Draft

Basic Assessment Report for the Proposed Vulindlela Bulk Water Supply (BWS) from Howick West to Reservoir 2, uMngeni Local and Umgungundlovu District Municipalities, KwaZulu-Natal

JANUARY 2020

Previous Application Department Reference: 14/12/16/3/3/1/2035

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The information in this report is based on information supplied by the client, Umgeni Water. All information is given in good faith; however, no physical testing or chemical analyses were performed by KSEMS Environmental Consulting Pty Ltd during the course of this assessment.

Although every effort was made to request and obtain all pertinent information for this assessment KSEMS Environmental Consulting Pty Ltd cannot be held accountable or accept responsibility for any discrepancies in this information or for the disclosure or review of information which has not been presented to the consultant. All reports presented to the consultant for review have been referenced.

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Tertiary Education: University of Natal, Durban
BSc (Hons) - Estuarine Ecology (Major), Urban Biogeography (Ecology) (Major) *MSc awarded cum laude*
Environmental Management and Open Space Planning Thesis *"Developing an Open Space System for the Queensburgh Municipal Area"*

Work Experience: 1993-1994 Queensburgh Municipality - Unofficial Environmental Advisor for duration of MSc
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1995-1998 Environment Branch, North and South Central Local Council- Professional Environmental Officer
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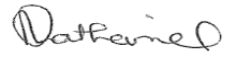
Compiled By:	**Patricia Nathaniel**	**November 2020**	
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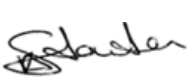
Reviewed and Approved By:	**Kerry Stanton**	**November 2020**	

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ABBREVIATIONS AND ACRONYMS

AMSL	Above Mean Sea Level
BID	Background Information Document
BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DAFF	Department of Forestry and Fisheries
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
I&AP	Interested and Affected Party
KSEMS	KSEMS Environmental Consulting
MAP	Mean Annual Precipitation
NEMA	National Environmental Management Act 107 of 1998
NWA	National Water Act
OHS	Occupational Health and Safety
PPP	Public Participation Process
PU	Planning Units

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EXECUTIVE SUMMARY

Introduction and Legal Requirements

Umgeni Water proposes to implement the Vulindlela Bulk Water Supply Scheme to increase supply to meet increasing water demand in the Vulindlela system and to improve pumping efficiencies with minimal impact on the environment. The proposed upgrade project will be an addition to the existing infrastructure supplying the Vulindlela area. The proposed project requires environmental authorisation from the national Department of Environment, Forestry and Fisheries (DEFF). KSEMS Environmental Consulting has been appointed as the independent Environmental Assessment Practitioner (EAP) by the project proponent, Umgeni Water, to undertake the Environmental Authorisation application process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) for the proposed Vulindlela BWS between Howick West and Reservoir 2, located within the Umngeni Local and Umgungundlovu District Municipalities of KwaZulu-Natal.

This report is a Basic Assessment Report (BAR) for construction of the Vulindlela BWS from Howick West to Reservoir 2, which will be submitted to the Department of Environment, Forestry and Fisheries (DEFF) as part of the requirements of the application for environmental authorisation. The report has been prepared in terms of the requirements of the Environmental Impact Assessment Regulations of 2014, as amended, published under the National Environmental Management Act, 1998 (Act No. 107 of 1998).

Project Background

The Vulindlela Water Supply Scheme (VWSS) covers approximately 280 square kilometres of area within the uMngeni and uMsunduzi Local Municipalities. The scheme was one of 12 National Presidential Lead Projects prioritised in 1994 under the Reconstruction and Development Program and was commissioned on 21 March 1998 by the then State President, Nelson Mandela. The demand for water is increasing, resulting in insufficient capacity and interrupted water supply problems within the region. Furthermore, the existing water resources in the region, particularly the areas which are supplied by the Mgeni System, have been severely impacted upon in recent months due to low water levels in the supplying dams which is further exacerbated by the current critical draught conditions.

The applicant (Umgeni Water) is thus investigating the option of constructing the VWSS Upgrade to meet these new demands and overcome water supply challenges. The proposal will comprise of the construction of the Vulindlela pipeline and associated pump station and storage reservoir infrastructure, from the existing Howick West pump station to the existing Reservoir 2.

Alternatives Considered

As the proposed Vulindlela Upgrade is proposed along existing infrastructure, no site alternatives were considered for this application. However, as per the EIA Regulations, 2014 as amended, the Basic Assessment (BA) process considered the proposed preferred alternative design layout as well as an alternative layout for the proposed Vulindlela pipeline route in an attempt to determine which layout could reduce the project footprint and associated impacts. Upon conducting an impact assessment with input from various specialists, it was determined that neither the preferred route, nor alternative route will have fatal impacts on the receiving environment. The alternative route will, however, have a greater direct impact on watercourses due to it having a greater construction footprint. The longer alternative route will also prove more costly to implement. As a result of the above findings, the preferred route will have less of an impact on watercourses and will be more economical to implement and is therefore the preferred option that is being applied for.

Umgeni Water have also considered technical alternatives that may enhance the project proposal, including the careful selection of the pipeline route, sizing of the pipe and placement of the pump stations, to allow the pumps to operate at an efficiency of greater than 80%. Although no energy alternatives are available to supply the pumps due to the power demand being too high, solar panels for the lighting in the pump stations are being considered.

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The no-go alternative would result in the demand for bulk potable water exceeding the supply. More significantly, the development needs of the local municipalities will not be realised as a result of a no-go alternative. If the activity is not implemented by Umgeni Water as proposed, the water supply in the area will remain at critically low levels which will result in the perpetuation of a lack of access to potable water for many households in the surrounding communities. This may result in households making use of non-treated water for drinking and sanitation purposes which may result in waterborne diseases and illnesses. Furthermore, the economy of the region will be negatively impacted upon due to the lack of proper service provision, and there will also be no jobs created if the activity is not implemented.

Public Participation

The proposal had previously been subjected to a full Public Participation Process (PPP) in 2016, including the placement of an advertisement in a local newspaper, erection of signboards along the study area, notification of Interested and Affected Parties (I&APs) to inform the public of the proposed activity, after which the Draft BAR had been distributed for a 30-day comment period. However, the application was subsequently withdrawn due to a lapse in the project timeline.

As the application is now being resubmitted, a new public participation process has been conducted, resulting in re-advertisement in a provincial newspaper "The mercury" to inform interested and affected parties that the application will be submitted to DEFF. Signboards were also erected along the proposed pipeline route containing details of the activity to be undertaken along with the contact details of the EAP with whom to register on the project. All I&APS that were previously registered on the project were also notified in writing of the same. Once the application is submitted, this Draft report will be distributed to all registered I&APs for a 30- day comment period, after which all comments will be addressed and the final report submitted to the competent authority for consideration.

Receiving Environment

The study site is predominantly comprised of urban township and grassland land uses (KSEMS, 2018) and was noted to be extensively transformed as a result of surrounding urban and rural settlements, as well as commercial and subsistence agricultural practices (McDonald, 2018). Several watercourses occur within the vicinity of the proposed Vulindlela BWS development that will be traversed by the pipeline, and which were recorded as ranging from being moderately modified, to seriously modified in condition, as a result of surrounding land use practices.

All risks to the environment can be adequately minimised if all mitigation measures presented within this BA report, the specialist reports and the Environmental Management Programme (EMPr), are effectively implemented.

Summary of the Impact Assessment Conducted

Subsequent to conducting an impact assessment with input from the various specialist reports it can be concluded that the most noticeable impacts associated with both the preferred and alternative routes, include the clearing of vegetation resulting in a loss of natural habitat and biodiversity along with an increased risk of erosion due to the exposure of bare soil, and construction activity within watercourses.

The clearance of vegetation may result in a loss of habitat for fauna and flora within the study area, and acts as a disturbance which may also facilitate the establishment of alien/invasive plant species, thereby resulting in transformation of the natural habitat and a loss of biodiversity. Impacts associated with vegetation clearance can be reduced by ensuring that contractors are trained in minimising disturbance of vegetation, by undertaking clearing activities in a phased approach, by keeping the development footprint to a minimum, and by rehabilitating disturbed areas with indigenous vegetation.

Several species protected under the provincial conservation ordinance were identified along the preferred and alternative route, which will require an application for a permit for their removal or relocation from Ezemvelo KZN Wildlife, including:

- *Aloe maculata*
- *Aristea* species
- *Boophone disticha*

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- *Crinum bulbispermum*
- *Gladiolus* species
- *Kniphofia* species
- *Ledebouria* species

Construction within watercourses may result in a loss of biodiversity, alteration/ reduction in the hydrological functional area of watercourses and an associated reduction in the provision of ecosystem services. There is also a risk of contamination of water resources. The impacts on watercourses can, however, be reduced by ensuring that the construction footprint is kept to a minimum to limit activity within watercourse systems, and by ensuring adequate erosion control measures are implemented. It is also important that the pipelines be inserted to ensure that the diversion allows for sufficient water to feed through the affected systems.

Although the alternative route was marginally favoured by the ecological specialist due to this route traversing erosion prone soils along its mid-reach, the preferred route was favoured by the wetland specialist due to the reduced construction footprint and associated area of impact. All specialists have, however, concluded that the preferred route can be implemented condition that the provided mitigation measures are implemented. The preferred route will not result in any fatal impacts. Furthermore, the preferred route will allow for greater capex savings and lower power requirements. As such, the preferred route is recommended by the EAP.

Although the no-go alternative would be favourable from an environmental perspective due to no impacts occurring, it is not feasible from a social perspective as the demand for bulk potable water would exceed the supply. More significantly, the development needs of the local municipalities will not be realised as a result of this no-go alternative. If the activity is not implemented by Umgeni Water as proposed, the water supply in the area will remain at critically low levels which will result in the perpetuation of a lack of access to potable and palatable water for many households in the surrounding communities. This may result in households making use of non-treated water for drinking and sanitation purposes which may result in waterborne diseases and illnesses.

Conclusion and EAP Impact Statement

Subsequent to conducting the aforementioned impact assessment with the input from the various specialist reports it can be concluded that no potentially fatal impacts will occur as a result of the proposed development being constructed for either the preferred or alternative route. The preferred route is favourable from an environmental, social and economic perspective and is therefore the route being applied for. However, it will be essential for all the avoidance and mitigation measures that have been presented within the relevant specialist studies and Environmental Management Programme (EMPr) to be strictly adhered to.

Further to the above, the proposed Vulindlela Bulk Water Supply Scheme forms an important component in meeting the increasing water demands of the region. The EAP is therefore of the opinion that authorisation be granted on condition that all mitigation measures are effectively implemented.

Recommendations

It is recommended by the EAP that the preferred route for the proposed Vulindlela Bulk Water Supply Scheme project be granted environmental authorisation based on the findings of the BA process and supporting specialist studies, on condition that all mitigation measures presented within this BAR, specialist reports, and EMPr, are effectively implemented and monitored by an independent Environmental Control Officer (ECO). Additionally, the site manager must ensure that the EMPr (Appendix F) is used as a guide for all on-site activities. Furthermore, to reduce the cumulative impacts of the proposed development the construction site must be remediated in strict accordance with the site-specific rehabilitation plan implemented by a rehabilitation specialist/expert (McDonald, 2018).

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TABLE OF CONTENTS

PHONE: 063 684 9195 FAX: 086 535 5281 CELL: 082 823 1844 E- MAIL: KSEMS@KSEMS.CO.ZA
PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

List of Figures

List of Tables

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
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1 INTRODUCTION

1.1 Project Background

1.1.1 Background to the proposed development

Umgeni Water (UW) is a state-owned business enterprise that operates within the South African legislative parameters of the Water Services Act (Act No. 108 of 1997), Public Finance Management Act (Act No. 1 of 1999) and Public Audit Act (Act No. 25 of 2004). The primary function of UW is to supply bulk potable water to its customers, comprising of seven municipalities in KwaZulu-Natal, namely:

- eThekwini Metropolitan Municipality
- iLembe District Municipality
- Sisonke District Municipality
- uMgungundlovu District Municipality
- Ugu District Municipality
- Msunduzi Local Municipality
- Uthukele District Municipality

Within the uMgungundlovu District Municipality, UW implemented the Vulindlela Water Scheme Supply (VWSS) to meet the increasing demand for water in the area. The VWSS covers approximately 280 square kilometres of area on land belonging predominantly to the Ingonyama Trust in the Msunduzi municipal area. The scheme was one of 12 National Presidential Lead Projects prioritised in 1994 under the Reconstruction and Development Program. The scheme was commissioned on 21 March 1998 by then State President, Nelson Mandela. Umgeni Water has identified the need for increased water supply to ensure that demand does not exceed supply, and so, is proposing to implement the Vulindlela Bulk Water Supply (BWS) upgrade.

The purpose of the proposed upgrade to the Vulindlela Bulk Water Supply is to increase supply to meet increasing water demand in the Vulindlela system and to significantly improve pumping efficiencies with minimal impact on the environment. The proposed upgrade project will be an addition to an existing system and infrastructure currently supplying the Vulindlela area.

This report is specific to the Vulindlela BWS Upgrade for the route extending between the Howick West Reservoir and Vulindlela Reservoir No.2. This Basic Assessment Report (BAR) will be submitted to the Department of Environment, Forestry and Fisheries, (DEFF) as part of the requirements of the application for environmental authorisation. The report has been prepared in terms of the requirements of the Environmental Impact Assessment Regulations of 2014 (as amended), published under the National Environmental Management Act, 1998 (Act No. 107 of 1998).

KSEMS Environmental Consulting has been appointed as the independent Environmental Assessment Practitioner (EAP) by Umgeni Water to undertake the Environmental Authorisation application process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) for the proposed construction of the Vulindlela Bulk Water Supply Scheme in the Umngeni Local and Umgungundlovu District Municipalities of KwaZulu-Natal (Figures 1 and 2).

1.1.2 Details of the Environmental Assessment Practitioner

According to the requirements of the NEMA, EIA Regulations GNR 326 of 2014 as amended, "An Environmental Assessment Practitioner (EAP) appointed in terms of regulation 16 (1) must be independent, have expertise in conducting environmental

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impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity".

KSEMS was appointed by Umgeni Water, to fulfil the role of the independent EAP to undertake the environmental authorisation process. The following tables contains the details of the EAP.

KSEMS was established in 1998 and has a record of undertaking independent environmental processes for a range of clients in compliance with the requirements of the various competent authorities. In this respect, we reiterate the declaration of independence made in the application form for this project assented to and lodged with the competent authority.

Table 1: EAP Contact Details

Contact Details	EAP
Business Name of EAP:	KSEMS Environmental Consulting Pty Ltd (KSEMS)
Name of EAP:	Kerry Stanton
Physical Address:	4 Woodville Lane, Summerveld, Assagay
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Postal Code:	3606
Telephone:	063 684 9195
E-mail:	stanton@ksems.co.za/ ksems@ksems.co.za
Cell:	082 823 1844
Fax:	086 535 5281

Names and details of the expertise of each representative of the EAP involved in the preparation of this report are provided in the table below. Curricula vitae of the EAP and EAP representatives are available in Appendix H of this report.

Table 2: Names and Details of the Expertise of each Representative of the EAP

Name of Representative of the EAP	Educational Qualifications	Professional Affiliations	Environmental Assessment Experience (Years)
Kerry Stanton	MSc awarded cum laude Environmental Management and Open Space Planning Thesis "Developing an Open Space System for the Queensburgh Municipal Area"	Environmental Assessment Practitioners of South Africa (EAPSA) and SACNASP Registered (400167/12).	23
Patricia Nathaniel	BSc (Hons) Geography and Environmental Management	NA	9
Simone Lewis	MSc Environmental Management awarded cum laude	NA	3

1.1.3 Description of the location of the activities

The pipeline follows the existing R617 provincial road for a portion of the route. Access to the proposed development will therefore be gained from the R617 (Figure 1).

Table 3: Details of properties affected by the proposed Pipeline Route between Howick West and Reservoir 2

PROPERTY DETAILS	
Province	KwaZulu-Natal
District Municipality	uMgungundlovu
Local Municipality	Umngeni
PREFERRED ROUTE:	

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COMPANY REGISTRATION NO: 2019/522106/07
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Affected Property	**Property Description**	PORTION 20 ERF 935 OF FARM BROOKDALES
	SG Code	N0FT00000000093500020
	Property Owner	Umgeni Water
Affected Property	**Property Description**	PORTION 18 ERF 935 OF FARM BROOKDALES
	SG Code	N0FT00000000093500018
	Property Owner	Umgeni Water
Affected Property	**Property Description**	PORTION 10 ERF 935 OF FARM BROOKDALES
	SG Code	N0FT00000000103500010
	Property Owner	RSA
Affected Property	**Property Description**	PORTION 7 ERF 935 OF FARM BROOKDALES
	SG Code	N0FT00000000103500007
	Property Owner	KZN Dept of Housing and Umngeni Local Municipality
Affected Property	**Property Description**	PORTION 0 ERF 935 OF FARM BROOKDALES
	SG Code	N0FT00000000093500000
	Property Owner	Gallus Giuseppe
Affected Property	**Property Description**	PORTION 6 ERF 935 BROOKDALES
	SG Code	N0FT0000000009350006
	Property Owner	RSA
Affected Property	**Property Description**	PORTION 5 ERF 1043 OF FARM RIET VALLEI
	SG Code	N0FT00000000104300005
	Property Owner	RSA
Affected Property	**Property Description**	REMAINING EXTENT ERF 1043 OF FARM RIET VALLEI
	SG Code	N0FT00000000104300000
	Property Owner	Ingonyama Trust
Affected Property	**Property Description**	PORTION 1 ERF 1043 OF FARM RIET VALLEI
	SG Code	N0FT00000000104300000
	Property Owner	Zenzele Community Trust - Trustees
Affected Property	**Property Description**	PORTION 2 ERF 1043 OF FARM RIET VALLEI
	SG Code	N0FT00000000104300002
	Property Owner	Ingonyama Trust
ALTERNATIVE SECTION OF THE ROUTE:		
Affected Property	**Property Description**	PORTION 0 ERF 1043 OF RIET VALLEI
	SG Code	N0FT00000000104300000
	Property Owner	Ingonyama Trust

Table 4: GPS Locations of the Preferred Route and Alternative Route for Phase 2

	PREFERRED ROUTE	**GEOGRAPHIC CO-ORDINATES**	
1	Start at HW Pump Station	29° 31' 8.84" S	30° 13' 13.45" E
2	Midway Reservoir	29° 34' 2.77" S	30° 12' 15.31" E
3	Pump Station 2A	29° 35' 3.38" S	30° 11' 53.68" E
4	Reservoir 2	29° 35' 42.74" S	30° 11' 52.33" E
	ALTERNATIVE ROUTE	**GEOGRAPHIC CO-ORDINATES**	
1	Start adjacent to R617 Road	29º 31' 47.27" S	30º 13' 01.79" E
2	Pump Station 1	29º 33' 54.37" S	30º 11' 39.67" E
3	Re-join Preferred Route	29º 34' 51.29" S	30º 12' 01.08" E

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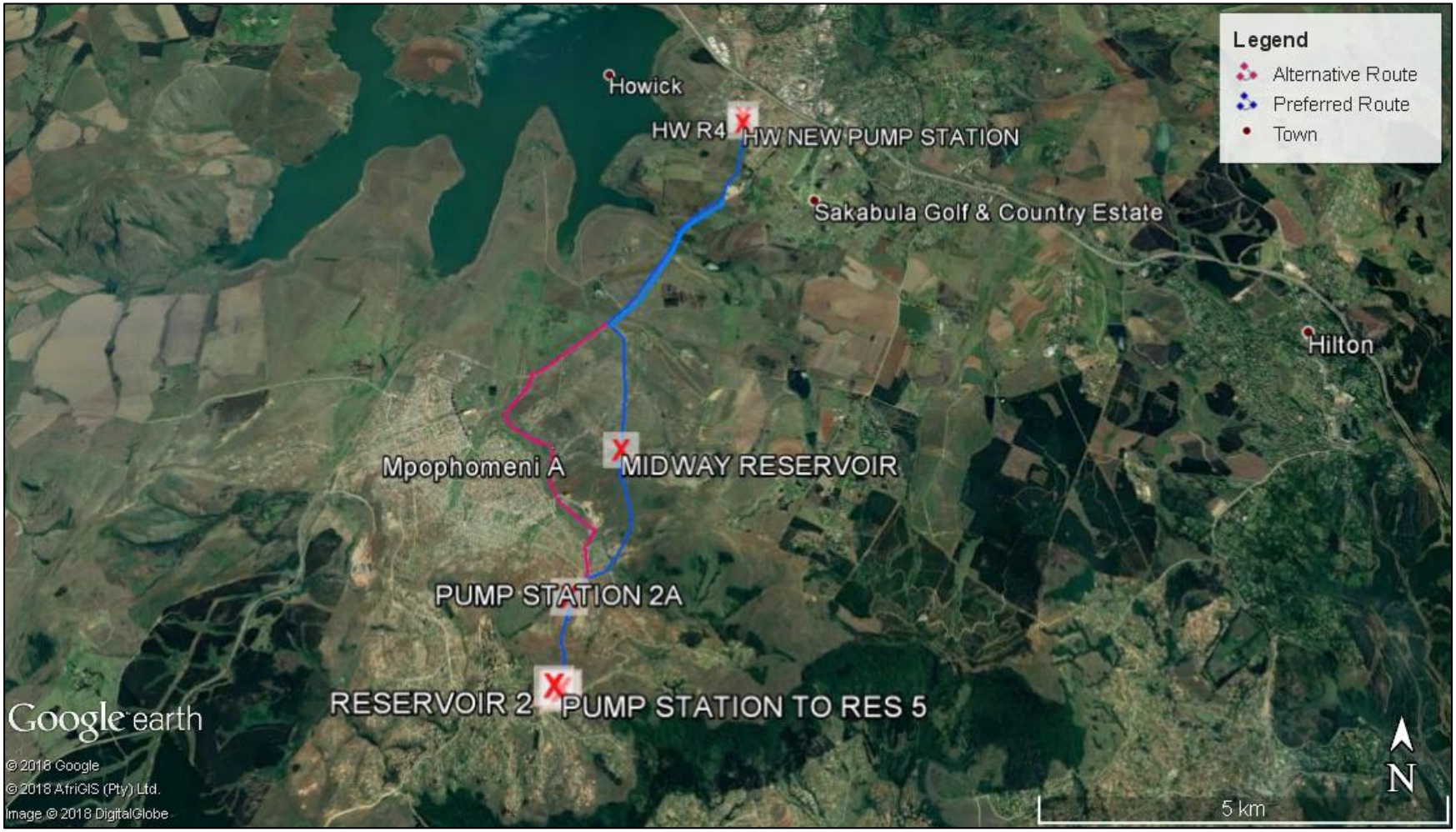

Figure 1: Map illustrating the preferred route (blue) and alternative route (pink section deviating from preferred route) within the Umngeni Local Municipality (Source: Google Earth, 2018).

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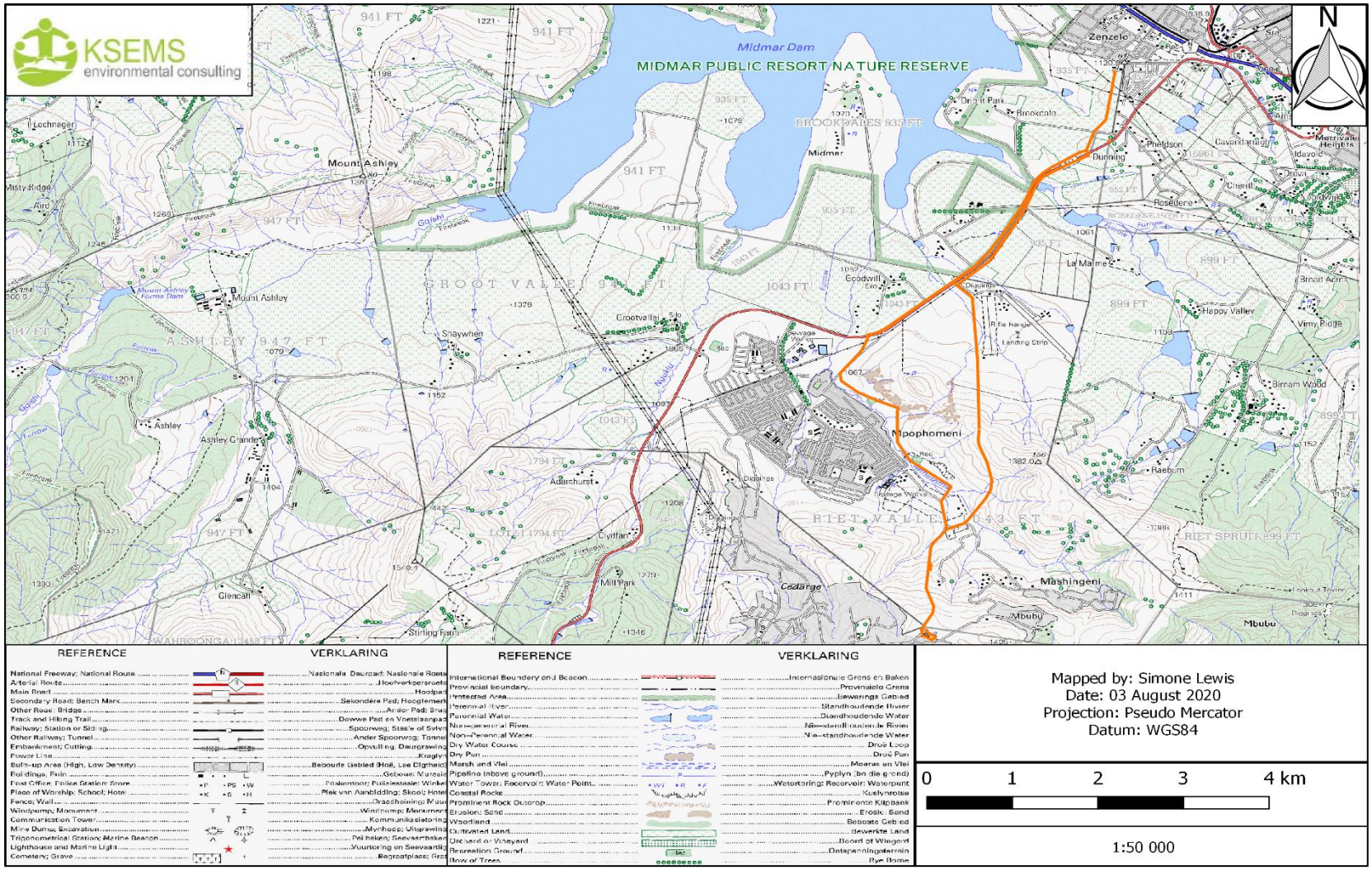

Figure 2: Locality of the proposed upgrade Vulindlela Pipeline route located within the Umngeni Local Municipality, KwaZulu-Natal (KSEMS, 2020).

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2 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

2.1 *A* description of the project activities to be undertaken including associated structures and infrastructure

The proposed scope of works for the proposed Vulindlela Bulk Water Supply Upgrade from Howick West to Reservoir 2, will comprise of the following new infrastructure components:

- DN800 rising main from the existing Howick West pump station to the existing Vulindlela Reservoir 2.
- 10Mℓ Reservoir at the midway ridge site.
- Pump Station at the existing Howick West Reservoir Site (48Ml/day).
- New Mpophomeni Booster Pump Station (48Ml/day).
- Improvements to the existing access track (1.3km long and 3m wide) to allow for access to the Midway Ridge site during construction. The track will be improved according the following specifications:
    - Rip and Recompact 150mm in situ material to 95% MOD AASHTO
    - 150mm G5 material to 97% MOD AASHTO
- Concrete Access driveway (0.25km long and 3m wide) required off existing gravel road to access the Mpophomeni pump station.

Preferred Route

The preferred route is the selected route between the Howick West Reservoir and Vulindlela Reservoir No.2 which follows the existing water pipeline to Mpophomeni on the western side of the R617 provincial road as far as the entrance to the airstrip and army shooting range, where it then deviates to alongside the shooting range, over a midway ridge at about 1260m elevation, and on through informal extensions to Mpophomeni to Vulindlela Reservoir 2 at a top inlet elevation of 1414m. The proposed route is 9.3km in length.

The preferred route pipeline on the western side of the R617 is divided into three (3) legs, excluding minor pipe lengths that are part of the two pump stations and the ridge reservoir site. The first leg is a total of 6077.90m in length from Howick West to Midway Ridge Reservoir which has a 10Ml capacity, the second leg is from the Midway Ridge Reservoir to Mpophomeni Booster Pumps which is 2420.70m in length and the third leg is from the Booster Pumps to Reservoir 2 which is the end of the proposed pipeline with a length of 862.09m.

The existing reservoir at Howick West with a capacity of 16Ml will serve as the source of water for the scheme with a new pump station at Howick West site to pump water to Midway Ridge Reservoir. The new booster pump station at Mpophomeni is required to pump water from Midway Ridge Reservoir with a capacity of 10Ml to the inlet at Reservoir 2 where the proposed pipeline ends. The pipe diameter is 800mm and the throughput capacity is 740 l/s.

Alternative Route

The route alternative (pink section deviating from the preferred route in Figure 1) is proposed to travel parallel to the R617 road on the opposite (eastern) side of the road to the preferred route, and branch off before the township of Mpophomeni B, running along the flats prior to re-join the preferred route as it traverses upslope to end at Reservoir 2. The length of the alternative as shown in pink in Figure 1, is 4970m. The alternative route will require the construction of a new pump station (Pump Station 1), a new 5ML Reservoir at the Pump Station 1 position, as well as an additional 5ML reservoir at the Mpophomeni Pump Station position.

Please refer to Appendix A for the drawing detailing the existing and proposed infrastructure associated with the activity.

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

2.2 Listed and specified activities triggered

Table 5: Listed and specified activities triggered by the upgrade

Government Notice No.	Activity No(s)	Description
Listing Notice 1 GNR327 December 2014, as amended in 7 April 2017	9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; **The proposed pipeline is 9.3km in length and the diameter is approximately 795mm (internal diameter) equating to 0.795m which exceeds the threshold of this pipeline.**
Listing Notice 1 GNR327 December 2014, as amended in 7 April 2017	12	The development of - (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs - (a) within a watercourse (b) if no development setback exists, within 32 metres of a watercourse measured from the edge of a watercourse. **The proposed development exceeds 100 square metres and some portions of the pipeline will traverse several wetlands and watercourses. Refer to Wetland Specialist Report- Appendix D.**
Listing Notice 1 GNR327 December 2014, as amended in 7 April 2017	19	**Activity 19:** The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from - (i) a watercourse **The proposed pipeline and associated infrastructure will entail the infilling or depositing of material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand or rock of more than 10 cubic metres from a watercourse. As such, this activity will be triggered.**
Listing Notice 3 GNR324 December 2014, as amended in 7 April 2017	2	The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres. (d) In KwaZulu-Natal: viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; xi. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (d) In KwaZulu-Natal- v. within a critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority, or in bioregional plans. **The proposed activity has a combined capacity of more than 250 cubic metres including the 10Ml reservoir at Midway Ridge. According to the KZN terrestrial systematic conservation plan, portions of the area are classified between Biodiversity Areas and Critical Biodiversity Area 1. As such, this activity will be triggered. However, despite being located within these classes, the EAP and specialist have identified numerous alien invasive species during site visits. The**

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MEMBERS: K.A. STANTON (DIRECTOR)

		Vegetation Specialist has stated that the area has a high density of alien invasive species (McDonald, 2018). Refer to Botanical Vegetation Assessment in Attachment D. **The areas of the proposed pipeline are also considered sensitive as part of the Msunduzi EMF therefore triggers (xi) of this activity.**
Listing Notice 3 GNR324 December 2014, as amended in 7 April 2017	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (b) In KwaZulu-Natal: iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose. xii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (d) In KwaZulu-Natal- **More than 300 square metres of indigenous vegetation may be cleared. Vegetation will be cleared from a critically endangered ecosystem (Oakland and Townhill Ridge) and endangered ecosystem (Pietermaritzburg South, Karkloof Forest Collective and Loskop Grassland) for the proposed pipeline. Therefore, this activity may be triggered.** **The areas of the proposed pipeline are also considered sensitive as part of the Msunduzi EMF therefore triggers xi of this activity.**
Listing Notice 3 GNR324 December 2014, as amended in 7 April 2017	14	The development of- (ii) infrastructure or structures with a physical footprint of 10 square metres or more; Where such development occurs (a) within a watercourse (d) In KwaZulu-Natal: vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. viii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (d) In KwaZulu-Natal- **The proposed pipeline is 9.3km in length for the preferred alternative and 10.5km for the route alternative and will have a physical footprint that exceeds 10 square metres in size and is within a watercourse with critical biodiversity areas according to the KZN systematic biodiversity plans. Therefore, this activity will be triggered.** **The areas of the proposed pipeline are also considered sensitive as part of the Msunduzi EMF therefore triggers xi of this activity.**

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MEMBERS: K.A. STANTON (DIRECTOR)

3 LEGISLATIVE CONTEXT

3.1 Description of the Policy and Legislative Framework

Relevant South African legislation and regulations that are considered applicable to or have implications for the proposed development have been assessed for their relevance to the project specifications. The following legislation and guidelines were considered during the Assessment Process. This section aims to provide an overview of the key legal requirements that apply to the development of the proposed project site. Legislation will be addressed in terms of its relevance to air quality, health and safety, waste management, noise management, as well as the activities requiring an impact assessment under the NEMA regulations. Although development is key to economic growth, it has the potential to negatively impact the environment. Table 6 below provides a list of applicable legislation to the proposed development.

Table 6: List of legislation key to proposed development

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a stand-alone piece of legislation, hence, additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis throughout the country. Section 24 of the Constitution states the following: • to an environment that is not harmful to their health or well-being; and • to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that —prevent pollution and ecological degradation; • promote conservation; and • secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. KSEMS and other specialists have been appointed for the proposed development in order to make recommendations that are in line with the above.	National Government of South Africa	1996
National Environmental Management Act, 1998	In terms of Section 24(2) of the NEMA the Minister may identify activities which may not commence without prior authorisation The Minister thus published GNR 983 (Listing Notice 1), 984 (Listing Notice 2) and 985 (Listing Notice 3) (4 December 2014) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in GNR 982 (EIA Regulations) (4 December 2014). Listing Notice 1 identifies activities that require a Basic Assessment (BA) process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 3 identifies activities within	Department of Environmental, Forestry and Fisheries	1998

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. This Act places an onus on all levels of government to ensure that risk to the environment is identified and where it cannot be avoided, is minimised and mitigated. Should there be any impact on the environment during or after construction, the applicant, have a duty to take measures to address these impacts and undertake the necessary clean up and mitigation measures (Section 28). The associated EMPr includes mitigation measures (recommended by specialists and the EAP) that if implemented will considerably reduce the impact on the receiving environment.		
National Environmental Management Biodiversity Act (No. 10 of 2004)	Sections 52(1)(a) and 56(1) of the National Environmental Management Biodiversity Act (No. 10 of 2004) (NEM:BA) state that the Minister may publish national lists of species and ecosystems, respectively, that are threatened or are in need of protection. A list of species that are threatened or are in need of protection was published in GNR 151 (23 February 2007), with GNR 152 (23 February 2007) detailing the regulations relating to such species. These regulations are imposed where restricted activities involve specimens of listed threatened or protected species. GNR 152 defines the requirements of permitting and the process related thereto. An assessment considering the presence of any floral and faunal species of concern, as well as suitable habitat to support any such species was undertaken during the impact assessment phase conducted by the EAP and specialists. This ecological report is found in Appendix D of this BAR. There are protected aloe species found along the route, for which permits will need to be obtained from EKZN Wildlife for removal and translocation thereof.	Department of Environmental, Forestry and Fisheries	2004
National Environmental Management Protected Areas Act, 2003 (Act No 57 of 2003)	The Act was promulgated for the protection and conservation of ecologically viable areas to promote sustainable development, that contributes to both economic growth, and preservation of natural ecosystems. The proposed route runs along the Midmar Nature Reserve. However, the ecological specialist noted that study area is highly transformed as a result of surrounding land use practices. All impacts associated with the activity can be reduced to an acceptable level following implementation of provided mitigation measures. There are also existing servitudes associated with the route.	Department of Environmental, Forestry and Fisheries	2003
National Environmental Management Waste Act (59 of 2008)	The National Environmental Management Waste Act, 2008 was promulgated in order to protect through environment by providing reasonable measures to prevent pollution and to control waste management activities.	Department of Environmental, Forestry and Fisheries	2008

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	Section 20 of the NEM:WA states that no person may commence, undertake or conduct a waste management activity except in accordance with a Waste Management License (WML). A list of waste management activities that require a WML was published in GNR 921 (29 November 2013). Even though the proposed upgrade will not require a WML, the applicant is required to comply with all relevant waste management regulations in order to ensure best practice in terms of waste management and pollution prevention.		
Hazardous Chemical Substance Regulations 1995	These regulations stipulate requirements for storage and handling of hazardous chemical substances and provide guidelines for training of staff. Any hazardous chemical substances used during construction must be identified, stored, used and disposed of in accordance with this legislation. A Spill Contingency Plan should be compiled for managing spills during construction of the structures and this should be monitored using the site-specific EMPr.	Department of Labour	1995
National Forest Act (Act No. 84 of 1998)	This Act aims to promote the conservation of natural forests. Permits are required to cut or remove protected tree species.	Department of Agriculture, Forestry and Fisheries	1998
KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997)	The Act provides for the management of nature conservation within KwaZulu-Natal and protected areas whereby permits are required to remove or relocate protected plant species.	Ezemvelo KZN Wildlife	1997
Natal Nature Conservation Ordinance (Act No. 15 of 1947)	An application is required for the removal/relocation of plants listed under this ordinance through Ezemvelo KZN Wildlife.	Ezemvelo KZN Wildlife	1947

National Heritage Resources Act (No. 25 of 1999)	Sections 34 and 38 of the NHRA detail specific activities that require an approved heritage impact assessment by the South African Heritage Resource Agency (SAHRA). The heritage activities identified as potentially applicable for the proposed project are as follows
	
	• 1(c) - Any development or other activity which will change the character of a site:
	  ○ Exceeding 5 000m^2 in extent; or Involving three or more existing erven or subdivisions.
	• 2 - Any development of the site where "development" means any physical intervention, excavation, or actions, other than those caused by natural forces, which results in a change to the nature, appearance or physical nature of a place, or influences its stability and future well-being, including:
	  ○ Construction, alteration, demolition, removal or change of use of a place or a structure at a place; or
	  ○ Carrying out any works on or over or under a place; or
	  ○ Any change to the natural or existing condition or topography of land; or
		South African Heritage Resources Agency	1999

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	○ Any removal or destruction of trees, or removal of vegetation or topsoil. Section 48(2) requires a permit from the AMAFA to perform such actions at such time and subject to such terms, conditions and restrictions or directions as may be specified in the permit. A Heritage Impact Assessment has been undertaken to identify heritage resources in the area and to minimise the impacts thereof. The Heritage specialist concluded that no structures of heritage/cultural concern is likely to be impacted on by the proposed upgrade (Appendix D of the BAR).		
KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008)	This Act aims to promote the conservation of cultural heritage resources and the management of activities that may have a significant impact on cultural heritage resources – specifically within KwaZulu-Natal.	Amafa KwaZulu-Natal	2008
National Water Act (No. 36 of 1998)	Section 22(1) of the NWA states that a person may only use water if the water use is authorised by a license under NWA or if the responsible authority has dispensed with a license requirement if it is satisfied that the purpose of the NWA will be met by the granting of a license, permit or other authorisation under any other law. A person may only use water without a license if the water use is permissible: Under Schedule I of NWA; As a continuation of an existing lawful use; and In terms of a general authorisation issued under Section 39 of NWA. A water use license (WUL) is required in terms of Section 41 of the NWA for activities listed in Section 21 of the said Act. The water uses potentially applicable to the proposed activity include: Section 21(c): Impeding or diverting the flow of water in a water course; Section 21(i): Altering the bed, bank, course or characteristics of a watercourse. KSEMS Environmental Consulting has been appointed to apply for the Water Use License associated with the proposed Vulindlela BWSS.	Department of Water and Sanitation	1998
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) National Dust Control Regulations	These regulations were released with the purpose of prescribing general measures for the control of dust in all areas. In the sections below the main aspects of the regulations will be discussed. There are two standards, one for a residential area and one for a non-residential area. The regulations specify that the method for measuring dust fall rate is the ASTM D1739: 1970, or equivalent method. Any person that exceeds the dust-fall standards should, within three months after submitting the dust-fall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Department of Environment, Forestry and Fisheries	2004

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	This dust management plan will identify all the sources of dust in the area, outline the best methods to mitigate dust emissions, detail the schedule and responsible personnel, incorporate the dust-fall monitoring plan and establish a register of complaints. This plan should be implemented within a month of approval and should be submitted on agreed time intervals. It is unlikely that the proposed construction will exceed the threshold of these regulations, however in the event that it does the above protocol will be followed as per the Dust Control Regulations of 2004.		
Occupational Health and Safety Act 1993	The main objective of this Act is to provide for the health and safety of persons at work, including aspects which are hazardous to health and safety. In terms of major hazardous installation, the regulations shall apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public. During both the construction and operational phase of this development all the requirements of Occupational Health and Safety Act 1993 will need to be adhered to.	Department of Labour	1993
Environmental Regulations for Workplaces 1987	These regulations specify optimal working conditions for staff including thermal conditions, illumination requirements, requirements for ventilation; noise levels etc. and also specify requirements for housekeeping.	Department of Labour	1987
Noise induced Hearing Loss Regulations 2003	These regulations specify safe working conditions in environments where noise levels exceed safe levels and gives guidelines for assessment of noise, training measures, provisions of information to staff etc.	Department of Labour	2003
Umgungundlovu Integrated Development Plan (IDP)	One of the objectives of the Umgungundlovu District Municipality's IDP is to improve access to basic water and sanitation services and to ensure continuous water and sanitation services (uMgungundlovu District Municipality's IDP Review Draft, 2015/2016). This proposed activity is a way in which the municipality can fulfil its objective. Therefore, the proposed activity is aligned with the SDF as it is the provision of basic services (potable and palatable water) to the rural communities of the Umgungundlovu District Municipality. Both the IDP and SDF for both Municipalities (Msunduzi and uMngeni) highlighted the need for improved infrastructure and water supply (Msunduzi IDP, 2016/2017; uMngeni Municipality IDP, 2016/2017). Issues identified include the provision of water to the population. The provision of basic services such as water is a critical element in the national developmental agenda. The project falls into the municipal Service Delivery Management Plan which promotes the effort to address water shortages in the area. Water supply has been identified as a critical infrastructure gap within the Umgungundlovu District Municipality IDP. Water infrastructure is identified as a	Umgungundlovu District Municipality	2019/2020

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	development priority. The activity within this application has been identified as part of the IDP implementation plan. The approval of the proposed pipeline would not compromise the IDP or the SDF.		
uMngeni Local Municipality Integrated Development Plan (IDP)	The proposal is in line with the projects and programmes identified as priorities in the IDP of the uMngeni Local Municipality. One of goals of the IDPs of the municipality is basic service provision in the form of water and sanitation (Source: uMngeni Municipality 2016/2017 IDP). The proposal will assist in the provision of basic services to the urban and rural communities within the above-mentioned municipalities. Please refer to section (a) (c) (d).	uMngeni Local Municipality	2016/2017
Msunduzi Environmental Management Framework (EMF)	The Msunduzi EMF is a tool geared towards identifying environmentally sensitive areas of conservation importance, that can be used to guide development in areas that will promote growth, as well as meeting conservation targets and preservation of sensitive habitats. Upon conducting a preliminary assessment of the proposed Vulindlela BWS supply route using the National EIA screening tool, it was noted that a portion of the route traverses the Msunduzi EMF area. However, it should be noted that only a small portion of the route, near Reservoir 2 (end point) traverses the EMF. The ecological specialist further identified that the area surrounding the proposed route has been largely transformed as a result of human settlement and agricultural activities. The specialist has recommended that disturbed areas be rehabilitated as per the rehabilitation plan (Appendix D).	Msunduzi Municipality	2010
Notice of identification in terms of Section 24(5) of the NEMA, 1998 for activities taking place within geographical areas of strategic importance – renewable energy development zones and associated strategic transmission corridors (GN No. 350 of April 2017).	The aforementioned notice is geared towards regulating environmental authorisation for large renewable energy projects and associated strategic transmission corridors, which are areas likely to be earmarked for long term electricity grid development. This proposal comprises the construction of a Bulk Water Supply pipeline and associated infrastructure, within an area highlighted as a strategic transmission corridor using the EIA screening tool. The activity will, however, be undertaken along existing water supply infrastructure, following a Basic Assessment procedure in accordance with the EIA Regulations, 2014 as amended.	Department of Environment, Forestry and Fisheries	2017
Public Participation Guideline in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)	These guidelines provide information and guidance on meeting requirements in terms of engaging with the public and keeping the public informed throughout the development process.	Department of Environmental Affairs	2017

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

4 MOTIVATION FOR THE NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

The VWSS covers approximately 280 square kilometres of area Within the uMngeni and uMsunduzi Local Municipalities. The scheme was one of 12 National Presidential Lead Projects prioritised in 1994 under the Reconstruction and Development Program. The scheme was commissioned on 21 March 1998 by the then State President, Nelson Mandela The VWSS consists of two older and smaller rural water schemes; the Sweetwaters and Phayiphini schemes that serve most of Ward 1, and the newer Vulindlela scheme including the RDP scheme that was opened in 1998 which now serves the remainder of Ward 1 and the other nine Wards of Vulindlela. The entire Vulindlela Bulk Supply System was handed over to the Msunduzi Municipality in 2013 as part of Umgeni Water's rationalisation strategy. Umgeni Water's responsibility ended at the sales metres downstream of the Vulindlela pump station.

Subsequent to the handover, demand increased resulting in insufficient capacity and interrupted water supply problems. A further challenge was that the water network needed to be extended to new connections, potentially worsening the already poor water service delivery to existing water users. Furthermore, the existing water resources in the region, particularly the areas which are supplied by the Mgeni System, have been severely impacted upon in recent months due to low water levels in the supplying dams which is further exacerbated by the current critical draught conditions. At the request of the municipal managers, Umgeni Water Operations now operates the bulk supply from Groenekloof to reservoir numbers 1, 2, 3, 4 and 5.

The applicant (Umgeni Water) is investigating the option of constructing the Vulindlela BWS Upgrade to meet these new demands and challenges. This aligns with both the IDP and SDF for the Msunduzi and uMngeni Municipalities which highlight the need for improved infrastructure and water supply. Therefore, the proposed development aims to address the urgent need for additional water supply infrastructure. Furthermore, the availability of potable water is considered a basic human need, thus at a strategic level, the surrounding communities need the proposed development.

A breakdown of the need and desirability of the proposed upgrade is highlighted in Table 7 below.

Table 7: Need and desirability of the proposed upgrade

1. Is the activity permitted in terms of the property's existing land use rights?	~~YES~~	**NO**	**Please explain**
The area is a mixture of vacant/unspecified and forestry land.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	~~YES~~	**NO**	**Please explain**
One of the four main spatial objectives informing the PSDF, stated in the KwaZulu-Natal Provincial Growth and Development Strategy (PGDS) (PGDS, August 2011), is that of Social Need. The project will form part of Service Delivery Management Plan as an effort to address water shortages in the area. Part of the PSDF is the Water Services Development plan, this activity is in line with this as it promotes the provision of water. These fall within the ambit of the term "Social Need". The Principle of Sustainable Communities within the PSDF of the KwaZulu-Natal promotes the building of places where people want to live and work. The sense of Quality of Living refers to the balance between environmental quality, addressing social need and promoting economic activities within communities (PGDS, August 2011). Often communities within the rural context of KwaZulu-Natal, such as the area surrounding the proposed activity site, are not located in the areas with perceived highest economic potential. Where economic potential low exists, planning and investments should be directed at projects and programmes to address poverty and the provision of basic services in order to address past and current social inequalities towards building sustainable communities. Therefore, the proposed activity is aligned with the SDF as it is the provision of basic services (potable and palatable water) to the rural communities of the Umgungundlovu District Municipality.			

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

(b) Urban edge / Edge of Built environment for the area	**YES**	**NO**	**Please explain**
The pipeline crosses the urban development line as per the PSDF however; the area is identified as rural. The proposed pipeline is situated outside urban areas and will therefore not affect the urban edge or edge of the built environment.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	**YES**	**NO**	**Please explain**
One of the objectives of the Umgungundlovu District Municipality's IDP is to improve access to basic water and sanitation services and to ensure continuous water and sanitation services (uMgungundlovu District Municipality's IDP Review Draft, 2015/2016). This proposed activity is a way in which the municipality can fulfil its objective. Therefore, the proposed activity is aligned with the SDF as it is the provision of basic services (potable and palatable water) to the rural communities of the Umgungundlovu District Municipality. Both the IDP and SDF for both Municipalities (Msunduzi and uMngeni) highlighted the need for improved infrastructure and water supply (Msunduzi IDP, 2016/2017; uMngeni Municipality IDP, 2016/2017). Issues identified include the provision of water to the population. The provision of basic services such as water is a critical element in the national developmental agenda. The project falls into the municipal Service Delivery Management Plan which promotes the effort to address water shortages in the area. Water supply has been identified as a critical infrastructure gap within the Umgungundlovu District Municipality IDP. Water infrastructure is identified as a development priority. The activity within this application has been identified as part of the IDP implementation plan. The approval of the proposed pipeline would not compromise the IDP or the SDF.			
(d) Approved Structure Plan of the Municipality	**YES**	**NO**	**Please explain**
The proposed activities and infrastructure plans of the proposal are in line with the current zoning and that of the uMngeni Local Municipality. Furthermore, it forms part of the Service Delivery Management Plan which promotes the effort to address water shortages within the Local Municipality.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES**	**NO**	**Please explain**
The proposal is in line with the projects and programmes identified as priorities in the IDP of the uMngeni Local Municipality. One of goals of the IDPs of the municipality is basic service provision in the form of water and sanitation (Source: uMngeni Municipality 2016/2017 IDP). The proposal will assist in the provision of basic services to the urban and rural communities within the above mentioned municipalities. Please refer to section (a) (c) (d).			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	**YES**	**NO**	**Please explain**
The availability of potable water is considered a basic human need, thus at a strategic level, the surround communities need the proposed upgrade. Keeping in line with the national outcomes (outcome number 8, sustainable human settlements and improved quality of household life) and the strategic objectives of the uMngeni Local and Umgungundlovu District Municipality's IDP to improve access to basic water and sanitation services, the proposal promotes service provision not only to urban areas but also to water scarce rural areas (Source: uMngeni Municipality 2016/2017 IDP). The provision of basic services is also highlighted as one of the national developmental outcomes as referenced by the Umgungundlovu District Municipality's IDP.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**	**NO**	**Please explain**

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Not applicable. No additional capacity will have to be created in order to cater for the proposal.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**	**NO**	**Please explain**
The proposal is being funded by Umgeni Water who have been in communication with the uMngeni Local and Umgungundlovu District Municipalities. The approval of this project is not dependent upon any municipal input and will not compromise any of the municipality's planning capabilities.			
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES**	**NO**	**Please explain**
The proposal is a part of a national programme by Umgeni Water and the Department of Water and Sanitation to address the lack of water and sanitation infrastructure.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES**	**NO**	**Please explain**
Location factors do favour the proposed land use due to existing pipeline. The existing route will be followed in order to maintain the existing land use. Location of this pipeline is location specific.			
9. Is the development the best practicable environmental option for this land/site?	**YES**	**NO**	**Please explain**
Due to the existing infrastructure, the upgrade and construction of additional infrastructure will result in minimal impacts to the environment in comparison to a completely new development. The development occurs alongside the current pipeline.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES**	**NO**	**Please explain**
The proposal addresses the need for additional water and sanitation infrastructure. The proposal is expected to benefit approximately 200 000 people in the surrounding communities, therefore, the benefits are expected to outweigh the negative impacts as described in the Impact Assessment Section of this BAR			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	**YES**	**NO**	**Please explain**
There is no need for similar activities due to the nature of this project. It does not set a precedent.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	**YES**	**NO**	**Please explain**
The proposal aims to addressing and promoting people's Basic Human Right to Water and Sanitation. The activity does not negatively impact any person's rights; peoples' right will not be affected.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	**YES**	**NO**	**Please explain**
The proposal will not compromise the 'urban edge' as it takes place alongside an existing pipeline.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	**YES**	**NO**	**Please explain**
The proposed development contributes to SIP 18 (Water and Sanitation) which aims to promote the provision of sustainable water supply to meet social needs and support economic growth (Presidential Infrastructure Coordinating Commission, 2012; The State of South Africa's Economic Infrastructure: Opportunities and challenges, 2012).			
15. What will the benefits be to society in general and to the local communities?			**Please explain**
The proposal will benefit approximately 200 000 people in the surrounding communities and will provide for additional water and sanitation infrastructure. The proposed development will result in 25 new jobs being created during the construction phase amounting to R2.7 000 000. 100% of this will be accrued to the previously disadvantaged group.			
16. Any other need and desirability considerations related to the proposed activity?			**Please explain**
The proposal will allow for local job creation during the construction phase, which will strengthen the local economy of the area.			
17. How does the project fit into the National Development Plan for 2030?			**Please explain**

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

One of the enabling milestones of the 2030 National Development Plan is to ensure that all South Africans have access to clean running water, therefore this activity fits into the National Development Plan as it will allow for the provision of running water to many more households within both municipalities.

Furthermore, In Chapter 4: Economic Infrastructure of the National Development Plan for 2030, the vision statement concerning the Water sector states the following:
"Before 2030, all South Africans will have affordable access to sufficient safe water and hygienic sanitation to live healthy and dignified lives."

The proposed development seeks to pursue this vision by continued provision of access to safe water.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

Section 23 of NEMA promotes the application of environmental management tools ensuring the integrated environmental management of activities. The general objective of integrated environmental management is to:

Promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;
Response: this assessment is aligned with the NEMA principles described below (see Section 19 assessment below).

Identify, predict and evaluate the actual and potential impact on the environment, socioeconomic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimizing negative impacts, maximizing benefits. And promoting compliance with the principles of environmental management set out in section 2;
Response: this process is implicit in the current Basic Assessment Reporting procedure.

Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
Response: this process is implicit in the current Basic Assessment Reporting procedure.

Ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;
Response: A comprehensive public participation process has been followed in accordance with EIA Regulation GN R982 of 2014.

Ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment;
Response: A comprehensive assessment of the significance of impacts has been conducted as part of the BAR.

Identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section.
Response: Considerations of the environmental risk presented by each of the three options were made during the feasibility study. The preferred alternative proposed is the option considered to have the least economic and environmental impact.

In conclusion, the effects of the activity on the environment have received adequate consideration, there has been an adequate and appropriate opportunity has been made for public participation, negative impacts have been minimised and the potential and actual impacts have been identified, predicted and evaluated.

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

(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.	The primary objective of the proposed project is to provide access to water.

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

(3) Development must be socially, environmentally and economically sustainable.	There is no indication that the proposed project would result in undue or environmental, social and economic impacts that would place at the risk the sustainability of local natural systems or the project. Recommendations made in the BAR must be adopted
(4)(i)that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;	The selection of the preferred alternative was, in part, based on the fact that of the three alternatives, this option would have the least impact on the environment.
(4) (ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;	The BAR notes that impacts with regard to pollution and degradation of the environment can be managed and will not result in unacceptable impact on the local environment. The recommendations made in the BAR must be adopted. Particular focus must be given to the Environmental Management Plan.
(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;	A cultural heritage survey of the proposed Vulindlela Bulk Water Supply Scheme, uMngeni and Msunduzi Municipalities identified no heritage sites or features. There are no heritage resources within 50m from the proposed pipeline development. The area is also not part of any known cultural landscape. There is no known archaeological reason why the upgrade may not proceed as planned. However, attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008) which, requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency. Amafa aKwaZulu-Natali, as a Key Stakeholder, are required to comment on this report.
(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;	The BAR notes that impacts with regard to pollution and degradation of the environment can be managed and will not result in unacceptable impact on the local environment. The recommendations made in the BAR must be adopted.
(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource	Not Applicable
(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;	Not Applicable
(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions;	The "precautionary principle" and the assessment of environmental risk are inherent in the EIA impact assessment process.
(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied	The BAR assesses impacts on the natural and social environment and also provides recommendations to prevent minimise or remedy such impacts. Recommendations and mitigation measures provided in the BAR must be adopted.

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

4(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.	As discussed, the selection of the preferred option was a result of an iterative process where considerations of the best practicable environmental options were made.
(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.	The proposed project is in line with the IDP and SDF the uMngeni Municipality and supports reliance on good water infrastructure as a support to its economy.
(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access there to by categories of persons disadvantaged by unfair discrimination.	The project will provide access to potable water to the surrounding communities.
(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.	Environmental Management Plans are mandatory as part of the EIA process.
(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.	The current EIA process has included a comprehensive Public Participation process, including: • Publicised the project through visible signage, local and regional press adverts, identification of local stakeholders and other government officials and parastatals. • Engagement with public • Engagement with key stakeholders, and affected land owners. • This process is described in more detail in the BAR.
(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.	As per (f) on page 21.
(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	Notification to the public made the communities aware of the proposed project and their opportunity to be involved in the project.
(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.	The EIA process has been undertaken in order to provide the relevant decision makers with the required information.
(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.	The proponent is committed to respecting the rights of workers in terms of both labour laws and environmental rights. Occupational Health and Safety mechanisms must be included in the relevant Environmental Management Plan.
(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.	The EIA provides the relevant information needed for effective decision-making. Furthermore, such information is released into the public sphere and as such contributes to greater access to information.
(l) There must be intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	Not Applicable.

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.	Not Applicable.
(n) Global and international responsibilities relating to the environment must be discharged in the national interest.	Not Applicable
(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.	The necessity for the project stems from a need to provide water infrastructure, benefitting people. The risk that the natural environment is presented with is in relation to the benefit afforded to the people. Specialist assessments have been undertaken in order to understand the risks and ensure that the level is acceptable so as to not compromise the environment for future generations.
(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.	The liabilities associated with environmental degradation remain with the applicant and their appointed agent.
(q) The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.	Opportunities to be involved in the Basic Assessment process are extended to all. Opportunities as a result of the construction contract are promoted through Umgeni Waters Contracts Procurement Goals where minimum requirements are to be met. These Goals require a specific participation of Historically Disadvantaged Individuals including woman.
(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	Whilst in close proximity to watercourses, the impacts are limited, provided that the Environmental Management Programme is implemented.

5 DETAILS OF ALTERNATIVES CONSIDERED

5.1 Site Alternatives

In September 2017, a preliminary feasibility report on an alternative option for the Phase 2 pipeline route was submitted to UW. The report noted that the supply to Groenekloof is pumped from the Mill Falls pump station at the Midmar Water Treatment Works to the Howick West Reservoir site and then pumped again to the Groenekloof Reservoir site in Hilton. Taking into consideration the upgrading of the Vulindlela pump station at the Groenekloof Reservoir site and pump changeover procedures, which was part of the original scope of work, it became apparent that the system between Midmar and Howick West, and Howick West and Groenekloof Reservoir site can only supply about 36 Mℓ/day. This would be barely enough to run one of the new pumps selected for the High lift pump station at Groenekloof which forms part of the previous EIA already submitted to the competent authority.

The pre-feasibility report dated 07/09/2017 showed that if the original Phase 2 design scope was changed to pumping directly from Howick West reservoir to Reservoir 2 which is the preferred route for this EIA, it would result in a capex savings for UW and no disruptions to the already fragile GRK high lift pump station and network. The feasibility assessment indicated that the selection of the shorter route from Howick West to Reservoir 2, instead of the initial planned route of Howick West to Groenekloof to Reservoir 2, is more cost effective and should save in the order of 28% on capital expenditure amounting

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

to about R50 million and a further 8% on energy costs amounting to about R2.3 million per annum when operating at the 30-year demand projection of 48.4 Mℓ/day in 2045.

Therefore, no site alternatives were proposed by UW and the consulting engineers i.e. Naidu Consulting for this preferred route between Howick West Reservoir and Vulindlela Reservoir 2.. However, there is a layout alternative (section of the pipeline deviating from the preferred route) that is further investigated within this Basic Assessment Report and the associated specialist studies, as discussed below.

5.2 Layout/ Design Alternatives

As mentioned above, no site alternatives were considered for the VBWS as this was previously investigated as part of the feasibility assessment discussed in Section 5.1 above. However, two (2) alternative layout designs were considered, as presented in Table 8 below.

Table 8: Alternative designs considered for the proposed Vulindlela Bulk Water Supply pipeline from Howick West to Reservoir 2.

VULINDLELA PIPELINE BETWEEN HOWICK WEST AND RESERVOIR 2: LAYOUT ALTERNATIVES	

Preferred Route (Alternative 1)	The preferred route, indicated in blue (Figure 1) as per the project description, includes the following new infrastructure components:
	• DN800 rising main from the existing Howick West pump station to the existing Vulindlela Reservoir 2.
	• 10Mℓ Reservoir at the midway ridge site.
	• Pump Station at the existing Howick West Reservoir Site (48Ml/day).
	• New Mpophomeni Booster Pump Station (48Ml/day).
	• Improvements to the existing access track (1.3km long and 3m wide) to allow for access to the site during construction:
	  o Rip and Recompact 150mm in situ material to 95% MOD AASHTO
	  o 150mm G5 material to 97% MOD AASHTO
	• Concrete Access driveway (0.25km long and 3m wide) required off existing gravel road to access the Mpophomeni pump station.
	
	The preferred alternative is the selected route between the Howick West Reservoir and Vulindlela Reservoir No.2 (indicated in blue in Figure 3 below) which follows the existing water pipeline to Mpophomeni on the western side of the R617 provincial road as far as the entrance to the airstrip and army shooting range, where it then deviates to alongside the shooting range, over a midway ridge at about 1260m elevation and on through informal extensions to Mpophomeni to Vulindlela Reservoir 2 at a top inlet elevation of 1414m. The proposed route is 9.3km in length.

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

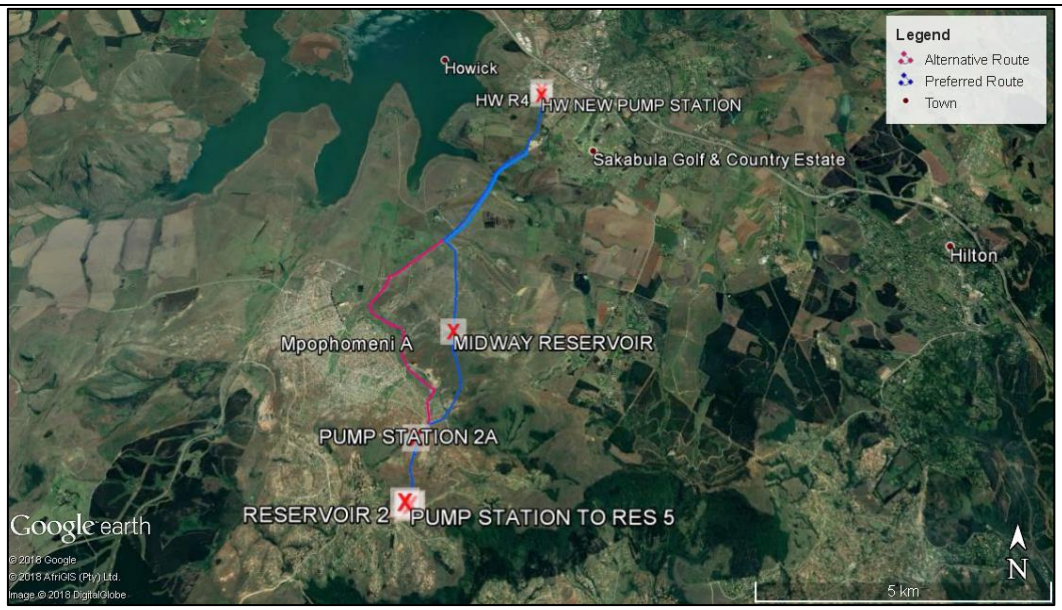

Figure 3: Preferred layout (blue) of the proposed VBWS (Google Earth, 2019).

Advantages:

- The preferred route (blue) is shorter, and so will have a smaller construction footprint and associated potential area of impact, specifically on watercourses, as per specialist findings.
- The shorter route will result in reduced construction costs and lower energy requirements.
- The project proponent will save approximately R50 000 000 if the preferred route is chosen.

Disadvantages:

- The preferred route will result in the need for construction of a midway reservoir (although will still be less costly to implement).
- The construction of a midway reservoir will result in habitat loss within its construction footprint. However, the ecological specialist noted that impacts can be reduced to an acceptable level, if adequately mitigated and if the rocky habitat is avoided. The vegetation was also noted to be in a highly transformed state.
- A portion of the route traverses Critical Biodiversity Area (Irreplaceable) although the site is considered highly transformed with species listed as being of Least Concern.
- The route in its mid reaches traverses rocky habitat and erosion prone soils. This impact can be mitigated to low significance following the correct mitigation.

Please refer to Appendix A for the detailed Layout Plan of the proposed development

Alternative 2	The route alternative (pink section of pipeline which deviates from the preferred route as per Figure 4) is proposed to travel parallel to the R617 road on the opposite (eastern) side of the road to the preferred route and branch off before the township of Mpophomeni B, running along the flats prior to re-join the preferred route as it traverses upslope to end at Reservoir 2.

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Figure 4: Alternative route (pink section of pipeline) of the proposed VBWS (Google Earth, 2019).

Advantages:

- The alternative route section falls outside of the Critical Biodiversity Area (CBA Irreplaceable).

Disadvantages:

- The alternative route is longer than the preferred layout, and therefore will have a greater construction footprint.
- Requires two (2) 5ML reservoirs (at Pump Station 1 site and at the Mpophomeni pump station (site).
- A greater construction footprint is anticipated to result in greater environmental impact.
- According to the impact assessment, the alternative route will have a greater impact on watercourses in terms of infilling associated with construction activities, due to the greater construction footprint of this route.
- The longer route will be more costly to implement due to its length and higher pressure requirements.
- This route also presents numerous obstacles such as poor ground conditions in low lying areas, dolerite boulders and a quarry in the way.
- The alternative route will result higher capex and operational costs in terms of power used, thereby being less sustainable from an economic and resource perspective.

The reason this alternative is not feasible is because an existing water pipeline is situated on the eastern side of the road, as well as a HV power line, a dam and evidence of dolerite boulders. The preferred route is therefore favoured by the applicant and consulting engineers. Further to this the preferred route is shorter and equates to an approximate R50 000 000 saving if the preferred route is chosen.

Please refer to Appendix A for the detailed Layout Plan of the proposed development

5.3 Technical Alternatives

Umgeni Water and the consulting engineers (Naidu Consulting) have promoted the careful selection of the pipeline route, sizing of the pipe and placement of the pump stations, to allow the pumps to operate at an efficiency of greater than 80%.

Unfortunately, in this case there is no energy alternative to supply the pumps as the power demand is too high. However solar panels for the lighting in the pump stations are being considered.

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

5.4 No-Go Alternative

The following background is taken from the Umgeni Water report "Upgrade of the Vulindlela Bulk Water Supply System" dated July 2015.

The VWSS covers approximately 280 square kilometres of area Within the uMngeni and uMsunduzi Local Municipalities. The scheme was one of 12 National Presidential Lead Projects prioritised in 1994 under the Reconstruction and Development Program. The VWSS consists of two older and smaller rural water schemes; the Sweetwaters and Phayiphini schemes that serve most of Ward 1, and the newer Vulindlela scheme including the RDP scheme that was opened in 1998 which now serves the remainder of Ward 1 and the other nine Wards of Vulindlela. The entire Vulindlela Bulk Supply System was handed over to the Msunduzi Municipality in 2013 as part of Umgeni Water's rationalisation strategy. Umgeni Water's responsibility ended at the sales meters downstream of the Vulindlela pump station.

Subsequent to the handover, demand increased resulting in insufficient capacity and interrupted water supply problems. A further challenge was that the water network needed to be extended to new connections, potentially worsening the already poor water service delivery to existing water users. Furthermore, the existing water resources in the region, particularly the areas which are supplied by the Mgeni System, have been severely impacted upon in recent months due to low water levels in the supplying dams which is further exacerbated by the current critical draught conditions. At the request of the municipal manager, Umgeni Water Operations now operates the bulk supply from Groenkloof to reservoir numbers 1, 2, 3, 4 and 5.

This no-go alternative would result in the demand for bulk potable water exceeding the supply. More significantly, the development needs of the local municipalities will not be realised as a result of this no-go alternative. Umgeni Water is proposing to improve water supply by upgrading existing water supply infrastructure and constructing additional infrastructure to supplement existing supply. If the activity is not implemented by Umgeni Water as proposed, the water supply in the area will remain at critically low levels which will result in the perpetuation of a lack of access to potable and palatable water for many households in the surrounding communities. This may result in households making use of non-treated water for drinking and sanitation purposes which may result in waterborne diseases and illnesses. Furthermore, the economy of the region will be negatively impacted upon due to the lack of proper service provision, there will also be no jobs created if the activity is not implemented.

From an environmental impact aspect, the no go alternative will result in no additional impacts to the receiving environment and will ensure that no net loss of biodiversity or wetlands will occur. However, this alternative will result in a negative impact from a social, economic, and service delivery perspective, and will not allow for the basic human need of access to potable water being attained. Further to this, the impacts associated with the proposal can be mitigated through implementation of the EMPr, to reduce potential impact on the receiving environment so that the proposal will not have a significant effect on the environment.

6 DETAILS OF THE PUBLIC PARTICIPATION UNDERTAKEN IN TERMS OF REGULATION 41 OF THE EIA REGULATIONS

6.1 Public Participation Process (PPP)

The PPP is central to the investigation of environmental impacts as it is important that stakeholders who are potentially interested and/ or affected by the project are given an opportunity to identify issues relevant to them and to ensure that local knowledge, needs and values are understood and utilised.

The PPP is being undertaken by KSEMS in a comprehensive and transparent manner, in accordance with Chapter 6 of the EIA Regulations, 2014 as amended. All requirements for the NEMA have been taken into consideration and require that an

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

inclusive, transparent process of engagement – sharing of information, receipt of comments, expression of issues and concerns, and response and feedback regarding issues and concerns – be undertaken that allows participation by any and all persons and entities who may be affected by and/ or have an interest in the proposed project. Procedures for informing stakeholders about a project and engaging their participation have become standard practice.

The PPP was undertaken in English and Zulu to accommodate for the local I&APs. The following sections outline the required tasks that have been undertaken as part of the stakeholder engagement process.

6.1.1 Roles and Responsibilities of I&APs

Registered I&APs have the right to bring to the attention of the competent authority any issues that they believe may be of significance to the consideration of the proposed project. Stakeholders are obligated to the following:

- Must ensure that their comments are submitted within the specified timeframes. When the draft report is released for public comment, registered I&APs must ensure that their comments are submitted before the closing date. I&APs will be provided with an electronic copy and a hard copy's will be placed at a public place for those I&APs who do not have access to email.
- Serve a copy of the comments submitted directly to the competent authority (Department of Environment, Forestry and Fisheries), to the applicant and the EAP.
- Disclose to the EAP any direct business, financial, personal, or other interest that they might have in the approval or refusal of the application.

The roles of I&APs in a stakeholder engagement process usually include one or more of the following:

- Assisting in the identification and prioritisation of issues that need to be investigated;
- Making suggestions on alternatives and means of preventing, minimising and managing negative impacts and enhancing benefits associated with the proposed project;
- Assisting in or commenting on the development of mutually acceptable criteria for the evaluation of decision options;
- Contributing information on public needs, values and expectations;
- Contributing local and traditional knowledge; and
- Verifying that their issues have been considered.

In order to participate effectively, stakeholders should:

- Become involved in the process as early as possible;
- Register as an I&AP;
- Advise the EAP of other stakeholders who should be consulted;
- Contribute towards the design of the stakeholder engagement process (including timeframes) to ensure that it is acceptable to all I&APs;
- Follow the process once it has been accepted;
- Read the material provided and actively seek to understand the issues involved;
- Give timeous responses to correspondence;
- Be respectful and courteous towards other stakeholders;
- Refrain from making subjective, unfounded or ill-informed statements; and
- Recognise that the process is confined to issues that are directly relevant to the application.

6.1.2 Approach to I&AP Engagement

KSEMS' approach to stakeholder engagement is based on the following principles:

- Undertake meaningful and timely participation with stakeholders;

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PO BOX 396 GILLITTS 3606
COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

- Focus on important issues during the S&EIA process;
- Consideration of feasible and reasonable alternatives presented by stakeholders;
- Take accountability for information used;
- Encourage co-regulation, shared responsibility, and a sense of ownership over the proposed project lifecycle; and
- Consider the needs, interests, and values of stakeholders.

6.1.3 I&AP Database

KSEMS has created a database of all registered Interested and Affected Parties which will be continually updated so that all registered I&APs are kept up to date of the project. Some of the key I&APs that have been included in the register are shown in Table 9 below.

Table 9: Registered Interested and Affected Parties

Affiliation/ key stakeholder status	Title, name and surname	Contact details (Tel number or e-mail address)
DEFF	Makhosi Yeni	myeni@environment.gov.za
DEFF	Mpho Monyai	mmonyai@environment.gov.za
DEFF	Ephron Maradwa	emaradwa@environment.gov.za
EDTEA	Kacy Rengasamy	kacy.rengasamy@kznedtea.gov.za
DOT	Paul Dantuma	Paul.Dantuma@Kzntransport.gov.za
DAFF`	Nandipha Sotangane	NandiphaS@daff.gov.za
DWS	Mpumy Mdlalose	mdlaloseN2@dwa.gov.za
DWS	Mngoma-Madibe Jabulile	Mngoma-MadibeJ@dws.gov.za
Mgungundlovu District Municipality	Mandisa Khomo	mandisa.khomo@umdm.gov.za
Umngeni Local Municipality Environmental Officer	Marc Hattingh	marc.hattingh@umngeni.gov.za
KZN Wildlife Trust	Dominic Wieners	Dominic.Wieners@kznwildlife.com
Landowner	Ingonyama Trust – Suewellen Ellis	EllisS@ingonyamatrust.org.za
Landowner	RSA – Maxwell Sabela	033 260 4054/ maxwell.sabela@kznworks.gov.za
Landowner	Gallus Giuseppe	033 330 3572
Landowner	Regional and Land Affairs	TBC
Landowner	Umgeni Water	Ntokozo.sosibo@ymgeni.co.za
Landowner	KZN Dept of Housing/ Umngeni Local Municipality – Johan Vuuren	johan.vuuren@kzndhs.gov.za

Please refer to Appendix E1 for the full register containing all registered Interested and Affected Parties for this project.

6.1.4 Public Engagement

The proposal had previously been subjected to a full Public Participation Process (PPP) in 2016, comprising of the placement of an advertisement in a local newspaper, erection of signboards along the study area (Appendix E2), notification of Interested and Affected Parties (I&APs) as well as distribution of the Draft BAR for a 30-day comment period. However, the application was subsequently withdrawn due to a lapse in the project timeline. As a result of the application now being re-submitted, the public participation process was redone (Appendix E1), which included the placement of an advert in a provincial newspaper and erection of signboards along the affected route, as per Table 10 below.

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MEMBERS: K.A. STANTON (DIRECTOR)

Table 10: Notification of I&APs

PUBLICATION NAME Please refer to Appendix E1	The Mercury	
DATE PUBLISHED	21 August 2020	
SITE NOTICE POSITION Please refer to Appendix E1	**LATITUDE**	**LONGITUDE**
	29°34'47"S	30°12'00"E
	29°32'46"S	30°12'10"E
	29°31'04"S	30°13'18"E
DATE PLACED	04 November 2020	

Appendix E1 contains all PPP materials used during the notification process associated with the new application.

6.2 Summary of the issues raised by I&APs during the initial consultation phase

An I&AP requested the following additional information; a shape file in WG84 Hartebeeshoek/referenced dgn file of the proposed route and associated activities, servitude/reserve width and tree restriction width (dimension of servitude), Basic Assessment Report once completed and a list of key contact people and project managers. The shapefile was sent as requested. KSEMS notified the I&AP that the engineers were still working on the servitude information. Further, KSEMS requested clarity on the tree restriction width for the engineers; to date, Mondi has not responded. KSEMS informed the I&AP that the Basic Assessment was still in the process of being compiled. The contact details of key contact people and project managers were provided to the I&AP.

- An I&AP noted that three properties are affected by the proposed pipeline and belong to the Ingonyama Trust Board (ITB), namely Farm no 4669 – FT; Farm no 1043 – FT and Portion 1 of 2589 – FT. This has been noted and accepted.
- A resident near the proposed site stated that the previous pipeline affected their water supply from a neighbouring wetland. This was noted during a site visit conducted on the 29th of September 2016.

The comments and responses report associated with the initial consultation process is included in Appendix E2 of this report.

All registered I&APs will be provided with an opportunity to comment (30-day comment period) on the draft Basic Assessment Report. All concerns and comments will be addressed and will be included in the Comments and Responses report which will be included in the Final Basic Assessment Report to be submitted to DEFF for consideration.

7 BASELINE ENVIRONMENT

7.1 Topography (Physical)

The topography of the study area comprises of steep sloping terrain that has been intersected by many watercourses that have cut into the landscape. The average slopes for phase 2 of the pipeline, along the preferred and alternative routes, were calculated to be 8.6 % and 3.6%, respectively, and the elevation ranging from between 1050 m and 1398 m with an average elevation of 1153 m. The phase 1 pipeline contained an average slope of 5.3 % and the elevations ranged between 1334 m and 1489 m.

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The topography along the preferred and alternative routes of the proposed development are illustrated in Figures 5 and 6, respectively (Google Earth Pro, 2018).

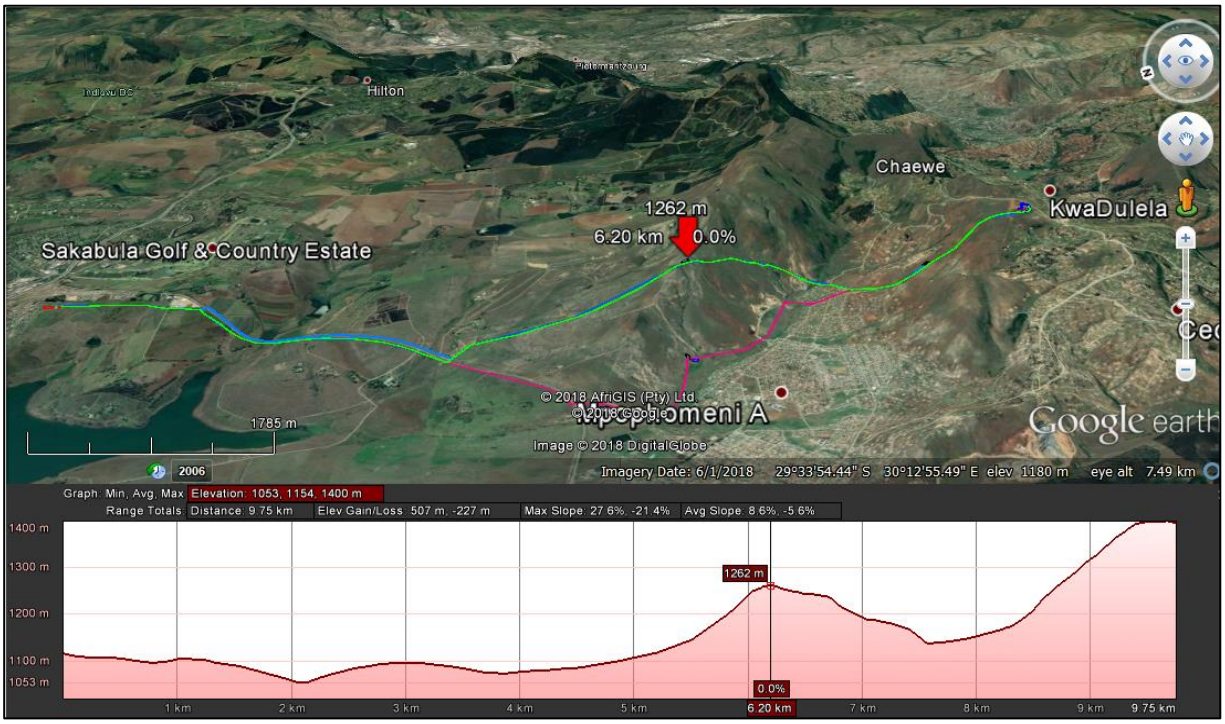

Figure 5: Map illustrating the topography along the preferred Vulindlela Pipeline route (Green line) (Google Earth Pro, 2018).

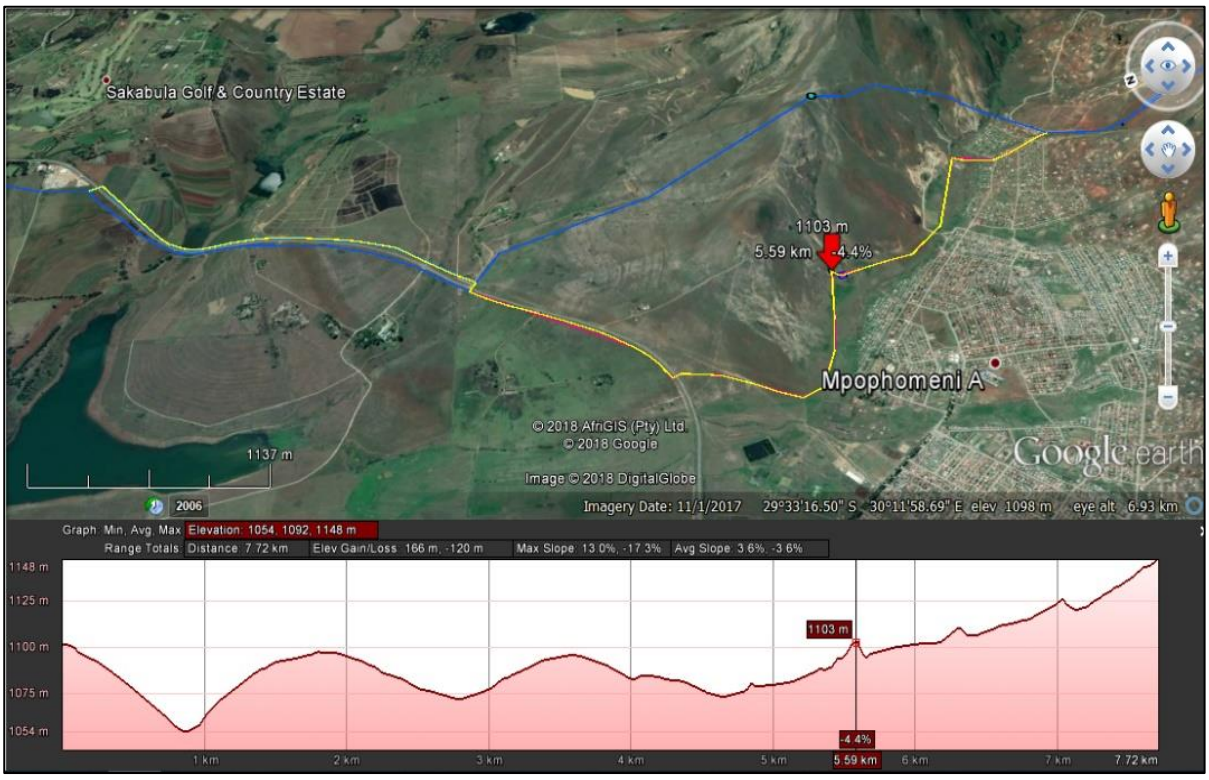

Figure 6: Map illustrating the topography along the alternative Vulindlela Pipeline route (Yellow line) (Google Earth Pro, 2018).

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7.2 Land Cover

The study area was noted, as having been transformed by human activities such as urban and rural settlements and agricultural activity (GJ McDonald, 2018). The dominant land covers within the study area were recorded to be Urban township (low veg/grass) and Grassland. However, in addition to the aforementioned land cover classes several other classes were recorded to be impacting on the surrounding terrestrial and aquatic environments within the study area (Figure 7).

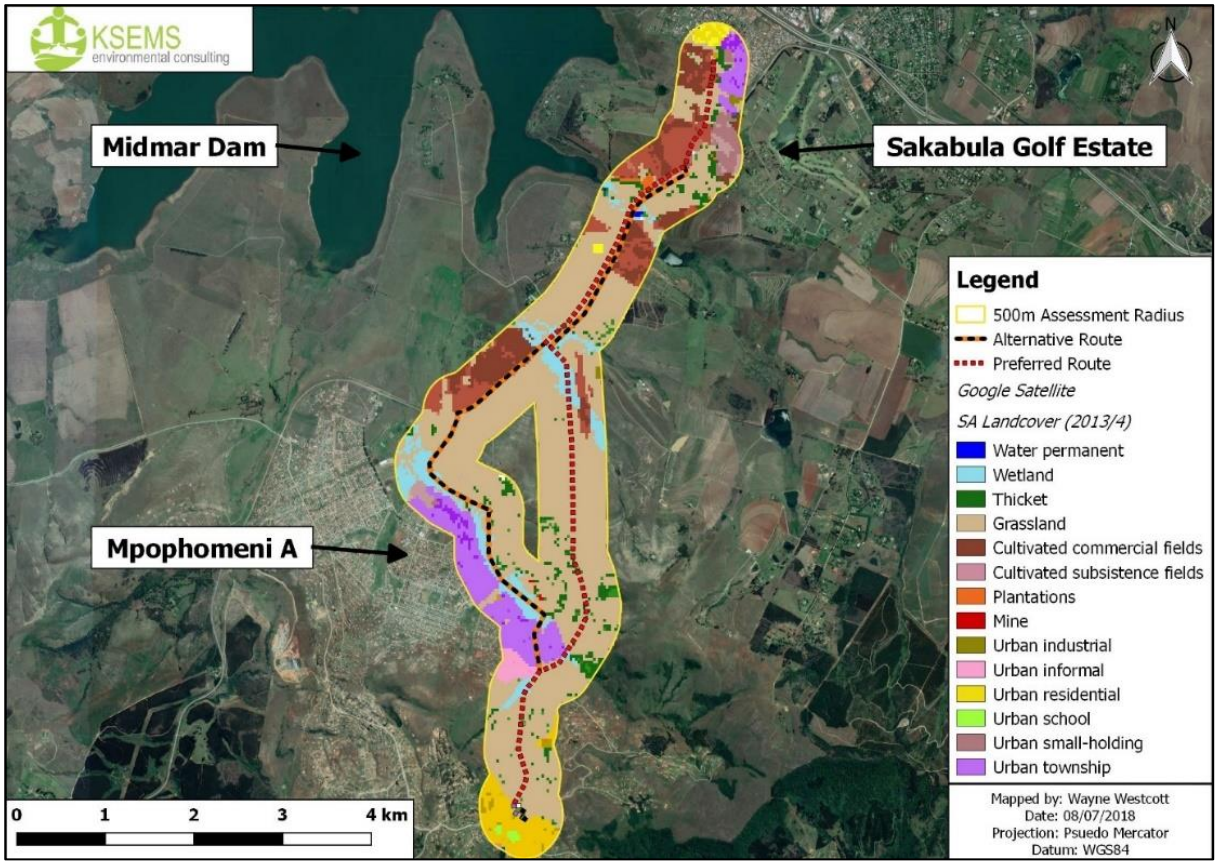

Figure 7: Illustration of the land cover classes recorded within the study area (SANBI, 2013/14).

7.3 Soil and Geology

Soils

The soil textures within the study area ranged from clay loam in the watercourses to sandy loam in the grassland areas. Approximately eighty percent (80 %) of the study area was recorded to contain soils that display characteristics associated with B/C class soils (Schultze et al., 2010). These soils were calculated to exhibit a moderate runoff potential with a slow infiltration rate and a generally restricted permeability, which may be attributed to the underlying sedimentary parent rocks. According to Schutlze (1992), soils within the B/C class calculated a low erosion potential factor of 0.19, indicating that these soils are presumably high in clay content and thus are resistant to detachment.

The higher elevation areas situated in the mid and latter sections of the study area were recorded to fall within the C soil class, which is representative of soils that are have a moderately high runoff potential with a very low infiltration rate and an impermeable underlying geological layer. These soils were calculated to have a moderate erosion potential of 0.23

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representative of medium textured soils such as silt loam, which are moderately susceptible to detachment (Schultze, et. al., 1992).

Geology

The study area extends over three (3) lithostratigraphic units, namely the Karoo Dolerite Suite, Volksrust Formation and Adelaide Sub-group (Council of Geoscience, 2008) (Figure 8). Hence, the characteristics of the overlying soil profile and consequent vegetation vary according to the underlying parent material and other climatic factors.

Karoo Dolerite Suite

The northern most section of the study area (approx. 15 %) was recorded to be situated on the intrusive Karoo Dolerite Suite, which forms part of the greater Karoo Supergroup (Figure 8). This intrusive layer was recorded to have protruded into the sedimentary deposits of the Karoo Supergroup during the Jurassic period of the Mesozoic era within the Phanerozoic Eon (Council of Geoscience, 2008). The Suite is mainly comprised of a network of Dolerite sills, sheets and dykes, which are very impermeable to water infiltration and are commonly found to create a series of base levels against which watercourses usually form upstream (Council of Geoscience, 2008).

Volksrust Formation

The majority of the study area is recorded to be dominated by the Volksrust Formation, which originates from the Ecca Group and forms part of the greater Karoo Supergroup (Figure 8). This relatively young sedimentary deposit was determined to have occurred during the late Permian Period of the Palaeozoic Era within the Phanerozoic Eon (Council of Geoscience, 2008). The formation consists of dark grey shale and basinal dark mudstone with either phosphatic, carbinate or sideritic concretions (SAHRA, 2013). Due to this formation being sedimentary in nature, under normal circumstances it would form a moderately impermeable layer over which subsurface diffuse flow may travel and encourage the formation of seepage wetlands as the topsoil layer depth decreases down slope and normally enters a watercourse at the valley bottom.

Adelaide Sub-group

Approximately 10% of the southernmost section of the study area was recorded to be underlain by the Adelaide Sub-group, which was deposited on top of the Ecca Group within the early sedimentary deposits of the Beaufort Group (Council of Geoscience, 2008). The sub-group was presumably deposited during the Permian Period of the Palaeozoic Era of the Phanerozoic Eon and was recorded to consist of deltaic and fluvial sequences of sandstone and green-grey mudstone (Council of Geoscience, 2008). Similar watercourse forming characteristics existing within this sub-group to those stated within the abovementioned Volksrust sedimentary layer.

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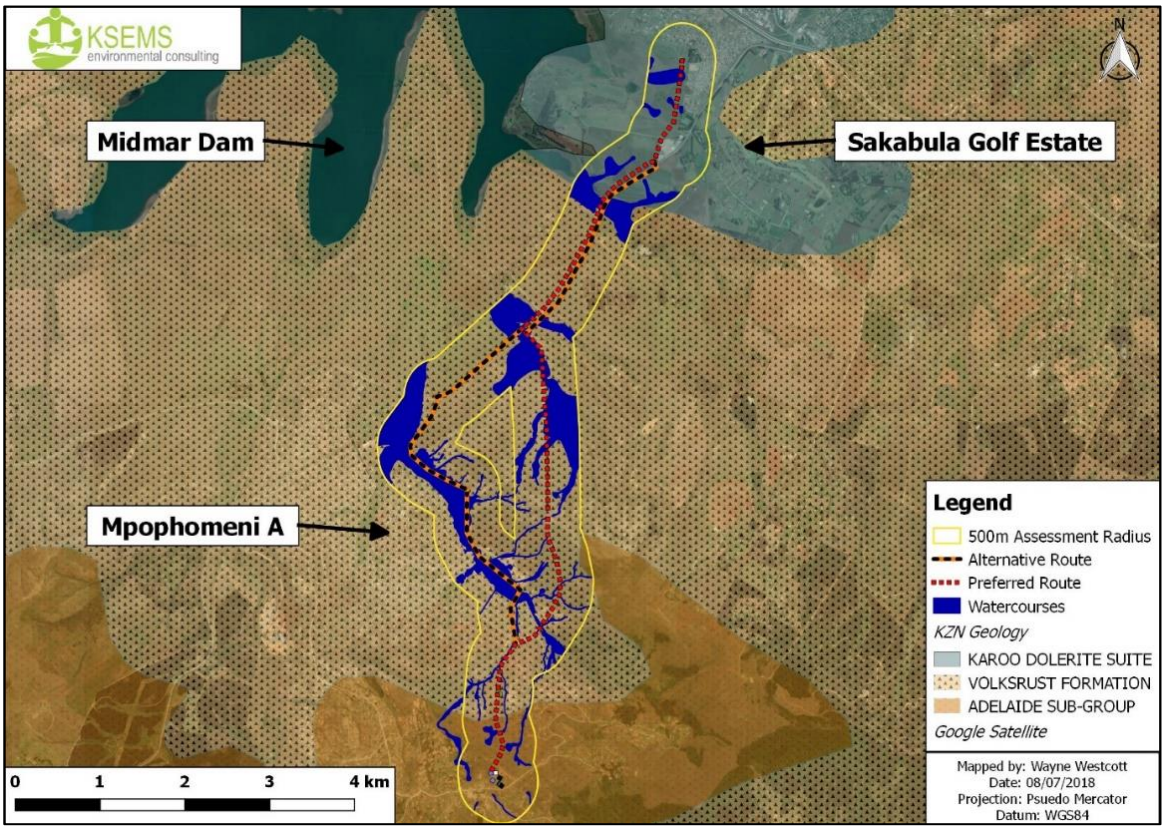

Figure 8: Illustration of the lithostratigraphic units that underlie the watercourses delineated within the study area (Council of Geoscience, 2008).

7.4 Vegetation

As per the findings of the Ecological Assessment conducted by GJ McDonald (2018), the study area was recorded to extend over four (4) vegetation units on a desktop level, namely: Midlands Mistbelt Grassland (Endangered), Southern KZN Moist grassland (Endangered), Eastern Temperate Wetlands (Vulnerable) and Temperate Alluvial Vegetation (Vulnerable) (Figure 9). The study area is, however, characterised by veld dominated by the presence of alien and/or invasive vegetation.

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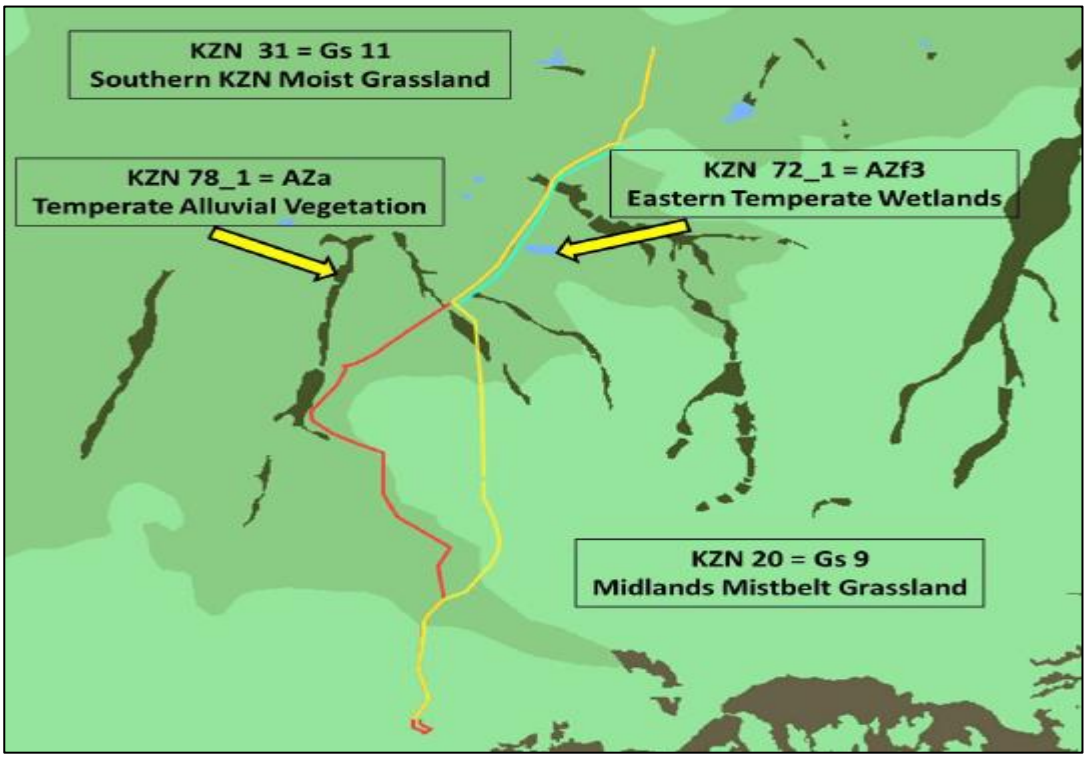

Figure 9: Map of the vegetation units relevant to the study area (Mucina & Rutherford, 2018).

The proposed pipeline route extends through formal nature reserve (Midmar) as well as through Critical Biodiversity Areas (Irreplaceable) as per Figure 10. The sensitivity highlighted above was considered to be attributed to the presence of the Midlands Mistbelt Grassland and Southern KZN Moist Grassland units. However, the specialist confirmed that due to the transformed nature of the site, and degraded vegetation, no species of conservation significance was identified during the assessment (GJ McDonald, 2018).

The specialist (GJ McDonald, 2018) described the vegetation along the proposed route as primarily consisting of close-cropped *Aristida* with weedy herbs such as *Helichrysum* and *Senecio* species scattered throughout (typical of disturbed grasslands), and further highlighted the dominant presence of alien vegetation such as *Richardia brasiliensis.*

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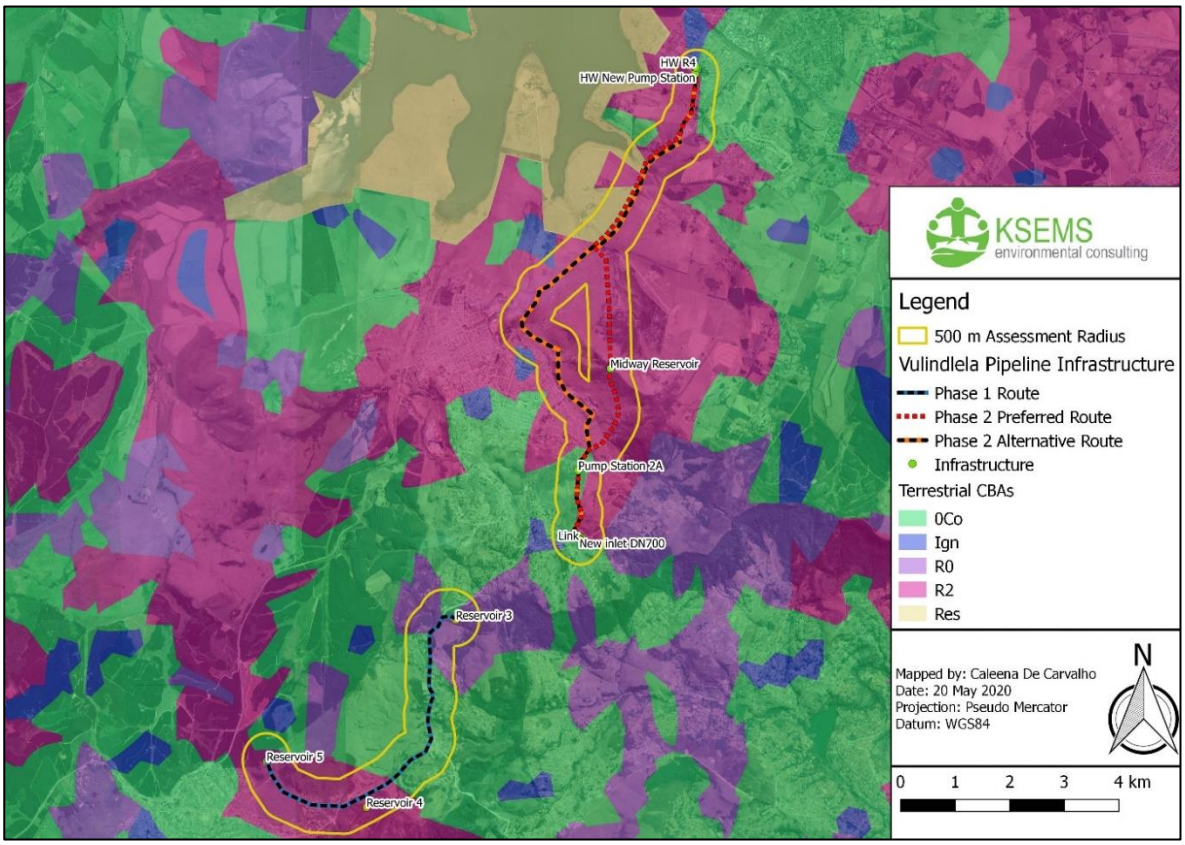

Figure 10: Map of the KZN terrestrial units that were recorded within the study area (EKZNW, 2010).

7.5 Hydrological setting

The proposed upgrade falls within the DWS quaternary catchment area U20C which falls under the Mgeni Sub-Water Management Area (WMA) and within the greater Mvoti to Mzimkhulu WMA.

The wetland specialist identified 10 wetland systems to be at risk by the proposed project, however, the systems identified ranged from moderately modified (category C) to seriously modified (category E), inferring that a large change in ecosystem processes and loss of natural habitat and biota and has occurred and category E inferring that a change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable. Overall, a majority of these systems were predicted to deteriorate slightly over the next five years as a result of the proposed development and its associated activities.

The watercourses within the study area were identified on a desktop level, classified and delineated in-field and subsequently mapped utilising Geographic Information Systems (GIS) (QGIS 2.14 and Google™ Earth Pro) and available spatial data. Due to the large extent of the study area, the proposed route was divided into segments for ease of reference (Figures 11 to 14).

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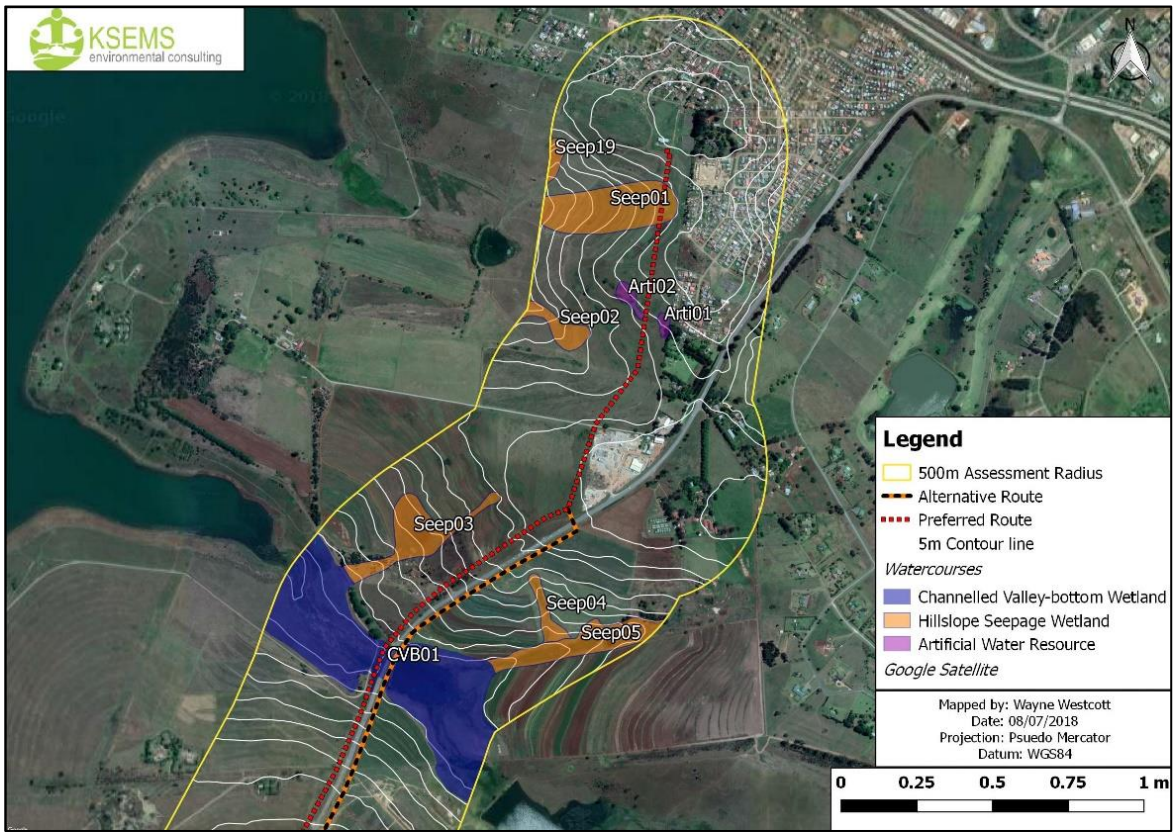

Figure 11: Illustration of the watercourses that were delineated within the northern portion of the study area.

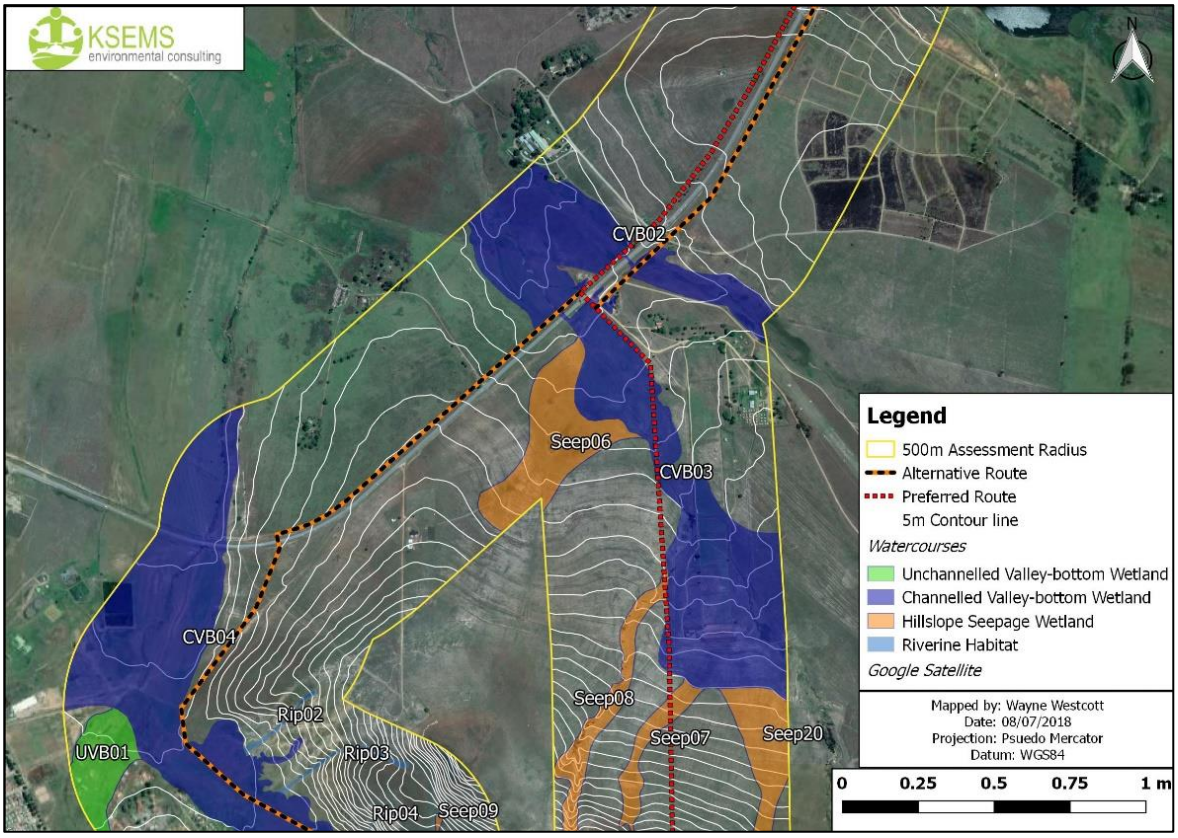

Figure 12: Illustration of the watercourses that were delineated within the mid reach of the study area.

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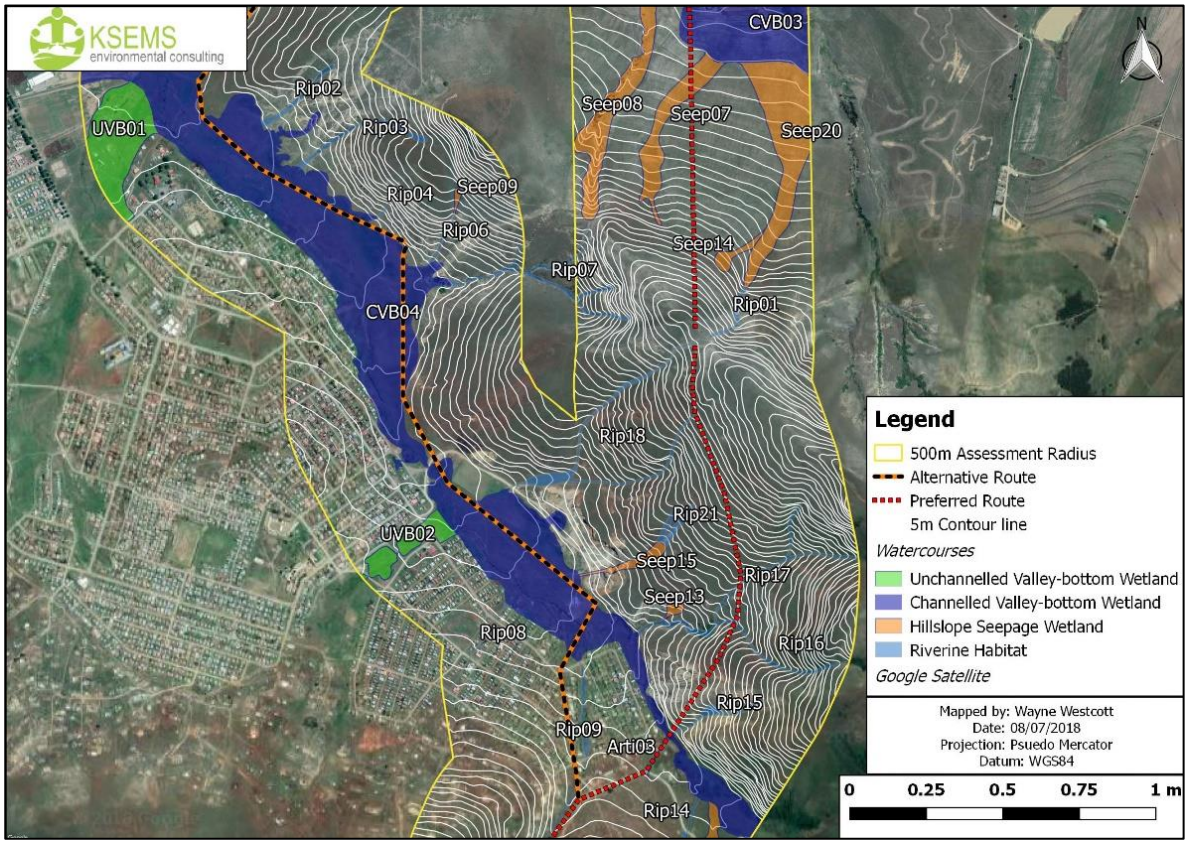

Figure 13: Illustration of the watercourses that were delineated within the portion of the study situated east of Mpophomeni A.

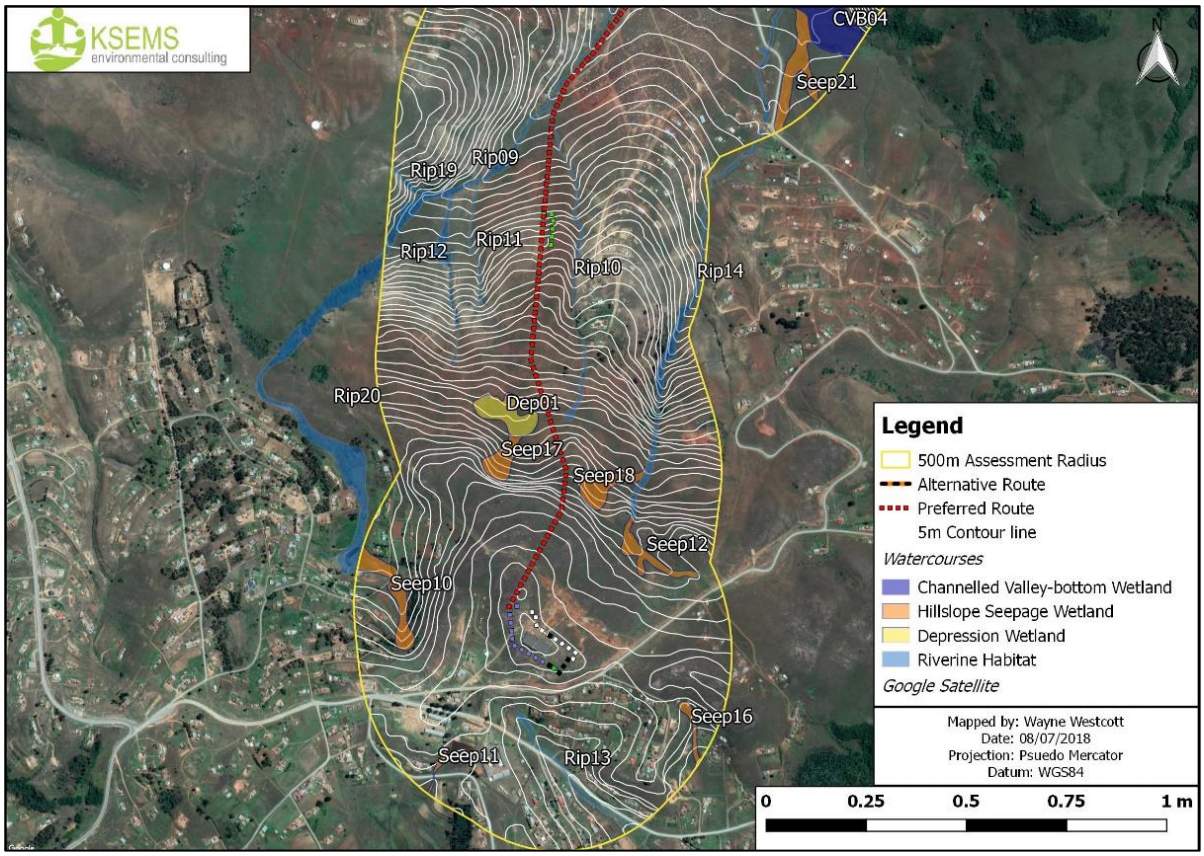

Figure 14: Illustration of the watercourses delineated within the southern portion of the study area as it moves up toward Reservoir 2.

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The table below (Table 11) consists of those watercourses that had a medium to high risk of being impacted on by the proposed development (preferred and route alternative) and which were further assessed by the specialist.

Table 11: Risk associated with watercourses that have a medium to high risk of being impacted on

Watercourse Code as per Figures 12 - 15	Watercourse Classification	Characteristic Potentially Impacted (Yes/No=Y/N)				Risk Rating	Need for further Assessment	Rationale
		Habitat	Biota	Water Quality	Flow Regime			
VULINDLELA PIPELINE: PREFERRED ROUTE								
Arti01 Arti02 Arti03	Artificial Watercourses	**Y**	N	N	N	**Medium**	Yes	Although these systems may be indirectly impacted on during the construction phase of the proposed development, they were classified as artificial freshwater resources in accordance with Ollis (2013), and thus their PES Scores cannot be assessed further as there is no reference condition to compare the current health of the systems to. However, as these systems were recorded to be providing ESS they were assessed utilising WET-Ecoservices and the EIS tool.
CVB01 CVB02 CVB03 CVB04	Channelled Valley-Bottom Wetland	**Y**	**Y**	**Y**	**Y**	**High**	**Yes**	The preferred route will intersect all four of these systems, and thus directly impact on the hydrological regime, geomorphology and floral community observed within the outer boundaries. Therefore, further assessment was required to accurately determine their base level conditions and the potential impacts of the proposed development.
Dep01	Depression Wetland	N	N	**Y**	**Y**	**Medium**	Yes	The preferred route will traverse approximately 24 m directly east of Dep01 and thus has a moderate potential of indirectly impacting on the current health of Dep01. Therefore, further assessment of this system was required.
Rip01, Rip15, Rip16, Rip17 & Rip18	"A" Channel Riverine Systems	**Y**	**Y**	N	**Y**	**High**	**Yes**	The preferred route is planned to traverse through, or within 20 m of these riverine systems and thus will directly, or indirectly impact on the aquatic habitat and sediment capacity of these systems, specifically during heavy storm events. Further assessment was thus required.

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Watercourse Code as per Figures 12 - 15	Watercourse Classification	Characteristic Potentially Impacted (Yes/No=Y/N)				Risk Rating	Need for further Assessment	Rationale
		Habitat	Biota	Water Quality	Flow Regime			
Rip09 & Rip10	"B" Channel Riparian System	Y	Y	Y	Y	High	Yes	This system will be traversed by the preferred route and as this system was recorded to be flowing during the site survey, it was essential to determine its current health and functionality to determine system-specific mitigation measures to reduce the potential impact.
Seep01 Seep07 Seep08	Hillslope Seep Wetlands (linked to channel)	Y	Y	Y	Y	High	Yes	The preferred route is planned to traverse through, or within 20 m of these wetland systems and thus will directly, or indirectly impact on the hydrological regime of these systems, specifically as these systems are dominated by subsurface diffuse flow. Further assessment was thus required.
VULINDLELA PIPELINE: ALTERNATIVE ROUTE								
CVB01 CVB02 CVB03 CVB04	Channelled Valley-bottom Wetland	Y	Y	Y	Y	High	Yes	The preferred route will intersect all four of these systems, and thus directly impact on the hydrological regime, geomorphology and floral community observed within the outer boundaries. Therefore, further assessment was required to accurately determine their base level conditions and the potential impacts of the proposed development.
Rip09	"B" Channel Riparian System	Y	Y	Y	Y	High	Yes	This system will be traversed by the alternative route and as this system was recorded to be flowing during the site survey, it was essential to determine its current health and functionality to determine system-specific mitigation measures to reduce the potential impact.

7.6 Socio-economic setting

The proposed project is situated within the uMngeni Local Municipality of KwaZulu-Natal. According to the latest 2011 Census data, the municipality has a population of 92710 people with an annual growth rate of 2.3% since 2001. In terms of population composition by age group, the highest percentage of the population distribution is between the ages 15-34 accounting for 38% of the population (Umgeni Municipality Integrated Development Plan Review, 2016/2017). The number of households has increased to 30490 in 2011 compared to 20488 in 2001. The average household size is now 2.8 with the female headed households at 42.7% of the population (Umgeni Municipality Integrated Development Plan Review, 2016/2017). The municipality has made improvements in terms of basic services with 95% of households having piped

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water, 85% with electricity and 81% with proper sanitation. The official unemployment rate is 23.9% which is significantly lower than that of the uMgungundlovu District which is 30.4% (Umgeni Municipality Integrated Development Plan Review, 2016/2017).

The proposed route extends across Wards 7, 8 and 9 of the municipality near Howick, Merrivale, Mpophomeni, Hilton and Worlds View, and are substantially urban in nature. The remaining wards include some urban components but are mainly rural in nature whereby the region is characterised by substantial farmland. According to the available data, the Primary Sector which is dominated by agriculture, within the municipality is the second highest contributor to the regional GDP of uMgungundlovu with 14.1% of the gross domestic products lower by 3.5% compared to 2001 (Umgeni Municipality Integrated Development Plan Review, 2016/2017).

The table 12 below provides a summary of the socio-economic value of the proposed development and further provides an indication of the benefits which may be experienced by the local community and previously disadvantaged individuals.

Table 12: Summary of the socio-economic value of the proposed development.

SOCIO-ECONOMIC CHARACTER	
All Alternatives	
What is the expected capital value of the activity on completion?	R 125 Million
What is the expected yearly income that will be generated by or as a result of the activity?	R 50 Million
Will the activity contribute to service infrastructure?	Yes
Is the activity a public amenity?	No
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	25 People
What is the expected value of the employment opportunities during the development and construction phase?	R 2.7 Million
What percentage of this will accrue to previously disadvantaged individuals?	100%
How many permanent new employment opportunities will be created during the operational phase of the activity?	Not Applicable
What is the expected current value of the employment opportunities during the first 10 years?	Not Applicable
What percentage of this will accrue to previously disadvantaged individuals?	Not Applicable

8 IMPACT ASSESSMENT

The following section presents separate impact assessments of each of the Preferred Alternative as well as the Alternative Route that have been identified for the proposed development. The below tables are summarised for comparison purposes and the full table containing the assessment of impacts and associated mitigation measures can be viewed in Appendix F. All socio-economic, biological and physical impacts have been considered, as per the various specialist reports that were composed for the proposed development, for the construction and operational phases of the proposed development. It must be noted that the precautionary principle has been applied within the below impact assessment, and thus although the impacts presented may not occur they have been assessed to ensure that all potential impacts have been accounted for.

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8.1 Assessment Methodology

The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts
- Prediction of the nature, magnitude, extent, and duration of potentially significant impacts
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact

The possible impacts associated with the project were primarily identified by the EAP and specialists and collated in the tables below.

In accordance with the NEMA EIA Regulations of 2014 as amended, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts
- Nature of the impact
- Extent of the impact
- Intensity of the impact
- Duration of the impact
- Probability of the impact occurring
- Impact non-reversibility
- Impact on irreplaceable resources
- Confidence level

The impacts were assessed in terms of the following criteria:

- The nature, a description of what causes the effect, what will be affected and how it will be affected
- The physical extent, wherein it is indicated whether:
  - 1 - the impact will be limited to the site
  - 2 - the impact will be limited to the local area
  - 3 - the impact will be limited to the region
  - 4 - the impact will be national
  - 5 - the impact will be international
- The duration, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years)
  - 2 - of a short duration (2-5 years)
  - 3 - medium-term (5–15 years)
  - 4 - long term (> 15 years)
  - 5 - permanent
- The magnitude of impact on ecological processes, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect on the environment
  - 2 - minor and will not result in an impact on processes
  - 4 - low and will cause a slight impact on processes
  - 6 - moderate and will result in processes continuing but in a modified way
  - 8 - high (processes are altered to the extent that they temporarily cease)

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  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes
- The probability of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:
  - 1 - very improbable (probably will not happen)
  - 2 - improbable (some possibility, but low likelihood)
  - 3 - probable (distinct possibility)
  - 4 - highly probable (most likely)
  - 5 - definite (impact will occur regardless of any prevention measures)
- The significance, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high
- The status, which is described as either positive, negative or neutral
- The degree to which the impact can be reversed
- The degree to which the impact may cause irreplaceable loss of resources
- The degree to which the impact can be mitigated

The significance is determined by combining the criteria in the following formula:

$$S = (E+D+M)*P$$

Where: **S** = Significance weighting, **E** = Extent, **M** = Magnitude, **D** = Duration, **P** = Probability

The significance weightings applied in assessing potential impact are outlined in Table 13 below:

Table 13: Significance weightings

Points	Significance Weighting	Description
< 30 points	**Low**	Where this impact would not have a direct influence on the decision to develop in the area
31-60 points	**Medium**	Where the impact could influence the decision to develop in the area unless it is effectively mitigated
> 60 points	**High**	Where the impact must have an influence on the decision process to develop in the area

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Table 14: Table presenting the summarised impacts of the preferred and route alternatives that may occur during the construction phase of the proposed development.

ACTIVITY	POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (ROUTE ALTERNATIVE)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (ROUTE ALTERNATIVE)
Direct Habitat Destruction/Modification					
Damage of flora and fauna during initial site visit (Pre-construction)	• Vehicular access will be needed using off-road vehicles to access certain areas of the site • Increase in vehicular and foot traffic leading to vegetation loss and soil compaction - Collateral damage to flora and fauna in areas surrounding the site	**Low**	**Low**	**Low**	**Low**
Construction and upgrade to the pump stations and new pipelines and reservoirs	- Loss of habitat and refugia - Habitat fragmentation - Loss of overall floral and faunal biodiversity as vegetation is removed - Loss of protected species, species of conservation concern and red data species - Loss of ecosystem services provided by flora and fauna	**High**	**Medium**	**High**	**Medium**
Clearance of vegetation for pipeline construction	- Erosion and loss of topsoil - Establishment of alien invasive species and alien invasive plant encroachment into disturbed areas as a result of construction activities.	**Medium**	**Low**	**Medium**	**Low**
Infilling for the pipeline and construction and upgrade of pump stations and Midway Reservoir.	- Loss of wetland habitat - Loss of biodiversity - Impact on hydrological functioning of water recourses - Reduction in ecosystem services	**High**	**Medium**	**High**	**High**

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COMPANY REGISTRATION NO: 2019/522106/07
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ACTIVITY	POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (ROUTE ALTERNATIVE)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (ROUTE ALTERNATIVE)
Direct Habitat Destruction/Modification					
Construction activities such as vehicle and personnel movement on access roads, haulage of waste, excavation, and exhaust emissions of heavy construction vehicles.	The potential cumulative impacts of the construction activities are detailed below: - Dust generation – the cumulative impact of dust generation has a potentially medium significance as the road and bridge does not currently generate dust. However, with the implementation of mitigation measures, as described above, the significance of this impact will be low.	**Medium**	**Low**	**Medium**	**Low**
Construction activities such as vehicle and personal movement on access roads, and haulage of waste	The potential cumulative impacts of the construction activities are detailed below: - Traffic management – the construction activities will result in the transportation of various materials by road as well as the use of construction vehicles and machinery on site. This will result in a significant increase in vehicle movement within the study area during the construction phase. However, with the implementation of mitigation measures, as described above, the significance of this impact will be low.	**Medium**	**Low**	**Medium**	**Low**
Vegetation removal for access roads and site camps/storage areas. There is an existing access track providing access to the prosed midway ridge reservoir position. The existing access track will be improved as follows:	- Increase in exposed surfaces and subsequent potential for decreased soil particle cohesion and soil binding capacity, increasing the potential for erosion and sedimentation. - Formation of rills and gullies from increased concentrated runoff may occur due to soil compaction.	**Medium**	**Low**	**Medium**	**Low**

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ACTIVITY	POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (ROUTE ALTERNATIVE)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (ROUTE ALTERNATIVE)
Direct Habitat Destruction/Modification					
1. Rip and Recompact 150mm in situ aterial to 95% MOD AASHTO 2. 150mm G5 material to 97% MOD AASHTO An access driveway will be required off existing gravel roads to access the Mpophomeni Booster Pump Station.	- This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface and into the riparian unit resulting in increased rates of erosion and sedimentation within the riparian and in-stream habitat. - Soil compaction resulting in reduced infiltration and increased surface runoff together with the artificial creation of preferential flow paths due to construction activities, will result in increased quantities of flow entering the system. - Damage to vegetation and biodiversity if the improvements are not limited to the existing tracks.				
Littering of waste by construction workers	- Increase organic matter into freshwater systems polluting the water - Blocking of drains and stormwater management measures - Bury flora species and thus reduce biodiversity - Kill faunal species and thus reduce faunal biodiversity	**Low**	**Low**	**Low**	**Low**
Social					
All construction activities	- Health and safety risks to the public and employees during the construction phase.	**Medium**	**Low**	**Medium**	**Low**
Excavation, construction machinery and construction vehicle movement	- Noise and visual disturbance during construction activities	**Low**	**Low**	**Low**	**Low**

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COMPANY REGISTRATION NO: 2019/522106/07
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ACTIVITY	POTENTIAL IMPACTS	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (PREFERRED)	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION (ROUTE ALTERNATIVE)	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION (ROUTE ALTERNATIVE)
Direct Habitat Destruction/Modification					
Partial road closures and increased traffic	- Traffic increase from construction vehicles - Traffic delays from closed roads during construction - Disturbance to commuters along the roadside	**Low**	**Low**	**Low**	**Low**
Improved service delivery	- Access to potable water for the surrounding communities.	**High (Positive)**	**N/A**	**High (Positive)**	**N/A**
Risk of not informing all property owners of proposed development (pre-construction)	- Damage to property where property owner was not aware of proposed development	**Low**	**Low**	**Low**	**Low**
Economic					
All construction activities	- Damage to surrounding properties	**Low**	**Low**	**Low**	**Low**
Heritage					
All construction activities	- Damage to unearthed heritage resources during construction phase	**Low**	**Low**	**Low**	**Low**
All construction activities	- Impact on the Cemetery along the preferred route	**Medium**	**Low**	**Low**	**Low**

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Table 15: Table presenting the summarised impacts that may occurring during the operational phase of the proposed development, and the mitigation measures that may be implemented to rectify the impacts

POTENTIAL IMPACT	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION
Possibility of continued introduction of alien invasive species, weeds and pioneer plants due to ineffective rehabilitation and maintenance.	**Medium**	**Low**
Potential continued temporary destruction of vegetation due to maintenance activities.	**Medium**	**Low**
Any maintenance activities may result in the pipeline having to be unearthed and reburied within the various freshwater habitat catchments. It is therefore possible that there would be increased possibilities of erosion and sedimentation of freshwater resources.	**Medium**	**Low**
Any additional change in the state of the wetland/riparian habitat in terms of pollution is likely to be due to maintenance activities during operation.	**Medium**	**Medium**
Solid waste generation and accumulation may result in polluted water sources and a generally polluted environment.	**Medium**	**Low**
Positive Impact: Rehabilitation of Vegetation	N/A	N/A
Positive Impact: Reduction in Alien Invasive Species	N/A	N/A
Positive Impact: Supply of Water to Local Municipalities	N/A	N/A

Table 16: Summary of the impacts associated with the no-go alternative

Activity	Impact summary
No Go Option	This no-go alternative would result in the demand for bulk potable water exceeding the supply. More significantly, the development needs of the local municipalities will not be realised as a result of this no-go alternative. Umgeni Water is proposing to improve water supply by upgrading existing water supply infrastructure and constructing additional infrastructure to supplement existing supply. If the activity is not implemented by Umgeni Water as proposed, the water supply in the area will remain at critically low levels which will result in the perpetuation of a lack of access to potable and palatable water for many households in the surrounding communities. This may result in households making use of non-treated water for drinking and sanitation purposes which may result in waterborne diseases and illnesses. Furthermore, the economy of the region will be negatively impacted upon due to the lack of proper service provision, there will also be no jobs created if the activity is not implemented.

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COMPANY REGISTRATION NO: 2019/522106/07
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9 ENVIRONMENTAL IMPACT STATEMENT

9.1 Summary of the key findings of the environmental impact assessment

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction and operational phases. The following will present; a summary of the key findings of the environmental impact assessment, a summary of the positive and negative impacts of the proposed development (Table 17) and a map at an appropriate scale which superimposes the proposed development on the environmental sensitive areas (if any) associated with the Preferred Alternative (Alternative 1) and the alternative route (Alternative 2) and any areas that should be avoided (i.e. buffer zones).

It should be noted that the positive and negative impacts identified below will for the most part, be applicable to both the preferred and alternative routes.

Table 17: Positive and negative impacts associated with the proposed Vulindlela BWS

POSITIVE IMPACTS	NEGATIVE IMPACTS
APPLICABLE TO THE PREFERRED ROUTE AND ALTERNATIVE ROUTE	
- Mpophomeni Cemetery was noted to be in close proximity to the preferred and alternative routes but if a buffer is maintained. the impact is expected to be low in significance. - The proposed development will improve the supply of potable water to the Msunduzi and uMngeni Local municipalities and thus reduce the water shortages which are currently being experienced. - The expected yearly income that will be generated by, or as a result of, the proposed development will be approximately R1 Million. - Approximately 25 new employment opportunities will be created as a result of the entire proposed development, of which approximately 95% will accrue to previously disadvantaged individuals. - Approximately 100 permanent jobs will be created as a result of the proposed development. - The expected value of the employment opportunities over the next 10 years following the development is projected to be approximately R15 Million. - The proposed development will improve the overall socio-economic wealth within the region as a result of the improvement of the supply of potable water to the surrounding communities.	- Several freshwater resources may be impacted upon, however, if all mitigation measures outlined within this report, the site specific EMPr and the Freshwater Habitat Impact Assessment Report, the impacts should be minimal. - General waste will be produced during the construction phase of the proposed development, however, if all avoidance and mitigation measures outlined within this BAR and the site-specific EMPr are strictly adhered to no detrimental impacts will occur to the environment. - Hazardous chemicals (e.g. petrol, oil and diesel) will be present on-site, which increases the risk of potential spills occurring. Drip-trays must be stationed under all stationary plant to reduce the risk, However if a spill were to occur, the appropriate spill-kits and bins/skips must be situated on-site to ensure that all accidental spills will be adequately mitigated and the content exposed of at the relevant registered waste sites. - Air emissions will be produced during the construction and operational phases of the proposed development, however, the quantity will be below the threshold presented under Section 10 of the National Environmental Management: Air Quality Act (Act no. 39 of 2004), and thus the proposed development will not require an atmospheric emission license. - There may be elevated noise levels during the construction and operational phases of the proposed development, however, the levels will be below 85dBa and working hours will be between 07h:00 to 17h:00 on week days. - There will be negligible destruction of floral biodiversity as a result of the proposed development, however due to the already disturbed nature of the receiving environment and

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	disturbed floral community the impacts are expected to be very low. - The increase in area of hardened surfaces within the site may result in the alteration of the natural hydrological regime currently recorded down the slope, however, this may be avoided if a stormwater management plan is strictly implemented to ensure that stormwater runoff enters the adjacent environment in a planned and non-detrimental manner (i.e. reduced flow velocity to reduce preferential flow paths being created). - Construction activities will increase traffic movement in the study area which will be inconvenient to road users. This can, however, be mitigated.
APPLICABLE TO PREFERRED ROUTE ONLY – Alternative 1	
- Reduced construction footprint and so reduced impact on watercourses. - Reduced length resulting in reduced construction costs and a capex savings of approximately R50 000.00 to Umgeni Water. - Less power required for operation of the preferred route	- Need for construction of a midway reservoir (however, the preferred route is still less costly to implement). - Construction of the midway reservoir will result in habitat loss within its construction footprint. However, the specialist noted that the habitat is highly transformed with alien/ invasive species and suggested that the rocky habitat be avoided where possible. - The preferred route in its mid reach, may have a slightly higher risk of erosion due to being located along erosion prone soils. Impacts can, however, be mitigated to low.
APPLICABLE TO ALTERNATIVE ROUTE ONLY – Alternative 2	
- No need for construction of an additional reservoir.	- The alternative route is longer than the preferred layout, and therefore will have a greater construction footprint. - A greater construction footprint is anticipated to result in greater environmental impact. - According to the impact assessment, the alternative route will have a greater impact on watercourses in terms of infilling associated with construction activities, due to the greater construction footprint of this route. - The longer route will be more costly to implement due to its length and higher pressure requirements. - This route also presents numerous obstacles such as poor ground conditions in low lying areas, dolerite boulders and a quarry in the way. Clearing of such areas may result in greater environmental impact. - Even though the route would have avoided a reservoir, it would have incurred higher capex and operational costs in terms of power used.

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Comparative summary of Impacts and EAP Recommendations

(Key: 0 = not viable (or may cause impact); 1 = less viable (or impact can be mitigated); 2 = most viable (or no impact caused)

Table 18: Comparative summary of impacts associated with the preferred and alternative routes

Ranking of Alternatives	Alternative 1 (Preferred)	Alternative 2	Reasons for Ranking
Ecological	1	2	Majority of the impacts identified by the specialist were equal in significance with an exception to the impacts relating to soil erosion and compaction in which the preferred route in its middle reach will pass through erosion prone soils. This favoured the alternative route marginally.
Freshwater Habitat	2	1	The direct impact on wetland habitat associated with the preferred route is 0.49 hectares in comparison to the 0.90 hectares of the alternative route this is almost double the preferred route, therefore the specialist favoured the preferred route over the alternative route.
Heritage	1	1	It is the opinion of the specialist that both alternative routes considered are equally suitable for the proposed pipeline development from a general heritage point of view.
Economic	2	0	the preferred alternative is more economical than the route alternative in terms of capital cost and energy usage. energy usage for the route alternative will have a negative impact on the amount of money spent on electricity.
Social	2	1	The alternative route traverses more properties than the alternative route therefore the preferred alternative is favoured.
Total	**8**	**5**	

Subsequent to conducting the aforementioned impact assessment with the input from the various specialist reports it can be concluded that no potentially fatal impacts will occur as a result of the proposed development being implemented. The most noticeable impacts associated with implementation of the preferred and alternative route, is the clearance of vegetation resulting in a loss of natural habitat and biodiversity, infilling within watercourses due to construction of the pipeline within several watercourses, and an increase in traffic during the construction phase.

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

It should be noted that the preferred route may have a slightly higher impact on soil erosion and compaction due to a portion of this route traversing erosion prone soils, as opposed to the alternative route. This impact can, however, be reduced to a low level of significance through implementation of recommended mitigation measures contained in the EMPr. However, the alternative route will have a greater construction footprint, and which will result in a greater direct impact on wetland habitat, and as such is considered to be less favourable than the preferred route. The alternative route will also result in greater capex and operational costs in terms of power used. As such, the preferred route is also favourable from an economic perspective due to the reduced construction footprint which will result in capex savings to Umgeni Water. Considering both alternatives will provide the Municipality with the requires potable water supply, the preferred alternative is favourable from an environmental and economic perspective.

Although the no-go alternative will have a lower environmental impact due to no construction taking place, the no-go alternative would result in the demand for bulk potable water exceeding supply. More significantly, the development needs of the local municipalities will not be realised as a result of this no-go alternative. Umgeni Water is proposing to improve water supply by upgrading existing water supply infrastructure and constructing additional infrastructure to supplement existing supply. If the activity is not implemented by Umgeni Water as proposed, the water supply in the area will remain at critically low levels which will result in the perpetuation of a lack of access to potable and palatable water for many households in the surrounding communities. This may result in households making use of non-treated water for drinking and sanitation purposes which may result in waterborne diseases and illnesses. Furthermore, the economy of the region will be negatively impacted upon due to the lack of proper service provision, there will also be no jobs created if the activity is not implemented.

In taking the above into consideration, it is the opinion of the EAP that the preferred alternative be authorised, on condition that all mitigation measures that have been presented within this report, as well as in the various specialist reports and EMPr (Appendix F) strictly adhered to. Additionally, the site manager must ensure that the EMPr (Appendix F) is used as a guide for all on-site activities. Furthermore, to reduce the cumulative impacts of the proposed development the construction site can must be remediated in strict accordance with the site-specific rehabilitation plan (McDonald, 2018).

9.2 Summary of specialist findings

The section below presents a summary of the recommendations, avoidance measures and mitigation strategies that were recorded within each specialist report (i.e. Freshwater habitat Impact Assessment, Biodiversity Impact Assessment, Biodiversity Rehabilitation Plan, Heritage Impact Assessment and Paleontological Study). The findings that are presented within each report, as well as the in-depth impact assessment, provided input into the conclusion regarding what Alternative site should be utilised for the proposed development.

Ecological Assessment (MacDonald, 2018):

The Ecological Assessment revealed that the proposed development is sited in an area which has been transformed by human activities, notably urban and rural settlement, and commercial and subsistence agriculture and pastoralism. Little natural woody vegetation was encountered, and grasslands were excessively burned and grazed resulting in a paucity of species which might be expected from upland grassland. Geophyte diversity was notably absent. Such species as were found were low-growing species such as Ledebouria indicating a relatively long history of over-grazing and removal of all but the most prostrate-growing species which are beyond the reach of grazing livestock and the deleterious effects of too-frequent burning. Numerous ruderal and “weedy” species were found, and extensive alien invasion was recorded.

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COMPANY REGISTRATION NO: 2019/522106/07
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No nationally protected or Red Listed plant species were encountered and those that are protected provincially fall within the blanket protection of "All Aloe species, All Amaryllidaceae, All Iridaceae and All Liliaceae/Hyacinthaceae" for example. The species concerned are Aloe maculata, Aristea spp., Boophone disticha, Crinum bulbispermum, Gladiolus spp., Kniphofia sp. and Ledebouria spp. These will necessitate the application for a permit to destroy or translocate from Ezemvelo KZN Wildlife. Given the Red List status of Least Concern for the geophytes encountered as listed above, it does not seem practical to specifically remove these species ahead of the construction. Provided the principle of progressive re-instatement is followed, they can be re-planted as encountered when re-topsoiling occurs.

Sensitivities are limited to a number of crossings over wetlands, streams or drainage lines which will require the application for a Water Use License from DWAS. Rocky areas or sheet-rock habitats that are found along the path of both route options would be best avoided by the re-routing of those sections of the proposed routes and re-siting of proposed new infrastructure to less sensitive habitats.

The specialist concluded that no particularly clear recommendation emerges from the above exercise and both route options have significant draw-backs. The joint route from the Howick reservoir along the western side of the R617 passes along the boundary of Midmar Nature Reserve (albeit a highly disturbed route with numerous existing servitudes). The joint route along the eastern side of the R617 is constrained by the narrowing of the route between the road and an impoundment. Both western and eastern routes traverse a number of wetlands and watercourses.

The preferred route passes through an area categorized as CBA Irreplaceable, whereas the alternative route falls on the boundary of CBA Irreplaceable and Biodiversity Support area, and both traverse wetlands and/or watercourses (NFEPA wetlands in the case of the alternative route).

The vegetation along both routes is far from pristine and species of conservation significance (Specially Protected) are all Red Listed as of Least Concern. Rocky habitats, which will pose technical issues for construction, are found along the proposed route along its middle reach, and on both along the common route leading to Vulindlela reservoir and will compromise the preference for a buried pipeline, as rock blasting will presumably be required. The specialist therefore recommends that the proposed location of the Vulindlela Reservoir be moved/ situated to a position where it avoids impacting on the rock habitats as these present a sensitive habitat.

The impact on clearance of vegetation for both the preferred and alternative route will be relatively the same, with the vegetation along the pipeline servitude being comprised of "undisturbed grassland" which has been transformed due to grazing and fire. However, the impact of erosion potential of soils (based on empirical data and K-factors) indicates that the proposed preferred route in its middle reach will pass through erosion-prone soils. It is this factor that results in the alternative route being the recommended route, although no strong case can be argued for either since both alternatives will have a high impact on habitat loss associated with the clearance of vegetation for construction activities.

Heritage Impact Assessment (Active Heritage, 2018):

The desktop study did not indicate any archaeological sites within 1km from the proposed pipeline routes. No sites associated with the recent 'Struggle Era' occur in close proximity of the proposed pipeline. The area is also not part of any known cultural landscape. However, an old historical building that dates back to the late 19th century is situated approximately 250m to the west of the Alternative Route proposed. This building is presently being transformed into the newly established Mpophomeni Museum. As this heritage site is situated more the 50m form the proposed pipeline no mitigation is needed. The building is not threatened by the proposed development. The only heritage site that may be threatened by the proposed development is the Mpophomeni Cemetery. This is a semi-formal Cemetery situated near the meeting point of the two alternative pipeline routes. In fact, the preferred Route runs parallel to a dirt road on the north eastern side of the Cemetery and within 10m – 20m from its border with the Cemetery. It would not be possible to alter the

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COMPANY REGISTRATION NO: 2019/522106/07
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trajectory of the proposed pipeline at this point. It is therefore recommended that the developers maintain a buffer of at least 8m from the border of the Cemetery. In addition, it is suggested that the developers erect a study fence with an entrance gate at the north eastern side of the Cemetery prior to any excavation work.

A paleontological desktop evaluation was conducted by an analysis of the SAHRIS 'fossil sensitivity map'. The results indicate that the greater section of the proposed pipeline trajectory, alternatives 1 and 2, transverse areas with a high paleontological sensitivity. The extreme southern and south eastern sections of the proposed pipeline trajectory transverse areas with a very high
paleontological sensitivity.

It is the opinion of the specialist that both alternative routes considered are equally suitable for the proposed pipeline development from a general heritage point of view. The construction of the proposed Vulindlela Bulk Water Supply Scheme may proceed under the following conditions:

- Maintain a buffer of at least 8m around the north eastern boundary of the Mpophomeni Cemetery.
- It is also recommended that the developers erect a sturdy fence and an entrance gate at the north eastern boundary of the Mpophomeni Cemetery prior to any excavation in the area.
- Should this not be possible then the developers may consider a phase two heritage impact assessment including a grave relocation process. The process relating to potential grave relocation is outlined in Appendix 1 of the report.
- An Amafa accredited palaeontologist must conduct a desktop study of the northern and central sections of the proposed pipeline trajectory. A systematic ground survey is required for the extreme southern and south eastern sections of the pipeline trajectory.
- It is important to point that the KwaZulu-Natal Heritage Act requires that all operations exposing graves as well as archaeological and historical residues as well as fossils should cease immediately pending an evaluation by the heritage authorities.

Freshwater Habitat Impact Assessment (KSEMS, 2018):

The watercourses that have been delineated within the study have undergone moderate disturbance from historic and current land use practices. This has resulted in the overall integrity of the watercourses calculating PES scores that were recorded to fall within PES categories C (moderately modified) to E (seriously modified). Subsequent to conducting the DWS required Risk Assessment Matric (RAM) (DWS, 2016) for both the preferred route and alternative route, the following aspects of the proposed construction activities were calculated to be the most significant: clearance of hydrophytic vegetation species, excavation of hydric soils, compacting of wetland habitat (soil and vegetation), potential leaks in the pipeline and input of hydrocarbons into the aquatic environment. Of these, the impacts associated with excavation of hydric soils from directly within several watercourses could not be mitigated from a high to low risk rating (DWS, 2016).

To determine the direct impact that the preferred route and alternative route may have on the at-risk watercourses within the study area a working area of 3m was used to estimate the servitude footprint within the systems during the construction phase. The specialist concluded that the alternative route will have a greater direct impact on the watercourses, due to the alternative, which is greater n length, having a larger construction footprint, which will result in more infilling within affected watercourse systems. The specialist therefore recommended that the preferred route be implemented, on condition that all mitigation measures are effectively implemented.

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COMPANY REGISTRATION NO: 2019/522106/07
MEMBERS: K.A. STANTON (DIRECTOR)

Paleontological Assessment (Bamford, 2019):

The specialist confirmed that no fossils were visible in the surface soils or exposed rocks, during the site visit, and so the potential impact to fossil heritage was considered low. However, it is possible that fossils could be discovered during excavation along the eastern alternative route. As such, the specialist recommended that a Fossil Chance Find Protocol be included in the EMPr.

Geotechnical Assessment (Geosure, 2018):

The geotechnical specialist concluded that the proposed VBWS may proceed from a geotechnical aspect, provided that the relevant mitigation measures are implemented. The following conditions were provided:

- As groundwater seepage was encountered along the pipeline route, caution must be taken in the vicinity of drainage courses along the route where further groundwater seepage may develop.
- All construction activities are to be undertaken in accordance with SAN 1200 (current version).
- The in-situ materials found along the proposed route are not suitable for pipe bedding and "selected fill" will therefore need to be sourced commercially.
- Provision should be made for a supplementary geotechnical investigation to conduct borehole drilling to inform final foundation recommendations for the reservoir and pump station structures.
- The geotechnical specialist (Geosure) must be appointed to carry out periodic inspections during construction, as it is possible that ground conditions may differ along the construction site, to what was identified during the initial field investigations.

9.3 Summary of impact management measures

The section below presents a summary of the recommendations, avoidance measures and mitigation strategies that were recorded within each specialist report (i.e. Freshwater habitat Impact Assessment, Biodiversity Impact Assessment, Biodiversity Rehabilitation Plan, Heritage Impact Assessment and Paleontological Study). The finding that are presented within each report, as well as the in-depth impact assessment, provided input into the conclusion regarding what Alternative site should be utilised for the proposed development.

The table presents the proposed impact management outcomes that have been proposed for each phase of the proposed development within the amended preferred alternative, which must be included into the site-specific EMPr.

Table 19: **Presentation of the management measures that must be implemented during the planning, construction and operational phases of the proposed development.**

PLANNING PHASE	
Physical	• Ensure efficient and open communications between all stakeholders involved in the project during project planning and inception phase to ensure that proposed development takes the concerns and suggestions of all parties into account.
Biological	• Surveyors and project engineers must be educated / trained on minimizing damage to vegetation during construction. • Footprint must be kept to a minimum.

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Social	• At this phase all I&APs must be identified and must be informed of all changes and phases throughout the Basic Assessment process. • Ensure that all affected landowners are made aware of specialist and surveyors entering their property, include the time and date of field visits to reduce risk associated with poor communication.
Economic	• Do not allow heavy machinery during the initial site visits, use hand held machinery to reduce the risk to property. • Ensure efficient communication during project planning and inception meeting between all stakeholders involved in the project to avoid loss of capital
Heritage	• Ensure that all heritage structures or buildings older than 60 years are clearly identified. • Maintain a buffer of at least 8m around the north eastern boundary of the Mpophomeni Cemetery. • A sturdy fence should be erected and an entrance gate established at the north eastern boundary of the Mpophomeni Cemetery prior to any excavation in the area.
Cultural	• At this phase all I&APs must be identified and must be informed of all changes and phases throughout the Basic Assessment process.
CONSTRUCTION PHASE	
Physical	• Contractors must limit vegetation clearing to the demarcated workable corridor/site. • The demarcated area must be approved by the ECO. • The contractor must stabilise cleared areas to prevent and control erosion and/or sedimentation of the watercourses. • Do not allow surface water or storm water to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place; • Berms, sand bags and hessian sheets must be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points to prevent erosion. • Vegetation clearing must be undertaken as and when necessary. The entire construction area must not be stripped of vegetation prior to commencing construction activities.
Biological	• Storm water control must be implemented during construction; this is a temporary impact of the proposal. • A drainage system must be established for the construction camp. Contaminated storm water must not be allowed to enter the surrounding waterbodies. This will be controlled by the EMPr. • Workers must be educated / trained on minimizing damage to vegetation during construction. • Only vegetation that must be removed for the construction of the road should be removed and the footprint must be kept to a minimum. • Rehabilitation of disturbed areas must be undertaken with locally indigenous species upon completion of construction activities. This must be controlled through the EMPr. • An alien invasive control plan must be implemented to eradicated existing alien plant infestation on and around the site. • Ongoing alien plant control must be undertaken after the construction phase and particularly in the disturbed areas. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. • Areas cleared of alien invasive plants must be rehabilitated with indigenous plant species. • All waste generated during construction is to be disposed of at an accredited landfill site and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment in the watercourse is permitted. • Hazardous substances (hydrocarbons and chemicals) must be stored within a hazardous bunded area until collection by a reputable hazardous waste collection company. • No releases of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the watercourses is permitted. • Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 50m from the watercourses.

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	• Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. • Portable toilets must be placed outside the 1:100year flood line or more than 50m away from the watercourse's edge, whichever is the greatest. • A site specific EMPr has been designed to manage pollution and is attached under Appendix F. • The only emissions that will be generated will be from construction vehicles which will be minimal and is not expected to significantly affect the surrounding communities or the environment. • Dust control measures (the use of a water cart / truck) must be used to wet exposed soil and thereby ensure that excessive dust levels are not experienced on site. The dust levels must be kept below the required SANBS standard to ensure minimal impact on the surrounding community and the environment. • Material Safety Data Sheets (MSDS's) must be readily available on site for all chemicals and hazardous substances to be used on site. MSDS's must include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Refuelling areas, if required, must be bunded with an impermeable liner to prevent potential pollution from spillage. • Stockpiles must not be located within 50 metres of any rivers, wetlands and/or riparian channels or within the 1:100 year flood lines. The furthest threshold must be adhered to. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. • Material Safety Data Sheets (MSDS's) must be readily available on site for all chemicals and hazardous substances to be used on site. MSDS's must include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Refuelling areas, if required, must be bunded with an impermeable liner to prevent potential pollution from spillage. • Adequate chemical toilet facilities must be provided for all staff members as standard construction practice. These toilets must be regularly cleaned by a reputable company and maintained in a clean state. This must be monitored in an EMPr. • Chemical toilets must be placed within the construction camp and not in close proximity to the surrounding waterbodies. • The chemical toilets must be provided by a registered company and all effluent must be regularly disposed of at a licenses facility. • A safe disposal certificate must be obtained for all chemical toilets • Stockpiles must not be located within 50 metres of any rivers, wetlands and/or riparian channels or within the 1:100 year flood lines. The furthest threshold must be adhered to. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. • A register of all waste removed from the construction camp must be complied and stored within the site office. The register must indicate the type of waste (General, Hazardous, Construction, and Rubble) removed from site and to which landfill site that waste has been removed to. • Sufficient bins must be provided within the construction camp. • Recycling bins should be placed within the construction camp to encourage recycling and ensure the separation of waste. • Separation of waste and recycling of paper, glass etc. must be implemented. • Composting of organic waste is encouraged. • The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. • Refuse must be separated at source and disposed of in the appropriate bins, which must be emptied regularly. • The water quality must be monitored to determine the baseline quality for operational comparisons.

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	• Construction in the channel must be undertaken as quickly as possible, discussions between the specialists, engineer and the contractor must take place to determine a feasible timeframe and must be carefully monitored by the Environmental Compliance Officer (ECO). • Hunting, poaching or fishing is prohibited during construction. • Guidelines set out by the ECO must be followed to ensure no potential impacts occur and workers will be instructed that hunting and fishing is a non-compliance of the authorized activity. This must be controlled through the EMPr. • All fauna encountered during hand clearing must be rescued and relocated to suitable intact habitat. • All materials must be obtained from a registered and sustainable source and all delivery notes and slips must be made available to the ECO e.g. mined material such as stone must only be obtained from permitted quarries. • No fires should be permitted onsite • No hunting/killing of fauna permitted • A walk through of the selected corridor should be conducted during the construction phase to minimise loss of sensitive species. The walk-through must identify where species require relocation. Permits must be obtained from EKZNW for disturbance to schedule 12 species translocation. • The pipeline must be made to run as close to the existing servitudes as possible. • Access roads through vegetation must be restricted to the minimum functional width to reduce impact on vegetation. • Pruning of vegetation is preferred to the removal thereof, where possible. • Clearing of land must be undertaken in accordance with acceptable best practice standards and must be done under the supervision of the contractor. • Regular checks must be conducted to identify where erosion is occurring and appropriate remedial action of eroded areas must be undertaken. • No plants are to be collected, nor animals intentionally killed. Poaching is thus prohibited. • Where possible, a sloping end or side to trenches must be constructed to allow animals falling into the trench, to escape. • Trenches are to be monitored on a daily basis for animals that may have fallen inside and for such animals to be safely returned to their natural habitat. • Efforts must be made to ensure that amphibians, herpetofauna and mammals, are removed from the working area before and during earthworks. All animals are to be safely released to the natural habitat. • No open fires are permitted on site. • Stockpiling of materials for rehabilitation should done in a manner that does not result in spill over into natural vegetation or watercourses. • An ongoing monitoring programme should be implemented to enforce the continual eradication of alien and invasive species during the post construction phase as this will be a permanent impact of the proposed activity. • The site must be rehabilitated once construction is completed.
Social	• Ensure that all signage of safety risk that may be present are clearly marked and cordoned off from the general public. • Excessive noise must be controlled on site. Workers will be trained regarding noise generation on site and construction hours will be kept to working hours (07h00 to 17h00). • The construction activities will be monitored by an ECO who will ensure compliance with the construction EMPr. All precautions must be taken to ensure that noise generation is kept to a minimum. If excessive noise is expected during certain stages of the construction, nearby residents must be notified prior to the event. • Speeding will be prohibited. Flagmen and other traffic control measures must be implemented if the need arises during the construction phase. An EMPr has been designed to manage construction activities and is attached as Appendix F
Economic	• Ensure effective communication with all interested and affected parties, detailing the period of construction and alternative access routes if they are available.

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	• Surrounding neighbours must be consulted prior to construction to discuss the construction process and potential impacts on nearby properties, as well as opportunities regarding employment. Properties are not expected to be severely impacted on as they are not in close proximity to the site, however, should unplanned impacts occur, the contractor will be responsible for the necessary repairs.
Heritage	• The KwaZulu-Natal Heritage Act requires that operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities. • Inclusion of a Fossil Chance Find Protocol in the EMPr for in the event fossils are uncovered during excavation.
OPERATIONAL PHASE	
Physical	• The condition of the banks around the development need to be checked by the ECO during operation and signed off if in a controlled state where no erosion has been observed for 1 year during operation. • Eroded areas along the road must be managed, particularly in the channels and steep slope areas. • Planting a suitable grass that will assist in stabilizing the banks (such as Vetiver grass). • Consider geo-textiles to stabilize the banks of the channels and provide a suitable medium for locally indigenous vegetation to establish.
Biological	• Routine (every 3 months) water quality measurements must be undertaken to determine if the quality has changed from the baseline condition. • Storm water drains must be in alignment with the storm water management plan. • Refer to the freshwater habitat impact assessment for further recommendations relating to pollution. • Follow up assessments by the ECO, for six months' post construction, must be undertaken to determine the success of the re-vegetation process. • The success of the re-vegetation process needs to be signed off by a vegetation specialist or a qualified ECO once the ground coverage has reached a level of at least 80 % within disturbed areas. • The ECO must determine if further follow-up assessments are needed.
Social	N/A
Economic	• Regular maintenance of the road is required to ensure the structural integrity is maintained and any potential damage can be mitigated. The cost of maintenance operations must be borne by the applicant.
Heritage	N/A
Cultural	N/A

10 FINDINGS OF THE EAP AND SPECIALIST TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

The following may be considered for inclusion in the environmental authorisation:

The EMPr (see appendix G) and conditions thereto must be adhered to.

- An ECO must be appointed and all contractor staff to be trained on the EMPr and Environmental Authorisation requirements prior to commencement of activities.
- Environmental monitoring and auditing shall be undertaken by the ECO on a weekly basis during the construction phase, and re-vegetated areas should be monitored every month for six months post construction.
- All construction activities are to be confined to the existing access/haulage routes, the identified construction site camp and the direct footprint of the preferred alternative site.

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- All sensitive areas (i.e. watercourses and the associated buffer zones and the floral areas indicated to have a high EIS), as illustrated in Appendix A, must be demarcated on-site with danger tape by the ECO. Access to these demarcated areas must be strictly prohibited.
- The construction site camp, and any other areas that have been disturbed as a result of the proposed development, must be rehabilitated according to the project-specific Biodiversity Rehabilitation Plan (McDonald, 2018).
- The prescribed 8m buffer must be implemented for the Mpophomeni Cemetery
- The Heritage specialist recommended that the applicant maintain a buffer of at least 8 metres from the border of the cemetery.
- Suggested that the developer erect a study fence with an entrance gate at the north eastern side of the cemetery prior to any excavation being undertaken.
- Should this not be feasible, then the applicant may need to consider a Phase 2 Heritage Impact Assessment.
- A Fossil Chance Find Protocol as contained in the EMPr must be implemented in the event that fossils are discovered during excavation/ construction.
- The relevant permits are to be applied for from Ezemvelo KZN Wildlife for the removal and relocation of the protected species identified by the Ecological specialist, prior to construction commencing.

11 ASSUMPTIONS AND LIMITATIONS

- All information regarding the proposed project was provided by the project proponent Umgeni Water and the appointed consulting engineers, Naidu Consulting. This includes the project description and layout information.
- Where data supplied by the client or other specialist consultants, has been used, it has been assumed that the information is correct unless otherwise stated.
- The location of the construction site camp associated for all alternatives will be within a previously disturbed area which will be rehabilitated according to the project-specific biodiversity rehabilitation plan (McDonald, 2018).
- The assessment of site-specific impacts and mitigation measures was informed by the once-off field survey, and the relevant specialist studies, which are based on the professional opinion of the assessor/specialist.

12 EAP OPINION

Subsequent to conducting the aforementioned impact assessment with the input from the various specialist reports it can be concluded that no potentially fatal impacts will occur as a result of the proposed development being constructed within either the preferred route or the route alternative. However, it will be essential for all the avoidance and mitigation measures that have been presented within Appendix G and the relevant specialist studies (Appendix D) to be strictly adhered to. Additionally, the site manager must ensure that the EMPr (Appendix G) is used as a guide for all on-site activities. Furthermore, to reduce the cumulative impacts of the proposed development the construction site can must be remediated in strict accordance with the site-specific rehabilitation plan (McDonald, 2018).

Further to the above, the proposed Vulindlela Bulk Water Supply Scheme forms an important component in meeting the increasing water demands of the region. The EAP is therefore of the opinion that authorisation be granted on condition that all mitigation measures are effectively implemented.

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13 RECOMMENDED VALIDITY OF THE AUTHORISATION

The EAP recommends a validity period of ten (10) years for the validity of the environmental authorisation.

14 DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Environmental assessment practitioner (EAP):[1]

Trading name (if any):	KSEMS Environmental Consulting		
Contact persons:	Kerry Stanton		
Postal address:	P.O. Box 396, Gillitts		
Postal code:	3603	Cell:	063 684 9196
Telephone:	063 684 9195	Fax:	086 535 5281
E-mail:	stanton@ksems.co.za/ ksems@ksems.co.za		
Education Qualifications[2]:	BSc (Hons) – Estuarine Ecology (Major), Urban Biography (Ecology) (Major) MSc awarded cum laude.		
Professional affiliation(s) (if any)[3]	Kerry Stanton is EAPSA certified. and is a member of the IAISA Certified Professional Natural Scientist (400167/12)		

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (years)
Kerry Stanton	MSc Cum laude BSc (Hons) MSc	- EAPSA Certified, - Certified Professional Natural Scientist (400167/12), - Certified GCX Carbon Footprint Analyst (Level 1)	23

I, _____Kerry Stanton_____ declare that I

- am the independent environmental practitioner in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- declare that there are no circumstances that may compromise my objectivity in performing such work;
- have expertise in conducting environmental impact assessments, including knowledge of the National Environmental Management Act, 1998 (Act107 of 1998), regulations and any guidelines that have relevance to the proposed activity;
- will comply with the National Environmental Management Act, 1998 (Act107 of 1998), regulations and all other applicable legislation;
- will take the provisions of regulation EIA Regulations, 2014 into account when preparing any report relating to this application;
- undertake to disclose to the applicant and the EDTEA all material information in my possession that reasonably has or may have the potential of influencing its decision with respect to this application;

[2] [8] Please include details of names, education qualifications and professional affiliations of the EAP and each representative of the EAP appointed to manage this application.

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- will ensure that information containing all reports in respect of this application is distributed or made available to interested and affected parties and that their participation is facilitated in such a manner that they will be provided with a reasonable opportunity to participate and provide comments on the reports;
- will provide the competent authority with access to all information at my disposal regarding this application, whether such information is favourable to the applicant or not;
- declare that all the particulars furnished by me in this form are true and correct;
- I am aware that a false declaration is an offence in terms of regulation EIA Regulations, 2014; and
- I will comply with all the requirements as indicated in the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Assessment Regulations, 2014.

_____

Signature of the environmental assessment practitioner

_____KSEMS Environmental Consulting Pty Ltd_ ___

Trading name

_____18 November 2020_____

Date:

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APPENDIX A – MAPS AND LAYOUT

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APPENDIX B – SITE PHOTOGRAPHS

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APPENDIX C – FACILITY ILLUSTRATIONS

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APPENDIX D – SPECIALIST REPORTS

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APPENDIX E – PUBLIC PARTICIPATION PROCESS

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APPENDIX F – IMPACT ASSESSMENT

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APPENDIX G – ENVIRONMENTAL MANAGEMENT PROGRAMME

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APPENDIX H – DETAILS OF THE EAP

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APPENDIX I – ADDITIONAL INFORMATION

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