and operational phase of the project will apply:

Pipeline from Mmamahabane Township to the Ventersburg SW reservoir:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. Although the western wall of the Voortrekker Monument (Figs 6 – 10) is located only 25 m away from the proposed route, it is a highly visible structure and can be easily avoided during the construction phase of this section. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

Construction of a new 5Ml reservoir at the Ventersburg SW reservoir:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

Pipeline from the Ventersburg SW reservoir to Phomolong and Hennenman:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The Iron Age complex located southeast of Phomolong and north-northeast of the R70 provincial road (Fig. 13) will not be impacted by

the proposed development. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

Pipeline Hennenman to the Brabant pump station:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The old farmstead area at the Brabant pump station was mapped and photographed, but it is not considered to be historically significant. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

Construction of two new 12Ml reservoirs at Brabant and upgrading of the Brabant pump station:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

Pipeline between Brabant and Koppie-Alleen and upgrading of the pump station at Koppie-Alleen:

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed section and development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (Rossouw, 2016).

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LIST OF ACRONYMS AND ABBREVIATIONS

DEA	Department of Environmental Affairs
DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation**ECO** Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Program Report
EPC	Engineering Procurement Contractor
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PHRA	Provincial Heritage Resources Agency
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES	
X	

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

Ventersburg is located approximately 160km north-east of Bloemfontein along the N1 and is supplied with potable water by Sedibeng Water. The water is transfer via a pipeline from the Koppie Alleen Reservoir in Riebeeckstad. The water is abstracted from the Vaal River in Balkfontein and from the Sand River in Virginia. The current system in place is insufficient and Sedibeng Water is experiencing problems to reliably provide potable water to the Ventersburg and Brabant reservoirs. Therefor the updrage of the existing service is required to ensure reliable water availability to the Brabant and Ventersburg reservoirs.

The existing pipeline is made from steel and can transport 110 litres per second. It is 42 km long and runs in a south eastern direction from the Koppie Alleen Reservoir via Brabant Reservoir to Ventersburg and transverse mostly agricultural land. According to information received from Aryx Consulting engineers there is an existing servitude of 15m in width from Koppie Alleen Reservoir to Henneman and a 10m servitude from Henneman to Ventersburg in place, with the new pipeline to be located within the existing servitude.

The proposed project entails the construction of a 42km pipe with a transport capacity of 310 litres per second. The client is currently considering the following materials for the construction of the pipeline; Glass-reinforced polyester (GRP), Polyvinyl Chloride (PVC), Steel or Ductile-Iron. Air Valves shall be constructed along the pipeline to accommodate access to the pipeline and enable maintenance of sections. The valves will also assist with the flow of the water through the pipeline and allow air to escape in order to ensure sufficient flow.

The proposed project will also entail the upgrade of the Henneman Reservoir with the construction of two additional reinforced concrete reservoirs with 12 mega litres storage capacity each and one additional reinforced concrete reservoir with 5 mega litres storage capacity at the Ventersburg reservoir.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 983,984 and 985	Description of project activity
GN 983 Activity 9: The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water – **(i)** with an internal diameter of 0,36 metres or more; or **(ii)** with a peak throughput of 120 litres per second or more.	The proposed pipeline exceeds the 1000 meters in length, while the diameter of the pipeline exceed 0.36 meters and the throughput capacity exceed 120 litres per second.
GN 983 Activity 12: The development of – (xi) infrastructure or structures with a physical footprint of 100 m^2 or more; where such development occurs – (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of the watercourse; excluding – (ee) where such development occurs within existing roads or road reserves.	The proposed project will have a physical footprint of more than 100 m^2 and crosses three watercourses.
GN 983 Activity 19: The infilling or depositing of any material of more than 5 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 m^3 from – (i) a watercourse.	Due to the nature of the proposed project more than 5 m^3 will be excavated.
GNR 985 Activity 12: The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (ii) Within critical biodiversity areas identified in bioregional plans.	The proposed project has a foot print of more than 300 square meters and part of it will traverse critical biodiversity and ecological support areas within an existing servitude.
GN 985 Activity 14: The development of –	The proposed project will have a foot print of approximately 10 square meters and will traverse

(xii) infrastructure or structures with a physical footprint of 10 square meters or more: (ii) outside urban areas, in: (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	critical biodiversity and ecological support areas within an existing servitude.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h) of GN 982, Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred)		
• Starting point of the activity	28° 5'33.52"S	27° 8'14.50"E
• Middle/Additional point of the activity	27°57'8.84"S	26°58'41.06"E
• End point of the activity	27°55'19.62"S	26°47'40.88"E
Alternative S2 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		
Alternative S3 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Ventersburg Bulk Water Supply		
• Starting point of the Bulk Water Supply	28° 5'33.52"S	27° 8'14.50"E
• Middle/Additional point of the Bulk Water Supply	27°57'8.84"S	26°58'41.06"E
• End point of the Bulk Water Supply	27°55'19.62"S	26°47'40.88"E

Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

Alternative 1 (preferred alternative)
The following materials will be considered to be used for the pipeline (0,6m diameter) from Koppie Alleen Reservoir to Ventersburg: 1. Steel and 2. Ductile-Iron
Alternative 2
The following materials will be considered to be used for the pipeline (0,45m diameter) from Koppie Alleen Reservoir to Ventersburg: 1. Glass-reinforced polyester (GRP); and 2. Polyvinyl Chloride (PVC);
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
3.
Alternative 2
3.
Alternative 3

e) No-go alternative

The no-go option will result in the non-construction of the potable water pipeline which will result in a backlog of potable water to Ventersburg. It will result in water shortages in the Ventersburg and Henneman area and could possibly cause unrest from the communities due to water shortages which are a basic service delivery that is prioritised in the Integrated Development Plan (IDP).

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
	N/A

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative)	42 000m
Alternative A2 (if any)	m
Alternative A3 (if any)	m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Size of existing servitude	540 250m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

4. SITE ACCESS

Does ready access to the site exist?	**YES** **X**	
If NO, what is the distance over which a new access road will be built	m	

Describe the type of access road planned:

The pipeline runs along the R70 from Koppie Alleen to Ventersburg. The pipeline will be easily accessible from the road. Access to the servitude area is also available by means of farm roads.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

See A3 Layout/Route Plan in Appendix A-1

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

See A3 Layout/Route Plan in Appendix A-2

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

See A3 Sensitivity map in Appendix A-3

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

See site photographs in Appendix B

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

See facility illustrations Appendix C

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	**YES X**		Please explain
The proposed development falls within a servitude for an existing pipeline.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES X**	NO	Please explain
The Ventersburg Bulk Water Supply falls within the Free State Province. The revised Provincial Spatial Development Framework of the Free State Province (PSDF) of 25 February 2013, provides a spatial vision and directives, policy and strategies for the province. The framework describes the six growth and development pillars, each of which has its own set of drivers with long-term programmes, on which the Free State PSDF is based. Pillar 3 deals with Improved Quality of Life. The twelfth driver of pillar 3 which is Integrate Environmental limitations and change into growth and development planning entails the following long-term programmes: **a) Improve water quantity and quality management.**			
(b) Urban edge / Edge of Built environment for the area	**YES X**		Please explain
The proposed project will supply potable water from the Koppie Alleen Reservior which is situated within the urban edge. The proposed project will move along the R70 ans pass through the Hennenman urban edge and end iwithin the Ventersburg Urban Edge			

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	**YES X**		Please explain
The IDP of the Matjhabeng Local Municipality 2014/2015 acknowledges that challenges the Municipality faces is the insufficient supply of bulk water and the ageing of bulk water supply infrastructure. One of the **main challenges experienced during the compilation of the Medium-Term Revenue and Expenditure Farmework (MTREF)** can be summarised as follow: • **Aging and poorly maintained water**, roads and electricity **infrastructure**; In accordance with national policy commitments and an agreed local definition of appropriate levels of services, extension of a differentiated package of service that is fit for purpose, affordable, and reliable to all households. It has to do with **eradicating backlogs linked to the supply of water**, electricity, waste removal, and bucket system.			
(d) Approved Structure Plan of the Municipality	**YES X**		Please explain
A large portion of the proposed project is situated outside town boundaries. No structure plan for Matjhabeng Local Municipality could be obtained.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	**YES X**		Please explain
No EMF applicable for Matjhabeng Local Municipality, or the area under investigation and assessment.			
(f) Any other Plans (e.g. Guide Plan)		**NO X**	Please explain
No other plans were identified			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES X**		Please explain
The proposed project falls within a servitude for an existing pipeline. The proposed project, however, is listed as a priority in the IDP as it will assist with the ageing and poorly maintained water infrastructure.			

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	**YES X**		Please explain
The expansion of Henneman and Ventersburg resulted in the current pipeline not being able to provide sufficient water from the Koppie Alleen Reservoir. Matjhabeng Local Municipality is confronted by numerous challenges that relates to the provision of access to water services. They range from planning, coordination, financing, execution and reporting. The absence of a comprehensive Water Services Development Plan(WSDP) in the municipality is an indictment. The construction of the new pipeline will assist will the supple of water to Henneman and Ventersburg. As well as assist with the above mentioned problems occurring within the Matjhabeng Local Municipality**.**			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES X**		Please explain
The proposed project will contribute to the Matjhabeng Local Municipality's service delivery infrastructure. According to Aryx Consulting Engineers the current pipeline transfers water at an approximate rate of 110 litres per second. The addition of the new pipeline will result in an increase of 290 litres per second, resulting in a total transport rate of 400 litres per second. The upgrade of the Brabant and Ventersburg Reservoirs will result in an additional 29m^3 of storage within Matjhabeng Local Municipality.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES X**		Please explain
The Matjhabeng Local Municipality listed aging and poorly maintained water infrastructure as a key area to be adresed. The proposed project will ensure that water is supplied to the Brabant and Ventersburg Reservoir which supplies the Henneman and Ventersburg area. The proposed project will also provide the Brabant and Ventersburg Reservoirs with an additional 29m^3 of storage capacity.			

7. Is this project part of a national programme to address an issue of national concern or importance?	**YES X**		Please explain
Most pipes that deliver water to our cities and towns are old and dilapidated. The proposed project will contribute to new service delivery infrastructure. The proposed project will contribute to the Strategic Infrastructure Projects.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES X**		Please explain
There is an existing pipeline within a servitude, whereas the new proposed project will be installed within the existing servitude. Due to the existing pipeline and maintenance thereof over time the area is already disturbed.			
9. Is the development the best practicable environmental option for this land/site?	**YES X**		Please explain
There is an existing pipeline within a servitude, whereas the new proposed project will be installed within the existing servitude. Due to the existing pipeline and maintenance thereof over time the area is already disturbed. By placing the new pipeline within the existing servitude, no other undisturbed area will be altered.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES X**		Please explain
Benefits associated with the proposed project include an increase in bulk water supply for the local level. Findings of the ecological, archaeological and paleontological studies determined that impact after mitigation would range between low and medium due to fact that it is within a servitude which has already been disturbed. If this is compared to the supply of bulk water above, the benefits of the proposed development outweighs the negative impacts thereof.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		**NO X**	Please explain
The proposed project will contribute to basic service delivery of water, and will not generate an income. Thus it won't set a precedent in the area.			
12. Will any person's rights be negatively affected by the proposed activity/ies?		**NO X**	Please explain
The proposed project will contribute to basic service delivery. Therefor no person's rights will be negatively affected.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	**YES X**		Please explain
The proposed project will cross into the urban edge of Riebeeckstad, Henneman and Ventersburg. The Koppie Alleen Reservoir is located within the urban edge.			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	**YES**	**NO**	Please explain
To date Enviroworks is still awaiting confirmation whether the proposed project falls within the Strategic Integrated Projects (SIP).			
15. What will the benefits be to society in general and to the local communities?			Please explain
The proposed project will contribute to basic service delivery of potable water to the Henneman and Ventersburg Areas.			
16. Any other need and desirability considerations related to the proposed activity?			Please explain
The construction and maintenance of the new pipeline will result in new employment opportunities.			
17. How does the project fit into the National Development Plan for 2030?			Please explain
The National Development Plan aims to improve the quality of public services as this is critical to achieving transformation. This will require provinces to focus on identifying and overcoming the obstacles to achieving improved outcomes, including the need to strengthen the ability of local government to fulfil its developmental role.			
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.			
Through the undertaking of a Basic Assessment Process by a competent EAP, informed by guidelines, the consideration of impacts and alternatives (advantages and disadvantages coupled thereto) has been made. Moreover, the conducting of public participation and specialist investigations form part of the process, whilst mitigation measures and the need and desirability of the proposed project were interrogated. This ensured that all provisions of the Act were considered and as such Integrated Environmental Management were accounted for.			

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

Through the undertaking of a Basic Assessment process by a competent EAP, informed by guidelines, the consideration of impacts and alternatives (advantages and disadvantages coupled thereto) has been made. Moreover, the conducting of a public participation process and specialist investigations formed part of this basic assessment process, whilst mitigation measures and the needs and desirability of the proposed project were interrogated. This ensured that all provisions of the Act were considered and as such integrated environmental management were accounted for as follow:

(2) Environmental Management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural heritage and social interests equitably.

The goal of this BA is to identify and mitigate potential socio-economic impacts in order to meet the terms of Section 24 of the Constitution.

(3) Development must be socially, environmentally and economically sustainable.

The overall goal of this BA is to predict, identify and manage potential positive and negative impacts in the socio-economic, cultural-heritage and biophysical environments in order to meet the needs of present generations without compromising the needs of future generations which will give effect to sustainable development.

(4)(a) Sustainable development requires the consideration of all relevant factors including the following:

i. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;

ii. that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;

iii. that the disturbance of landscapes and sites that constitute the nation´s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;

iv. that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;

v. that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;

vi. *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*

vii. *that a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*

viii. *that negative impacts on the environment and on people´s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

Specialists were appointed to undertake, Ecological, Palaeontological and Archaeological Impact Assessments as part of this Basic Assessment Process to consider all impacts relating to the above. An Environmental Management Program Report (EMPr) was compiled to mitigate and manage all activities during the planning, construction and operational phases.

(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

All aspects, including socio-economic, cultural-heritage and biophysical was evaluated and assessed in order to minimize potential negative impacts which will give effect to Integrated Environmental Management, as set out in Chapter 5 of NEMA, 1998.

(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.

A public participation process will be undertaken in terms of Section 41 of the NEMA EIA Regulations, which came into effect on 4 December 2014, in order to give effect to Section 32 of the Constitution in such a way that adherence is given to Section 24 of the Constitution.

(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.

The proposed project will contribute to service delivery to meet basic human needs.

(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.

The EMPr will be applicable throughout the lifecycle of the project.

(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.

A public participation process will be undertaken in terms of Section 41 of the NEMA EIA Regulations, which came into effect on 4 December 2014, in order to give effect to Section 32 of the Constitution in such a way that adherence is given to Section 24 of the Constitution.

(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

The Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) decision making process has to be in accordance with the above.

(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

The Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) decision making process has to be in accordance with the above.

(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

This BAR does give effect to Section 5 of NEMA whereby all social, economic and environmental impacts of activities were considered, assessed and evaluated.

(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.

Human rights will be taken into account during all phases of the proposed project.

(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.

The decision will take place in an open and fair manner and to give effect to Section 32 of the Constitution. I&AP's will be notified of the decision in terms of the requirements as set out in Section 41 of the NEMA EIA Regulations, 2014.

(l) There must be intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.

All Governmental Authorities will be considered during the BA process to give their inputs on the project.

(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.

Sedibeng Water is an organ of state and actual or potential conflicts of interest between organs of state should / will be resolved through conflict resolution procedures.

(n) Global and international responsibilities relating to the environment must be discharged in the national interest.

The proposed project will contribute to local service delivery. Potable water will be pumped from the Koppie Alleen Reservoir to the Brabant and Ventersburg Reservoirs and to Ventersburg.

(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people´s common heritage.

It is not foreseen that any cultural-heritage resources will be affected by the proposed project. The appropriate Heritage Specialists were appointed to undertake Impact Assessments in this field.

(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

An EMPr were compiled in order to prevent or minimize any potential negative impacts to the environment. It will be the responsibility of the Applicant and Contractor to adhere to all measures set out in the EMPr, in order to give effect to Section 28 (1) of NEMA.

(q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.

(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

An Ecologist was appointed to undertake an Ecological Impact Assessment in which all possible impacts on wetlands, rivers and ecosystems were assessed and mitigation measures will be implemented. Refer to the **EMP-r in Appendix G** of this report.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act (Act No. 107 of 1998)	The proposed project triggers listed activities which may not commence without authorisation as stipulated in Section 24 (2)(a) of The National Environmental Management Act.	The Department of Economic, Small Business Development, Tourism and Environmental Affairs.	1998
Environmental Impact Assessment Regulations 2014 promulgated in terms of Section 24(5) of NEMA	The proposed project triggers activities that would require environmental authorisation as set out in GN R No. 983 and GN R No. 985.	The Department of Economic, Small Business Development, Tourism and Environmental Affairs.	2014
National Heritage Resources Act (Act No. 25 of 1999)	The proposed project will exceed 300 metres in length as stipulated in Section 38 (1)(a) of the National Heritage Resources Act.	South African Heritage Resource Agency (SAHRA)	1999
National Water Act (Act 36 of 1998)	The proposed project will traverse within a radius of 32 metres from a water course and result in the storage of water, which is listed as a water use in terms of Section 21 of the act.	The Department of Water and Sanitation (DWS).	1998
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Alien and invasive species must be eradicated.	The Department of Economic, Small Business Development, Tourism and Environmental Affairs.	2004

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES X	
If YES, what estimated quantity will be produced per month?		12m^3

How will the construction solid waste be disposed of (describe)?

Waste compromising of cement bags and general construction-related solid waste will be collected on site and kept at a temporary designated area and regularly removed by the Contractor to be disposed of at a permitted landfill site. The contractor must ensure that waste separation between hazardous and non-hazardous waste take place on site and hazardous waste must be delivered to a registered hazardous waste management facility. This will be included in the EMPr.

Where will the construction solid waste be disposed of (describe)?

All non-hazardous construction waste must be disposed of by the Contractor at either of the following landfill sites:

1. Welkom Landfill Site, Class G (Permit Ref: P8);
2. Phomolong Landfill Site, Class G:M:B- (Permit Ref: B33/2/460/2/P30); or
3. Ventersburg Landfill Site, Class G:M:B- (Permit Ref: B33/2/340/115/P134)

Will the activity produce solid waste during its operational phase?		NO X
If YES, what estimated quantity will be produced per month?		m^3

How will the solid waste be disposed of (describe)?

N/A

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

N/A

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?		NO X

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?		NO X

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		NO X
If YES, what estimated quantity will be produced per month?		m^3
Will the activity produce any effluent that will be treated and/or disposed of on site?		NO X

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?		NO X

If YES, provide the particulars of the facility:

Facility name:	**N/A**		
Contact person:			
Postal address:			
Postal code:			
Telephone:		**Cell:**	
E-mail:		**Fax:**	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A, water will be used for drinking and ablution purposes only during the construction phase.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?		NO X
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If NO, describe the emissions in terms of type and concentration:

N/A, no emissions other than that of exhaust emissions and dust associated emissions will be released on site.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?		NO X

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	YES X	
If YES, is it controlled by any legislation of any sphere of government?		NO X

Describe the noise in terms of type and level:

Noise impacts will be limited to the construction phase. The level of noise generated will be temporary and is anticipated not to be significant.

The sources of noise includes:

- Establishment of the construction camp site;
- Delivery of materials to the construction camp site;
- Movement of heavy vehicles;
- Excavation of trenches for the potable pipes;
- Construction of the additional reservoirs.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal X	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water

	N/A
If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	**YES X**

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The proposed pipeline has been designed between two constraints:

1. Minimise velocity in the pipe to ensure low friction losses and thereby minimising the pumping energy.
2. Ensure a minimum velocity in the pipeline to maintain water quality and avoid deposition in the line.

Furthermore, it has been stipulated by Aurecon that the pump is efficient and operates close to its best Efficiency Point to minimize the required pumping energy.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

None

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A): **A: Bulk Water Supply from Koppie Alleen to Brabant Reservoir**

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? **YES X**

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Ward Number(s)	3, 10 and 13
Farm name and number	See list attached as **Appendix J-1**
Portion number	See list attached as **Appendix J-1**
SG Code	See list attached as **Appendix J-1**

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

The proposed project will traverse through land zoned as agricultural land, residential and within the road reserve of R70. However the project will be occurring within an existing servitude.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? **NO X**

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
X	X	X				

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

Alternative S1 and Alternative S2:

2.1 Ridgeline		2.4 Closed valley		**2.7 Undulating plain / low hills**	**X**
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		**2.6 Plain**	**X**	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	**YES X**		YES	NO	YES	NO
Dolomite, sinkhole or doline areas		**NO X**	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)		**NO X**	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		**NO X**	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)		**NO X**	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		**NO X**	YES	NO	YES	NO
Any other unstable soil or geological feature		**NO X**	YES	NO	YES	NO
An area sensitive to erosion		**NO X**	YES	NO	YES	NO
The following geology and soils and be encountered within Section A of the proposed project:						

Gh 10:
Granite and gneiss at the core of the Vredefort Dome underlie this area and includes the Inlandsee Gneiss. Various soil types including Hutton, Mispah and Avalon forms, representing plinthic soils, which can be dystrophic and/or mesotrophic or eutrophic. Red soils are generally widespread.

AZa 5:
Deep snady to clayey (but mostly coarse sand) alluvial soils developed over Quaternary alluvial (fluviatile) sediments.

AZi 10:
Shales of the Ecca Group are usually present giving rise to vertic clays. Dense dust can reach several thousand metres into the air under such windy conditions.

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).
Alternative S1 and Alternative S2:

Natural veld - good condition[E]	**Natural veld with scattered aliens[E] X**	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	**Gardens X**
Sport field	**Cultivated land X**	**Paved surface X**	**Building or other structure X**	**Bare soil X**

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Alternative 1 and Alternative 2:

Perennial River		**NO X**	
Non-Perennial River		**NO X**	

Permanent Wetland		NO X	
Seasonal Wetland		NO X	
Artificial Wetland		NO X	
Estuarine / Lagoonal wetland		NO X	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Only section B of the proposed project will cross watercourses.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Alternative 1 and Alternative 2:

Natural area X	**Dam or reservoir X**	Polo fields
Low density residential	Hospital/medical centre	**Filling station [H] X**
Medium density residential X	**School X**	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential	**Church X**	**Agriculture X**
Retail commercial & warehousing X	Old age home	River, stream or wetland
Light industrial X	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room X	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam[A]	**Sport facilities X**	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

The proposed project falls within an existing servitude and the filling station line will not be impacted upon.

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	**YES X**	
Core area of a protected area?		**NO X**
Buffer area of a protected area?		**NO X**
Planned expansion area of an existing protected area?		**NO X**
Existing offset area associated with a previous Environmental Authorisation?		**NO X**
Buffer area of the SKA?		**NO X**

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

A map indicating the affected CBA areas is attached to Appendix A-3 as the Sensitivity Map

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:		**NO X**
N/A		

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Pipeline between Brabant and Koppie-Alleen and upgrading of the pump station at Koppie-Alleen

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed section and development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) - (Russouw, 2016)

	NO X
YES X	

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

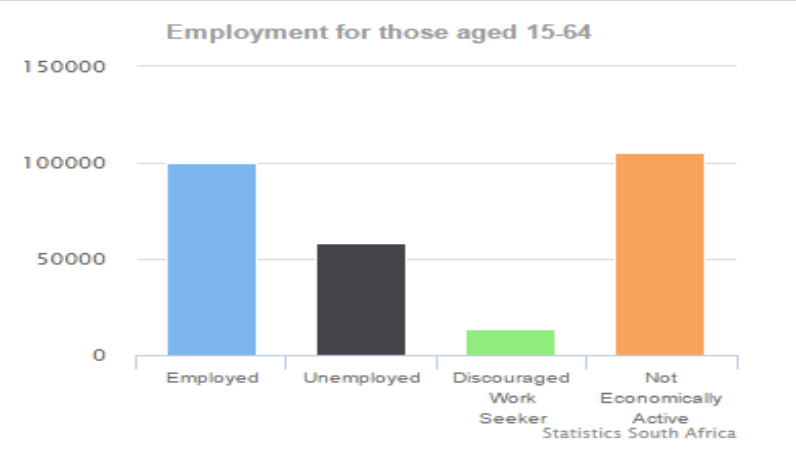
a) Local Municipality

The information provided within this section is for the entire project

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

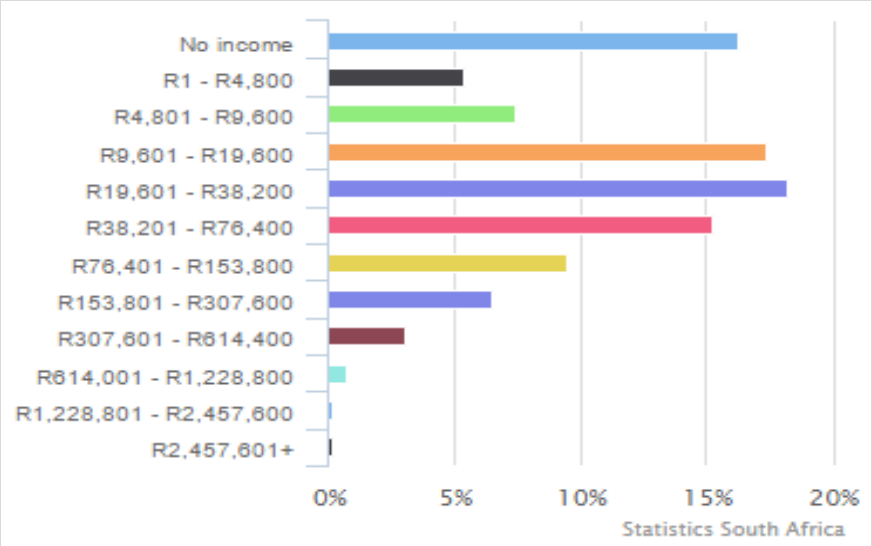
Level of unemployment:

A total of 99 650 people are employed while 13 290 are discouraged work-seekers. According to Census 2011, 58 524 people are unemployed, making the unemployment rate stand at 37%.
The youth aged of between 15–34, are 39 442 employed and 38 975 are unemployed (Statistics South Africa, 2011).



Economic profile of local municipality:

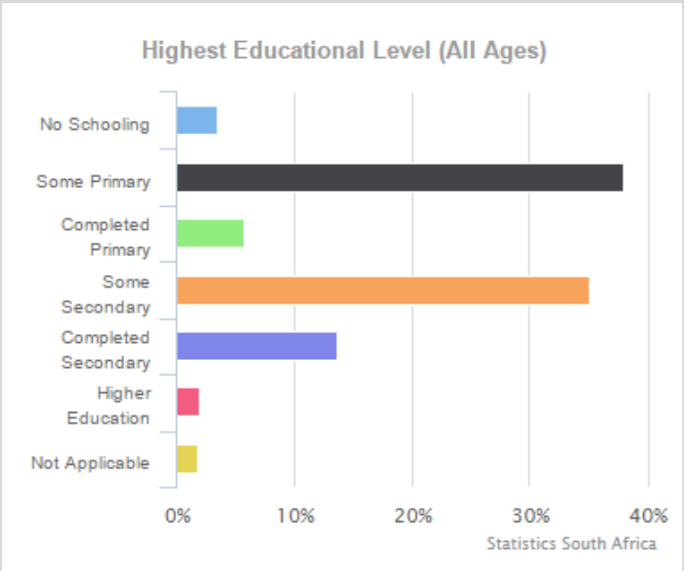
The economic profile of the Matjhabeng Local Municipality is summarized in the graph below **(Statistics South Africa, 2011).**



Level of education:

The Matjhabeng Local Municipality has a total population of 406 461people, of which 87,7% are black African.The coloured population makes up 2,1%, and 9,6% are white (Statistics South Africa, 2011)..

Of the people aged 20 and older, 38,8% have some form of secondary schooling and only 28,1% have matric. In the municipality, 4,6% of people have no schooling and 14% have some form of primary schooling (Statistics South Africa, 2011)..



b) Socio-economic value of the activity

The information provided within this section is for the entire project

What is the expected capital value of the activity on completion?	R165 000 000,00
What is the expected yearly income that will be generated by or as a result of the activity?	The aim of the development is to provide a public amenity – such does not generate income, but helps to facilitate other development and helps to maintain basic living conditions.
Will the activity contribute to service infrastructure?	**YES**
Is the activity a public amenity?	**YES**
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Some unskilled labour will be used during construction, much of the remainder will be done by skilled, trained contract staff and minimal new jobs are likely to be generated.
What is the expected value of the employment opportunities during the development and construction phase?	This figure cannot be determined at this stage of the project.
What percentage of this will accrue to previously disadvantaged individuals?	This percentage cannot be determined at this stage of the project.

How many permanent new employment opportunities will be created during the operational phase of the activity?	The pipeline and other related infrastructure will run from the existing reservoir to pump station, and thus will be serviced by the existing Sedibeng staff.
What is the expected current value of the employment opportunities during the first 10 years?	R Given it is the extension of an existing infrastructure, potentially minimal or no new jobs to be created.
What percentage of this will accrue to previously disadvantaged individuals?	This percentage cannot be determined at this stage of the project.

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

<table>
<tr><th colspan="4">Systematic Biodiversity Planning Category</th><th>If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan</th></tr>
<tr><td rowspan="3">Critical Biodiversity Area (CBA)
X</td><td rowspan="3">Ecological Support Area (ESA)
X</td><td rowspan="3">Other Natural Area (ONA)
X</td><td rowspan="3">No Natural Area Remaining (NNR)</td><td>CBAs are included due to the fact that it is classified as a site that is irreplaceable or near-irreplaceable for meeting Biodiversity targets. The loss of a CBA site implies that biodiversity targets will not be met (Collins, 2015).</td></tr>
<tr><td>ESAs are included due to the fact that less than 10% of the surface has been transformed or degraded. Belonging to this category are mostly natural land that are considered to represent prime corridor areas (Collins, 2015).</td></tr>
<tr><td>Other Natural Areas are natural vegetation that have not been classified as CBA or ESA (Collins, 2015).</td></tr>
<tr><td colspan="5">Please refer to Appendix A – Sensitivity Map for the complete Biodiversity Map.</td></tr>
</table>

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	11,54%	The historic disturbance caused and current presence of the existing pipeline within the proposed route corridor has however caused the corridor area to be slightly more degraded than the surrounding natural areas of the CBA 1. The development of the new pipeline and reservoir enlargement will therefore not significantly contribute to the negative impact on the CBA 1 (Lamprecht, 2016).
Near Natural (includes areas with low to moderate level of alien invasive plants)	3,85%	The species richness within the initial natural to semi-natural area of the route corridor is not significantly high (≤ 15) and no Red Data Listed species were found to be present. Grasses mainly include *Eragrostis chloromelas, Aristida congesta, Cynodon dactylon* and *Hyparrhenia hirta* indicating a level of disturbance and transformation as opposed to the surrounding vegetation. No shrubs of significance are present within the proposed route corridor (Lamprecht, 2016).
Degraded (includes areas heavily invaded by alien plants)	70,77%	The vegetation within this servitude is mostly degraded and transformed and of little conservational significance.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	13,84%	The proposed pipeline passes through Riebeeckstad within Section A.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and
(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems					
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	**Least Threatened**	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)		Estuary		Coastline	
			NO		**NO**		**NO**

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Riebeeckstad:
The proposed route corridor within the road servitude along the R 70 main road passes through the town of Riebeeckstad. As in the case of Hennenman, a windrow of trees is situated within the road servitude which provides a significant visual and potential noise buffer between the road and neighbouring houses. Care should therefore also be taken here during the pipeline construction in order to minimise damage or unnecessarily remove trees situated in this windrow as this might be negatively perceived by the residents. It is important that the residents be properly consulted prior to construction in order to obtain their inputs on the importance and necessity of keeping the windrow of trees intact.

Koppie Alleen Reservoir to Brabant Reservoir:
As the proposed route corridor continues past the Brabant Reservoir area the route again follows the pipeline servitude along the R 70 road. The route continues all the way to Riebeeckstad. In accordance with the Provincial Spatial Biodiversity Plan the route corridor again traverses on the edge of a second CBA 1 but 'ground truthing' during the site visit confirmed that the pipeline impact will fall just outside the identified CBA as the road servitude does not form part of the mapped portion of natural vegetation classified as the CBA 1.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION (B)

Important notes:

4. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):	**B: Bulk Water Supply from Brabant Reservoir to Ventersburg**

5. Paragraphs 1 - 6 below must be completed for each alternative.

6. Has a specialist been consulted to assist with the completion of this section?

YES	
X	

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Ward Number(s)	1, 3 and 10
Farm name and number	See list attached as **Appendix J-1**
Portion number	See list attached as **Appendix J-1**
SG Code	See list attached as **Appendix J-1**

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

The proposed project will traverse through land zoned as agricultural land and within the road reserve of R70. However the project will be occurring within an existing servitude.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

	NO
	X

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
X	**X**	**X**				

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		**2.7 Undulating plain / low hills**	**X**
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		**2.6 Plain**	**X**	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:		Alternative S2 (if any):			Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	**YES X**		YES	NO		YES	NO
Dolomite, sinkhole or doline areas		**NO X**	YES	NO		YES	NO
Seasonally wet soils (often close to water bodies)	**YES X**		YES	NO		YES	NO
Unstable rocky slopes or steep slopes with loose soil		**NO X**	YES	NO		YES	NO
Dispersive soils (soils that dissolve in water)		**NO X**	YES	NO		YES	NO
Soils with high clay content (clay fraction more than 40%)		**NO X**	YES	NO		YES	NO
Any other unstable soil or geological feature		**NO X**	YES	NO		YES	NO
An area sensitive to erosion		**NO X**	YES	NO		YES	NO

Gh 6: Sedimentary mudstones and sandstone mainly of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). The less common intrusive dolerites of the Jurassic Karoo Dolerite Suite support dry clayey soils typical of the Ea land type.

Gh 7: Sills cover alternating layers of mudstone and sandstone of sedimentary origin. Prominent soil forms are the stony Mispah and gravel-rich Glenrosa derived from Jurassic Dolerite.

Gh 10: Granite and gneiss at the core of the Vredefort Dome underlie this area and includes the Inlandsee Gneiss. Various soil types including Hutton, Mispah and Avalon forms, representing plinthic soils, which can be dystrophic and/or mesotrophic or eutrophic. Red soils are generally widespread.

AZi 10: Shales of the Ecca Group are usually present giving rise to vertic clays. Dense dust can reach several thousand metres into the air under such windy conditions.

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	**Natural veld with scattered aliens[E] X**	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens X
Sport field	**Cultivated land X**	**Paved surface X**	**Building or other structure X**	**Bare soil X**

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	**YES X**		UNSURE
Non-Perennial River	**YES X**		UNSURE
Permanent Wetland		**NO X**	UNSURE
Seasonal Wetland		**NO X**	UNSURE
Artificial Wetland		**NO X**	UNSURE
Estuarine / Lagoonal wetland		**NO X**	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Please note that the description provide below from the Ecological Specialist is from Ventersburg towards the Brabant Reservoir.

First Watercourse Crossing

Within 1 km from the starting point, the route corridor crosses a small seasonal watercourse (see sensitivity map watercourse 1) and the corridor is also situated within 500 m of a second water course (watercourse 1). Due to its small size and seasonality, watercourse 1 area is more of a drainage line and does not contain any distinctive or important riparian vegetation distinguishing it from the surrounding terrestrial vegetation. The development of the pipeline can therefore continue but must not negatively influence the integrity of this drainage line. Adequate mitigation measures must be implemented to ensure the continued functionality and unimpeded flow of the watercourse after construction completion. This discussion will also be included in the Water Use License Application (Lamprecht, 2016).

Second watercourse crossing

The second watercourse crossing is characterised by a larger, more significant permanent stream (watercourse 2). Once again no significant or important riparian vegetation for conservation purposes is present at the proposed route corridor crossing point. A number of *Searsia lancea* trees are present on the banks of the watercourse. Impacts on or the removal of such individuals should be avoided as far as possible as they play an important role in the stability of the watercourse banks. Due to the presence of the existing pipeline within the route corridor, the development of the new pipeline should not pose a significant additional threat to the integrity and continued functionality of the watercourse. Adequate mitigation measures must be implemented to ensure the continued functionality and unimpeded flow of the watercourse after construction completion. This discussion will also be included in the Water Use License Application (Lamprecht, 2016).

Third watercourse crossing

The proposed route corridor crosses a third permanent watercourse just prior to entering the town of Hennenman (watercourse 3). Aquatic species such as *Phragmites australis* and *Typha capensis* are present the alien tree species *Salix babylonica* is also present. No other significant riparian or aquatic vegetation was observed. The quality of the water resource also visibly seems to be highly degraded and polluted. Algal blooms and unidentified materials visible in the water indicate potential sewage or other source pollution (see figure below). Although the ecological integrity of the watercourse does not seem to be very favourable, it will still fulfil a level of aquatic functionality within the greater area and must therefore not be further negatively impacted upon by the proposed pipeline development. Adequate mitigation measures must be implemented to ensure the continued functionality and unimpeded flow of the watercourse after construction completion. This discussion will also be included in the Water Use License Application (Lamprecht, 2016).

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant [A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam [A]	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

The proposed project falls within an existing servitude and will cross the railway line at Henneman

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	**YES X**	
Core area of a protected area?		**NO X**
Buffer area of a protected area?		**NO**

		X
Planned expansion area of an existing protected area?		**NO X**
Existing offset area associated with a previous Environmental Authorisation?		**NO X**
Buffer area of the SKA?		**NO X**

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	**YES X**	

Pipeline from Mmamahabane Township to the Ventersburg SW reservoir

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. Although the western wall of the Voortrekker Monument (**Figs 6 – 10 of specialist report)** is located only 25 m away from the proposed route, it is a highly visible structure and can be easily avoided during the construction phase of this section. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Construction of two new 12Ml reservoirs at Brabant and upgrading of the Brabant pump station

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Pipeline Hennenman to the Brabant pump station

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The old farmstead area at the Brabant pump station was mapped and photographed, but it is not considered to be historically significant. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Pipeline from the Ventersburg SW reservoir to Phomolong and Hennenman

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The Iron Age complex located southeast of Phomolong and north-northeast of the R70 provincial road (**Fig. 13**) will not be impacted by the proposed development. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Construction of a new 5Ml reservoir at the Ventersburg SW reservoir

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

	NO
YES	

Will any building or structure older than 60 years be affected in any way?
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?
If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

<table>
<tr><th colspan="4">Systematic Biodiversity Planning Category</th><th>If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan</th></tr>
<tr><td rowspan="3">Critical Biodiversity Area (CBA)</td><td rowspan="3">Ecological Support Area (ESA)</td><td rowspan="3">Other Natural Area (ONA)</td><td rowspan="3">No Natural Area Remaining (NNR)</td><td>CBAs are included due to the fact that it is classified as a site that is irreplaceable or near-irreplaceable for meeting Biodiversity targets. The loss of a CBA site implies that biodiversity targets will not be met (Collins, 2015).</td></tr>
<tr><td>ESAs are included due to the fact that less than 10% of the surface has been transformed or degraded. Belonging to this category are mostly natural land that are considered to represent prime corridor areas (Collins, 2015).</td></tr>
<tr><td>Other Natural Areas are natural vegetation that have not been classified as CBA or ESA (Collins, 2015).</td></tr>
</table>

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	8,11%	The proposed route corridor deviates away from the R 70 road servitude through a portion of natural vegetation in order to reach the existing Brabant Reservoir. This portion of natural vegetation is classified

		as a Critical Biodiversity Area 1. This piece of natural veld is a remnant of the endangered Vaal-Vet Sandy Grassland vegetation type. The route corridor is however once again slightly more disturbed and degraded when compared to the surrounding vegetation due to the past disturbance when the existing pipeline was constructed and the current activities to inspect and maintain the pipeline (Lamprecht, 2016).
Near Natural (includes areas with low to moderate level of alien invasive plants)	29,73%	The species richness within the initial natural to semi-natural area of the route corridor is not significantly high (≤ 15) and no Red Data Listed species were found to be present. Grasses mainly include *Eragrostis chloromelas, Aristida congesta, Cynodon dactylon* and *Hyparrhenia hirta* indicating a level of disturbance and transformation as opposed to the surrounding vegetation. No shrubs of significance are present within the proposed route corridor (Lamprecht, 2016).
Degraded (includes areas heavily invaded by alien plants)	45.95%	The vegetation within this servitude and reservoir areas are mostly degraded and transformed and of little conservational significance.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	16.22%	The proposed pipeline passes through Henneman and Ventersburg. The reservoirs will be constructed alongside existing reservoirs.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		**Aquatic Ecosystems**				
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)		Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)		Estuary		Coastline
	Least Threatened	**YES**		**NO**		**NO**

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Brabant Reservoir enlargement area:

The proposed route corridor deviates away from the R 70 road servitude through a portion of natural vegetation in order to reach the existing Brabant Reservoir. This portion of natural vegetation is classified as a Critical Biodiversity Area 1. This piece of natural veld is a remnant of the endangered Vaal-Vet Sandy Grassland vegetation type. The route corridor is however once again slightly more disturbed and degraded when compared to the surrounding vegetation due to the past disturbance when the existing pipeline was constructed and the current activities to inspect and maintain the pipeline. The species richness within the proposed route corridor area is not significantly high (≤ 10) and no Red Data Listed or significant protected species were found to be present. Grasses mainly include *Eragrostis chloromelas, Aristida congesta* and *Hyparrhenia hirta* which are also an indication of a degree of disturbance. A number of individuals of the exotic tree species *Schinus molle* are also present in the vicinity of then route corridor. Therefore although the area is classified as a CBA 1 the development of the pipeline in the proposed corridor along with the existing one should not significantly further impact on the integrity of the CBA. Special care must be taken during vegetation clearance to restrict clearance to the route corridor footprint as far as possible to prevent any unnecessary damage to adjacent natural vegetation of the CBA 1 (Lamprecht, 2016).

Town of Hennenman

The proposed route corridor continues in the road servitude along the R 70 main road which traverses the town of Hennenman. A windrow of trees is situated within the road servitude in town which provides a significant visual and potential noise buffer between the road and directly adjacently located houses. Care should therefore be taken during the pipeline development in order to attempt to not significantly damage or unnecessarily remove trees situated in this windrow as this might be negatively perceived by affected residents. It is important that such residents be adequately consulted prior to construction in order to obtain their opinions on the importance and necessity of keeping the windrow of trees intact. The proposed route corridor goes past Hennenman it remains in the highly degraded servitude of the R 70 road. The servitude is situated in or next to cultivated crop fields (Lamprecht, 2016).

Ventersburg Reservoir enlargement area:

The vegetation of the area surrounding the existing Ventersburg Reservoir is also mainly degraded due to the presence of the existing pipeline and continual maintenance activities in the form of vegetation defoliation and clearance (see figure below). The species richness within the proposed reservoir enlargement area is not significantly high (≤ 10) and no Red Data Listed or provincially protected species were found to be present. Grasses mainly include *Eragrostis chloromelas, Aristida congesta* and *Hyparrhenia hirta*. No shrubs are present within the proposed reservoir enlargement area. Forbs mainly include *Salvia aethiopica* and *Helichrysum sp*.

The enlargement of the reservoir will therefore not negatively impact on any significant vegetation of conservational importance and can continue. Vegetation clearance and impact should however be restricted to the enlargement footprint as far as possible in order to avoid unnecessary damage to surrounding vegetation which forms part of the Winburg Grassy Shrubland (Gh 7) and is still in a natural condition (Lamprecht, 2016).

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Volksblad and Vista Newspaper	
Date published	10 November 2016	
Site notice position	**Latitude**	**Longitude**
	-28.087936	27.139703
	-28.070667	27.113111
	-28.085678	27.137017
	-27.973167	27.021306
	-27.949797	26.973803
	-27.97875	26.737542
	-27.921117	26.796689
	-27.918075	26.797769
Date placed	11 November 2016	

Include proof of the placement of the relevant advertisements and notices in **Appendix E**

2. DETERMINATION OF APPROPRIATE MEASURES

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

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 982

Title, Name and Surname	**Affiliation/ key stakeholder status**	**Contact details (tel number or e-mail address)**
Steenkamp & kinders beleggings Pty	Farmer	bfn.accounts@dpw.gov.za
DP Slabbert (DPS Besigheids Trust)	Farmer	pat@corlentrade.co.za
Marula Spyrou	Farmer	stna_spy@hotmail.com
Francois Delport Familie Trust	Farmer	fjdel@jdgtelecom.co.za
Raymond Geyser / Isabella Christina Geyser	Farmer	estnavisagie@gmail.com
Piet Crous	Farmer	newington@global.co.za
Orpa Badenhorst	Farmer	badenhorstprok@vodamail.co.za
Machiel Frederick Strydom	Farmer	hillsdale@absamail.co.za
Freddy Khuze	Farmer	freddy.khuze@matjhabeng.co.za
Josias Willem van der Merwe	Farmer	josiasvdmerwe@gmail.com
Emma Maria Wessels	Farmer	amme@vodamail.co.za

Frederik Evert Vogel	Farmer	vogelsrand@gmail.com

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr. T Dayantyi	Office of the HOD: Office Manager for the Free State Department of Police, Roads and Transport	thamid@safety.fs.gov.za
Me. C Booyse	Roads Infrastructure / Pothole's / Claims for Free State Department of Police, Roads and Transport	booysec@freetrans.gov.za
Mr. A. Bodenstein	TRANSNET	andre.bodenstein@transnet.net
Me V. Bota	SANRAL	BotaV@nra.co.za
Mr. X. Songcaka	ESKOM	songcaxh@eskom.co.za
Mr. W. Voigt	Telkom	VoigtW@telkom.co.za

Mr. J. Morton	Department of Agriculture and Rural Development	jack@fs.agric.za
Me. P. Kaota	Municipal Manager Lejweleputswa District Municipality	jane@lewja.co.za
Mr. D. Kirsten	Environmental Officer at	dewald@lejwe.co.za
Mr. Mthombeni	Manager Environmental Health & Disaster Management at Lejweleputswa District Municipality	moss@lejwe.co.za
Mr. M. Sebotsa	Ward (1) Councillor for Matjhabeng Local Municipality	rolanda.vanderberg@matjhabeng.co.za
Mr. K. Schlebusch	Ward (3) Councillor for Matjhabeng Local Municipality	cjs@gcs.co.za
Mr. Ramalefame	Ward (10) Councillor for Matjhabeng Local Municipality	sfuramalcfane@gmail.com
Mr. Thelingoane	Ward (13) Councillor for Matjhabeng Local Municipality	thelingoanetj@gmail.com
Mr. T. Tsoaeli	Chief Operating Officer for Matjhabeng Local Municipality	Leona.nel@matjhabeng.co.za
Me. B. Maswangany	Executive Director of Infrastructure for Matjhabeng Local Municipality	Betty.tlhabani@matjhabeng.co.za
Me. B. Mogorosi	Acting Environmental Officer Control Grade A: EIM	mogorosib@detea.fs.gov.za

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Impact Assessment Methodology

For each potential impact, the EXTENT (spatial scale), MAGNITUDE, DURATION (time scale), PROBABILITY of occurrence, IRREPLACEABLE loss of resources and the REVERSIBILITY of potential impacts must be assessed by the specialist by using the results of their specialist studies. The assessment of the above criteria will be used to determine the significance of each impact, with and without the implementation of the proposed mitigation measures. The scales to be used to assess these variables and to define the rating categories are tabulated in Table 1 and Table 2 below.

Evaluation component	Ranking scale and description (criteria)
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	**10 - Very high**: Bio-physical and/or social functions and/or processes might be *severely* altered. **8 - High**: Bio-physical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Bio-physical and/or social functions and/or processes might be *notably* altered. **4 - Low** : Bio-physical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Bio-physical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated	**10 - Very high (positive)**: Bio-physical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced. **6 - Medium (positive)**: Bio-physical and/or social functions and/or processes might be *notably* enhanced.

spatial scale)	**4 - Low (positive)**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced. **2 - Very Low (positive)**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced. **0 - Zero (positive)**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5 - Permanent** **4 - Long term**: Impact ceases after operational phase/life of the activity > 60 years. **3 - Medium term**: Impact might occur during the operational phase/life of the activity – 60 years. **2 - Short term**: Impact might occur during the construction phase - < 3 years. **1 - Immediate**
EXTENT (or spatial scale/influence of impact)	**5 - International**: Beyond National boundaries. **4 - National**: Beyond Provincial boundaries and within National boundaries. **3 - Regional**: Beyond 5 km of the proposed development and within Provincial boundaries. **2 - Local**: Within 5 km of the proposed development. **1 - Site-specific**: On site or within 100 m of the site boundary. **0** - None
IRREPLACEABLE loss of resources	**5 – Definite** loss of irreplaceable resources. **4 – High** potential for loss of irreplaceable resources. **3 – Moderate** potential for loss of irreplaceable resources. **2 – Low** potential for loss of irreplaceable resources. **1 – Very low** potential for loss of irreplaceable resources. **0 - None**
REVERSIBILITY of impact	**5 –** Impact **cannot** be reversed. **4 – Low** potential that impact might be reversed. **3 – Moderate** potential that impact might be reversed. **2 – High** potential that impact might be reversed. **1 –** Impact **will be** reversible. **0 –** No impact.
PROBABILITY (of occurrence)	**5 - Definite**: >95% chance of the potential impact occurring. **4 - High probability**: 75% - 95% chance of the potential impact occurring. **3 - Medium probability**: 25% - 75% chance of the potential impact occurring **2 - Low probability**: 5% - 25% chance of the potential impact occurring. **1 - Improbable**: <5% chance of the potential impact occurring.
Evaluation component	**Ranking scale and description (criteria)**

CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Medium**: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed (or calculated) using the following formula:

- **SP (significance points) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum value is 150 SP (significance points). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per Table below.

2. POTENTIAL IMPACTS DURING THE PLANNING, DESIGN AND CONSTRUCTION PHASE

SECTION A: BULK WATER SUPPLY FROM KOPPIE ALLEEN TO BRABANT RESERVOIR

Nature of Impact	Impact summary	Significance (before mitigation)
Alternative 1 (600mm Diameter Steel/Ductile Iron Pipeline)		
Activity: Construction of the proposed Bulk Water Supply		
Potential impacts on biological aspects:		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • The guidelines for trenching through any wetland/watercourse as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby. • Restrict vegetation clearance and impact to the proposed route corridor and reservoir enlargement footprint as far as practicably possible in order to avoid unnecessary increase of the footprint size and damage to the surrounding natural vegetation of the area. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site with no waste being left behind. No burning of waste on site. • The areas of natural vegetation impacted by the construction of the pipeline need to be adequately

Nature of Impact	Impact summary	Significance (before mitigation)
		rehabilitated.
Destruction/transformation of a Critical Biodiversity Area	**Direct impacts:**	Medium
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Special care must be taken during vegetation clearance to restrict clearance to the route corridor footprint as far as possible to prevent any unnecessary damage to adjacent natural vegetation of the CBA 1 and to avoid unnecessary increase of the footprint size. • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site • with no waste being left behind. No burning of waste on site. • The areas of the CBA 1 impacted by the construction of the pipeline need to be adequately rehabilitated.
Damage to windrow trees in towns	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Incorporate existing windrow trees into the pipeline design and layout as far as reasonably possible in order to prevent significant damage or unnecessary removal. • Adequately consult homeowners during the Public Participation Process in order to obtain their opinions on the importance and necessity of keeping the windrow of trees intact.
Transformation and loss of habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be

Nature of Impact	Impact summary	Significance (before mitigation)
		avoided • All construction vehicles should stay on approved access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks. • Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during

Nature of Impact	Impact summary	Significance (before mitigation)
		and after rainy periods. •
Potential impacts on geological and physical aspects:		
	Direct impacts:	Low
	Indirect impacts:	-
	Cumulative impacts:	-
Topsoil Preservation and Soil Erosion.	**Proposed mitigation**	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications; • The route corridor where the pipeline has been submerged must be adequately rehabilitated in order to stabilise the surface material and prevent any significant surface erosion of bare soil from occurring.

Nature of Impact	Impact summary	Significance (before mitigation)
		• See mitigation measures for Loss of Vegetation (Landscaping) and for negative Impact on Integrity of Riparian Vegetation.

Nature of Impact	Impact summary	Significance (before mitigation)
Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly,

Nature of Impact	Impact summary	Significance (before mitigation)
		• The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day,

Nature of Impact	Impact summary	Significance (before mitigation)
		• General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of mountainous routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition;

Nature of Impact	Impact summary	Significance (before mitigation)
		• Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Traffic Impact for pipeline crossing the road to the Brabant Reservoir and crossing the R70 road.	**Direct impacts:**	Medium-High
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • The construction of these crossing should be prioritised and be completed as soon as possible. • All construction workers should wear visibility jackets during this section to avoid any risk to themselves and the traffic. • This construction should be limited to day time when visibility is at its best, as the R70 at Brabant don't have street lights.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site,

Nature of Impact	Impact summary	Significance (before mitigation)
		• Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, • Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area.
Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; • The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible, particularly for less labor-intensive

Nature of Impact	Impact summary	Significance (before mitigation)
		work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction; • Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
Damage and destruction of vertebrate fossils during excavation activities.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other

Nature of Impact	Impact summary	Significance (before mitigation)
		built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50m radius of the find must be cordoned off with hazard tape; o Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during construction should be conserved and used for

Nature of Impact	Impact summary	Significance (before mitigation)
		rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.

Nature of Impact	Impact summary	Significance (before mitigation)
Alternative 2 (450mm Diameter PVC/GRP Pipeline)		
Activity: Construction of the proposed Bulk Water Supply		
Potential impacts on biological aspects:		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby. • Restrict vegetation clearance and impact to the proposed route corridor and reservoir enlargement footprint as far as practicably possible in order to

		avoid unnecessary increase of the footprint size and damage to the surrounding natural vegetation of the area. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site with no waste being left behind. No burning of waste on site. • The areas of natural vegetation impacted by the construction of the pipeline need to be adequately rehabilitated.
Destruction/transformation of a Critical Biodiversity Area	**Direct impacts:**	Medium
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Special care must be taken during vegetation clearance to restrict clearance to the route corridor footprint as far as possible to prevent any unnecessary damage to adjacent natural vegetation of the CBA 1 and to avoid unnecessary increase of the footprint size. • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site • with no waste being left behind. No burning of waste on site. • The areas of the CBA 1 impacted by the construction of the pipeline need to be adequately rehabilitated.
Damage to windrow trees in towns	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Incorporate existing windrow trees into the pipeline design and layout as far as reasonably possible in order to prevent significant damage or unnecessary removal. • Adequately consult homeowners during the Public Participation Process in order to obtain their opinions on the importance and necessity of keeping the windrow of trees intact.
Transformation and loss of	**Direct impacts:**	Medium

habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Indirect impacts:**	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should stay on approved access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks.

		• Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during and after rainy periods. •
Potential impacts on geological and physical aspects:		
	Direct impacts:	Low
	Indirect impacts:	-
	Cumulative impacts:	-
Topsoil Preservation and Soil Erosion.	**Proposed mitigation**	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications; • The route corridor where the pipeline has been submerged must be adequately rehabilitated in order

		to stabilise the surface material and prevent any significant surface erosion of bare soil from occurring. • See mitigation measures for Loss of Vegetation (Landscaping) and for negative Impact on Integrity of Riparian Vegetation.

	Direct impacts:	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Proposed mitigation**	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly, • The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural

		environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day, • General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and

		non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of mountainous routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition; • Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least

		amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Traffic Impact for pipeline crossing the road to the Brabant Reservoir and crossing the R70 road.	**Direct impacts:**	Medium-High
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • The construction of these crossing should be prioritised and be completed as soon as possible. • All construction workers should wear visibility jackets during this section to avoid any risk to themselves and the traffic. • This construction should be limited to day time when visibility is at its best, as the R70 at Brabant don't have street lights.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site, • Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, • Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area. •

Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; • The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible, particularly for less labor-intensive work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-

	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction; • Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
Damage and destruction of vertebrate fossils during excavation activities.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist

		must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50m radius of the find must be cordoned off with hazard tape; o Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.

SECTION B: BULK WATER SUPPLY FROM BRABANT RESERVOIR TO VENTERSBURG

Nature of Impact	Impact summary	Significance (before mitigation)
Alternative 1 (600mm Diameter Steel/Ductile Iron Pipeline)		
Activity: Construction of the proposed Bulk Water Supply		
Potential impacts on biological aspects:		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby. • Restrict vegetation clearance and impact to the proposed route corridor and reservoir enlargement footprint as far as practicably possible in order to avoid unnecessary increase of the footprint size and damage to the surrounding natural vegetation of the area. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site with no waste being left behind. No burning of waste on site. • The areas of natural vegetation impacted by the construction of the pipeline need to be adequately rehabilitated.

Nature of Impact	Impact summary	Significance (before mitigation)
Destruction/transformation of a Critical Biodiversity Area	**Direct impacts:**	Medium
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Special care must be taken during vegetation clearance to restrict clearance to the route corridor footprint as far as possible to prevent any unnecessary damage to adjacent natural vegetation of the CBA 1 and to avoid unnecessary increase of the footprint size. • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site • with no waste being left behind. No burning of waste on site. • The areas of the CBA 1 impacted by the construction of the pipeline need to be adequately rehabilitated.
Damage to windrow trees in towns	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Incorporate existing windrow trees into the pipeline design and layout as far as reasonably possible in order to prevent significant damage or unnecessary removal. • Adequately consult homeowners during the Public Participation Process in order to obtain their opinions on the importance and necessity of keeping the windrow of trees intact.
Transformation and loss of habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should stay on approved

Nature of Impact	Impact summary	Significance (before mitigation)
		access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks. • Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during and after rainy periods. •

Nature of Impact	Impact summary	Significance (before mitigation)
Potential Impacts on Watercourses		
Damage to or impeding of watercourses	**Direct impacts:**	Medium
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Pipeline design and layout must ensure the continued functionality and unimpeded flow of the watercourse after construction completion. • Potential erosion due the pipeline development must be monitored and managed by implementing erosion prevention measures in order to prevent contamination and decrease in water quality of the watercourses. • The areas around the watercourses impacted by the construction of the pipeline need to be adequately rehabilitated.
Potential impacts on geological and physical aspects:		
Topsoil Preservation and Soil Erosion.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season

Nature of Impact	Impact summary	Significance (before mitigation)
		if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications; • The route corridor where the pipeline has been submerged must be adequately rehabilitated in order to stabilise the surface material and prevent any significant surface erosion of bare soil from occurring. • See mitigation measures for Loss of Vegetation (Landscaping) and for negative Impact on Integrity of Riparian Vegetation.

Nature of Impact	Impact summary	Significance (before mitigation)
Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly,

Nature of Impact	Impact summary	Significance (before mitigation)
		• The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day,

Nature of Impact	Impact summary	Significance (before mitigation)
		• General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of mountainous routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition;

Nature of Impact	Impact summary	Significance (before mitigation)
		• Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Traffic Impact for pipeline crossing the road to the Brabant Reservoir and crossing the R70 road.	**Direct impacts:**	Medium-High
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • The construction of these crossing should be prioritised and be completed as soon as possible. • All construction workers should wear visibility jackets during this section to avoid any risk to themselves and the traffic. • This construction should be limited to day time when visibility is at its best, as the R70 at Brabant don't have street lights.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site,

Nature of Impact	Impact summary	Significance (before mitigation)
		• Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, • Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area.
Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; • The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women

Nature of Impact	Impact summary	Significance (before mitigation)
		wherever possible, particularly for less labor-intensive work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction; • Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
Damage and destruction of vertebrate fossils during excavation activities.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity,

Nature of Impact	Impact summary	Significance (before mitigation)
		stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50m radius of the find must be cordoned off with hazard tape; o Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during

Nature of Impact	Impact summary	Significance (before mitigation)
		construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.
Alternative 1 (preferred alternative)		
• **Activity:** Construction of the proposed Reservoirs		
• **Potential impacts on biological aspects:**		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Transformation and loss of habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • All construction vehicles should stay on approved access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • A search and rescue operation must take place to translocate the protected species (should there be

Nature of Impact	Impact summary	Significance (before mitigation)
		any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks. • Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during and after rainy periods.
• **Potential impacts on geological and physical aspects:**		
Topsoil Preservation and Soil Erosion.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and

Nature of Impact	Impact summary	Significance (before mitigation)
		measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications;

Nature of Impact	Impact summary	Significance (before mitigation)
Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly,

Nature of Impact	Impact summary	Significance (before mitigation)
		• The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day,

Nature of Impact	Impact summary	Significance (before mitigation)
		• General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition;

Nature of Impact	Impact summary	Significance (before mitigation)
		• Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site, • Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area.
Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	• -
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible;

Nature of Impact	Impact summary	Significance (before mitigation)
		• The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Moderate (positive)
	Indirect impacts:	-
	Cumulative impacts:	• -
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible, particularly for less labor-intensive work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types

Nature of Impact	Impact summary	Significance (before mitigation)
		of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction; • Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
Damage and destruction of vertebrate fossils during excavation activities.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	• -
	Proposed mitigation	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor;

Nature of Impact	Impact summary	Significance (before mitigation)
		• All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50m radius of the find must be cordoned off with hazard tape; • Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	o -
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.

Nature of Impact	Impact summary	Significance (before mitigation)
Alternative 2 (450mm Pipeline)		
Activity: Construction of the proposed Bulk Water Supply		
Potential impacts on biological aspects:		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby. • Restrict vegetation clearance and impact to the proposed route corridor and reservoir enlargement footprint as far as practicably possible in order to avoid unnecessary increase of the footprint size and damage to the surrounding natural vegetation of the area. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site with no waste being left behind. No burning of waste on site. • The areas of natural vegetation impacted by the construction of the pipeline need to be adequately rehabilitated.
Destruction/transformation of a Critical Biodiversity	**Direct impacts:**	Medium
	Indirect impacts:	

Nature of Impact	Impact summary	Significance (before mitigation)
Area	**Cumulative impacts:**	
	Proposed mitigation	• Special care must be taken during vegetation clearance to restrict clearance to the route corridor footprint as far as possible to prevent any unnecessary damage to adjacent natural vegetation of the CBA 1 and to avoid unnecessary increase of the footprint size. • Use existing roads and paths as far as practicably possible to prevent unnecessary increase of the impact footprint. • Ensure good housecleaning is maintained and all waste is adequately disposed of from site • with no waste being left behind. No burning of waste on site. • The areas of the CBA 1 impacted by the construction of the pipeline need to be adequately rehabilitated.
Damage to windrow trees in towns	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Incorporate existing windrow trees into the pipeline design and layout as far as reasonably possible in order to prevent significant damage or unnecessary removal. • Adequately consult homeowners during the Public Participation Process in order to obtain their opinions on the importance and necessity of keeping the windrow of trees intact.
Transformation and loss of habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • Impacts to sensitive sites (drainage lines) should be avoided • All construction vehicles should stay on approved access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Nature of Impact	Impact summary	Significance (before mitigation)
		• The guidelines for trenching through any wetland/watercourses as set out in the EMPr must be applied by the contractor. • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks. • Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during and after rainy periods. •
Potential Impacts on Watercourses		
Damage to or impeding of watercourses	**Direct impacts:**	Medium
	Indirect impacts:	
	Cumulative	

Nature of Impact	Impact summary	Significance (before mitigation)
	impacts:	
	Proposed mitigation	• Pipeline design and layout must ensure the continued functionality and unimpeded flow of the watercourse after construction completion. • Potential erosion due the pipeline development must be monitored and managed by implementing erosion prevention measures in order to prevent contamination and decrease in water quality of the watercourses. • The areas around the watercourses impacted by the construction of the pipeline need to be adequately rehabilitated.
Potential impacts on geological and physical aspects:		
Topsoil Preservation and Soil Erosion.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs

Nature of Impact	Impact summary	Significance (before mitigation)
		timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications; • The route corridor where the pipeline has been submerged must be adequately rehabilitated in order to stabilise the surface material and prevent any significant surface erosion of bare soil from occurring. • See mitigation measures for Loss of Vegetation (Landscaping) and for negative Impact on Integrity of Riparian Vegetation.

Nature of Impact	Impact summary	Significance (before mitigation)
Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly,

Nature of Impact	Impact summary	Significance (before mitigation)
		• The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day,

Nature of Impact	Impact summary	Significance (before mitigation)
		• General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of mountainous routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition;

Nature of Impact	Impact summary	Significance (before mitigation)
		• Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Traffic Impact for pipeline crossing the road to the Brabant Reservoir and crossing the R70 road.	**Direct impacts:**	Medium-High
	Indirect impacts:	
	Cumulative impacts:	
	Proposed mitigation	• Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • The construction of these crossing should be prioritised and be completed as soon as possible. • All construction workers should wear visibility jackets during this section to avoid any risk to themselves and the traffic. • This construction should be limited to day time when visibility is at its best, as the R70 at Brabant don't have street lights.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site,

Nature of Impact	Impact summary	Significance (before mitigation)
		• Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, • Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area.
Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; • The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women

Nature of Impact	Impact summary	Significance (before mitigation)
		wherever possible, particularly for less labor-intensive work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction; • Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
Damage and destruction of vertebrate fossils during excavation activities.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity,

Nature of Impact	Impact summary	Significance (before mitigation)
		stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50m radius of the find must be cordoned off with hazard tape; o Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during

Nature of Impact	Impact summary	Significance (before mitigation)
		construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.

Alternative 1 and 2		
• **Activity:** Construction of the proposed Reservoirs		
• **Potential impacts on biological aspects:**		
Impact on vegetation and loss of species	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • All construction vehicles should be adhere to construction sites and avoid off road movement to minimise impact on vegetation and soil • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill • A search and rescue operation must take place to translocate the protected species (should there be any) to a similar, suitable site nearby.
Transformation and loss of habitat will have a negative effect on resident fauna due to loss of natural vegetation and soil disturbance within the construction footprint.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation. • All construction vehicles should stay on approved access roads and avoid deviation to minimise impact on vegetation and soil. • Any accidental fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • A search and rescue operation must take place to

		translocate the protected species (should there be any) to a similar, suitable site nearby.
Fauna will be directly impacted on as a result of construction activities and human presence on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• In case of observation of any species during construction phase, an experienced person should be consulted to deal with translocation of such species. No killing or attempt to translocate species should be undertaken by contractors. • Fires should only be allowed within fire safe demarcated areas • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species • Any fuel and oil spills that occur at the site should be cleaned up as specified in the EMPr. • The collection, hunting or harvesting of animals at the site should be strictly forbidden
Dust nuisance generated by the operation of machinery and vehicles.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods. • Ensure all vehicles remain on designated roads and avoid the opening of detour or by-pass tracks. • Implement speed restrictions for vehicles on gravel roads. • Manage and maintain roadside vegetation to allow for absorption of runoff from road surfaces during and after rainy periods.
• **Potential impacts on geological and physical aspects:**		
Topsoil Preservation and Soil Erosion.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Remove topsoil approximately 300mm deep from establishment areas and stockpile areas. • Topsoil stockpiles to be kept free from weeds. • Topsoil stockpiles to be placed on a levelled area and

		measures to be implemented to safeguard the piles from being washed away in the event of heavy rains/storm water. • Ensure that topsoil is not mixed with subsoil and/or any other excavated material. • Provide spill containment facilities for hazardous materials like fuel and oil. • All the areas disturbed during construction work needs to be landscaped to its original state before replacement of topsoil; • All spoils (soil not utilized to close the trench) should be used to increase the effectiveness of the existing drainage channels by constructing designed and appropriate cross berms, angle, height and length for the slope specific to the area; • Building levels shall be planned/designed adequately for surface run-off, to minimise erosion during construction. Construction, particularly the earth works portion, shall take place during the dry season if possible. Failing this, additional measures shall be taken to ensure that possible environmental damage is minimised. In the event of channels or erosion occurring, the Contractor must affect repairs timeously. Restorative repairs shall include the backfilling and consolidation of eroded areas; • Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e. geotextiles, rocks, topsoil mixtures as per specifications;

Surface and groundwater contamination by construction activities such as the use of hazardous materials on site, e.g. fuel and oil.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure that excavation areas have a predetermined stockpile area for construction materials and excavated material, • Disposal of waste excavated material at appropriate waste disposal sites, • Alternatively, concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose, • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces, • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage, • All spillage must be cleaned up as soon as they occur, • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site, • Provide suitable and sufficient ablution facilities, • Do not locate any site toilet, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line, • Combine drinking water facilities with hand washing facilities near site toilet, • Vehicles and machinery must be regularly serviced to avoid spillages, • No uncontrolled discharges from the site or working area to depressions must be permitted. All discharge points will require approval from the ESA, • No natural water course may be used to clean equipment, or for bathing. Al cleaning operations should take place off site at a location where waste water can be disposed of correctly, • The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural

		environment and the storm water system must strictly be prohibited. • Fuel and chemical storage should be done within designated areas only, which are properly bunded to be able to contain 110% of the capacity of fuel or chemicals stored within. • Construction vehicles must be serviced regularly to ensure that no leaks occur during the construction phase. • Spill kits must be available on site. • Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp.
Handling of general waste materials on development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• An adequate number of scavenger proof litter bins are to be placed throughout the site at 100m intervals. Dumping of waste on site is prohibited; • Waste sorting and separation should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • Dedicate a demarcated and signposted storage area on site for the collection of construction waste; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; • Care should be taken to ensure that no waste fall off disposal vehicles en-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn plastic materials, as this is regarded as hazardous waste • Littering by construction workers shall not be permitted; • Workers from the immediate area need to be encouraged to take their waste with them at the end of each day, • General refuse/rubbish shall be removed from site on a weekly basis to an approved landfill site or as soon as the waste bins are at full capcity, • Minimise waste by sorting wastes into recyclable and

		non-recyclable waste, • Rubble and upgrading refuse shall be collected and removed weekly; and • A bi-weekly litter patrol of the entire site shall be conducted by the designated Environmental Control Officer (ECO). • Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility.
Traffic impacts associated with movement of construction vehicles on site	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; • Abnormal loads should not be transported after dark when visibility of routes is poor; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to be licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • The contractor must ensure that all damage caused to local farm roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair will be for the contractors account; • Any damage to public roads is to be reported to the management authority and repaired to its original condition; • Signage is to be placed on vehicles at all times; • Traffic control measures such as flag bearers, delineators and stop and go measures should be implemented in accordance with requirements from the relevant roads authority; • Transport of materials should be limited to the least

		amount of trips possible; • Construction-related vehicles and machinery may not operate on the route without reflective safety signage, car-top lights and reflective personnel gear; • Stopping in narrow road shoulders or on bends without the presence of traffic calming or diversion measures should not be allowed.
Increase risk of veld fires through the use of hazardous and flammable materials on site.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Ensure Work Site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site, • Workers must be adequately trained in the handling of firefighting equipment, • No open fires are permitted anywhere on site. Restrict contained fires for heating and cooking (i.e. in a fire drum) to designated areas on site, • Prevent Employees from creating fires randomly outside designated areas, • Do not store any fuel or chemicals under trees, • Do not store gas and liquid fuel in the same storage area, Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area.
Potential noise impact:		
Noise nuisance generated by construction works from vehicles and personnel.	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	• -
	Proposed mitigation	• Limit working hours of noisy equipment to daylight hours; • All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; • The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; • Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; • Fit silencers to equipment; • Unless otherwise specified by the ESA, normal work

		hours will apply (i.e. from 06:30 to 17:00, Mondays to Fridays); • Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours; • No loud music is permitted on site or in the Camp.
Potential impacts on socio-economic aspects:		
The creation of job opportunities during the construction phase.	**Direct impacts:**	Moderate (positive)
	Indirect impacts:	-
	Cumulative impacts:	• -
	Proposed mitigation	• Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible, particularly for less labor-intensive work such as flag bearing and supervision; • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the route.
Presence of construction workers in the area	**Direct impacts:**	Medium
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	• Where possible, implement a requirement for contractors to implement a local employment policy for construction jobs, particularly for semi and low-skilled job categories, thus reducing impact which foreign workers could have on local communities; • A contractual requirement of potential contractors must be a preparation and implementation of a Code of Conduct for construction workers, identifying types of behaviour and activities which construction workers may not engage in. Workers who breach this code should be dismissed, on the grounds that such dismissals comply with South African labour legislation; • The project manager responsible for contractor appointments and administration, should implement an HIV/AIDS awareness programme for all contractors and their construction workers prior to commencement of construction;

		• Contractors must manage the transport and movement of workers on and off site on a daily basis, as well as allow for the returning home of workers intermittently over weekends to limit interaction with local communities during such periods; • No personnel, with the exception of security officers, are permitted to stay overnight in the vicinity of the route and must be housed in a site camp.
Potential impact on cultural-historical aspects		
	Direct impacts:	Medium
	Indirect impacts:	-
	Cumulative impacts:	• -
Damage and destruction of vertebrate fossils during excavation activities.	**Proposed mitigation**	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be immediately notified to assess the finds, and this must then be reported to the applicable heritage authority. • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so has been given. • Under no circumstances shall any heritage material be destroyed or removed from the site. • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains to SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted;

		○ The area in a 50m radius of the find must be cordoned off with hazard tape; • Public access must be limited and the area must be placed under guard.
Potential impacts on visual aspects:		
Impact on sense of place of the surrounding environment.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	○ -
	Proposed mitigation	• Access roads are to be kept clean and dust suppression techniques should be employed to minimise impacts of vehicle movement and wind on exposed surface soils; • Surface material that is scraped off during construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact. • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.

3. POTENTIAL IMPACTS DURING OPERATIONAL PHASE

SECTION A: BULK WATER SUPPLY FROM KOPPIE ALLEEN TO BRABANT RESERVOIR

Activity	Impact summary	Significance (before mitigation)
Alternative 1 (600mm diameter Steel/Ductile Iron Pipeline)		
Activity: Operation of the proposed 42km pipeline.		
Potential impacts on biological aspects:		
Habitat fragmentation of the areas surrounding the development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	No mitigation is proposed to minimise this impact, since the fragmentation of habitat will have occurred during the construction phase.
Road mortality of fauna	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	Road users are to drive within the speed limit.
Potential impacts on visual aspects:		
Impact on the sense of place	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	N/A
Potential impacts on socio-economic aspects:		
Delivery of more potable water to the Brabant and Ventersburg Reservoir.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed Mitigation	N/A
Maintenance of pipeline, where the water flow to the community will be shut down	**Direct impacts:**	Medium (positive)
	Indirect impacts:	
	Cumulative impacts:	
	Proposed Mitigation	• Notify all impacted individuals of the maintenance work at least one week before maintenance will start. • Conduct the maintenance as quickly as possible.
Alternative 2 (450mm Diameter PVC/GRP Pipeline)		
Activity: Operation of the Brabant and Ventersburg Reservoirs		
Potential impacts on visual aspects:		
Impact on the sense of place	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	N/A
Potential impacts on socio-economic aspects:		
Larger storage capacity of potable water	**Direct impacts:**	Moderate (positive)
	Indirect impacts:	-

Activity	Impact summary	Significance (before mitigation)
	Cumulative impacts:	-
	Proposed Mitigation	N/A
Maintenance of reservoir, where the water flow to the community will be shut down	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed Mitigation	• Notify all impacted individuals of the maintenance work at least one week before maintenance will start. • Conduct the maintenance as quickly as possible.

SECTION B: BULK WATER SUPPLY FROM BRABANT RESERVOIR TO VENTERSBURG

Activity	Impact summary	Significance (before mitigation)
Alternative 1 and 2		
Activity: Operation of the proposed 42km pipeline.		
Potential impacts on biological aspects:		
Habitat fragmentation of the areas surrounding the development sites.	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	No mitigation is proposed to minimise this impact, since the fragmentation of habitat will have occurred during the construction phase.
Road mortality of fauna	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	Road users are to drive within the speed limit.
Potential impacts on visual aspects:		
Impact on the sense of place	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	N/A
Potential impacts on socio-economic aspects:		
Delivery of more potable water to the Brabant and Ventersburg Reservoir.	**Direct impacts:**	Medium (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed Mitigation	N/A
Maintenance of pipeline, where the water flow to the community will be shut down	**Direct impacts:**	Medium (positive)
	Indirect impacts:	
	Cumulative impacts:	
	Proposed Mitigation	• Notify all impacted individuals of the maintenance work at least one week before maintenance will start. • Conduct the maintenance as quickly as possible.

Activity	Impact summary	Significance (before mitigation)
Alternative 1 and 2		
Activity: Operation of the Brabant and Ventersburg Reservoirs		
Potential impacts on visual aspects:		
Impact on the sense of place	**Direct impacts:**	Low
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed mitigation	N/A
Potential impacts on socio-economic aspects:		
Larger storage capacity of potable water	**Direct impacts:**	Moderate (positive)
	Indirect impacts:	-
	Cumulative impacts:	-
	Proposed Mitigation	N/A
Maintenance of reservoir, where the water flow to the community will be shut down	**Direct impacts:**	Low
	Indirect impacts:	
	Cumulative impacts:	
	Proposed Mitigation	• Notify all impacted individuals of the maintenance work at least one week before maintenance will start. • Conduct the maintenance as quickly as possible.

A complete impact assessment in terms of Regulation 19(3) of GN 982 must be included as Appendix F.

4. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment <u>after</u> the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

4.1 ALTERNATIVE A (PREFERRED ALTERNATIVE)

<u>ECOLOGICAL IMPACT ASSESSMENT:</u>

The majority of the proposed pipeline route corridor is situated within the road reserve of the R 70 main road. The vegetation and conditions in this servitude are highly degraded and the servitude is also mostly isolated on either side by historic or current degraded cultivates lands.

The areas where the route corridor goes through natural areas are also slightly more disturbed than the surrounding natural areas due to the previous disturbance and the existing pipeline. No Red Data Listed species or vegetation of conservational significance was identified along the route corridor. A number of provincially protected species were identified which can be relocated through a search and rescue process.

The area where the route corridor goes through a CBA 1 is also slightly disturbed and the development of the new pipeline within the corridor of the existing pipeline should therefore not cause significant additional damage to the integrity of the CBA 1 if all the recommended mitigation

measures are adequately implemented.

The proposed route corridor goes through three watercourses of which the latter two are permanent and significant in size. The first one is a small seasonal drainage line. Construction of a pipeline through these watercourses could result in damage to the integrity and functionality as well as impeding of the watercourses which could have further downstream negative effects on water supply and quality. Adequate mitigation measures as recommended in this report must be implemented to ensure the continued functionality and unimpeded flow of the watercourse after construction completion.

It is the opinion of the specialist that all identified impacts can be mitigated to within acceptable levels and that this proposed development may continue in the event that all mitigation measures and recommendations as per this report are adhered to as well as all necessary authorisations and permits are successfully obtained.

HERITAGE IMPACT ASSESSMENT:

Pipeline from Mmamahabane Township to the Ventersburg SW reservoir

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. Although the western wall of the Voortrekker Monument (**Figs 6 – 10)** is located only 25 m away from the proposed route, it is a highly visible structure and can be easily avoided during the construction phase of this section. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Construction of a new 5Ml reservoir at the Ventersburg SW reservoir

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Pipeline from the Ventersburg SW reservoir to Phomolong and Hennenman

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The Iron Age complex located southeast of Phomolong and north-northeast of the R70 provincial road (**Fig. 13**) will not be impacted by the proposed development. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).9

Pipeline Hennenman to the Brabant pump station

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the section revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The old farmstead area at the Brabant pump station was mapped and

photographed, but it is not considered to be historically significant. The section is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Construction of two new 12Ml reservoirs at Brabant and upgrading of the Brabant pump station

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

Pipeline between Brabant and Koppie-Alleen and upgrading of the pump station at Koppie-Alleen

It is unlikely that the proposed development will result in any significant archaeological impact. A foot survey of the development footprint revealed no indication of historically significant structures, Iron Age sites, graves or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. The proposed section and development area is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C).

4.2 ALTERNATIVE B

The impacts of Alternative 2 is similar to that as mentioned in Alternative 1. However the use of the 450mm diameter pipe will limit the water transfer capacity of the new pipeline and thus result in the reservoirs taking longer to fill up. The water transfer capacity will also not be able to reach the required 400 litres per second.

Alternative C

4.3. NO-GO ALTERNATIVE (COMPULSORY)

The no-go option will result in the non-construction of the potable water pipeline which will result in a backlog of potable water to Henneman and Ventersburg. It will result in water shortages in the Ventersburg and Henneman area and could possibly cause uproar from the communities due to water shortages which are a basic service delivery that is prioritised in the Integrated Development Plan (IDP).

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES X	

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A

If "YES", please list any 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.

1. <u>Watercourse habitat</u>

- ✓ Limit the construction footprint which is to remain within designated servitude and access roads;
- ✓ Storage of machinery and surplus materials to be only allowed outside of wetland / watercourse areas;
- ✓ No indiscriminate destruction of wetland / watercourse vegetation.

To reduce the impact on wetland / watercourse soils and hydrology during trenching, the following needs to be considered:

- ✓ Wetland / watercourse boundaries should be clearly marked in work areas prior to the start of any construction activities to assist the project personnel, contractors and environmental officer to avoid unplanned disturbances to the wetlands / watercourses. This is also to demarcate the area to which these guidelines apply.
- ✓ Preferably trenching should be done in the dry season to minimize the risk of compaction and disturbance to the wetland / watercourse.
- ✓ Where machinery is to be used, the necessary precautionary measures need to be put in place to minimize their impact, especially when this involves driving through the wetland / watercourse. Where vehicles need to enter a wetland / watercourse for trenching, the impact can be mitigated by lowering the tyre pressure, thereby distributing the load over a larger area. This more so for 'wetter' wetland/watercourses. *The weight of construction vehicles can also be dissipated by creating a wooden platform (thick wooden slats / planks) for vehicles to drive on whilst trenching.*
- ✓ Maintain only the minimal footprints for the work necessary to accomplish the task at hand. *This is essential to limiting the impact on the* wetland / watercourse*;*
- ✓ Remove the top 30 cm as sods, i.e. the vegetation and underlying soil must be removed as a unit and stored separately from the underlying material. These can be stockpiled immediately next to the trench (*by placing on a material layer (shade cloth or a geotextile).*

This will ensure that wetland vegetation is not smothered, and will negate the need for re-establishment of the wetland vegetation once removed if backfilling is to occur within 24 hours, and if the local hydrological conditions allow, i.e. there is no surface water on site.

- ✓ Replace the soil in the reverse order in which it was removed, i.e. the soil that was removed last must be used as the first backfill.
- ✓ Ensure that the top 30 cm of the backfill is the topsoil (sod) layer of the material that was excavated from the wetland/watercourse;
- ✓ The backfill must be restored to its pre-construction elevation upon completion of the work. This is to prevent the establishment of preferential flow pathways.
- ✓ Ensure that trenching does not create a subsurface drain, i.e. an underground preferential flow path due to i.e. backfilling with soil of lower permeability. This in particular where trenching is to occur in the same direction of the natural flow. Precautions can include inserting clay plugs at approximate 1 – 2 m intervals.
- ✓ *Trenching through a wetland / watercourse for a pipeline of this diameter should be done to below the impermeable clay layers (the G-horizon). It is this impermeable clay layer that allows for the persistence of surface waters to within 500 mm of the surface and, therefore, the existence of the wetland / watercourse. Trenching to below this layer and then the resealing of this impermeable layer will ensure the retention of proper hydrological functionality of the wetland/watercourse. It cannot be stressed more that wetland/watercourse functionality is dependent on the characteristics of the soil stratification within the local area. This stratification must be maintained post construction by placing soils in the reverse order of removal;*

Soil erosion:

- ✓ Make use of geotextiles within disturbed areas of steeper topography to avoid erosion through surface water runoff;
- ✓ Avoid steep-cut banks of watercourses;
- ✓ Construct within the low-flow (dry) period;
- ✓ Correct site reinstatement and landscaping following any disturbances will abate channel and gulley formation.

Impacts on riverine habitat:

- ✓ Entrenching the pipeline deep enough below the watercourse with proper reinstatement of soil layering to retain soil structure and therefore abate erosion through scouring.
- ✓ No establishment of unnatural drops in water level greater than 100 mm – applicable during low-flow conditions of the system – should be allowed.
- ✓ Soil erosion must be controlled as an ongoing management strategy throughout the

various phases of the proposed development activities;

- ✓ Vehicles to be in good working order to avoid fluid leaks;
- ✓ Provision of adequate on-site sewerage management.
- ✓ Prevent water quality impacts;
- ✓ Ensure proper site reinstatement;
- ✓ Avoid establishment of migratory barriers;
- ✓ Prevent siltation of the habitat emanating from soil erosion.
- ✓ Construction methods should not allow for deviations of the watercourse that will create undue turbulence and scouring;
- ✓ Riverbanks should be stabilized by using Gabion baskets or geotextiles to allow for vegetation establishment where found to be necessary.

Dust Nuisance:

- ✓ Implement dust suppression measures e.g. regular watering of dusty surfaces.

Noise Nuisance:

- ✓ Limit working hours of noisy equipment,
- ✓ Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.

Loss of vegetation:

- ✓ Reinstatement should be done;
- ✓ A search and rescue operation must be implemented to translocate the protected species to a similar, suitable site nearby. It will be the responsibility of the Environmental Control Officer to ensure that the protected plants are moved to an adequate site.

Heritage:

- ✓ *Pipeline from Mmamahabane Township to the Ventersburg SW reservoir*: The western wall of the Voortrekker Monument is located only 25 m away from the proposed route, it is a highly visible structure and can be easily avoided during the construction phase of this section.

Conclusion

The contents of this report have sought to identify and assess key issues relating to the proposed Ventersburg Bulk Water Supply and Reservoir Upgrades, Free State province.

In consolidation thereof, no environmental fatal flaws were identified to be associated with the proposed facility. The majority of impacts identified were of a medium to low significance and can be suitably mitigated to acceptable levels, provided that specifications are stipulated in the EMP-r are followed and adhered to.

It is thus the opinion of the EAP, supported by the findings of specialist determinations that the development of the proposed Ventersburg Bulk Water Supply and Reservoir Upgrades, with the guidance of the EMPr, be authorised for construction and operation.

Is an EMPr attached? **YES X**

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

_____

NAME OF EAP

_____ _____

SIGNATURE OF EAP DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

REFERENCES:

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