



KZN Agriculture and Environmental Affairs

Mnyango: eZolimo neZemvelo

SIFUNDAZWE SAKWAZULU-NATALI

Basic Assessment Report

in terms of the
Environmental Impact Assessment Regulations, 2006

Kindly note that:

1. This **basic assessment report** meets the requirements of regulation 23 of the EIA Regulations, 2006 and is meant to streamline applications.
2. The report may 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.
3. Where applicable **cross** the boxes that are applicable or **black out** the boxes that are not applicable in the report.
4. An incomplete report will be returned to the applicant for revision.
5. 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 this department for assessing the application, it may result in the rejection of the application as provided for in the regulations.
6. The report must be compiled by an independent environmental assessment practitioner.
7. Unless protected by law, all information in the report will become public information on receipt by this department. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
8. This department may require that for specified types of activities in defined situations only parts of this report need to be completed. In addition, if it is clear to the EAP that because of the particular circumstances of the case it is not sensible to complete any of the sections indicated under paragraph 3 of this report, he or she may apply for exemption from completing that part of the report in the spaces provided in the report. It must however be noted that if the application for exemption is turned down, the report may have to be resubmitted.
9. No faxed or e-mailed reports will be accepted.
10. This application must be handed in or posted to the appropriate Regional Office of the KwaZulu-Natal Department of Agriculture and Environmental Affairs at one of the following addresses:

- **FOR APPLICATIONS IN SOUTHERN KWAZULU-NATAL** (Ethekwini Metro, Ilembe, Sisonke, Ugu, Umgungundlovu and Uthukela District Municipalities):

Environment: South Region
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COMPLETION OF THIS REPORT

Please indicate the numbers of the sections of this report that have not been completed:

Section C:	6(a)	6(b)	6(c)	6(d)	7	8	9(c)	9(e)	9(f)	9(g)	9(h)	11
Section D:	1	2	3	4	5	6						
Section E:	1(a)	1(b)	1(c)	1(d)	1(f)	1(g)	3					

Provide detailed reasons for not completing the sections indicated:

Section	Reasons for not completing

SECTION A: APPLICATION FOR EXEMPTION

Please provide details regarding any application for exemption from the requirements of the EIA Regulations, 2006:		
Has an application for exemption been submitted to the Department?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
Has an Exemption Notice in respect of an application for exemption been issued?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
Is a copy of the Exemption Notice attached to this report?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

SECTION B: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. Name and contact details of environmental assessment practitioner (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	Umgeni Water		
Physical address:	310 Burger Street, Pietermaritzburg		
Postal address:	P O Box 9, Pietermaritzburg		
Postal code:	3200	Cell:	083-6794423
Telephone:	033-3411335	Fax:	033-3411349
E-mail:	asha.ramjatan@umgeni.co.za		

2. Names and expertise of Representatives of the EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Educational qualifications	Experience at environmental assessments (yrs)
Asha Ramjatan	M.Sc. (Environment and Development)	3 years
Sazi Cele	M.Sc. (Chemistry)	1 year

3. Names and expertise of specialists

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Educational qualifications	Experience in field of expertise (yrs)
Biodiversity Specialist- Dacre James Alletson (Alletson Ecologicals)	B.Sc. Honours in Biological Sciences	38 years
Heritage Specialist – Wouter Fourie (Matakoma Heritage Consultants)	Masters in Archaeology	11 years
Heritage Specialist – Jaco Van der Walt (Matakoma Heritage Consultants)	Masters in Archaeology	5 years
Public Participation Specialist – Lawrence Ngubane (Khanyisa Projects)	BA in Public and Development Management/administration	19 years
Geotech Specialist – Gerald Davie (Geosure Pty Ltd)	M.Sc. in Engineering Geology	20 years

4. Names and expertise of EIA Reviewer

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Educational qualifications	Experience in field of expertise (yrs)
Jenny Barnard	Masters in Environmental Science	15 years
Richard Kinvig	M.Sc.; PhD - Entomology	5 years

Name and contact details of the Environmental Practitioners who Reviewed this report:

Business name of EAP:	SiVEST Environmental Division		
Physical address:	221 Pietermaritz Street, Pietermaritzburg		
Postal address:			
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E-mail:	richardk@pmb.sivest.co.za		

SECTION C: ACTIVITY INFORMATION

1. PROJECT INFORMATION

a. Project Title

Augmentation and Extension of the Wartburg Bulk System Incorporating Supply to Efaye and Ozwathini.

b. Project Reference Number

DAEA Reference No.: DC22/EX/0001/06

c. Project Description

Describe your project in detail:

Umgeni Water is a water service utility that provides bulk water services to Municipalities (Water Services Authorities). The organisation endeavours to assist its customers in addressing water services backlogs by means of implementing bulk water schemes. Studies have shown that areas of Greater Efaye and Ozwathini that fall within the Umgungundlovu and Ilembe District Municipalities would benefit from such a bulk scheme. The locality of Greater Efaye and Ozwathini is indicated in the map in (**Appendix A Map 1**).

An existing bulk water scheme that supplies the Greater Wartburg and Dalton areas was identified as a feasible option of supplying the Greater Efaye and Ozwathini areas. In order to supply these areas, the scheme will have to be extended from its existing terminal point in Dalton.

An analysis of the bulk water system capacity and demand trends indicated that augmentation of the existing system (from Claridge to Dalton via Wartburg) would be necessary to supply the increasing water demands of the consumers and to provide sufficient capacity for supply to Greater Efaye and Ozwathini. The proposed project will involve the laying of some 90km of pipelines, construction of valve chambers and storage reservoirs. The project will be broken into three phases which will be implemented in succession. Details of the proposed phases are as follows:

Phase 1 Claridge to Wartburg:

- A 26 km long, 800mm diameter(Ø) pipeline - stretching from the existing 50 Megalitre (ML), or 50 000 kilolitre (kl) Claridge Reservoir, just outside Pietermaritzburg to the town of Wartburg.
- A 5 ML reservoir (or 5 000 kl reservoir) at Wartburg that will be supplied by the proposed new 800mm Ø pipeline.
- A booster pump station will occupy an area of about 3600m² (capable of pumping at a rate of 752 l/s, with an ultimate energy consumption of 1135kW) and would be located 23km along the route from Claridge.

Phase 2 Wartburg to Dalton:

- A 15 km long pipeline with a 700mm (Ø) stretching from the proposed 5ML reservoir in Wartburg to in the town of Dalton.
- A 10 ML (10 000m³) storage reservoir adjacent to the existing Dalton reservoir.
- A booster pump station, which will occupy an area of about 3600m², (capable of pumping water at a rate of 428 l/s, with an ultimate energy consumption of 1195kW) will be located approximately 10.8km along the route from Wartburg.

Phase 3 Dalton to Ozwathini with an of take at Fawn Leas to Efaye:

- A 32 km long pipeline with a 660 – 300 mm Ø. Stretching from the proposed new 10ML Dalton reservoir to the existing 1.1ML Nondabula Reservoir in Ozwathini. This would serve to supply the Ozwathini area.
- A booster pump station occupying an area of about 3600m², (capable of pumping water at a rate of 324 litres/sec, with an ultimate energy consumption of 489 kW) will be located approximately 30km along the route away from Dalton.
- A 15 km long pipeline with a 300mm Ø. This is an off-take from the Dalton to Ozwathini proposed pipeline, at the town of Fawn Leas, that would feed into the existing Nadi Mvoti Reservoir (205 kl). This would serve to

supply the greater Efaye area.

- A booster pump station occupying an area of about 3600m², (capable of pumping water at a rate of 57 l/s, with an ultimate energy consumption of 61 kW) will be located at Fawn Leas at the off-take point.

The proposed pipeline extends in a north-easterly direction from the Claridge Reservoir (Pietermaritzburg) and will cross a number of sugar cane farms alongside the existing pipeline and servitude. The proposed pipeline then proceeds in a northerly direction parallel to the R33 (Greytown Road) until it crosses the R33 at the R614 road to Wartburg. The pipeline route continues in an easterly direction along the R614 and crosses the Umgeni River and a railway line before reaching Wartburg. In the Wartburg area, the proposed pipeline will feed a new 5ML reservoir, at the back of the existing reservoir. The dominant land use in this section is sugar cane farming.

From Wartburg the proposed pipeline extends on in a northerly and then in an easterly direction towards Dalton. In this portion, the pipeline crosses the R614 twice, three streams and five railway lines. The dominant land use in this section is sugarcane farming.

From Dalton reservoir, the proposed pipeline proceeds east, passing Appelsbosch (where communities reside on Ingonyama Trust Land), to terminate at the Nondabula Reservoir in Ozwathini.

Along this stretch a small 15km pipeline off-take is proposed at P158 road (at Fawn Leas) towards the Greater Efaye area. This proposed pipeline diverts from the Ozwathini line and proceeds in a northerly direction towards the Nadi-Mvoti Reservoir, along the P158, turning left along the D704 road, that passes rural communities residing on property belonging to the Department of Land Affairs. The dominant land use in this section is sugarcane farming.

2. ACTIVITY DESCRIPTION

Describe the activity / activities which is / are being applied for in detail:

Activity 1(k) of the GNR 386 of 2006:

The construction of facilities or infrastructure, including associated structures or infrastructure, for the bulk transportation of sewage and water, including storm water, in pipelines with –
(i) an internal diameter of 0.36 meter or more; or
(ii) a peak through put of 120 litres per second or more.

Activity 1 (m) of GNR 386 of 2006:

Any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including - canals; channels; bridges; dams; and weirs.

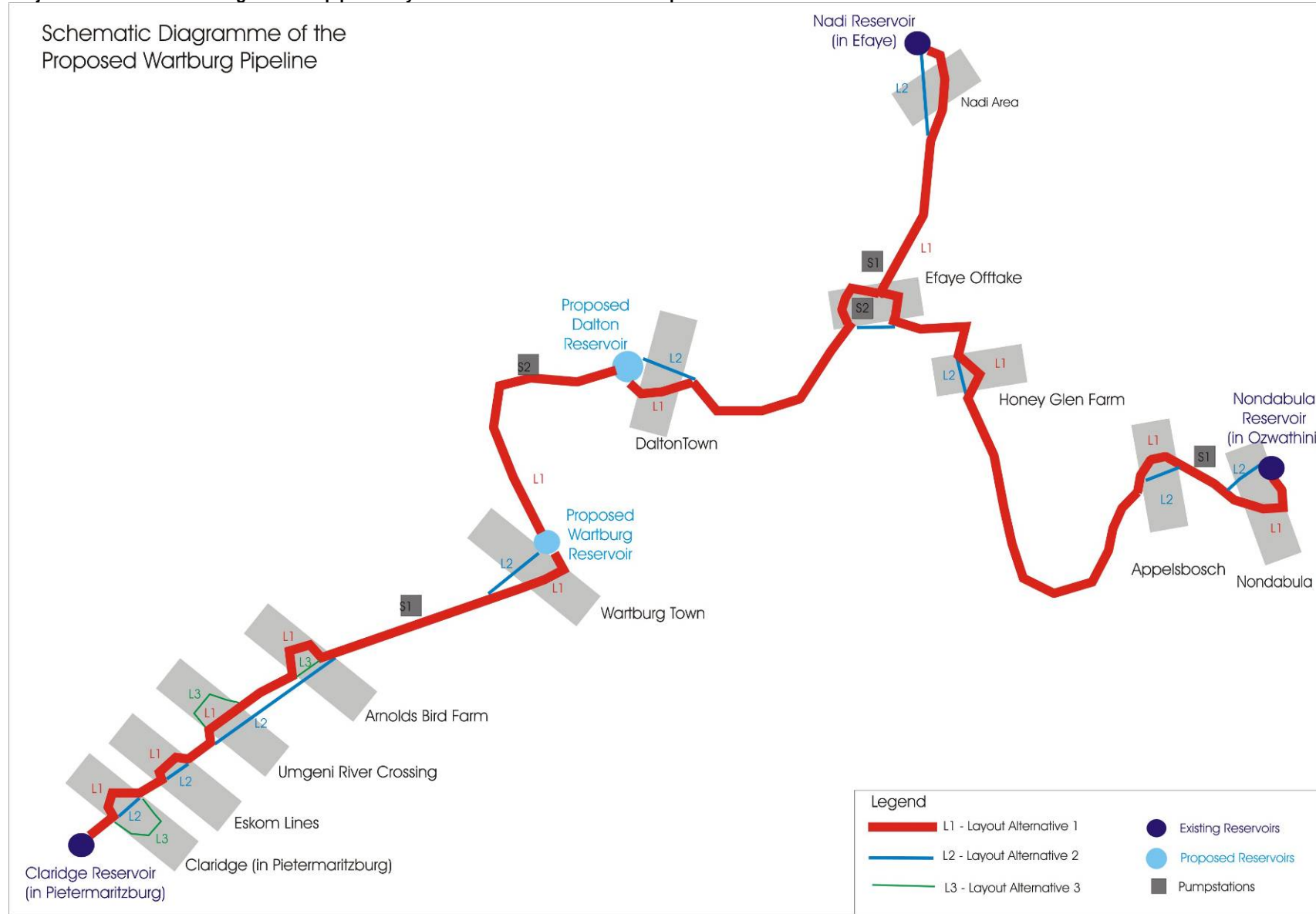
Activity 4 of GNR 386 of 2006:

The dredging, excavation, infilling removal or moving of soil, sand or rock exceeding 5 cubic meters from a river, tidal lagoon, tidal river, lake, instream dam, floodplain or wetland.

3. ALTERNATIVES

Describe alternatives that are considered in this application. Consideration of alternatives must not be limited to site and layout alternatives only. Alternatives assessed must include the consideration of alternative technologies, processes and activities by means of which the objectives of the proposed project may be achieved. 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 for informed decision making.

Project Area – Schematic Diagramme of pipeline layouts/routes and reservoir & Pumpstation sites



2(a) Site alternatives:

This Section refers to Pump station and Reservoir sites and alternatives

Site Alternate1 (S1) - Preferred

Preferred sites for Pump stations:

Phase 1 Claridge to Wartburg

- ★ Pump station 1 will be located approximately 23 km along the pipeline route from Claridge Reservoir on the farm named "Kort Krans Kloof" owned by Heine Stephanie and Gerda Barbara.

Phase 2 Wartburg to Dalton

- ★ Pump station 2 will be located approximately 10,8km along the route from Wartburg on the farm named "Mooiplaats" owned by the German Lutheran Church of New Hanover.

Phase 3

- ★ Pump station 3 (S1) will be located approximately 30km along the route from the proposed Dalton Reservoir on Ingonyama Trust land on the preferred route L1 in Appelsbosch (**Appendix A. Map 12**).
- ★ Pump station 4 will be located at the Efaye off-take in Fawn Leas on the property of L'Estrange & Kenneth Guy.

Preferred sites for Reservoirs

Phase 1 Claridge to Wartburg

The proposed 5ML Reservoir will be located on the property owned by the Wartburg Bowling Club.

Phase 2 Wartburg to Dalton

The proposed 10ML reservoir will be located on the property owned by Mr V Uhlmann

Phase 3

No Proposed reservoirs

Site Alternate2 (S2)

Alternate sites for pump stations

Phase 1 Claridge to Wartburg

- ★ Pump station 1 will be located approximately 23km from the Claridge Village in Pietermaritzburg on the alternate route L2 en-route to the town of Wartburg (refer to Schematic diagram) on property owned by Fountain Hill Estate

Phase 2 Wartburg to Dalton

No Alternate – as the proposed site is located on an altered environment, namely a sugar can farm, and would have insignificant environmental impacts. An alternative was therefore deemed not necessary.

Phase 3 Dalton to Ozwathini with an of take at Fawn Leas to Efaye

- ★ Pump station 3 (S2) will be located approximately 29.7km from Dalton along the pipeline route to Appelsbosch, approximately 100m along the preferred route (L1) through Applesbosch (**Appendix A. Map 12**)
- ★ Pump station 4 will be located to the west of the P156 at Fawn Leas on the Efaye pipeline Off-take, on Property owned by the Meyer Werner Family Trust (**Appendix A. Map 11**)

Alternate sites for Reservoirs

There are no alternate reservoir sites – need to be at the highest point in the area to enable maximum use of gravity in the distribution system.

Site Alternate3 (S3)

Pump stations, alternate sites:

- ★ Pump station 3 will be located approximately 29.7km from Dalton on the alternate pipeline route (L2) along the P156 to Appelsbosch on property owned by the Ingonyama Trust.

Alternate sites for Reservoirs

There are no alternate reservoir sites – need to be at the highest point in the area to enable maximum use of gravity in the distribution system.

2(b) Layout alternatives:

Describe layout alternative 1 (L1), **if any** for the activity described above, or for any other activity alternative:

Layout/route 1 (L1) – preferred route

Phase 1 Claridge to Wartburg

This section describes the proposed pipeline route as depicted in the Schematic Diagram. Alternatives that were considered at areas highlighted in grey in the schematic are described in Layout Alternatives L2 & L3

The proposed pipeline will tie into the outlet of the Claridge reservoir and proceeds in a north-easterly direction between the Belfort and Claridge reservoirs across the Provincial Road P9 (Ottos Bluff road). After this road crossing, the proposed pipeline will proceed in a north-westerly direction through a plantation of gum trees for approximately 100m and thereafter change to a north-easterly direction for approximately 400m.

The pipeline then proceeds parallel to and on the right hand side of the existing pipeline, in a northerly direction out of Claridge village and into sugar cane farms for approximately 1,5km before changing to a north-easterly direction, still through sugar cane farms for approximately 2km. **(Note : there are alternative routes through Claridge Village as depicted in the Schematic Diagram; These alternatives are described in section L2 & L3)**

The proposed route then crosses the existing pipeline so that there will be sufficient working servitude in the vicinity of the existing Eskom power pylons and proceeds parallel to and on the left hand side of the existing pipeline in a north-easterly direction for 1km. **(Note there is the alternative route at this point near the Eskom Power lines as indicated in the schematic diagram. This alternative is described in Section L2).**

The pipeline then crosses the existing pipeline and proceeds in a easterly direction parallel to the existing pipeline for a distance of 900m. At this point the proposed pipeline reaches the P6 (Greytown Road). The pipeline crosses the existing pipeline, remains on the left had side of the existing pipeline, outside the road reserve and proceeds parallel to the existing pipeline along the P6 for approximately 4km until the P6 intersects with the P424 (Greytown road and Wartburg road).

The pipeline crosses the P6 and proceeds in a north-easterly direction, parallel to the P424 and outside the road reserve. The pipeline proceeds in a north-easterly direction for approximately 4km, crosses the Umgeni River and continues in a north-easterly direction, parallel to the P424 for 11km mainly through sugar cane farms. The pipeline then proceeds away from the road at Mr Arnolds Farm, first in a north westerly direction and then in a north easterly direction returning to the P424, in order to avoid sand rock formation, farming activities and indigenous trees. This pipeline alignment is depicted in **Appendix A, Map 7. An alternate to this alignment as described in the Alternatives section (L2).**

The pipeline the realigns with the P424 in a north-easterly direction towards the town of Wartburg (**Appendix A. Map 8**). (Note : there is an alternative route for this section as depicted in the Schematic Diagram . The proposed route through Wartburg town is, up Fairview Drive in a northerly direction to the proposed new reservoir site, as depicted in **Appendix A, Map 8**. (Note : there is an alternative route for this section as depicted in the Schematic Diagram . This alternative is described is Section L2)

Layout/route 1 (L1) – preferred route

Phase 2 Wartburg to Dalton

The pipeline will tie into the outlet of the new 5ML Wartburg Reservoir and proceed in a northerly direction, bypassing existing houses in Wartburg, by being routed through sugar cane fields and away from the existing pipeline as indicated in **Appendix A, Map 8**. The pipeline thereafter, will be aligned on the left of the existing pipeline with an offset of 4.5m and continue in a northerly direction for approximately 1,2km. The pipeline will cross the D75 and P154 (Trust Feeds and Schroeder's Roads) and thereafter be aligned on the right hand side of the existing pipeline to avoid existing services as well as the road reserve, proceeding in a northerly direction for approximately 3,8km.

The pipeline will cross the Mlalaan River in Schroeder's as per method specification attached at **Appendix G2**. The pipeline remains on the right hand side of the existing pipeline, proceeding in a north-easterly direction. The pipeline then crosses railway line at Schroeders and is thereafter aligned through sugar cane fields until Dalton. The length of this section is approximately 10.5km. The Fortmann's stream is crossed twice as per the method specification described in **Appendix G2**. All main roads and railway crossings will be done by means of pipe jacks.

Note : There are no alternatives for this phase of the pipeline

Layout/route 1 (L1) – preferred route

Phase 3 Dalton to Ozwathini with an of take at Fawn Leas to Efaye

The proposed pipeline to Efaye and Ozwathini will tie into the outlet of the proposed 10ML Dalton Reservoir and will proceed in a southerly direction across the P156(New Hanover to Dalton road), and the railway line and will align in an easterly direction through the sugar cane fields, bypassing Dalton town. This alignment is depicted in **Appendix A, Map 9**. (Note there is an alternate route for this section through Dalton Town as depicted in the Schematic Diagram. This route is described in section L2)

The pipeline will then cross the railway line and the P 156, approximately 500m from Dalton town, and will proceed in an easterly direction on the left hand side and parallel to the P156, outside the road reserve in the direction of Appelsbosch. The pipeline will continue to proceed in an easterly direction through sugar cane fields for approximately 8,5km to Fawn Leas. A section at Fawn Leas will be aligned through a sugar cane field away from the road in order to avoid a wetland. This section is depicted in **Appendix A, Map 11**.

The pipeline will then proceed in a south-easterly direction for approximately 7,5km through sugar cane fields until a sawmill, outside the town of Glenside and through Glenside. The pipeline will remain in a south easterly on the left of the P156 after Glenside for approximately 2,2km. The pipeline will continue to proceed along a firebreak on Honey Glen Farm (Clantrock), in order to avoid a wetland as well a steep section that will be prone to erosion. This alignment is depicted in **Appendix A, Map 10**.(Note: There is an alternate route at this point. This route is discussed in Section L2).

The pipeline then proceeds in a north easterly direction and remains on the left hand side of the P156 through sugar cane fields for approximately 7km until the town of Appelsbosch. The pipeline through Appelsbosch is depicted in **Appendix A, Map 12**. A pipeline route with the least impact on residents has been chosen through Appelsbosch. (Note : There is an alternate route through Applesbosch that is described in Section L2).

The pipeline alignment moves away from the P 156 and proceeds for approximately 1km in an easterly direction through a grassland and along a ridge. This is the most suitable alignment for the pipeline up the generally steep terrain, west of Nondabula Reservoir.

The pipeline crosses the P156 and proceeds to the Nondabula Reservoir, at which the pipeline will terminate. The alignment that least impacts on residents has been chosen as the preferred route. The length of this section is approximately 800m. **Appendix A, Map 13**. (Note: There is an alternate route for this section. This route is discussed in Section L2).

Fawn Leas to Berlin (Nadi Mvoti)

The off-take from the proposed Dalton to Ozwathini pipeline, that will supply the greater Efaye area, will be at Fawn Leas which is approximately 10km from the town of Dalton. The pipeline will be aligned on the left of the Mt Elias Road (P158) and will proceed in a north easterly direction across a railway line and will proceed through sugar cane fields for approximately 10km to the D704 road. The pipeline will remain on the left of the D704 road for approximately 3,2km, and will proceed to the right hand side of the road in a north westerly direction, in order to avoid community homesteads and graves. The pipeline will then proceed in north-easterly direction, on the right hand side of D704, to the existing Nadi-Mvoti Reservoir. The route that will have the least impacts on the residents at Nadi Mvoti has been chosen through Nadi Mvoti as depicted in **Appendix A, Map 14**. (Note: There is an alternative route to this section. This route is described in Section L2).

Describe layout alternative 2 (L2), **if any**, for the activity described above, or for any other activity alternative:

Layout/route 2 (L2)

Phase 1 Claridge to Wartburg

CLARIDGE VILLAGE

L2 at Claridge. After crossing the P9, the pipeline will proceed in a north-easterly direction, parallel to the existing pipeline, passing the Thompson's property (**Appendix A, Map 5**). This route impacts on the residents and will affect the equestrian activities on this property. Rehabilitation along this route will pose challenges as there are established pastures and gardens.

ESKOM TOWERS:

L2 at Eskom towers. A 1100m section just beyond Claridge Village in the Hardingsdale Farm, aligned in a north easterly on the right of the existing pipeline is in close proximity of Eskom power lines and towers (**Appendix A, Map 6**). Whilst construction between the existing pipeline and the powerlines is possible, there is an increased risk of damage to these services as well as a safety risk to construction personnel. This alignment is not preferred.

AREA 3 : GREYTOWN ROAD TO WARTBURG – (includes Umgeni river crossing)

At the intersection of the P6 (Greytown Road) and P424 (Wartburg Road, a possible route would be parallel to the existing pipeline, and the P424, proceeding in a north easterly direction, crossing the Umgeni River, until the town of Wartburg (**Appendix A, Map 7**). This is not the preferred route for the following reasons:

- The table Mountain Road crossing (pipe jacking) is avoided.
- The section alongside Table Mountain Road will be challenging for the pipeline construction and affect the operation of an existing factory.
- An existing game farm, housing settlement and proposed crocodile farm is avoided.
- Construction of the new pipeline alongside the existing under the Umgeni River will be challenging and the existing will be at risk of failure should the need for blasting arise.
- A landowner (Mrs Trethewey) on the section from the Umgeni River to Wartburg, has requested that pipeline be re-routed as there is already a pipeline through her property.

AREA 4 : WARTBURG TOWN

The pipeline proceeds through Wartburg town, parallel to the existing pipeline is depicted in (**Appendix A, Map 8**). This route is not preferred as it will be more disruptive to the Wartburg community than the route described in Section L1.

Layout/route 2 (L2)

Phase 2 Wartburg to Dalton

There are no alternatives for this section of the pipeline.

Layout/route 2

Phase 3 Dalton to Ozwathini with an of take at Fawn Leas to Efaye

- ★ **Alternate Route Through Dalton:** An alternate route through Dalton is depicted in **Appendix A, Map 9**. The proposed pipeline will tie into the outlet of the proposed 10MI Dalton Reservoir and proceed in a southerly direction across the P156 (New Hanover to Dalton Road). The pipeline then proceeds in an easterly direction, on the right hand side of the P156 (in the direction of Fawn Leas), through Dalton CBD. The pipeline continues in an easterly direction, crosses the P503 (Cool Air Road) and joins the preferred pipeline route that proceeds in an easterly direction parallel to the P156 (described in Section L1). The total length of this alternative route is 1,2km. This is not the preferred route as it impacts heavily on businesses through the Dalton CBD and will pose many construction challenges mainly due to space constraints. There are also impacts on indigenous trees in Dalton CBD,
- ★ **Alternate Route at Fawn Leas:** An alternate route at Fawn Leas is depicted in **Appendix A, Map 11**. The pipeline proceeds in an easterly direction parallel to the P156. The pipeline will cross the P 158 and proceed in a south easterly direction through a wetland before continuing on towards Ozwathini. The total length of this alternate route is approximately 750m.
- ★ **Alternate Route at Honey Glen (Clantrock) Farm:** The alternate route through Honey Glen (Clantrock) farm is depicted in **Appendix A, Map 10**. This pipeline proceeds in an easterly direction (through a wetland), parallel to the P156 and joins the preferred route described in Layout L1: Phase 3, and is approximately 950m long. This route not preferred as it will impact on an existing wetland.
- ★ **Alternate Route through Appelsbosch:** The alternate route through Appelsbosch is depicted in **Appendix A, Map 12**. The pipeline proceeds in a south easterly direction parallel to the P156, along a very steep slope, and joins the preferred alignment to the Nondabula Reservoir in Ozwathini (described in Layout L1: Phase 3). This route is approximately 750m long and is not preferred, as construction will be challenging through a steep section along the P156.
- ★ **Alternate Route through Mathulini:** An alternate route through Mathulini to the terminal point at the Nondabula Reservoir is depicted in **Appendix A, Map 13**. After the P156 road crossing, the pipeline will proceed in a southerly direction for approximately 1km until tie point at the Nondabula Reservoir. This route is not preferred as it is longer and impacts more on the informal community in this area.

Describe layout alternative 3 (L3), **if any**, for the activity described above, or for any other activity alternative:

Layout/route 3 (L3):

Phase 1 Claridge to Wartburg

Claridge Village

After crossing the P9 road, a possible route that will bypass Claridge Village is depicted in, **Appendix A, Map 5**. This option is considerably longer (1548m) than the other two options described in Section L1 and L2. The steep section after the railway crossing will pose rehabilitation challenges as highlighted in the biodiversity assessment.

Use of Havelock Bridge for Umgeni River Crossing

The existing Havelock bridge is an option for the crossing of the Umgeni River. The proposed pipeline will have to deviate from the P424 as depicted in Appendix A, Map 7. The proposed route will proceed in a north-westerly direction, over the Havelock Bridge and thereafter proceed in a easterly direction and rejoin the route parallel to the P424. The total length of this section is 882m

Mr Arnolds Property

This route which proceeds in a north easterly direction, parallel to the P424 is approximately 1km long. This route has various impacts on Mr Arnold's farm including a borehole, indigenous trees as well as rock, and is therefore not preferred.

2(c) Process (technology) alternatives:

Describe site alternative 1 (P1), **if any** for the activity described above, or for any other activity alternative:

None

4. ACTIVITY POSITION

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.

1. Reservoir at Wartburg

Alternative:

Alternative S1¹ (preferred or only site alternative)

Latitude (S):		Longitude (E):	
29°	25' 49"	30°	34' 16"

2. Reservoir at Dalton – no alternate site

Alternative:

Alternative S1² (preferred or only site alternative)

Latitude (S):		Longitude (E):	
29°	20' 36"	30°	37' 38"

3. Pump station 1 en-route to Wartburg

Alternative:

Alternative S1³ (preferred or only site alternative)

Alternative S2 (if any)

Latitude (S):		Longitude (E):	
29°	26' 46"	30°	33' 00"
29°	26' 50"	30°	33' 02"

4. Pump station 2 en-route to Dalton – no alternate site considered

Alternative:

Alternative S1⁴ (preferred or only site alternative)

Latitude (S):		Longitude (E):	
29°	22' 01"	30°	35' 47"

5. Pump station 3 en-route to Ozwathini

Alternative:

Alternative S1⁵ (preferred or only site alternative)

Alternative S2 (if any)

Alternative S3 (if any)

Latitude (S):		Longitude (E):	
29°	24' 03"	30°	50' 58"
29°	24' 03"	30°	50' 52"
29°	24' 07"	30°	50' 52"

6. Pump station 4 en-route to Efaye at Fawn Leas

Alternative:

Alternative S1⁶ (preferred or only site alternative)

Alternative S2 (if any)

Latitude (S):		Longitude (E):	
29°	21' 22"	30°	43' 15"
29°	21' 20"	30°	43' 24"

In the case of linear activities:

1. A pipeline from Claridge to Wartburg

Alternative:

Alternative L1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Alternative L2 (if any)

Latitude (S):		Longitude (E):	
29°	32' 57"	30°	22' 13"
29°	28' 35"	30°	27' 35"
29°	25' 49"	30°	34' 15"

Alternate route is not significantly different from preferred

2. A pipeline from Wartburg to Dalton – No alternatives were considered for this section

Alternative:

Alternative L1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):		Longitude (E):	
29°	25' 49"	30°	34' 15"
29°	21' 59"	30°	33' 55"
29°	20' 37"	30°	37' 38"

3. A pipeline from Dalton to Ozwathini

Alternative:

Alternative L1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Alternative L2 (if any)

Latitude (S):		Longitude (E):	
29°	20' 37"	30°	37' 38"
29°	22' 14"	30°	45' 37"
29°	24' 36"	30°	51' 05"

Alternate route is not significantly different from preferred

¹ "Alternative S.." refer to site alternatives.

² "Alternative S.." refer to site alternatives.

³ "Alternative S.." refer to site alternatives.

⁴ "Alternative S.." refer to site alternatives.

⁵ "Alternative S.." refer to site alternatives.

⁶ "Alternative S.." refer to site alternatives.

3. A pipeline – off take to Efaye

Alternative:

Alternative L1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Alternative L2 (if any)

Latitude (S):

Longitude (E):

29°	21' 14"	30°	43' 25"
29°	14' 24"	30°	44' 15"
29°	17' 36"	30°	45' 12"

Alternate route is not significantly different from preferred

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. Refer to **Appendix C1**.

5. PHYSICAL SIZE OF THE ACTIVITY

The foot print in this case was calculated as the product of the width times the length of the pipeline servitude. The working servitude in the construction phase will remain at 20m, however in the operational phase the servitude will reduce to 9 metres. The 9 metres servitude will remain as the registered servitude throughout the life cycle of the project hence the footprint was calculated based on this width. Umgeni Water has an existing registered 9m servitude from Claridge to Dalton. In areas where the new pipeline runs parallel to the existing pipe only a 4.5 metre servitude will be acquired.

Indicate the physical size of the proposed activity as related to layout alternatives:

1. Wartburg Reservoir

Alternative:

Alternative S1⁷ (preferred activity alternative)

Size of the activity:

720 m² in 5040 m² acquired land

2. Dalton Reservoir

Alternative:

Alternative S1⁸ (preferred activity alternative)

Size of the activity:

1400 m² in 3500 m² acquired land

3. Pump station 1 en-route to Wartburg

Alternative:

Alternative S1⁹ (preferred activity alternative)

Alternative S2 (if any)

Size of the activity:

600 m² in 3600 m² acquired land

600 m² in 3600 m² acquired land

4. Pump station 2 en-route to Dalton

Alternative:

Alternative S1¹⁰ (preferred activity alternative)

Size of the activity:

600 m² in 3600 m² acquired land

5. Pump station 3 en-route to Ozwathini

Alternative:

Alternative S1¹¹ (preferred activity alternative)

Alternative S2 (if any)

Alternative S3 (if any)

Size of the activity:

600 m² in 3600 m² acquired land

600 m² in 3600 m² acquired land

600 m² in 3600 m² acquired land

6. Pump station 4 enroute to Efaye at Fawn leas

Alternative:

Alternative S1¹² (preferred activity alternative)

Alternative S2 (if any)

Size of the activity:

600 m² in 3600 m² acquired land

600 m² in 3600 m² acquired land

or, for linear activities:

⁷ "Alternative S.." refer to activity, process, technology or other alternatives.

⁸ "Alternative S.." refer to activity, process, technology or other alternatives.

⁹ "Alternative S.." refer to activity, process, technology or other alternatives.

¹⁰ "Alternative S.." refer to activity, process, technology or other alternatives.

¹¹ "Alternative S.." refer to activity, process, technology or other alternatives.

¹² "Alternative L.." refer to activity, process, technology or other alternatives.

Phase 1: Claridge to Wartburg

7. Pipeline – Claridge Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any) Alternative L3 (if any)	Description Through Forest plantation Through Thompson's land Through Hofmeyer's land	Length of the activity: 582 m 317 m 1706 m
8. Pipeline – Eskom lines Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Description	Length of the activity: 1088 m 1088 m
9. Pipeline – Greytown Road to Wartburg Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Description	Length of the activity: 15608 m 12890 m
10. Pipeline – Umgeni River crossing Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Description Havelock Bridge LHS of R614	Length of the activity: 882 m 694 m
11. Pipeline – Arnold's Farm Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Description	Length of the activity: 1010 m 1492 m
12. Pipeline – Wartburg Town Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Description Along Fountain Hill to Fairview Along existing pipeline to Fairview	Length of the activity: 1014 m 989 m

Phase 2: Wartburg to Dalton

13. Pipeline – Wartburg to Dalton Alternative: Alternative L1 (preferred activity alternative)	Along existing pipeline	Length of the activity: 15251 m
14. Pipeline – Dalton Town Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)	Avoiding Dalton town Through Dalton Town	Length of the activity: 1280 m 1192 m

Phase 3: Dalton to Ozwathini with offtake to Efaye

15. Pipeline – Dalton to Ozwathini (total length) Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)		Length of the activity: 31272 m 31415 m
16. Pipeline – Dalton to Ozwathini at Honey Glen (Clantrock) Wetland Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)		Length of the activity: 930 m 950 m
17. Pipeline – Dalton to Ozwathini at Appelsbosch Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)		Length of the activity: 1075 m 715 m
18. Pipeline – Dalton to Ozwathini at Nondabula Res Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)		Length of the activity: 877 m 1018 m
19. Pipeline – Off-take from Fawn Leas to Efaye Alternative: Alternative L1 (preferred activity alternative) Alternative L2 (if any)		Length of the activity: 14501 m 14491 m

6. SITE ACCESS

Does ready access to the site exist, or is access directly from an existing road?

YES ✓

Include the position of the access road on the site plan.

7. WASTE, EFFLUENT AND NOISE MANAGEMENT

Please note that the following environmental issues must be described for each alternative site, layout and process.

a. Solid waste management

Will the activity produce solid waste during the construction/initiation phase?

YES ✓

If yes, what estimated quantity will be produced per month?

<5 m³

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

Construction solid waste will be collected into skips at designated points in the construction area
Surplus excavated material will be stockpiled at designated sites in the construction area.

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

Solid waste will be disposed off at designated/licensed municipal landfill site (e.g. in Pietermaritzburg).
Surplus excavated material will be disposed of at spoil sites as identified by the geotechnical assessment.

Will the activity produce solid waste during its operational phase?

YES

NO ✓

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES

NO ✓

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for, for that of a solid waste handling or treatment facility?

YES

NO ✓

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:
Surplus excavated material would be used to rehabilitate eroded areas along the pipeline route as per the construction rehabilitation specification.

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

YES

NO ✓

b. Liquid effluent

The liquid effluent will be produced mainly in the construction phase as sewage into the potable toilets. During the operational phase of the activity no liquid effluent will be produced.

Will the activity produce effluent, other than domestic sewage? NO✓

Will the activity produce any effluent that will be treated and/or disposed of on site? NO✓

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

Has a specialist been consulted to assist with the completion of this section? NO✓

c. Emissions into the atmosphere

Potential Chlorine emissions: There are no significant emissions associated with transportation of water through pipelines as the disinfection of the water using chlorine only occurs at the water works, which is outside the scope of this project. It should be noted that the waterworks chloraminates the potable water, ensuring a stable chlorine residual in the water transported via the pipelines and in so doing minimises chlorine loss into the atmosphere via the pipeline chambers. Should post treatment disinfection of the transported water become necessary it would occur at the reservoirs where HtH (solid) or liquid sodium hypochlorite is used; in both cases chlorine emissions would be insignificant.

Carbon dioxide emissions (CO₂):

- ★ Direct CO₂ emissions associated with the project will occur mainly during the construction phase through use of vehicles and consumption of fuel.
- ★ Indirect CO₂ emissions (not at the reservoir & pumpstation sites or pipeline layouts) will occur during the construction and operational phases of the project through the use of electric power from the national grid.. During the Operational Phase all four pump stations will use electric power required to pump the water to the desired destinations.

Will the activity release emissions into the atmosphere? NO✓

If yes, is it controlled by any legislation of any sphere of government?

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.

If no, describe the emissions in terms of type and concentration:

Has a specialist been consulted to assist with the completion of this section? NO✓



d. Generation of noise

Construction phase: The noise associated with this activity would occur primarily during the construction phase. The noise will be associated with delivery trucks and earthmoving vehicles.

Operational Phase: No noise will be expected from the pipes as these will be buried underground. The reservoirs are not expected to produce significant noise impacts but some noise associated with the pumping activities at the pump stations is expected. It is anticipated, however, that this noise will be minimal and where necessary the pump station structures will be sound-insulated to reduce noise levels to meet the relevant standards.

Will the activity generate noise?

YES✓	NO
YES✓	NO

If yes, is it controlled by any legislation of any sphere of government?

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.

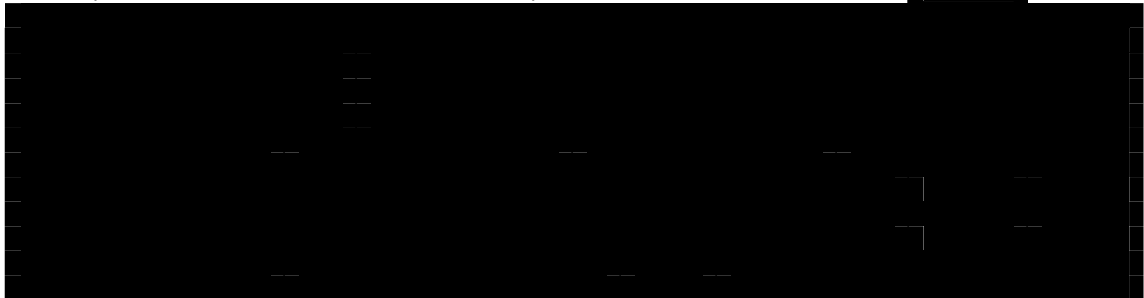
If no, describe the noise in terms of type and level:

The pumps in their operational phase would generate some noise. It is anticipated, however, that this noise will be minimal and where necessary the pump station structures will be sound-insulated to reduce noise levels to meet the limits specified in SABS 0103, as follows:

Type of District	Outdoor rating level Lr for ambient noise dB (A)	
	Daytime	Night-time
Sub-urban districts with little road traffic	50	40
Urban districts	55	45

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

<input checked="" type="checkbox"/>	NO✓
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8. WATER USE

Please note that the following issue must be described for each alternative site, layout and process.

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

municipal	<input checked="" type="checkbox"/>
-----------	-------------------------------------

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: No water will be extracted _____ litres

Does the activity require a water use permit from the Department of Water Affairs and Forestry? NO✓

If yes, please submit the necessary application to the Department of Water Affairs and Forestry and attach proof thereof to this application if it has been submitted.

The pipeline project will involve 6 river/stream crossings (see **Appendix G2** for method statement). According to section 21 (i) of the National Water Act, stream crossings are regarded as a water use. However, DWAF has

confirmed that the river/stream crossings are covered under the General Authorizations and has confirmed that a water use license is not required - Refer to correspondence with Mr. N Ward – Deputy Chief Engineer at DWAF (**Appendix G3**).

9. ENERGY EFFICIENCY

Please note that the following issue must be described for each alternative site, layout and process.

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

The conceptual/preliminary design provides for water to be gravitated for as long as possible to minimize the energy used in pumping the water to the desired destinations. At detail design stage pumps and pumping time will be selected with due regard to demand, pumping time and ESKOM's off-peak power periods to minimize the electrical energy used to pump water for the short distances needed to get it into all the reservoirs.

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

No alternative viable energy sources are available for the nature of power required for this project.

10. SITE OR 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:

- 10(a) the scale of the plan (appropriate to the extent of the development);
- 10(b) the property boundaries and erf or farm numbers of the adjoining properties;
- 10(c) the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 10(d) the position of each element of the application as well as any other structures on the site;
- 10(e) the position of services (e.g. electricity supply cables, water supply pipelines, boreholes, sewage pipelines and storm water infrastructure) including servitudes and the purpose of such servitudes;
- 10(f) sensitive environmental elements on the site/s and within 100m of the site/s including (but not limited thereto):
 - Rivers, streams and drainage lines;
 - wetlands;
 - the 1:100 year flood line (where available or where it is required by DWAF);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation including protected plant species (even if it is degraded or invested with alien species);
- 10(g) contour intervals appropriate to the scale of the development must be indicated on the plan; and
- 10(h) the positions from where photographs of the site were taken must be indicated.
- 10(i) a detailed viewshed illustration (where appropriate)

Site/route plans are presented in *Appendix A, Maps 1 to 14*

11. SITE PHOTOGRAPHS

Colour photographs must include important features of the site and a description of each photograph must be provided. Photographs must be attached under Appendix B to this form.

Photographs are presented in *Appendix B*.

12. ACTIVITY MOTIVATION

12(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?
What is the expected yearly income that will be generated by or as a result of the activity?

Will the activity contribute to service infrastructure?
Is the activity a public amenity?
How many new employment opportunities will be created in the development phase of the activity?
What is the expected value of the employment opportunities during the development phase?
What percentage of this will accrue to previously disadvantaged individuals?
How many permanent new employment opportunities will be created during the operational phase of the activity?
What is the expected current value of the employment opportunities during the first 10 years?
What percentage of this will accrue to previously disadvantaged individuals?

R 375 000 000	
The average 30yr income is R 38 000 000 pa (base on projected demands an current tariff of R2.96 the)	
YES✓	NO
YES✓	NO
Approximately 200 temporary jobs for the duration of the construction (3 years)	
At a rate of R100/day per worker for 3 years R14400000	
	90 %
None since UW already has its own permanent staff.	
	N/A
	N/A

12(b) Need and desirability of the activity

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

The proposed pipeline upgrades are aims at increasing the level of potable water service and meet the increasing demands in the Wartburg, Efaye and Ozwathini areas. The population in the Greater Efaye area has increased by over 37% in 2005; this was accompanied by a 226% increase in the bulk water meter readings data in the same year. Similar patterns for potable water demand are expected in the Grater Efaye and Ozwathini areas. The project will therefore assist in meeting these increasing demands while assisting with meeting the development goals for the national, provincial and local government.

The proposed activity will provide a basic service, which both the Umgungundlovu and Ilembe District Municipalities have a constitutional imperative to provide for development. A great deal of interest has been shown by the two municipalities on the project, as it will assist in accelerating service delivery even to the remotest of areas.

Indicate any benefits that the activity will have for society in general:

The project will assist with provision of the basic services by providing a reliable and sustainable potable water supply to Ozwathini, Efaye, Wartburg, Dalton and other on route consumers.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The project will provide the communities with access to a sustainable potable water supply.

13. 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:	Administering authority:	Date:
The Constitution of the Republic of South Africa: s27(1), s152, s156	National Constitutional Court	ACT 108 of 1996
National Environmental Management Act 107	DAEA	Act 107 of 1998
National Water Act s21, s22	DWAF	Act 36 of 1998
Conservation of Agricultural Resources Act No. 43	DAEA	Act 43 of 1983
Environmental Conservation Act	DAEA	Act 73 of 1989
Water Services Act s1, s2, s3, s6, s11, s19, s29	DWAF	Act 108 of 1997
GNR 385 and GNR 386 identified in terms of Section 24 and 24D of NEMA	DAEA	May 2006
The National Heritages Resources Act	SAHRA	Act 25 of 1999
KZN Heritage Act	AMAFA	Act 10 of 1997
National Environmental Management Protected Areas Act	EKZN Wildlife	Act 57 of 2003
KwaZulu-Natal Nature Conservation Bill	EKZN Wildlife	1999
National Environmental Management Biodiversity Act	EKZN Wildlife	Act 102 of 2004
Department of Agriculture & Environmental Affairs, KwaZulu-Natal	Basic Assessment Report Version 5, March 2007	Page 21 of 56

SECTION D: SITE/AREA DESCRIPTION

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

Section C Copy No. (e.g. A):

(complete only when appropriate) **Note: this section was not deem applicable as the dominate landuse in the project area is agriculture.**

1. GRADIENT OF THE SITE

Indicate the general gradient of the sites (Please cross the appropriate box).

Alternative L1 & S1 (preferred layout & site):

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
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Alternative L2 & 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
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Alternative L3 & 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
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For more details refer to **Appendix D3**.

2. location in landscape

Indicate the landform(s) that best describes the site (Please cross the appropriate box).

Alternative S1 (preferred site):

Ridgeline	Plateau	Side slope of hill/mountain√	Closed valley	Open valley	Plain	Undulating plain/low hills√	Dune	Sea-front
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Alternative S2 (if any):

Ridgeline	Plateau	Side slope of hill/mountain√	Closed valley	Open valley	Plain	Undulating plain/low hills√	Dune	Sea-front
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Alternative S3 (if any):

Ridgeline	Plateau	Side slope of hill/mountain√	Closed valley	Open valley	Plain	Undulating plain/low hills√	Dune	Sea-front
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3. Groundwater, Soil and Geological stability of the site

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

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

Note: By marking the appropriate boxes as negative does not imply that the entire pipeline route is unaffected by the factors listed in Table 3 above. Localised conditions may occur - for example high groundwater levels may be encountered in limited areas –the “X” indicating the general condition along route.

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 available / they exist, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

Has a specialist been consulted to assist with the completion of this section? YES NO

If YES, please complete:

Name of the specialist:	Gerald Davie (Geosure (Pty) Ltd)		
Qualification(s) of the specialist:	M.Sc. Pr.Sci.Nat		
Postal address:	Box 253, Howick, 3290		
Postal code:	3290		
Telephone:	+27 33 3452960	Cell:	082 9260626
E-mail:	Geosure@iafrica.com	Fax:	086 6727451

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: Gerald Davie Date: 16 October 2007

4. Groundcover

Cross the types of groundcover present on the site.

Alternative S1: GREATER PART OF THE PIPELINE

Natural veld - good condition ^E <input checked="" type="checkbox"/>	Natural veld with scattered aliens ^E <input checked="" type="checkbox"/>	Natural veld with heavy alien infestation ^E <input checked="" type="checkbox"/>	Veld dominated by alien species ^E <input checked="" type="checkbox"/>	<input type="checkbox"/>
Sport field <input checked="" type="checkbox"/>	Cultivated land <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If any of the boxes marked with an “E” are crossed, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise. The environmental assessment practitioner or specialist must provide reasons for their selection above in the following box:

The proposed pipeline passes through a wide variety of conditions along its length. The greater part is in sugar cane fields, and the remaining sections pass through everything from veld through to towns. This is all covered in the biodiversity assessment report (**Appendix D1**).

Has a specialist been consulted? YES NO

If YES, please complete the following:

Name of the specialist:	Alletson Ecologicals		
Qualification(s) of the specialist:	BSc (Hons). 21 years in nature conservation. Eleven years as an environmental consultancy. Over 80 EIAs. Numerous environmental management plans. Environmental monitoring especially in wetland systems.		
Postal address:	PO Box 1129, Hilton.		
Postal code:	3245		
Telephone:	033 3434972	Cell:	083 7871584
E-mail:	jallet@mweb.co.za	Fax:	086 6108896

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? YES NO

If YES, specify and explain: _____

Are there any special or sensitive habitats or other natural features present on any of the alternative sites? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, please complete the following:

Name of the specialist:	Alletson Ecologicals		
Qualification(s) of the specialist:	BSc (Hons). 21 years in nature conservation. Eleven years as an environmental consultancy. Over 80 EIAs. Numerous environmental management plans. Environmental monitoring especially in wetland systems.		
Postal address:	PO Box 1129, Hilton		
Postal code:	3245		
Telephone:	033 3434972	Cell:	083 7871584
E-mail:	jallet@mweb.co.za	Fax:	086 6108896
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?		YES	NO ✓
If YES, specify and explain:			
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?		YES	NO ✓
If YES, specify and explain:			
Are any further specialist studies recommended by the specialist?		YES	NO ✓
If YES, specify:			
If YES, is such a report(s) attached?		YES	NO ✓

Signature of specialist:  Date: 30 October 2007

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

5. Land use character of surrounding area

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site
Alternative L1 and S1 (preferred layout and sites):

Natural area ✓	Low density residential ✓	Medium density residential ✓	High density residential ✓	Informal residential ^A ✓
			Quarry, sand or borrow pit ✓	Dam or reservoir ✓
	School/creche ✓		Church ✓	
	Train station or shunting yard ^N	Railway line ^N ✓		
	Sport facilities	Golf course		
	Plantation ✓	Agriculture ✓	River, stream or wetland ✓	
Mountain, koppie or ridge ✓				
Other land uses (describe)				

If any of the boxes marked with an ^N are crossed, please consult an appropriate noise specialist to assist in the completion of this section.

Has a specialist been consulted? **This was not deemed necessary as the pipeline will be buried underground and not affected by noise.**

YES	NO ✓
-----	------

If YES, please complete the following:

Name of the specialist:			
Qualification(s) of the specialist:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	
Will the ambient noise level have a negative impact on the proposed activity?		YES	NO ✓
If YES, specify and explain:			

Are any further specialist or studies recommended by the specialist? If YES, specify: _____	YES	NO
If YES, is such a report(s) attached? _____	YES	NO
Signature of specialist: _____ Date: _____		

If any of the boxes marked with an "A" are crossed, please consult an appropriate air quality specialist to assist in the completion of this section.

Has a specialist been consulted? **This was not deemed necessary as the pipeline will be buried underground and not affected by air pollution**

YES	NO ✓
-----	------

If YES, please complete the following:

Name of the specialist:			
Qualification(s) of the specialist:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Will the ambient air pollution level have a negative impact on the proposed activity?

YES	NO ✓
-----	------

If YES, specify _____

and explain: _____

Are any further specialist studies recommended by the specialist? _____

YES	NO
-----	----

If YES, specify: _____

If YES, is such a report(s) attached? _____

YES	NO
-----	----

Signature of specialist: _____ Date: _____

If any of the boxes marked with an "H" are crossed, please consult an appropriate health assessment specialist to assist in the completion of this section.

Has a specialist been consulted?

YES	NO
-----	----

If YES, please complete the following:

Name of the specialist:			
Qualification(s) of the specialist:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Will the surrounding land use pose any unacceptable health risk on the proposed activity?

YES	NO
-----	----

If YES, specify _____

and explain: _____

Are any further specialist studies recommended by the specialist? _____

YES	NO
-----	----

If YES, specify: _____

If YES, is such a report(s) attached? _____

YES	NO
-----	----

Signature of specialist: _____ Date: _____

Alternative L2 & S2 (if any):

Natural area ✓	Low density residential	Medium density residential ✓	High density residential ✓	Informal residential ^A ✓
Retail	Commercial & warehousing			
			Quarry, sand or borrow pit	Dam or reservoir
			Church	
		Railway line ^N ✓		
Harbour	Sport facilities			
Landfill or waste treatment site ^A	Plantation ✓	Agriculture ✓	River, stream or wetland ✓	Nature conservation area
			Graveyard ✓	

If any of the boxes marked with an "N" are crossed, please consult an appropriate noise specialist to assist in the completion of this section.

Has a specialist been consulted? **This was not deemed necessary as the pipeline will be buried underground and not affected by noise**

YES	NO ✓
-----	------

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the ambient noise level have a negative impact on the proposed activity? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

If any of the boxes marked with an "A" are crossed, please consult an appropriate air quality specialist to assist in the completion of this section.

Has a specialist been consulted? **This was not deemed necessary as the pipeline will be buried underground and not affected by air pollution.** YES NO

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the ambient air pollution level have a negative impact on the proposed activity? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

If any of the boxes marked with an "H" are crossed, please consult an appropriate health assessment specialist to assist in the completion of this section.

Has a specialist been consulted? YES NO

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the surrounding land use pose any unacceptable health risk on the proposed activity? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

Alternative L3 and S3 (if any):

Natural area	Low density residential	Medium density residential	High density residential	Informal residential ^N
Retail	Commercial & warehousing	Light industrial	Medium industrial ^{AN}	Heavy industrial ^{AN}
Power station ^N	Office/consulting room	Military or police base/station/compound	Casino/entertainment complex	Hospitality facility
Open cast mine	Underground mine	Spoil heap or slimes dam ^N	Quarry, sand or borrow pit	Dam or reservoir
Hospital/medical center/clinic	School/creche	Tertiary education facility	Church	Old age home
Sewage treatment plant ^N	Train station or shunting yard ^N	Railway line ^N ✓	Major road (4 lanes or more) ^N	Airport ^N
Harbour	Sport facilities	Golf course	Polo fields	Filling station ^N
Landfill or waste	Plantation	Agriculture✓	River, stream or	Nature

treatment site			wetland	conservation area
Mountain, koppie or ridge✓	Museum	Historical building✓	Graveyard	Archeological site
Other land uses (describe):				

If any of the boxes marked with an "N" are crossed, please consult an appropriate noise specialist to assist in the completion of this section.

Has a specialist been consulted? **This was not deemed necessary as the pipeline will be buried underground and not affected by noise** YES NO✓

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the ambient noise level have a negative impact on the proposed activity? YES NO✓

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

If any of the boxes marked with an "A" are crossed, please consult an appropriate air quality specialist to assist in the completion of this section.

Has a specialist been consulted? YES NO

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the ambient air pollution level have a negative impact on the proposed activity? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

If any of the boxes marked with an "H" are crossed, please consult an appropriate health assessment specialist to assist in the completion of this section.

Has a specialist been consulted? YES NO

If YES, please complete the following:

Name of the specialist: _____

Qualification(s) of the specialist: _____

Postal address: _____

Postal code: _____

Telephone: _____ Cell: _____

E-mail: _____ Fax: _____

Will the surrounding land use pose any unacceptable health risk on the proposed activity? YES NO

If YES, specify and explain: _____

Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

Signature of specialist: _____ Date: _____

6. Cultural/Historical Features

Alternative L1 (Routing with Umgeni River crossing as preferred alternative)

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 palaeontological sites, on or close (within 20m) to the site?	YES✓	NO
If YES, explain:	Uncertain	
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.	Refer to HIA completed (Appendix D2)	
Briefly explain the findings of the specialist:	Eight sites of heritage significance were identified during the HIA. None to be directly impacted upon will need conservation. Mitigation will be in the form of monitoring of the sites during construction	
Will any building or structure older than 60 years be affected in any way?	YES	NO✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO✓
If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.		

Alternative L2

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 palaeontological sites, on or close (within 20m) to the site?	YES✓	NO
If YES, explain:	Uncertain	
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.		
Briefly explain the findings of the specialist:		
Will any building or structure older than 60 years be affected in any way?	YES	NO✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO✓
If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.		

Alternative L3 (routing to cross Umgeni River via Havelock bridge)

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 palaeontological sites, on or close (within 20m) to the site?	YES✓	NO
If YES, explain:	Refer to HIA completed (Appendix D2)	
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.		
Briefly explain the findings of the specialist:	<p>The crossing of the Umgeni River between the Havelock Bridge and the existing main bridge on the Pietermaritzburg-Wartburg road has two alternatives:</p> <ul style="list-style-type: none"> The first and main alternative being the tunnelling of the pipe underneath the riverbed of the Umgeni River, while; The second alternative for the routing of the pipeline is to utilise the bridge as a crossing point for the pipeline. In the event that the second alternative is considered at a later stage the following is recommended: <p>It is recommended that the structural integrity of the bridge is investigated. The pipeline should not hinder traffic flow on the bridge. The pipe must be constructed over the bridge to be sympathetic to the existing design. These designs can be done with the help of a conservation architects</p>	
Will any building or structure older than 60 years be affected in any way?	YES✓	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES✓	NO
If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.		

Permit applications will be lodge as soon a finalisation on routing of the pipeline over the Havelock Bridge has been reached.

Are any further specialist studies recommended by the specialist?	YES	NO
If YES, specify:	Structural integrity of Havelock Bridge	
If YES, is such a report(s) attached?	No	

Signature of specialist: _____



Date: 10-10-2007

Note: Structural integrity of Havelock Bridge – this, however will only be conducted in the detail design stage of the project.

SECTION E: PUBLIC PARTICIPATION

Please note that details of all components of this section must be included under Appendix E to this report.

1. ADVERTISEMENT

The environmental assessment practitioner must follow any relevant guidelines adopted by the competent authority in respect of public participation and must at least –

- 1(a) Fix a notice in a conspicuous place, on the property where it is intended to undertake the activity which states that an application will be submitted to the competent authority in terms of these regulations and which provides information on the proposed nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations on the application may be made.
- 1(b) inform landowners and occupiers of adjacent land of the applicant's intention to submit an application to the competent authority
- 1(c) inform landowners and occupiers of land within 100 metres of the boundary of the property where it is proposed to undertake the activity and whom may be directly affected by the proposed activity of the applicant's intention to submit an application to the competent authority;
- 1(d) inform the ward councillor and any organisation that represents the community in the area of the applicant's intention to submit an application to the competent authority;
- 1(e) inform the municipality which has jurisdiction over the area in which the proposed activity will be undertaken of the applicant's intention to submit an application to the competent authority; and
- 1(f) inform any organ of state that may have jurisdiction over any aspect of the activity of the applicant's intention to submit an application to the competent authority; and
- 1(g) place a notice in one local newspaper and any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of these regulations.

2. Content of advertisements and notices

Advertisements and notices must indicate that an application will be submitted to the competent authority in terms of the EIA regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made;

3. Placement of advertisements and notices

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for site alternatives where appropriate.

4. Determination of appropriate measures

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention

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should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. **Please note** that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. Comments and response report

The practitioner must record all comments and respond to each comment of the public before the application 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 this application. The comments and response report must be attached under Appendix E.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least 30 (thirty) calendar days before the submission of the application.

Has any comment been received from the district municipality?

YES ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Umgungundlovu and Ilembe District Municipalities are the two municipalities in the development area and have shown a great deal of interest in the project, as it will assist in accelerating water service delivery remote areas i.e. Efaye and Ozwathini.
Liaison at Umgungundlovu DM: Miss Bongzi Dube. Umgungundlovu District Municipality, Water Services.
Liaison at iLembe DM: Mr. Dumisani Khoza, Zanele Mngadi.
 The municipalities were invited to public meetings (18, 20, 25, 26 August 2007) (**Appendix E3 & E4**) and the two representatives mentioned above attend and participated in the discussions. See **Appendix E2** for comments and responses.
 Liaison meetings were held with the Umgungundlovu DM (**Appendix E10**)

Has any comment been received from the local municipality?

YES ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Umshwathi Municipality represented by Mr TW Eggers, he indicated his full support of the project as it will help accelerate potable water delivery to areas not serviced at present. For correspondence, refer to **Appendices E2 & E8**. Also refer to **Appendix E2** for comments and responses.

Has any comment been received from a traditional authority?

YES ✓

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

A meeting was held with Ingonyama Trust on 22 June 2007 (see **Appendix E5** for correspondence and **Appendix E2** for comments and responses).
 Three traditional Authorities are affected and have been consulted (2 in the Ozwathini area and one in the Efaye area).
 ★ Mathuli TA was consulted on 26 Aug 2007 (Meeting with Inkosi Mthuli – contact No. 082 4889008).
 ★ Nodwengu TA was consulted on 2 Aug 2007 (Meeting with TA administrator Mr. Ngcobo – contact No. 082 0568903)
 ★ Nadi TA was consulted on 11 July 2007 (Councilor Mbatha has delegated authority to represent TA on developmental issues – 0828568656).

7. CONSULTATION WITH OTHER STAKEHOLDERS

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Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application at least 30 (thirty) calendar days before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES ✓

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Stakeholders with direct and indirect interest in the activity site (Department of Transport, Telkom, Transnet and ESKOM) were informed both directly and indirectly through notices of the application and provided with the opportunity to comment through such notices. Comments were received from some of the stake holders se below and responses made (Appendix E2):

- **ESKOM** : Detailed line mapping and survey information is awaited before an application will be made to Eskom.
- **Spoornet** – An application has been made to Spoornet for encroachment onto their railway servitude (**Appendix 5**).
- **DOT** – Preliminary discussions were held with DOT regarding road crossings and no significant problems were foreseen. Detailed applications are still to be made in this regard. Correspondence regarding the use of the road 614 bridge over the Umgeni River for purposes of appending the pipeline have been undertaken, but these were rejected (**Appendix 7**).
- **Telkom** – Telkom has been consulted regarding the project and a response is awaited (**Appendix E9**).
- **DWAF** – DWAF has been consulted for approvals to cross rivers and streams. Approval has been granted (**Appendix G3**).
- **Landowners** – landowners were consulted and most landowner consent forms were signed (**Appendix E1**). It should however be noted that it was agreed by DAEA that signed landowner consent forms would not be required for this linear activity (**Appendix E11**).
- Interested and affected parties were consulted through public meetings (**Appendix E1**).

SECTION F: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2006, 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.

Please note that details of all components of this section must be included under Appendix F to this report.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the issues raised by interested and affected parties.

See the comments and responses report (**Appendix E2**) for more details.

- a. Access to property impacts.
- b. Socio-economic impacts.
- c. Visual impacts.
- d. Technical considerations.
- e. Compensation issues.
- f. Economic impacts.
- g. Land rights impact / servitude issues.
- h. Historical issues
- i. Construction issues.
- j. Planning issues.
- k. Heritage impacts.
- l. General.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report):

A written response all issues raised by IAP's was made, see the comments and responses report (**Appendix E2**) for more details.

- a. **Access to property impacts.** Road access will be provided where possible during the construction phase. The inconvenience to landowners will be minimized by closing trenches as soon as possible. In areas where access to property is compromised, the construction working range of 500m will be reduced as required to ensure minimal inconvenience to the affected party.
- b. **Socio - economic impacts.** To reduce potential crime – the assistance of the local police and Community Policing Forums will be accessed. Local labour will be sourced through community leaders.
- c. **Visual impacts.** The contractor will use rehabilitation specialists to rehabilitate the entire length of the pipeline to blend in with the surrounding area as per the Environmental Management Plan (see Draft EMP).
- d. **Technical considerations.** Alternative routes were proposed in the areas where IAP's indicated potential difficulties for the project.
- e. **Compensation issues.** Compensation will be undertaken by a recognized valuator after construction.
- f. **Economic impacts.** Where economic impacts were significant, alternate pipeline routes were considered. For loss of crops, Umgeni Water would compensate for damaged crops at market rates after valuation.
- g. **Land rights impact / servitude issues.** The pipeline has been re-routed to avoid existing infrastructure.
- h. **Historical issues.** Umgeni Water regrets any historical issues that may have left communities/landowners unhappy. This project will endeavour to consult with the community and take heed to concerns throughout the project.
- i. **Construction issues.** Umgeni Water will rehabilitate the areas affected by the construction activities. This is a legislative requirement and rehabilitation measures as well as an Environmental Management Plan (see Draft EMP) will form part of contract specification.
- j. **Planning Issues.** Liaison meetings with District and Local municipalities will continue to occur though out the project. A Project Steering Committee will be formed by landowners and this committee will be responsible to keep the landowners informed to the project progress.
- k. **Heritage Impacts.** Alternate routes were sought to avoid any areas of heritage importance. The routes avoiding the heritage impacts were then chosen as the preferred routes.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

Direct impacts:

1. Access to private property and disturbance to property occupier (social). The planning team comprising of the project manager, environmental scientist, social impact personnel and specialist practitioners who will traverse the proposed pipeline route as well as the sites for the reservoirs and pumpstations to assess the potential impacts of the activity on the surrounding environment. This is would involve gaining access to some private properties and hence minor social discomfort/impacts.

2. Access to proposed sites (physical).

- ★ Access to the proposed reservoirs (Wartburg and Dalton) is available from the existing reservoirs near these sites.
 - ★ Access to the proposed pumpstations – access is available from existing roads in the area.
- Disturbances could be experienced where new servitudes are acquired.

3. Specialist studies. Various specialist studies would be undertaken during this phase of the project. Those with impacts have been discussed below:

- ★ Geo-technical studies: Test pits (750 mm wide, 3m long and 3m deep) will be made during the geo-technical study to assess the sub-surface soil conditions, ground water and depth to bedrock. This will be undertaken after every 250 m along the 90 km pipeline route, with a total of approximately 500 test pits.
- ★ Land Survey: Bush will be cleared (without grubbing or stripping of topsoil) from a strip approximately 4m wide along the proposed pipe-centre-line to enable the route to be surveyed and to facilitate the identification of obstructions such as unmarked graves that are normally difficult find. Some additional bush clearing may be required outside of the 4m strip to allow the tachometric survey to cover a band 25m either side of the proposed centre line. Concurrently, shallow pits not exceeding 0,5m deep x 0,8m² plan area at approximately 100m

intervals along the proposed centre-line will be excavated where deemed necessary to clearly indicate to local communities where the proposed pipe will be laid and thus facilitate identification of any community related issues that may not have come to light during the public participation process. Pipe centre-line survey reference pegs and benchmarks in the form of labeled steel pegs cast into mortar bases in shallow depressions dug into the ground will also be placed. For each steel peg approximately 1m² of area would be disturbed. A total of 92 pegs would be secured over the 90km of proposed pipeline with a total of 92 m² disturbed for survey pegs.

Indirect impacts:

4. Carbon dioxide emissions associated with fuel consumption during travelling is expected to occur, however this will not be significant.

Cumulative impacts:

No impacts were identified

Alternative S2 (if any)

Direct impacts:

As per S1.

Indirect impacts:

No impacts were identified.

Cumulative impacts:

No impacts were identified.

Alternative S3 (if any)

Direct impacts:

As per S1.

Indirect impacts:

No impacts were identified.

Cumulative impacts:

No impacts were identified.

No-go alternative (compulsory)

Direct impacts:

- ★ Land Survey – in the event that survey is not undertaken there would be insufficient information to inform the design and hence construction activities. This could have huge cost implications.
- ★ Geotechnical Survey/assessment – in the event that this study is not undertaken the project integrity would be compromised. This could have huge cost implications.

Indirect impacts:

Raised community expectation for water service delivery.

Cumulative impacts:

None anticipated.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Alternative S2

Alternative S3

<p>1. Access to private property and disturbance to property occupier (social). Property occupiers will be provided with adequate notification and site visits will be undertaken at a mutually convenient time. The number of trips into private property will be kept to a minimum.</p> <p>2. Access to proposed route (physical). Bush clearing, to gain access to the proposed pipeline route will be kept to a minimum and the servitude. No bush clearing will be undertaken in sensitive areas. Small amounts of vegetation will be cleared during survey however, this will be limited to survey pegs.</p> <p>3. Specialist studies. Disturbance of the ground will be kept to a minimum and the ground will be back filled if disturbed during geotechnical and survey investigations (except as described under “Land Survey” on the previous page). During the geotechnical assessment, test the pits will be positioned to avoid any ecological sensitive areas including trees, rivers, wetlands etc. Topsoil will be separated from subsoil and after the assessment the pit will be backfilled firstly with the subsoil and then with the topsoil. This will be done in order to maintain the integrity of the soil profile and to facilitate rapid re-growth of the ground cover, minimizing soil erosion. Work done by the geotechnical specialist will be audited by Umgeni Water.</p>	<p>As for Alternative S1</p>	<p>As for Alternative S1</p>
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<p>4. Carbon dioxide emissions. The number of trips will be kept to a minimum and teams will minimize the number of vehicles used, where possible.</p>		
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b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Impacts associated with layout/route alternatives
Alternative L1 (preferred layout or route alternative)

Direct impacts:

1. Access to private property and disturbance to property occupier (social). The planning team comprising of the project manager, environmental scientist, social impact personnel and specialist practitioners who will traverse the proposed pipeline route to assess the potential impacts of the activity on the surrounding environment. This is would involve gaining access to some private properties and hence minor social discomfort/impacts.

2. Access to proposed route (physical). The proposed pipeline route includes:

- ★ an existing servitude from Claridge to Dalton (via Wartburg), and
- ★ new servitude between Dalton and Ozwathini including Efaye offtake.

On the existing servitude, access is available for maintenance of the pipeline and servitude and little disturbance is anticipated as this route is maintained on a regular basis by cutting grass and clearing all long rooted shrubs in the servitude. The main disturbances will be experienced in the areas where a new servitude is being acquired i.e. from Dalton to Ozwathini and Efaye.

3. Specialist studies. Various specialist studies would be undertaken during this phase of the project. Those with impacts have been discussed below:

- ★ Biodiversity assessment: SASS - for SASS assessments parts of the river/stream would be temporarily disturbed. During wetland assessments, soil/core samples will be taken to confirm the extent of the wetland.
- ★ Geo-technical studies: Test pits (750 mm wide, 3m long and 3m deep) will be made during the geo-technical study to assess the sub-surface soil conditions, ground water and depth to bedrock. This will be undertaken after every 250 m along the 90 km pipeline route, with a total of approximately 500 test pits.
- ★ Survey: Some vegetation would be cleared to enable route surveying. Holes would be dug and steel pegs would be secured with concrete. For each steel peg approximately 1 m² of area would be disturbed. A total of 92 pegs would be secured over the 90km of proposed pipeline with a total of 92 m² disturbed for survey pegs.

Indirect impacts:

4. Carbon dioxide emissions associated with fuel consumption during travelling is expected to occur, however this will not be significant.

Cumulative impacts:

No impacts were identified

Alternative L2 (if any)

Direct impacts:

As per S1.

Indirect impacts:

No impacts were identified.

Cumulative impacts:

No impacts were identified.

Alternative L3 (if any)

Direct impacts:

As per S1.

Indirect impacts:

No impacts were identified.

Cumulative impacts:

No impacts were identified.

No-go alternative (compulsory)

Direct impacts:

- ★ Land Survey – in the event that survey is not undertaken there would be insufficient information to inform the design and hence construction activities. This could have huge cost implications.
- ★ Geotechnical Survey/assessment – in the event that this study is not undertaken the project integrity would be compromised. This could have huge cost implications.

- ★ In the event that the biodiversity assessment is not undertaken the project could be severely criticised by the external environmental lobby groups. In addition, this will prevent data collection and monitoring of river health before construction activities, preventing the collection of baseline data.

Indirect impacts:

The would be raised community expectation for water service delivery.

Cumulative impacts:

None anticipated.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative L1	Alternative L2	Alternative L3
<p>1. Access to private property and disturbance to property occupier (social). Property occupiers will be provided with adequate notification and site visits will be undertaken at a mutually convenient time. The number of trips into private property will be kept to a minimum.</p> <p>2. Access to proposed route (physical). Bush clearing, to gain access to the proposed pipeline route will be kept to a minimum and the servitude. No bush clearing will be undertaken in sensitive areas. Small amounts of vegetation will be cleared during survey however, this will be limited to survey pegs.</p> <p>3. Specialist studies. Disturbance of the ground will be kept to a minimum and the ground will be back filled if disturbed during geotechnical and survey investigations. During the geotechnical assessment, test the pits will be positioned to avoid any ecological sensitive areas including trees, rivers, wetlands etc. Topsoil will be separated from subsoil and after the assessment the pit will be backfilled firstly with the subsoil and then with the topsoil. This will be done in order to maintain the integrity of the soil profile and to facilitate rapid re-growth of the ground cover, minimizing soil erosion. Work done by the geotechnical specialist will be audited by Umgeni Water.</p> <p>4. Carbon dioxide emissions. The number of trips will be kept to a minimum and teams will minimize the number of vehicles used, where possible.</p>	<p>As for Alternative L1</p>	<p>As for Alternative L1</p>

3. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Potential impacts associated with reservoir and pumpstation sites.

Alternative S1 (preferred site)

<p>Direct impacts:</p> <p>1. Socio-economic</p> <ul style="list-style-type: none"> ★ Removal of Fences. Fences will be removed in some areas to make way for the construction process. ★ Crops. Landowners/occupiers will experience a loss of crops within the project boundary. ★ Land. Land will be expropriated and servitudes registered as will be required for the project. This will have an economic impact on the landowners. ★ Employment. There will be increased employment of local communities during the construction phase. <p>2. Biodiversity/Loss of Vegetation.</p> <p>The land will be cleared of all vegetation along the servitude and working boundary.</p> <ul style="list-style-type: none"> ★ Agriculture. This will include loss of agricultural crops in the area. For most of the route, the proposed pipeline crosses cultivated land which are significantly transformed monocultures (primarily sugarcane). ★ Road reserves. Some sites are located near road servitudes. This area is highly altered, indicated by the presence of alien vegetation. Hence very little change is expected in terms of biodiversity losses. ★ Grasslands. Displacement of some indigenous vegetation will occur. <ul style="list-style-type: none"> ▪ One pumpstation will be located in Appelsbosh in an indigenous grassland.

- ★ **Indigenous plants.** All plants and grasses will be removed from the working boundary to enable construction.
- ★ **Loss of habitat for fauna** will result from the removal of the vegetation and micro-habitats.
- ★ **Fauna.** Potential loss of small mammals and birds. There is a potential for loss of animals through illegal hunting.
- ★ **Fire.** Habitat could be destroyed through accidental fires during construction.

3. Land/excavation

- ★ **The soil profile** will be disturbed during excavation and laying of the pipeline.
- ★ **Erosion of stockpiles and exposed steep slopes.** Stockpiles erosion may occur if not adequately contained. The slopes will be partly destabilized through the removal of boulders and earth especially in areas with a steep terrain/slopes. This has a potential for soil erosion.
- ★ **Safety.** There is a potential for an increased risk to animals/people falling into the open trenches during construction.
- ★ **Pests.** There is a potential for rain water to stand and become stagnant in excavated areas, providing a breeding ground for mosquitoes.

4. Water

- ★ **Rivers/streams Crossings.** The pipeline traverses six rivers/streams including Umgeni River, Mlalaan River, Fortmanns Spruit River, Waterfall River and two other small streams on Erick's Farm along the R33 and Kort Krans Kloof No. 1012. The rivers/streams will be disturbed during construction increasing the sediment levels/turbidity of the water. The movement of aquatic ecosystem will also be affected during construction phase as the river flow is disturbed. However, these impacts are expected to be temporary, and limited to the construction phase of the project.
- ★ **Storm Water Drains.** The pipeline crosses through several stormwater drainage lines and these will be impacted upon during the construction process.
- ★ **Ground water.** No impacts expected.

5. Access/Traffic

- ★ **Access roads.** The pipeline will cross several access roads/driveways. During construction these roads will be temporarily blocked/closed to allow for excavation and construction.
- ★ **Disturbance to traffic.** The disturbance to the flow of traffic on the following roads is expected: D73, R33 and R614. The anticipated disturbances are expected as a result of the trucks and other earthmoving equipment delivering materials (bedding material, pipes, readymix) and excavating.

6. Waste

- ★ **General waste** will be produced during the construction process.
- ★ **Construction waste** or spoil material will be generated during excavation.
- ★ **Sewage/effluent** will be generated by the construction workers.
- ★ **Litter.** There will be an increased risk of litter that could arise during the construction phase at the construction sites.

7. Air

- ★ **The air quality** will be impaired from dust that will be produced from the driving of vehicles and excavation.
- ★ **Exhaust emissions** from the vehicles will impact on air pollution.

8. Noise Disturbances. The noise associated with construction activities may cause disturbance to people and/or animals. One farmer raised the issue of the potential for construction noise affecting the breeding cycle of his birds.

Indirect impacts:

Air. Potential fire hazards especially during the winter months.

Cumulative impacts:

Alternative S2

Direct impacts:

Same as S1 above.

Indirect impacts:

Same as S1 above

Cumulative impacts:

Alternative S3

Direct impacts:

Same as S1 above

<p>Indirect impacts: Same as S1 above</p> <p>Cumulative impacts: Same as S1 above</p>

<p>No-go alternative (compulsory)</p> <p>Direct impacts:</p> <p>Should the construction of the project be delayed or not supported it will slow down Umgeni Water's delivery to municipalities which would have a negative impact on their service deliveries and reducing water service backlogs to communities from. In addition, it would have financial implications for the contractor and Umgeni Water.</p> <p>Indirect impacts:</p> <p>Cumulative impacts:</p>

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	Alternative S2	Alternative S3
<p>Mitigation for Direct impacts</p> <p>1. Socio-economic</p> <ul style="list-style-type: none"> ★ Removal of Fences. Fences will be removed only during the construction phase. Temporary fences will be erected outside the working servitude to meet the necessary requirements of the land activity. Upon completion of the pipeline the fence will be reinstated in the original position, assuming permission has been provide to the landowner for use of our servitude, or along a route agreed by both parties (landowner and Umgeni Water). In areas that do not necessitate the erection of temporary fencing (e.g. in place where livestock is being removed to another area) no temporary fence will be erected. During construction, there will be close monitoring of site personnel and request for a greater police presence from the area. ★ Crops. Should there be any damage to standing crops during construction, Umgeni Water will reimburse the owner/occupier in accordance with current market related prices. ★ Land expropriation and servitudes. Umgeni Water will survey and register a defined pipeline servitude in its favour, aligned with the project. In accordance with normal practice, Umgeni Water will pay consideration for the acquisition of the servitudes based on current land valuations which will be provided by a Sworn Valuer. ★ Employment. Employment of local labour will be a positive impact of the project and will be encouraged. <p>2. Biodiversity/Loss of Vegetation. Removal of vegetation will be keep to a minimum throughout the project.</p> <ul style="list-style-type: none"> ★ Agriculture: Agricultural lands in the area are highly transformed monocultures, namely sugarcane. Biodiversity losses are likely to be insignificant. ★ Road reserves. A significant length of the pipeline would traverse road servitudes or would align with road reserves. These areas are highly transformed with a significant amount of alien vegetation. Removal of this alien vegetation will have a positive impact on biodiversity and can be considered another positive impact of this project. The affected areas will be rehabilitated with indigenous vegetation post-construction. ★ Grasslands. These areas will be rehabilitated to blend in with the surrounding habitat and minimize the impacts on biodiversity. ★ Indigenous plants. Indigenous plants will be removed and planted in suitable areas outside the project working boundary. ★ Loss of habitat for fauna. Construction time will be kept to a minimum followed by speedy rehabilitation to restore habitat and biodiversity integrity. ★ Fauna. Potential loss of small mammals and birds. Illegal hunting (by project related personnel) of animals will be prohibited through out the project life cycle. 	Same as S1	Same as S1

<p>★ Fire. Lighting of fires will be discouraged . Safety rules will apply during construction.</p> <p>All activities including traffic, site clearing, site camps, and excavation activities will be limited to construction working boundary that will be clearly demarcated.</p> <ul style="list-style-type: none"> ★ The removal and clearing of vegetation will not be allowed until an approval is obtained from the Environmental Control Officer. ★ The imported sand used for bedding materials will be free of alien seeds and will not be taken from alien infested riverbeds. ★ Once the construction is completed, the area will be rehabilitated with indigenous grasses to blend in with the surrounding area. <p>3. Land/excavation</p> <ul style="list-style-type: none"> ★ Soil profile. The top soil will be removed and stockpiled separately from the subsoil. After construction the integrity of the soil profile will be restored by first filling with subsoil, followed by topsoil. ★ Erosion of stockpiles and exposed steep slopes. Stockpiles will be monitored for excessive erosion and where necessary measures (eg sand bagging) implemented to control erosion. Steep slopes will be stabilised with appropriate measures such as gabion baskets. All areas will be rehabilitated and grassed to minimize soil erosion. ★ Safety. To minimize safety risks, the route will be excavated and the pipeline laid in manageable sections (less than 500m in length for each working front) and open excavation will be marked with danger tape. <p>4. Water</p> <p>River/stream Crossings.</p> <p>The proposed method statement for river/stream crossings has been approved by the Department of Water Affairs and Forestry (Appendix G3). Also see method statement for river/stream crossing (Appendix G2). To further minimize impacts:</p> <ul style="list-style-type: none"> ★ Crossing of the rivers and streams will take place during dry seasons (April to September). ★ The duration spent during construction of river crossings will be kept as short as possible. ★ A provision will be made in the EMP for proper rehabilitation of the river/stream crossings. ★ The river health and water quality will be monitored before, during and after construction with the view of restoring water quality to the baseline (Appendix G7). <p>Storm Water Drains. All storm drains along the route of the pipeline will be restored after construction has been completed.</p> <p>5. Access/Traffic</p> <p>Access roads. The landowner/occupier will be notified of construction activities that would impede access. In consultation, alternative access will be provided.</p> <p>Disturbance to traffic.</p> <ul style="list-style-type: none"> ★ The road crossings of the major roads such as R33 and R614 will be achieved by pipe-jacking. This would reduce the impact on traffic and minimal traffic disruptions are expected. ★ Ensure that the construction vehicles make use of existing gravel and tarred roads where available, and where these roads are not part of the national or provincial network, they are upgraded and maintained as necessary. ★ For the smaller roads excavation will only happen during the day time and either one lane will be left open or a deviation provided at all times to allow for the flow of traffic. ★ Ensure appropriate consultation with land owners regarding the use of private roads. ★ Encourage observance of all the regulations relating to traffic management especially speeding. <p>6. Waste</p> <p>Litter and Waste Pollution. Suitable waste disposal facilities will be provided including bins and regular collection and removal of waste to an approved waste disposal site.</p> <ul style="list-style-type: none"> ★ The construction phase of the project will be monitored by the ECO to ensure compliance with EMP requirements. 		
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<p>7. Air</p> <ul style="list-style-type: none"> ★ Dust pollution will be minimized by spraying water onto gravel roads used by construction vehicles. ★ The number of trips made by construction vehicles will be minimized to reduce air pollution. ★ Burning of refuse onsite will be prohibited to prevent fire hazards. <p>8. Noise Disturbances.</p> <ul style="list-style-type: none"> ★ To reduce the impact of the noise, specific construction activities, will be restricted to weekdays (Monday to Saturday) between sunrise and sunset.. The EMP will provide for the monitoring of noise and a complaints register will be made available in all construction sites for the residents to raise their concerns should the noise levels become unacceptable. ★ An alternate route was proposed and agreed by the landowner, to avoid potential noise impacts on the breeding cycle of his birds. 		
Alternative S2		
Same as for S1		
Alternative S3		
Same as for S1		

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Impacts associated with pipeline routes/layouts and alternatives during the construction phase of the project

Alternative L1 (preferred route/layout)

<p>Direct impacts:</p> <p>1. Socio-economic</p> <ul style="list-style-type: none"> ★ Removal of Fences. Fences will be removed in some areas to make way for the construction process. ★ Crops. Landowners/occupiers will experience a loss of crops within the project boundary. ★ Land. Land will be expropriated and servitudes registered as will be required for the project. This will have an economic impact on the landowners. ★ Employment. There will be increased employment of local communities during the construction phase. <p>2. Biodiversity/Loss of Vegetation.</p> <p>The land will be cleared of all vegetation along the servitude and working boundary.</p> <ul style="list-style-type: none"> ★ Agriculture. This will include loss of agricultural crops in the area. For most of the route, the proposed pipeline crosses cultivated land which are significantly transformed monocultures (primarily sugarcane). ★ Road reserves. Removal of alien plants growing in the area. A significant length of the pipeline would traverse road servitudes. This area is highly altered, indicated by the presence of alien vegetation. Hence very little change is expected in terms of biodiversity losses. ★ Grasslands. Displacement of some indigenous vegetation will occur. <ul style="list-style-type: none"> ▪ Along R614 before the Montobello hospital turnoff there is an isolated grassland fragment species such as the Common Thatch Grass (<i>Hyparrhenia hirta</i>), Narrow heart love grass (<i>Eragrostis racemosa</i>), Red Grass (<i>Themeda triandra</i>), Finger Grass (<i>Digitaria eriantha</i>), Ngongoni Bristlegrass (<i>Aristida junciformis</i>), Common Russet Grass (<i>Loudetia simplex</i>). These grass species will be destroyed during construction. ▪ The vegetation along the off take to Efaye is mainly sugarcane; there is however a small section of natural veld with a high <i>lantana camara</i> infestation. The dominant grass type in this patch is Ngongoni Bristlegrass (<i>Aristida junciformis</i>) which is indicative of disturbed areas. ★ Indigenous plants. All plants and grasses will be removed from the working boundary to enable construction. ★ Loss of habitat for fauna will result from the removal of the vegetation and micro-habitats. ★ Fauna. Potential loss of small mammals and birds. There is a potential for loss of animals through illegal hunting. ★ Fire. Habitat could be destroyed through accidental fires during construction. <p>3. Land/excavation</p> <ul style="list-style-type: none"> ★ The soil profile will be disturbed during excavation and laying of the pipeline. ★ Erosion of stockpiles and exposed steep slopes. Stockpiles erosion may occur if not adequately 		
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contained. The slopes will be partly destabilized through the removal of boulders and earth especially in areas with a steep terrain/slopes. This has a potential for soil erosion.

- ★ **Safety.** There is a potential for an increased risk to animals/people falling into the open trenches during construction.
- ★ **Pests.** There is a potential for rain water to stand and become stagnant in excavated areas, providing a breeding ground for mosquitoes.

4. Water

- ★ **Rivers/streams Crossings.** The pipeline traverses through six rivers/streams including Umgeni River, Mlalaan River, Fortmanns Spruit River, Waterfall River and two other small streams on Erick's Farm along the R33 and Kort Krans Kloof No. 1012. The rivers/streams will be disturbed during construction increasing the sediment levels/turbidity of the water. The movement of aquatic ecosystem will also be affected during construction phase as the river flow is disturbed. However, these impacts are expected to be temporary, and limited to the construction phase of the project.
- ★ **Storm Water Drains.** The pipeline crosses through several stormwater drainage lines and these will be impacted upon during the construction process.
- ★ **Ground water.** No impacts expected.

5. Access/Traffic

- ★ **Access roads.** The pipeline will cross several access roads/driveways. During construction these roads will be blocked/closed to allow for excavation and construction.
- ★ **Disturbance to traffic.** The disturbance to the flow of traffic on the following roads is expected: D73, R33 and R614. The anticipated disturbances are expected as a result of the trucks and other earthmoving equipment delivering materials (bedding material, pipes, readymix) and excavating.

6. Waste

- ★ **General waste** will be produced during the construction process.
- ★ **Construction waste** or spoil material will be generated during excavation.
- ★ **Sewage/effluent** will be generated by the construction workers.
- ★ **Litter.** There will be an increased risk of litter that could arise during the construction phase at the construction sites.

7. Air

- ★ **The air quality** will be impaired from dust that will be produced from the driving of vehicles and excavation.
- ★ **Exhaust emissions** from the vehicles will impact on air pollution.

8. Noise Disturbances. The noise associated with construction activities may cause disturbance to people and/or animals. One farmer raised the issue of the potential for construction noise affecting the breeding cycle of his birds.

Indirect impacts:

Air. Potential fire hazards especially during the winter months.

Cumulative impacts:

Alternative L2

Direct impacts:

Same as S1 above.

In addition, there is a potential for:

- ★ Wetland functionality assessment to be completed at Honey Glen (Clantrock) Farm and Efaye offtake, **Appendix A, Maps 10 & 11.**
- ★ Existing service infrastructure (Eskom lines) could be compromised, **Appendix A, Map 6.**
- ★ Existing infrastructure to be compromised at Dalton town **Appendix A, Map 9.**
- ★ Archaeological/cultural characteristics, such as gravesites, to be damaged en-route to Nadi reservoir **Appendix A, Map 14.**

Indirect impacts:

Same as S1 above

Cumulative impacts:

Alternative L3

Direct impacts:

Same as S1 above

<p>Soil erosion. Potential exists for soil erosion and rehabilitation difficulties along a steep slope at Claridge (alternate L3 or route through the Hofmeyers land).</p> <ul style="list-style-type: none"> ★ Archaeological/cultural characteristics, Havelock bridge could be damaged at the Umgeni River crossing Appendix A, Map 7. <p>Indirect impacts: Same as S1 above</p> <p>Cumulative impacts: Same as S1 above</p>
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<p>No-go alternative (compulsory)</p> <p>Direct impacts:</p> <p>Should the construction of the project be delayed or not supported it will slow down Umgeni Water's delivery to municipalities which would have a negative impact on their service deliveries and reducing water service backlogs to communities from. In addition, it would have financial implications for the contractor and Umgeni Water.</p> <p>Indirect impacts:</p> <p>Cumulative impacts:</p>

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	Alternative S2	Alternative S3
<p>Mitigation for Direct impacts</p> <p>1. Socio-economic</p> <ul style="list-style-type: none"> ★ Removal of Fences. Fences will be removed only during the construction phase. Temporary fences will be erected outside the working servitude to meet the necessary requirements of the land activity. Upon completion of the pipeline the fence will be reinstated in the original position, assuming permission has been provide to the landowner for use of our servitude, or along a route agreed by both parties (landowner and Umgeni Water). In areas that do not necessitate the erection of temporary fencing (e.g. in place where livestock is being removed to another area) no temporary fence will be erected. During construction, there will be close monitoring of site personnel and request for a greater police presence from the area. ★ Crops. Should there be any damage to standing crops during construction, Umgeni Water will reimburse the owner/occupier in accordance with current market related prices. ★ Land expropriation and servitudes. Umgeni Water will survey and register a defined pipeline servitude in its favour, aligned with the project. In accordance with normal practice, Umgeni Water will pay consideration for the acquisition of the servitudes based on current land valuations which will be provided by a Sworn Valuer. ★ Employment. Employment of local labour will be a positive impact of the project and will be encouraged. <p>2. Biodiversity/Loss of Vegetation. Removal of vegetation will be keep to a minimum throughout the project.</p> <ul style="list-style-type: none"> ★ Agriculture: Agricultural lands in the area are highly transformed monocultures, namely sugarcane. Biodiversity losses are likely to be insignificant. ★ Road reserves. A significant length of the pipeline would traverse road servitudes or would align with road reserves. These areas are highly transformed with a significant amount of alien vegetation. Removal of this alien vegetation will have a positive impact on biodiversity and can be considered another positive impact of this project. The area will be rehabilitated with indigenous vegetation post-construction. ★ Grasslands. These areas will be rehabilitated to blend in with the surrounding habitat and minimize the impacts on biodiversity. 	<p>Same as S1</p>	<p>Same as S1</p>
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<ul style="list-style-type: none"> ★ Indigenous plants. Indigenous plants will be removed and planted in suitable areas outside the project working boundary. ★ Loss of habitat for fauna. Construction time will be kept to a minimum followed by speedy rehabilitation to restore habitat and biodiversity integrity. ★ Fauna. Potential loss of small mammals and birds. Illegal hunting of animals will be prohibited through out the project life cycle. ★ Fire. Lighting of fires will not be encouraged. Safety rules will apply during construction. <p>All activities including traffic, site clearing, site camps, and excavation activities will be limited to construction working boundary that will be clearly demarcated.</p> <ul style="list-style-type: none"> ★ The removal and clearing of vegetation will not be allowed until an approval is obtained from the Environmental Control Officer. ★ The imported sand used for bedding materials will be free of alien seeds and will not be taken from alien infested riverbeds. ★ Once the construction is completed, the area will be rehabilitated with indigenous grasses to blend in with the surrounding area. <p>3. Land/excavation</p> <ul style="list-style-type: none"> ★ Soil profile. The top soil will be removed and stockpiled separately from the subsoil. After construction the integrity of the soil profile will be restored by first filling with subsoil, followed by topsoil. ★ Erosion of stockpiles and exposed steep slopes. To reduce erosion from stockpiles they will be grassed or suitable alternatives to contain the stockpiles will be investigated. Steep slopes will be stabilised with appropriate measures such as gabion baskets. All areas will be rehabilitated and grassed to minimize soil erosion. ★ Safety. To minimize safety risks, the route will be excavated the pipeline will be laid in manageable sections (less than 500m in length) and open excavation will be marked with danger tape. <p>4. Water</p> <p>River/stream Crossings.</p> <p>The proposed method statement for river/stream crossings has been approved by the Department of Water Affairs and Forestry (Appendix G3). Also, see method statement for river/stream crossing (Appendix G2). To further minimize impacts:</p> <ul style="list-style-type: none"> ★ Crossing of the rivers and streams will take place during dry seasons (April to September). ★ The duration spent during construction of river crossings will be kept as short as possible. ★ A provision will be made in the EMP for proper rehabilitation of the river/stream crossings. ★ The river health and water quality will be monitored before, during and after construction with the view of restoring water quality to the baseline (Appendix G7). <p>Storm Water Drains. All storm drains along the route of the pipeline will be restored after construction has been completed.</p> <p>5. Access/Traffic</p> <p>Access roads. The landowner/occupier will be notified of construction activities that would impede access. In consultation, alternative access will be provided.</p> <p>Disturbance to traffic.</p> <ul style="list-style-type: none"> ★ The road crossings of the major roads such as R33 and R614 will be achieved by pipe-jacking. This would reduce the impact on traffic and minimal traffic disruptions are expected. ★ Ensure that the construction vehicles make use of existing gravel and tarred roads, and that these are upgraded and maintained as necessary. ★ For the smaller roads excavation will only happen during the day time and one lane will be left open at all times to allow for the flow of traffic. ★ Ensure appropriate consultation with landowners regarding the use of private roads. ★ Observe all the regulations relating to traffic management especially speeding. <p>6. Waste</p>		
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<p>Litter and Waste Pollution. Suitable waste disposal facilities will be provided including bins and regular collection and removal of waste to an approved waste disposal site.</p> <ul style="list-style-type: none"> ★ The construction phase of the project will be monitored by the ECO to ensure compliance with EMP requirements. <p>7. Air</p> <ul style="list-style-type: none"> ★ Dust pollution will be minimized by spraying water in the exposed areas e.g. dirt roads. ★ The number of trips made by construction vehicles will be minimized to reduce air pollution. ★ Burning of refuse onsite will be prohibited to prevent fire hazards. <p>8. Noise Disturbances.</p> <p>To reduce the impact of the noise associated with the construction activities, construction will be restricted to weekdays (Monday to Saturday) between 7am and 17:30pm in the afternoon. The EMP will provide for the monitoring of noise and a complaints register will be made available in all construction sites for the residents to raise their concerns should the noise levels become unacceptable.</p> <p>An alternate route was proposed and agreed by the landowner, to avoid potential noise impacts on the breeding cycle of his birds.</p>		
Alternative L2		
<p>Same as for L1</p> <p>The most appropriate mitigation for the issues listed below was to find a better route for the pipeline which the preferred option (alternate 1).</p> <p>Potential for:</p> <ul style="list-style-type: none"> ★ Wetland functionality to be compromised at Honeyglen Farm and Efaye offtake (Appendix A. Maps 10 & 11). ★ Existing service infrastructure could be compromised – Eskom power lines (Appendix A. Map 6). ★ Existing infrastructure to be compromised at Dalton town. ★ Archaeological/cultural characteristics, such as gravesites, to be damaged en-route to Nadi reservoir. 		
Alternative L3		
<p>Same as for L1</p> <p>The most appropriate solution to avoid potential of soil erosion and rehabilitation problems of the steep slope (at Claridge, route via Hofmeyers) is to use another route for the pipeline, the preferred route (alternate 1).</p>		

4. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

c. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Alternative S1 (preferred alternative)

Direct impacts:

In the operation stages of the project minimal impacts are expected. However some minor impacts have been highlighted:

- 1. Noise.** Noise from the operation of the pump stations is expected.

2. Visual impacts will be attributed to pump stations and reservoirs.

3. Flooding -

- ★ In the event of leaks in either the storage reservoirs, the possible impact would be flooding of the local area.
- ★ Possible flooding and erosion might result from reservoir overflow.

4. Umgeni Water will acquire the servitude in and around the reservoirs and pumpstations, and hence no developments will be allowed in this servitude.

5. Loss of agricultural land in the reservoirs and pump station sites. The vegetation in these areas will be cleared on a regular basis as part of planned maintenance program.

6. Biodiversity. Weeds and Alien vegetation are likely to thrive during and after the rehabilitation process.

Indirect impacts:

- ★ Limits road development since the servitude will be registered as Umgeni Water's and hence other developments will be prohibited.
- ★ Support subsistence and commercial farming in the intended areas and hence unlocking agricultural potential of the intended recipients.

Cumulative impacts:

- ★ Additional water infrastructure and enhanced surety of potable water supply.
- ★ Enabling additional growth and development in the intended areas.
- ★ Unlocking economic potential of the intended areas, by providing potential investors with reliable water supply.

Alternative S2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative S3 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

If the project is not undertaken, assurance of potable water supply to Ozwathini and Efaye areas will be compromised. The water supply in the intended areas will remain inadequate and the affected municipalities will not be able to reduce their water service backlogs.

Indirect impacts:

Poor living conditions.

Cumulative impacts:

Increased morbidity and poverty.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	Alternative S2	Alternative S3
<p>1. Noise. For the pump stations, an "Environmental Noise Measurement and Rating Survey" will be conducted in accordance with SANAS 10103-2004 requirements. Efforts will be made to ensure alignment with the code of practice for 'Measurement and Rating of Environmental Noise with respect to Land Use, Health, Annoyance and to Speech Communication.'" In addition, The pumps in their operational phase would generate some noise. It is anticipated, however, that this noise will be minimal and where necessary the pump station structures will be sound-insulated to reduce noise levels to meet the specified limits.</p> <p>2. Visual impacts- Pump stations and reservoirs will be painted with suitable colours to blend with the surrounding environment. Where it is deemed necessary vegetation will be used to screen the pump stations and the reservoirs.</p> <p>3. Flooding – Annual environmental audits will be conducted to assess potential environmental impacts.</p> <ul style="list-style-type: none"> ★ Regular maintenance will be scheduled for all Umgeni Water facilities to minimize incidences of this nature. ★ In the event of controlled flooding communities will be made aware of 	<p>Same as S1</p>	<p>Same as S1</p>

<p>potential impacts.</p> <ul style="list-style-type: none"> ★ After flooding appropriate rehabilitation measures will be employed. ★ Scour release valves will be positioned such that erosion is minimized. In difficult areas gabion baskets will be used as anti-erosion measures. <p>4. Umgeni Water servitude- an application will be made to the relevant service providers and this infrastructure will be integrated into their future developmental needs.</p> <p>5. Loss of agricultural land. Where appropriate farmers will be allowed use of the servitude for continuous production of their crops provided that the farming activities do not compromise the integrity of the pipeline.</p> <p>6. Biodiversity. Weeds and alien vegetation along the pipeline route will be cleared on regular basis as part of routine maintenance.</p> <p>In addition, an operational phase EMP, identifying detailed impacts and mitigation, will be prepared before the Operational Phase commences.</p>		
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d. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Impacts associated with layout/route alternative Alternative L1 (preferred alternative)

Direct impacts:

In the operation stages of the project minimal impacts are expected since the pipeline would be buried underground and would not have significant impacts. However some minor impacts have been highlighted:

1. Noise. Noise from the operation of the pump stations is expected.

2. Visual impacts will be attributed to markers (white concrete markers that outline the pipeline route), valve chambers, air chambers, scour chambers, pump stations and reservoirs.

3. Flooding -The proposed pipeline will have scour releases valves at scour release points. A typical scour is presented in **Appendix F1**. The proposed number of scour release valves are as follows:

- From Claridge to Wartburg: 19 Scours.
- Wartburg to Dalton : 14 Scours.
- Dalton to Ozwatini : 33 Scours.
- Fawn Leas to Efaye :13 Scours.

The possible environmental impacts from these valves are flooding of the areas in the direction of the valve.

- ★ In the event of leaks in either the pipeline or the storage reservoirs, the possible impact would be flooding of the local area.
- ★ Possible flooding and erosion might result from reservoir overflow.

4. Umgeni Water will acquire the servitude in and around the pipeline and associated facilities, and hence no developments will be allowed in this area. As the pipeline is built on the roadside it might hamper road infrastructure developments in the future.

5. Loss of agricultural land in the reservoirs, pump station sites and pipeline servitude. The vegetation in the areas situated on top of the pipe servitude will be cleared on regular basic as part of planned maintenance program.

6. Biodiversity. Weeds and Alien vegetation are likely to thrive during and after the rehabilitation process.

Indirect impacts:

- ★ Limits road development since the servitude will be registered as Umgeni Water's and hence other developments will be prohibited.
- ★ Support subsistence and commercial farming in the intended areas and hence unlocking agricultural potential of the intended recipients.

Cumulative impacts:

- ★ Additional water infrastructure and enhanced surety of potable water supply.
- ★ Enabling additional growth and development in the intended areas.
- ★ Unlocking economic potential of the intended areas, by providing potential investors with reliable water supply.

Alternative L2 (if any)

Direct impacts:

As for L1

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Indirect impacts:
Cumulative impacts:

Alternative L3 (if any)
Direct impacts:
As for L1
Indirect impacts:
Cumulative impacts:

No-go alternative (compulsory)
Direct impacts:
If the project is not undertaken, assurance of potable water supply to Ozwathini and Efaye areas will be compromised. The water supply in the intended areas will remain inadequate and the affected municipalities will not be able to reduce their water service backlogs.
Indirect impacts:
Poor living conditions.
Cumulative impacts:
Increased morbidity and poverty.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative L1	Alternative L2	Alternative L3
<p>1. Noise. For the pump stations, an “Environmental Noise Measurement and Rating Survey” will be conducted in accordance with SANAS 10103-2004 requirements. Efforts will be made to ensure alignment with the code of practice for ‘Measurement and Rating of Environmental Noise with respect to Land Use, Health, Annoyance and to Speech Communication.” In addition,</p> <ul style="list-style-type: none"> ★ The wall of the pump stations will be insulated to reduce noise levels to within acceptable levels. ★ The pump station positions have been selected to avoid social and environmental impacts. <p>2. Visual impacts- Pump stations and reservoirs will be painted with suitable colours to blend with the surrounding environment. The impact associated with the markers, valve chambers, air chambers, and scour chambers is minimal since these occupy small areas. Where it is deemed necessary vegetation will be used to screen the pump stations and the reservoirs.</p> <p>3. Flooding – Annual environmental audits will be conducted to assess potential environmental impacts.</p> <ul style="list-style-type: none"> ★ Regular maintenance will be scheduled for all Umgeni Water facilities to minimize incidences of this nature. ★ In the event of controlled flooding communities will be made aware of potential impacts. ★ After flooding appropriate rehabilitation measures will be employed. ★ Scour release valves will be positioned such that erosion is minimized. In difficult areas gabion baskets will be used as anti-erosion measures. <p>4. Umgeni Water servitude- an application will be made to the relevant service providers and this pipeline will be integrated into their future developmental needs.</p> <p>5. Loss of agricultural land. Where appropriate farmers will be allowed use of the servitude for continuous production of their crops provided that the farming activities do not compromise the integrity of the pipeline.</p> <p>6. Biodiversity. Weeds and alien vegetation along the pipeline route will be cleared on regular basis as part of routine maintenance.</p>	<p>Same as L1</p>	<p>Same as L1</p>

5. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

e. Site and layout alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

Alternative S1 (preferred alternative)

Direct impacts:

The infrastructure associated with the proposed pipeline, pump station and reservoirs is comprised of relatively inert materials (concrete, Steel, HDPE) the residual risks associated with decommissioning will be negligible. If decommissioning occurs then the decision of whether to remove or leave the infrastructure in situ will have to be made. The above ground infrastructure such as reservoirs and pump stations may have to be demolished and the subject area rehabilitated, whilst the pipeline would probably be left in situ.

Impacts on Air quality - Dust during the removal of infrastructure such as the pump stations and reservoirs.

Indirect impacts:

Opportunity cost for the land and funds that would have been invested in other activities.

Cumulative impacts:

None identified

Alternative S2

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative S3

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Should the pipeline, reservoir or pumpstation be deem unfit for further use, then continued use could lead to:

- ★ Operations of the system being compromised;
 - ★ Water service delivery could be compromised;
- In addition, this could have negative financial implications for Umgeni Water

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative L1 & S1

Alternative L2 & S2

Alternative L3 & S3

The servitude can be de-registered in favour of another party; the risks associated with the submerged pipeline will also be passed on to the new party.

Impacts on Air quality – spray exposed areas with water to minimize dust.

In addition, a decommissioning phase EMP, with details of impacts and mitigation measures, will be prepared before the development is decommissioned.

6. PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative L1&S1 (preferred)	Alternative L2 & S2	Alternative L2 & S3																														
<p>Monitoring an auditing of the impacts would be the same for all alternatives for sites and layouts.</p> <p>Umgeni Water's environmental management systems will be adhered to, to ensure that the impacts resulting from the company activities are identified, prevented or mitigated if unavoidable, during all phases of the project lifecycle. For the duration of the construction phase a designated Environmental Control Officer will be appointed by Umgeni Water conduct all monitoring activities associated with the project.</p>																																
<table border="1"> <thead> <tr> <th>Action</th> <th>Responsibility</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Construction Phase EMP. The construction phase EMP will be incorporated into the project specifications and will cover all impacts identified in the specialist studies as well as the requirements of the "environmental authorization". Details for mitigation will be clearly discussed.</td> <td>UW Scientist/ Project Manger</td> <td>Prior to project initiation</td> </tr> <tr> <td>Monitoring and Auditing. The construction will be monitored and audited against the EMP as well as Umgeni Water specifications for construction. This will be undertaken by regularly by the appointed ECO and monthly reports will be provided to the project manager.</td> <td>ECO, Project Manager and Contractor.</td> <td>Weekly</td> </tr> <tr> <td>Environmental awareness. As a minimum requirement all contractors will be required to familiarize themselves with the EMP. The contractor will ensure that all staff and labourers undergo necessary environmental training.</td> <td>ECO, Contractor</td> <td>Project commencement</td> </tr> <tr> <td>Surface Water, river stream crossings. For stream crossings the ECO will be present to ensure compliance with the agreed stream crossing method statement, approved by DWAF. Compliance with the recommendation from the specialist studies for Umgeni river crossing incorporated into the project specifications / EMP will be monitored on regular basis by the ECO.</td> <td>ECO. Contractor</td> <td>Twice a week</td> </tr> <tr> <td>Surface Water monitoring and auditing. The potential impacts of the construction on river health will be monitored quarterly and monthly for water quality.</td> <td>ECO, Environmental Officer</td> <td>Quarterly/monthly</td> </tr> <tr> <td>An operational phase EMP will be prepared by the ECO and provided to the Operations staff to comply with.</td> <td>ECO, SHEQ co-ordinator</td> <td></td> </tr> <tr> <td>During the operation stage of the pipeline Umgeni Water artisans conducts inspection of the pipeline and its related facilities to identify all defects and rectify them accordingly.</td> <td>UW Operations division</td> <td>Twice a year</td> </tr> <tr> <td>The Engineering & Scientific Services will conduct environmental audits for the pipelines and its infrastructure, annually. The environmental non-compliances are reported and rated in terms of their significance. These will then be attended according to priority.</td> <td>UW Scientific services</td> <td>Annually</td> </tr> <tr> <td>Decommissioning phase EMP. In the event that Umgeni Water decides to decommission the pipeline, reservoirs or pumpstations, a decommissioning phase EMP will be prepared with appropriate mitigation measure to minimize impacts during this phase of the project lifecycle.</td> <td>Scientist, environmental officer</td> <td>When required</td> </tr> </tbody> </table>			Action	Responsibility	Frequency	Construction Phase EMP. The construction phase EMP will be incorporated into the project specifications and will cover all impacts identified in the specialist studies as well as the requirements of the "environmental authorization". Details for mitigation will be clearly discussed.	UW Scientist/ Project Manger	Prior to project initiation	Monitoring and Auditing. The construction will be monitored and audited against the EMP as well as Umgeni Water specifications for construction. This will be undertaken by regularly by the appointed ECO and monthly reports will be provided to the project manager.	ECO, Project Manager and Contractor.	Weekly	Environmental awareness. As a minimum requirement all contractors will be required to familiarize themselves with the EMP. The contractor will ensure that all staff and labourers undergo necessary environmental training.	ECO, Contractor	Project commencement	Surface Water, river stream crossings. For stream crossings the ECO will be present to ensure compliance with the agreed stream crossing method statement, approved by DWAF. Compliance with the recommendation from the specialist studies for Umgeni river crossing incorporated into the project specifications / EMP will be monitored on regular basis by the ECO.	ECO. Contractor	Twice a week	Surface Water monitoring and auditing. The potential impacts of the construction on river health will be monitored quarterly and monthly for water quality.	ECO, Environmental Officer	Quarterly/monthly	An operational phase EMP will be prepared by the ECO and provided to the Operations staff to comply with.	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7. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to their type, likelihood, duration and the significance.

Alternative L1 (preferred pipeline route and preferred reservoir and pump station sites)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts			
	Implication	Proposed Mitigation	Significance before mitigation	Probability	Duration	Significance after mitigation
Topography	Placement of reservoirs, pump station, marker posts and the pipeline with result in alteration of the existing topography.	The pipeline and other facilities have been positioned in areas that will minimise the impacts. Small trees and shrubs will be planted around the reservoirs to blend in with the surrounding area. Note. Markers are often camouflaged by the surrounding sugarcane crops that grow taller than the markers, hiding them.	Medium	High	Long term	Low
Geology and soil	Erosion of steep slope. Dust from Construction. Erosion of top soil	Clear shortest possible distances and construct immediately. The rehabilitation should follow immediately after construction. Watering of roads, topsoil and spoil areas during construction. Employ anti erosion measures.	Low	Medium	Short term	Low
Water Resources	River and stream crossing will be disturbed	The flow of the river will not be inhibited during construction; a cofferdam will be constructed in the streams during crossings, as per method statement for river and stream crossings.	Medium	Medium	Short term	Low
Fauna	Disturbances related to construction activities	All affected areas will be rehabilitated after construction to restore habitat for fauna.	Medium	High	Medium term	Medium
Flora	Loss of vegetation during construction	All threatened species will be avoided. The biodiversity assessment report will guide appropriate mitigation. A competent ECO will oversee the clearing and removal of all vegetation in the pipeline route.	Medium	High	Medium term	Medium
Waste	Disposal of construction waste and general domestic waste.	★ Waste bins will be provided and all waste will be disposed off to a designated landfill site ★ Construction spoil will be disposed off at designated spoil sites.	Low	Site Specific	Short term	Low
Air Quality	Dust from construction and driving in dirt roads.	Watering of roads, topsoil and spoil areas will be undertaken during construction.	Low	Site Specific	Short term	Low
Visual & Aesthetic Aspects	Visual	The reservoirs and Pump stations will be painted with suitable colours to blend with the surrounding environment and where appropriate trees and shrubs will be planted to blend in with the surrounding environment.	Medium	High	Long term	High
Socio Economic impacts	Job creation Provision of sustainable water supply (and reduction of water service backlogs)	These are the positive impacts of the project.	High	High	Long term	High

Alternative L2 (alternate pipeline route and alternate pump station sites)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts			
	Implication	Proposed Mitigation	Significance before mitigation	Probability	Duration	Significance after mitigation
Topography	Placement of reservoirs, pump station, marker posts and the pipeline with result in alteration of the existing topography.	The pipeline and other facilities have been positioned in areas that will minimise the impacts. Small trees and shrubs will be planted around the reservoirs to blend in with the surrounding area. Note. Markers are often camouflaged by the surrounding sugarcane crops that grow taller than the markers, hiding them.	Medium	High	Long term	Low
Geology and soil	<ul style="list-style-type: none"> ★ Erosion of steep slope. ★ Dust from Construction. ★ Erosion of top soil 	<ul style="list-style-type: none"> ★ Clear shortest possible distances and construct immediately. The rehabilitation should follow immediately after construction. ★ Watering of roads, topsoil and spoil areas during construction. ★ Employ anti erosion measures. 	Low	Medium	Short term	Low
Water Resources	River and stream crossing will be disturbed	The flow of the river will not be inhibited during construction; a cofferdam will be constructed in the streams during crossings, as per method statement for river and stream crossings.	Medium	Medium	Short term	Low
	Wetland functionality will be compromised	<ul style="list-style-type: none"> ★ The pipeline should be re-routed. ★ Plants will be rescued by hand and not an excavator ★ Wetland will be rehabilitated 	High	High	Medium to long term	Medium
Fauna	Disturbances related to construction activities	All affected areas will be rehabilitated after construction to restore habitat for fauna.	Medium	High	Medium term	Medium
Flora	Loss of vegetation during construction	<ul style="list-style-type: none"> ★ All threatened species will be avoided. ★ The biodiversity assessment report will guide appropriate mitigation. ★ A competent ECO will oversee the clearing and removal of all vegetation in the pipeline route. 	Medium	High	Medium term	Medium
Waste	Disposal of construction waste and general domestic waste.	<ul style="list-style-type: none"> ★ Waste bins will be provided and all waste will be disposed off to a designated landfill site ★ Construction spoil will be disposed off at designated spoil sites. ★ Surplus excavated soil could be used to rehabilitate areas along the pipeline where there is erosion. 	Low	Site Specific	Short term	Low
Air Quality	Dust from construction and driving in dirt roads.	Watering of roads, topsoil and spoil areas will be undertaken during construction.	Low	Site Specific	Short term	Low
Visual & Aesthetic Aspects	Visual	The reservoirs and Pump stations will be painted with suitable colours to blend with the surrounding environment and where appropriate trees and shrubs will be planted to blend in with the surrounding environment.	Medium	High	Long term	High
Socio Economic impacts	Job creation. Provision of sustainable water supply (and reduction of water service backlogs)	These are the positive impacts of the project.	High	High	Long term	High
Heritage	Community grave sites could be compromised	Pipeline should be re-routed	High	High	Long term	low

Alternative L3 (alternate pipeline route)

Environmental Aspect	Summary of Implications and Mitigation		Assessment of Environmental Impacts			
	Implication	Proposed Mitigation	Significance before mitigation	Probability	Duration	Significance after mitigation
Topography	Placement of reservoirs, pump station, marker posts and the pipeline with result in alteration of the existing topography.	The pipeline and other facilities have been positioned in areas that will minimise the impacts. Small trees and shrubs will be planted around the reservoirs to blend in with the surrounding area. Note. Markers are often camouflaged by the surrounding sugarcane crops that grow taller than the markers, hiding them.	Medium	High	Long term	Low
Geology and soil	<ul style="list-style-type: none"> ★ Erosion of steep slope. ★ Dust from Construction. ★ Erosion of top soil 	<ul style="list-style-type: none"> ★ Clear shortest possible distances and construct immediately. The rehabilitation should follow immediately after construction. ★ Watering of roads, topsoil and spoil areas during construction. ★ Employ anti erosion measures. 	Low	Medium	Short term	Low
Fauna	Disturbances related to construction activities	All affected areas will be rehabilitated after construction to restore habitat for fauna.	Medium	High	Medium term	Medium
Flora	Loss of vegetation during construction	<ul style="list-style-type: none"> ★ All threatened species will be avoided. ★ The biodiversity assessment report will guide appropriate mitigation. ★ A competent ECO will oversee the clearing and removal of all vegetation in the pipeline route. 	Medium	High	Medium term	Medium
Waste	Disposal of construction waste and general domestic waste.	<ul style="list-style-type: none"> ★ Waste bins will be provided and all waste will be disposed off to a designated landfill site Construction spoil will be disposed off at designated spoil sites.	Low	Site Specific	Short term	Low
Air Quality	Dust from construction and driving in dirt roads.	Watering of roads, topsoil and spoil areas will be undertaken during construction.	Low	Site Specific	Short term	Low
Visual & Aesthetic Aspects	Visual	The reservoirs and Pump stations will be painted with suitable colours to blend with the surrounding environment and where appropriate trees and shrubs will be planted to blend in with the surrounding environment.	Medium	High	Long term	High
Socio Economic impacts	Job creation. Provision of sustainable water supply (and reduction of water service backlogs)	These are the positive impacts of the project.	High	High	Long term	High
Heritage	Havelock bridge structure and aesthetic appearance may be compromised.	Permit applications would be lodged to DOT and if approval is obtained, construction will be undertaken as per conditions of the permit.	Medium	High	Long term	Medium

No-go alternative (compulsory)

- ★ *Municipalities would be unable to reduce Water service backlogs in the Efaye and Ozwathini Areas.*
- ★ *Water supply from the existing water service infrastructure (e.g. to Wartburg and Dalton) would not be assured.*
- ★ *Potential for development along the route would be compromised due to lack of assurance of water supply services.*
- ★ *Community/public health will be compromised in areas where communities are still reliant on water from rivers, stream, and boreholes.*
- ★ *Socio-economic conditions in the project area would be compromised due to lack of water services.*

8. 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

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):

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. Assessment of the Alternatives.

Alternative sites for reservoirs and pump stations

- ★ S1 would have the least environmental and social impacts and is therefore the preferred option for sites.
- ★ S2 could have some social issues that could be mitigated.
- ★ S3 could have some social issues that could be mitigated.

Layout or Route Alignments

L1 – this route has been realigned to avoid wetlands, heritage sites, existing infrastructure and landowner activities. This route will have the least environmental and social impacts and is the preferred route.

L2 – this route will have environmental and social impacts with wetland functionality being compromised at Fawn Leas and Honey Glen as well as and grave sites being compromised en-route to the Nadi-Mvoti reservoir in the Efaye Area) being compromised. This route is therefore not preferred.

L3 – this route will have heritage impacts (Havelock bridge), environmental impacts (steep slope at Hofmeyers in Claridge; birds at Arnold's Farm) as well as social impacts (Hofmeyer's Farm) and is therefore not preferred.

2. EMP. The impacts identified during this basic assessment study was assessed and a draft environmental management plan (see attached) has been submitted to DAEA for review.

3. Suggested Specific conditions for the Environmental Authorisation

- ★ The environmental Management Plan must be amended and submitted to DAEA for approval prior to the commencement of the construction.
- ★ The environmental control officer must be appointed on a full time basis to monitor the requirements of the EMP.
- ★ The environmental audit reports for the construction of the development must be submitted to DAEA on a monthly basis.
- ★ River health assessments must be undertaken at the Umgeni, Mlalaan, Fortmanns Spruit, Waterfall rivers before, during and after construction. The findings of the assessment must be submitted to DAEA for record purposes.
- ★ Water quality monitoring must be taken before, during and after construction and the findings submitted to DAEA for record purposes.
- ★ All wetlands must be avoided and where they cannot be avoided altogether, the impacts must be minimised as wetlands are characterised by high biodiversity and perform important ecological functions. Measures to minimise impacts in such areas must be included in the EMP.
- ★ The terms and conditions of DWAF's general authorisation for river crossings must be adhered to and included in the EMP.
- ★ All indigenous trees in the proposed pipeline route must be marked prior to the construction phase to prevent unnecessary removal.
- ★ All invasive alien plants in the pipeline servitude must be eradicated and replaced with indigenous vegetation.
- ★ The maximum open trench of the proposed bulk pipeline must be limited to 1km at any given time during the construction. The open trench in sensitive areas such as steep slopes must be back filled as soon as the pipe has been installed. Backfilling and rehabilitation must take place immediately after pipe installation is complete.
- ★ The open trenches and construction servitude must be demarcated using red tape to ensure safety of humans and other animals. A construction safety plan must be prepared in line with the Occupation Health and Safety Act. Provision must be made for a full time safety office during construction. This must be included in the EMP and part of the contractor's terms of reference.
- ★ The fill material to be used in the trenches must be obtained from a source approved by the Department of Mineral and Energy. Proof of provenance of this material must be available on site.
- ★ Excess backfill material and larger rocks (spoil) must be disposed off at an appropriate spoil site identified by the

geotechnical assessment or alternatively at a licensed landfill site.

- ★ Consent for jacking und the railway lines must be obtained from Spoornet prior to commencement of the proposed development.
- ★ Consent to disturb/destroy the assets on any of the affected properties must be sought from the landowners prior to the commencement of construction activities.
- ★ Should it become necessary to use heritage sites such as the Havelock Bridge then Amafa aKwaZulu-Natali must be notified and consent obtained from the Department of Transport.
- ★ In accordance with the KwaZulu-Natal heritage Act, Act no. 10 of 1997, Amafa aKwaZulu-Natali must be notified should any cultural material is discovered during the course of the development. All work at the point of discovery must cease until Amafa has given approval to continue with the construction.

APPENDICES

Appendix A: Schematic Diagram of Project Layout and Sites

Appendix A1: Map 1. Pipeline Alignment – Entire Project

Appendix A2: Map 2. Pipeline Alignment – Claridge to Wartburg

Appendix A3: Map 3. Pipeline Alignment – Wartburg to Dalton

Appendix A4: Map 4. Dalton to Ozwathini with Offtake to Efaye

Appendix A5: Map 5. Claridge and Alternative Pipeline Alignments

Appendix A6: Map 6. Pipeline Alignment and Alternative along the Eskom Line

Appendix A7: Pipeline from Greytown Road to Wartburg along the R614, showing alternatives at the Umgeni River Crossing and Arnold's Farm

Appendix A8: Map 8. Pipeline Alignment through Wartburg Town with Alternative.

Appendix A9: Map 9 Pipeline Alignment at Dalton Town with alternative.

Appendix A10: Map 10. Pipeline Alignment at Honey Glen (Clantrock) Farm with Alternative.

Appendix A11: Pipeline Alignment at Fawn Leas

Appendix A12: Map 12 Pipeline Alignment at Appelsbosch with Alternative

Appendix A13: Termination of Pipeline at Nondabula Reservoir in Ozwathini

Appendix A14: Termination of Pipeline at Nadi-Mvoti Reservoir in Efaye

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix C1. Co-ordinates of pipeline (every 250m)

Appendix D1: Specialist reports – Biodiversity Assessment

Appendix D2: Specialist reports – Heritage Assessment

Appendix D3: Graphs of Gradients.

Appendix E: Details of the public participation process including the comments and responses report

Appendix E1: Public Participation Report

Appendix E2: Comments and Responses Report

Appendix E3: Correspondence to Umgungundlovu DM

Appendix E4: Correspondence to Ilembe DM

Appendix E5: Correspondence with Ingonyama Trust

Appendix E6: Correspondence with Spoornet

Appendix E7: Correspondence with the Department of Transport – Bridge crossings

Appendix E8. Correspondence with Umshwati Municipality

Appendix E9: Correspondence with Telkom

Appendix E10: Liaison Meeting Minutes – Umgungundlovu DM

Appendix E11. Correspondence from DAEA – Landowner consent forms

Appendix F1: Typical Scour Valve

Appendix G: Other information

Appendix G1: Exemption Notice (from DAEA)

Appendix G2: River/Stream Crossings – Method Statement

Appendix G3: Correspondence to DWAF – Approval for river stream crossings.

Appendix G4: Correspondence to Municipalities

Appendix G5: Correspondence to AMAFA

Appendix G6: Correspondence to E-KZN Wildlife

Appendix G7: River Health and Water Quality