

APPENDIX C

UPDATED SPECIALIST STUDIES

APPENDIX C1:

TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT

PROPOSED UMKHOMAZI WATER PROJECT PHASE 1

ADDENDUM TO TERRESTRIAL FAUNA AND FLORA ASSESSMENT REPORT

DEA REF. No.:

- SMITHFIELD DAM - 14/12/16/3/3/3/94
- WATER CONVEYANCE INFRASTRUCTURE - 14/12/16/3/3/3/94/1
- BALANCING DAM - 14/12/16/3/3/3/94/2

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PREPARED FOR: DEPARTMENT OF WATER AND SANITATION



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Amendments Page

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1 INTRODUCTION AND BACKGROUND

The current water resources of the Integrated Mgeni Water Supply System (WSS) in KwaZulu-Natal (KZN) are insufficient to meet the long-term water requirements of the system. The uMkhomazi Water Project Phase 1 (uMWP-1) proposes the transfer of water from the undeveloped uMkhomazi River to the existing Mgeni system. This transfer scheme is deemed to be the most viable option to provide a large volume of water to fulfil the long-term water requirements of the Mgeni system.

The uMWP-1 consists of both Raw Water and Potable Water components which are being undertaken by the Department of Water and Sanitation (DWS) and Umgeni Water, respectively. Nema Consulting was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for both components of the uMWP-1.

The Final EIA Reports (Raw Water and Potable Water) were submitted to the Department of Environmental Affairs (DEA) on 10 November 2016. A letter (dated 13 February 2017) was received from DEA which rejected the Final EIA Report for uMWP-1 Raw Water and requested additional information.

In response, the following additional alternatives were identified for the proposed uMWP-1 Raw Water components:

- ❖ Two additional tunnel routes (Option B and Option C) were identified, as well as a tunnel corridor; and
- ❖ The previous route for the realignment of the R617, as assessed as part of the EIA, was discarded due to its encroachment into the Impendle Nature Reserve. Four new route options (Option 1A, Option 1B, Option 2 and Option 3) were identified for the deviation of the R617, as well as a road corridor.

This document serves as an Addendum to the Terrestrial Fauna and Flora Assessment specialist report that was compiled and attached to the Final EIA Report for uMWP-1 Raw Water. It provides an assessment of the abovementioned additional alternatives.

2 R617 REALIGNMENT OPTIONS

2.1 Overview

Option 1 is about 6.43km long and is located south of the existing R617. Starting on the eastern side, Option 1 peels away from the existing R617 east and south of the Lundy's Hill Supply Store where after it crosses the uMkhomazi River (future Smithfield Dam) approximately 170m south of the existing old bridge (built 1896). From here the alignment

follows the existing D1212 for about 2km. At this point Option 1B separates from Option 1A and heads in a north-westerly direction towards the Mdayane Village. After passing the southern part of Mdayane Village, the road makes an about turn and heads in a south-westerly direction where it re-joins the existing D1212 / R617 intersection *en-route* to Hlanganai. Option 1A continues to follow the existing D1212 alignment until it ties back in to the existing R617 in the vicinity of the existing D1212 / R617 intersection.

Option 2 is the route furthest to the north slotting in below the Impendle Nature Reserve and is the longest route at 8,250km long. The challenge on this route is the mountainous terrain. The uMkhomazi River will be crossed with a medium-sized yet substantial bridge to the north of the existing bridge on the R617. The alignment traverses over a mountain/hill and down again, crossing a stream before re-joining the existing R617 road. An additional smaller bridge will be required to cross the stream. A bridge servicing pedestrians and cattle will be required near the old bridge on the D1212.

Option 3 is about 7,750km long and aims to follow the existing R617 road as far as possible. The uMkhomazi River will be crossed with via a medium-sized yet substantial bridge to the north of the existing bridge on the R617. The alignment then hugs the contours whilst staying fairly parallel with the existing road but on higher ground in order to stay clear of the floodline and purchase line of the proposed Smithfield Dam. As per Option 2, a small stream is crossed before re-joining the existing R617. An additional smaller bridge will be required to cross the stream. A bridge servicing pedestrians and cattle will be required near the old bridge on the D1212. The challenge on Option 3 is the mountainous terrain where the road will run parallel to the existing road but on a higher level against a steep slope. This slope will require stabilisation and the road could potentially require a form of cantilever as it passes the steep slopes.

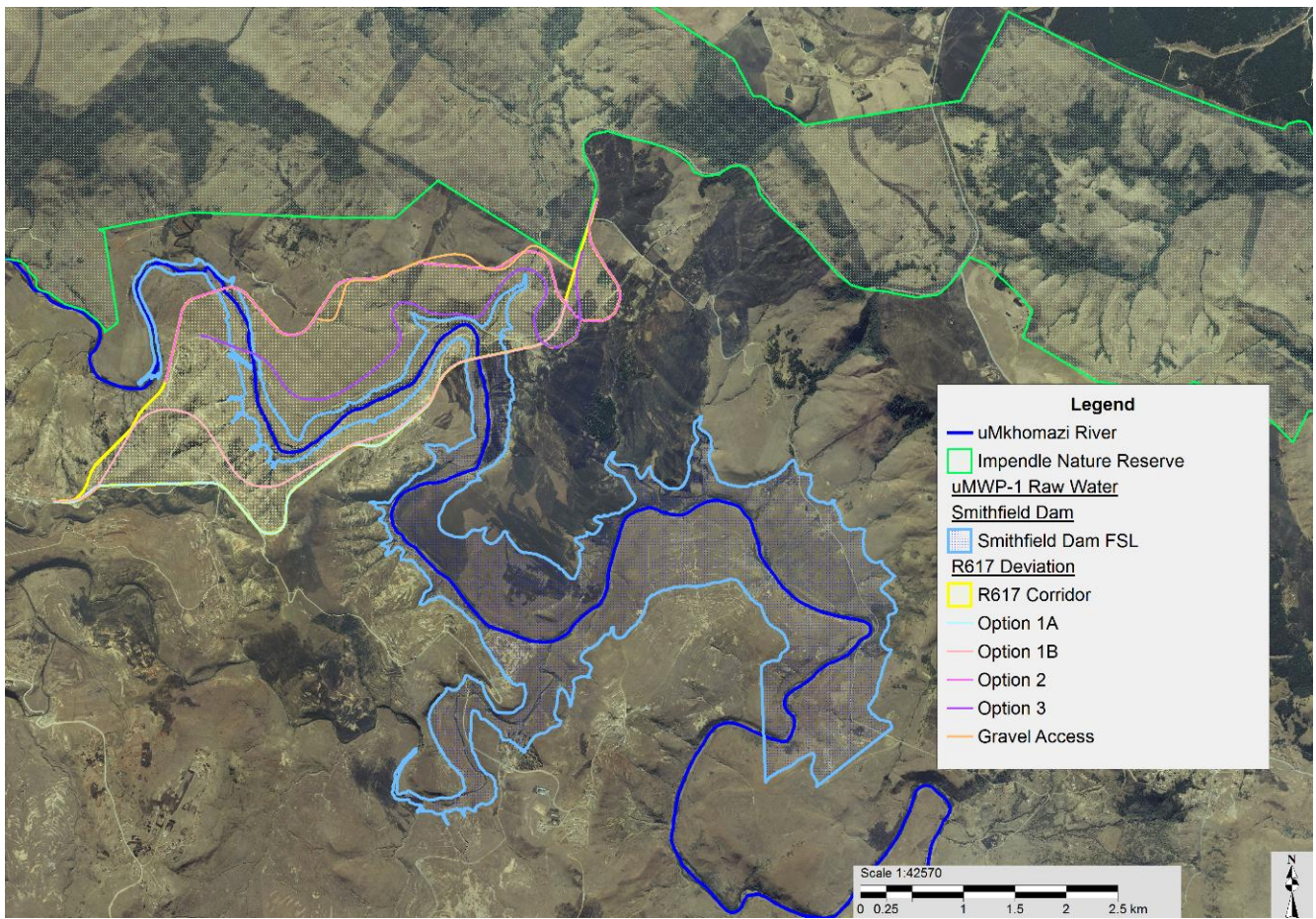


Figure 1. R617 realignment route options

2.2 Critical Biodiversity Areas

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. The CBAs can be divided into two subcategories, namely Irreplaceable and Optimal (Ezemvelo KZN Wildlife, 2016).

2.2.1 KZN CBA: Irreplaceable Areas

The **CBA: Irreplaceable Areas** are identified as having an Irreplaceability value of 1, these Planning Units (PU's) represent the only localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved, i.e. there are no alternative sites available. In the Terrestrial Systematic Conservation Assessment (SCA), this category was previously referred to as a Biodiversity Priority 1 Area (KZN CBA Irreplaceable version 01022016, 2016).

CBA: Irreplaceable Areas are made up of up to three subcategories; namely CBA: High Irreplaceable Areas (In the Terrestrial SCA, this category was previously referred to as a Biodiversity Priority 2 Area), CBA: Irreplaceable Linkages and Critical Biodiversity Area: Expert Input (Ezemvelo KZN Wildlife, 2016).

According to the Ezemvelo KZN Wildlife (2016), the following can be deduced (**Figure 2**).

- A very small section ($\pm 48\text{m}$) of the route Options 1A and 1B fall within the CBA: Irreplaceable Areas; however, these sections are along the road servitude with little or no natural vegetation remaining (**Figure 3**);
- $\pm 1.5\text{km}$ of the route Option 2 falls within the CBA: Irreplaceable Areas;
- $\pm 4\text{km}$ of the route Option 3 falls within the CBA: Irreplaceable Areas; and
- The proposed gravel access road required to maintain access to dwellings to the north of the R617 (associated with Options 1A and 1B) traverses CBA: Irreplaceable Areas for approximately 650m.

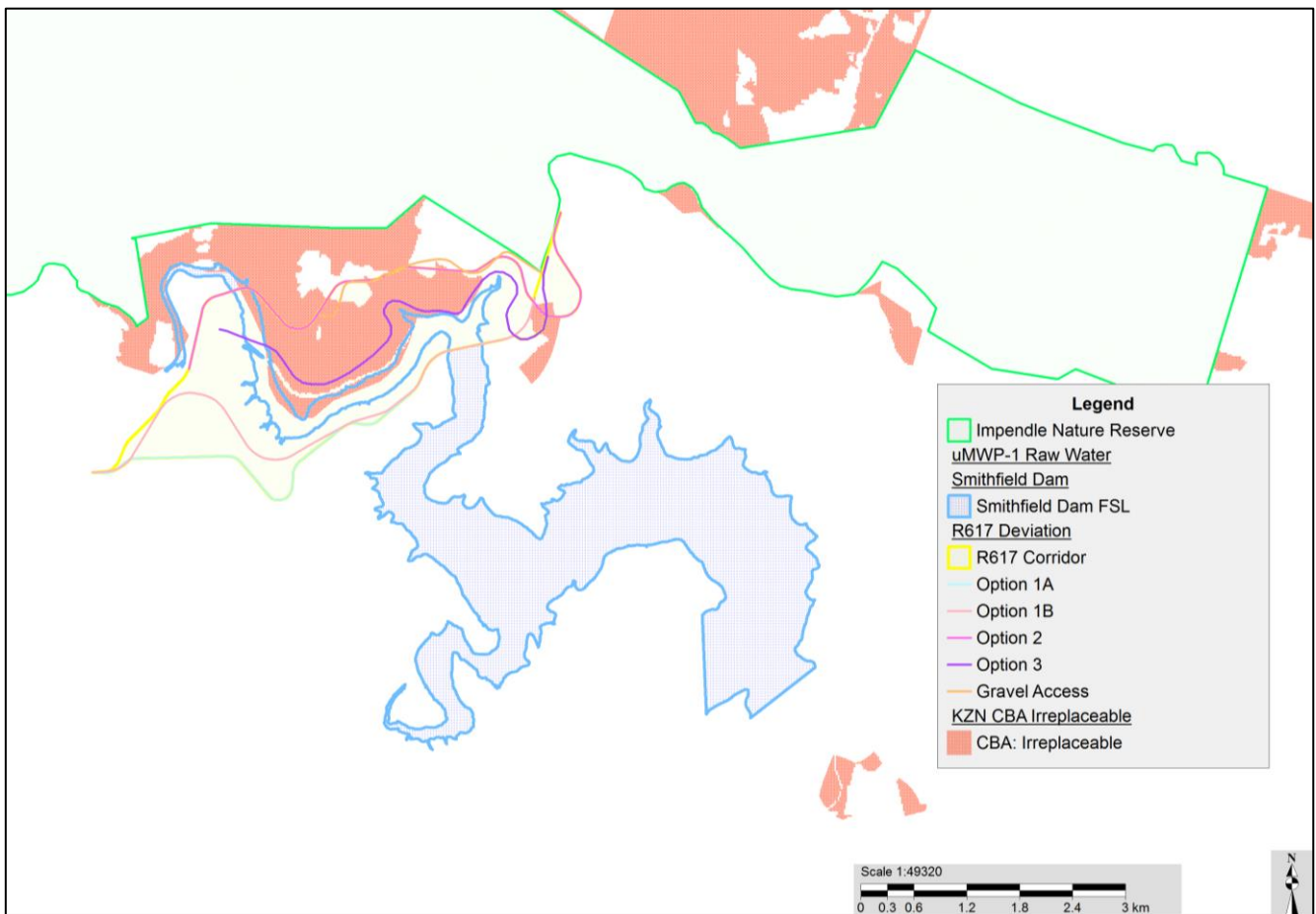


Figure 2. KZN CBA: Irreplaceable areas in relation to the proposed route alternative options



Figure 3. CBA: Irreplaceable areas in relation to the proposed route alternative options 1A and 1B

2.2.2 KZN CBA: Optimal Areas

This category is a combination of two subcategories, namely CBA: Optimal (SCA) and CBA: Optimal Expert Input. CBA: Optimal Areas are areas which represent the best localities out of a potentially larger selection of available PU's that are optimally located to meet both the conservation target but also the criteria defined by either the Decision Support Layers or the Cost Layer. In the Terrestrial SCA, this category was previously referred to as a Biodiversity Priority 3 Area (Ezemvelo KZN Wildlife, 2016.)

CBA: Optimal Expert Input are areas identified by local experts as representing areas of biodiversity importance. These areas must have been taken through a workshop exercise to confirm their identification and selection. These areas can be categorized as CBA: Optimal based on confidence in the data, condition and threat status (Ezemvelo KZN Wildlife, 2016).

According to the Ezemvelo KZN Wildlife (2016), the following can be deduced (**Figure 4**):

- A very small section ($\pm 28\text{m}$) of the route Options 1A and 1B fall within the CBA: Optimal Areas;
- Only $\pm 200\text{m}$ of the route Option 2 falls within the CBA: Optimal Areas;
- Only $\pm 800\text{m}$ of the route Option 3 falls within the CBA: Optimal Areas; and
- The proposed gravel access road (associated with Options 1A and 1B) traverses $\pm 200\text{m}$ of CBA: Optimal areas.

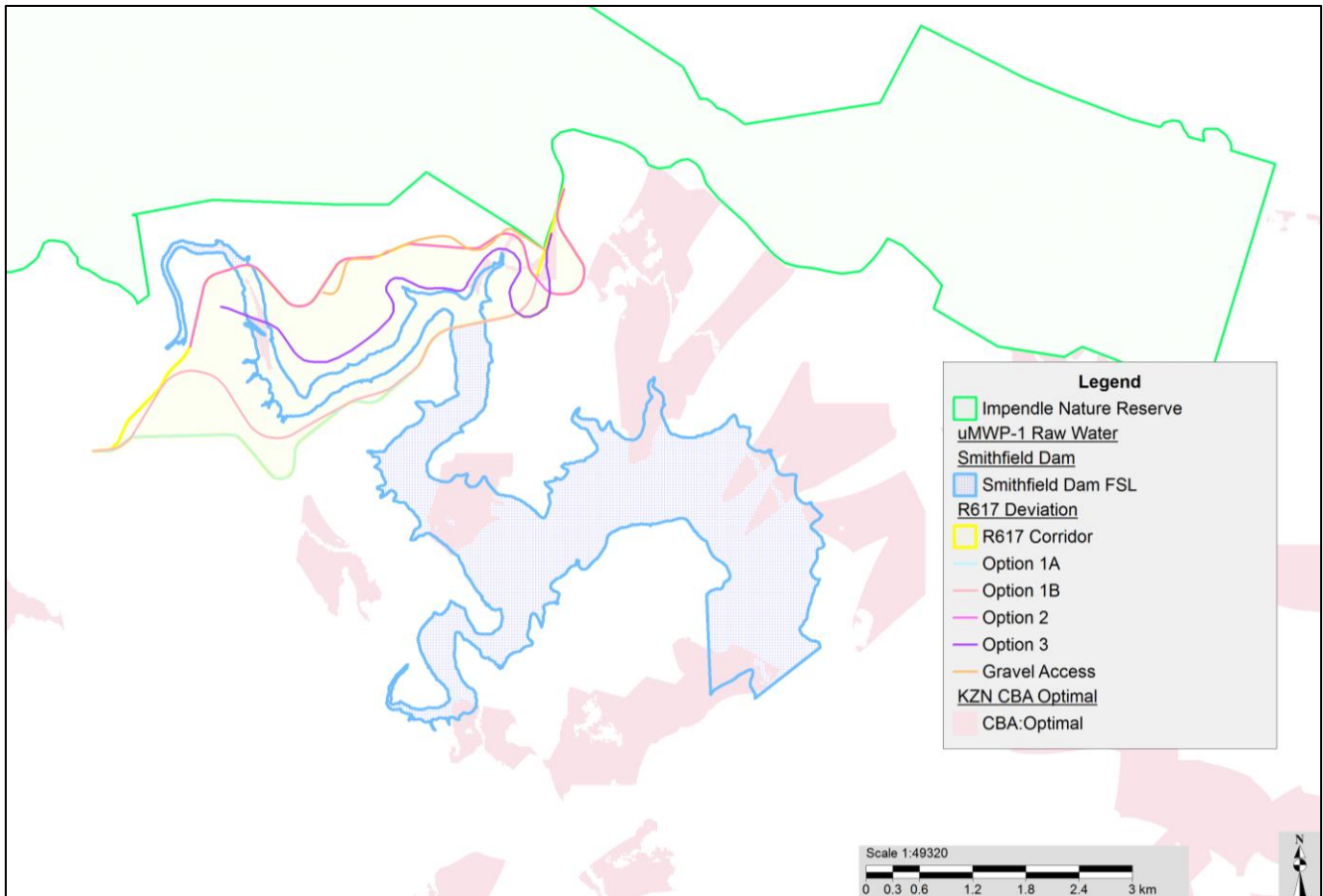


Figure 4. KZN CBA: Optimal Areas in relation to the proposed route alternative options

2.2.3 Ecological Support Areas

Ecological Support Areas (ESAs) are areas required to support and sustain the ecological functioning of CBAs. For terrestrial and aquatic environments, these areas are functional but are not necessarily pristine natural areas. They are however required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, and which also contributes significantly to the maintenance of Ecological Infrastructure (EI) (Ezemvelo KZN Wildlife, 2016)..

ESAs are made up of up to four subcategories; namely Ecological Support Areas (SCA), ESA: Expert input, ESA: Species Specific and ESA: Corridors (Ezemvelo KZN Wildlife, 2016).

According to the Ezemvelo KZN Wildlife (2016), approximately only 6m of the proposed route alternatives 1A and 1B fall within the ESA region (**Figure 5**). Approximately 2.6km and 1.2km of the proposed Option 2 and proposed Option 3 routes fall within the ESA region respectively. The proposed gravel access road (associated with Options 1A and 1B) traverses \pm 2km of an ESA. However, no ESA: Species Specific was noted in relation to the proposed route alternatives (**Figure 6**).

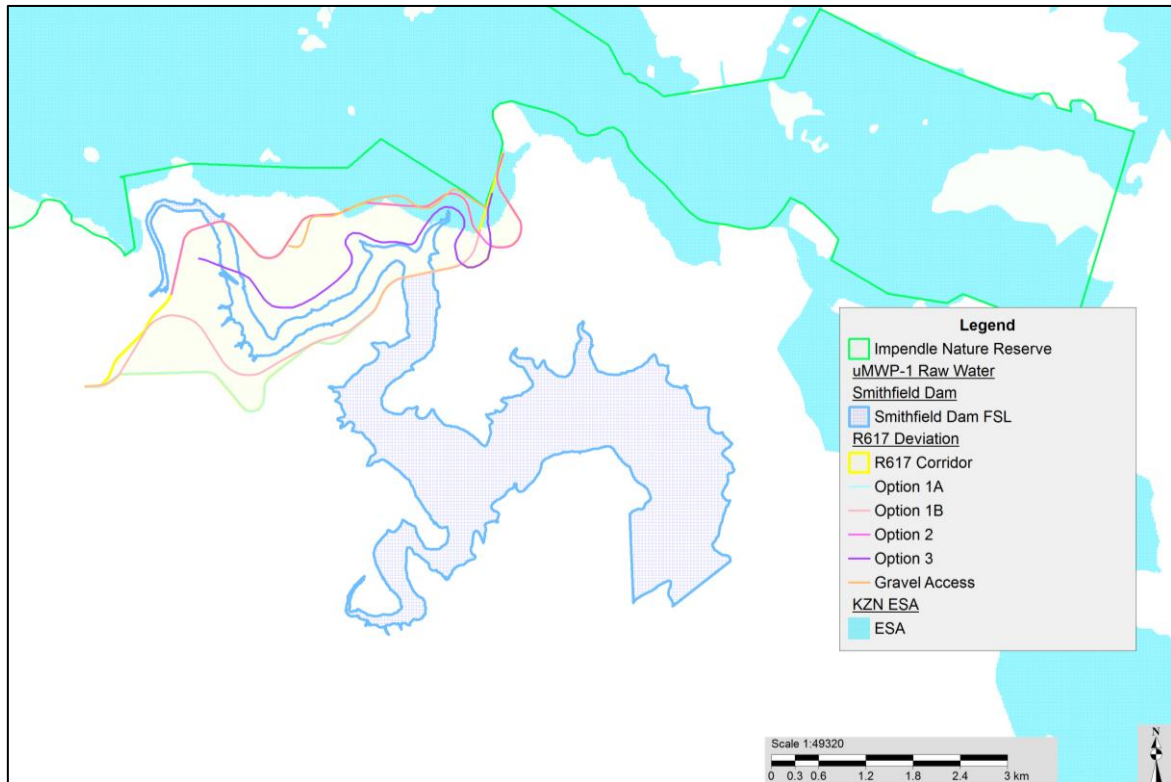


Figure 5. KZN ESA region in relation to the proposed route alternative options

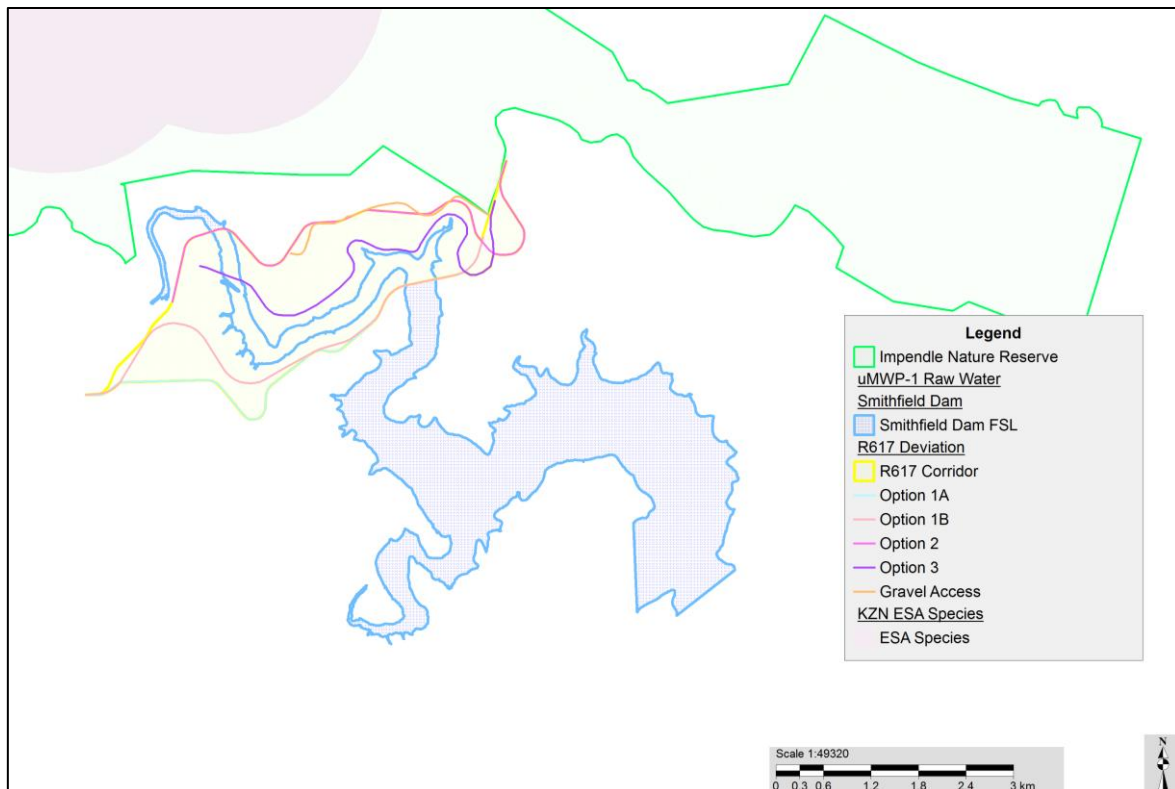


Figure 6. No KZN ESA: Species specific region was noted in relation to the proposed route alternative options

3 TUNNEL CORRIDOR

According to the information provided by Seele Family, who owns farms on Dunbar Estate 1478 and Driefontein 854, more than 4km of pipeline cross Trewirgie farm, which is a declared a natural heritage site. An endangered plant such as the Hilton Daisy (*Gerbera aurantiaca*), occur in the area of the proposed corridor on Trewirgie Farm. However, this species will not be impacted because the proposed conveyance tunnel crosses underneath both these farms at an approximate depth that mostly exceeds 400m. There are no shafts or access adits earmarked on these farms. *G. aurantiaca* is endemic to the mistbelt grassland and typically occur in rocky grassland between 900 and 1 500 m, on warm slopes in well-drained, shallow soils associated with doleritic formations (Scott-Shaw, 1999 and Pooley, 1998).

According to the Ezemvelo KZN Wildlife (2016), the proposed tunnel outlets of Options B and C do not fall within any of the KZN CBA or ESA regions whereas the proposed tunnel option A outlet falls entirely within the KZN: CBA Irreplaceable (**Figure 7**).

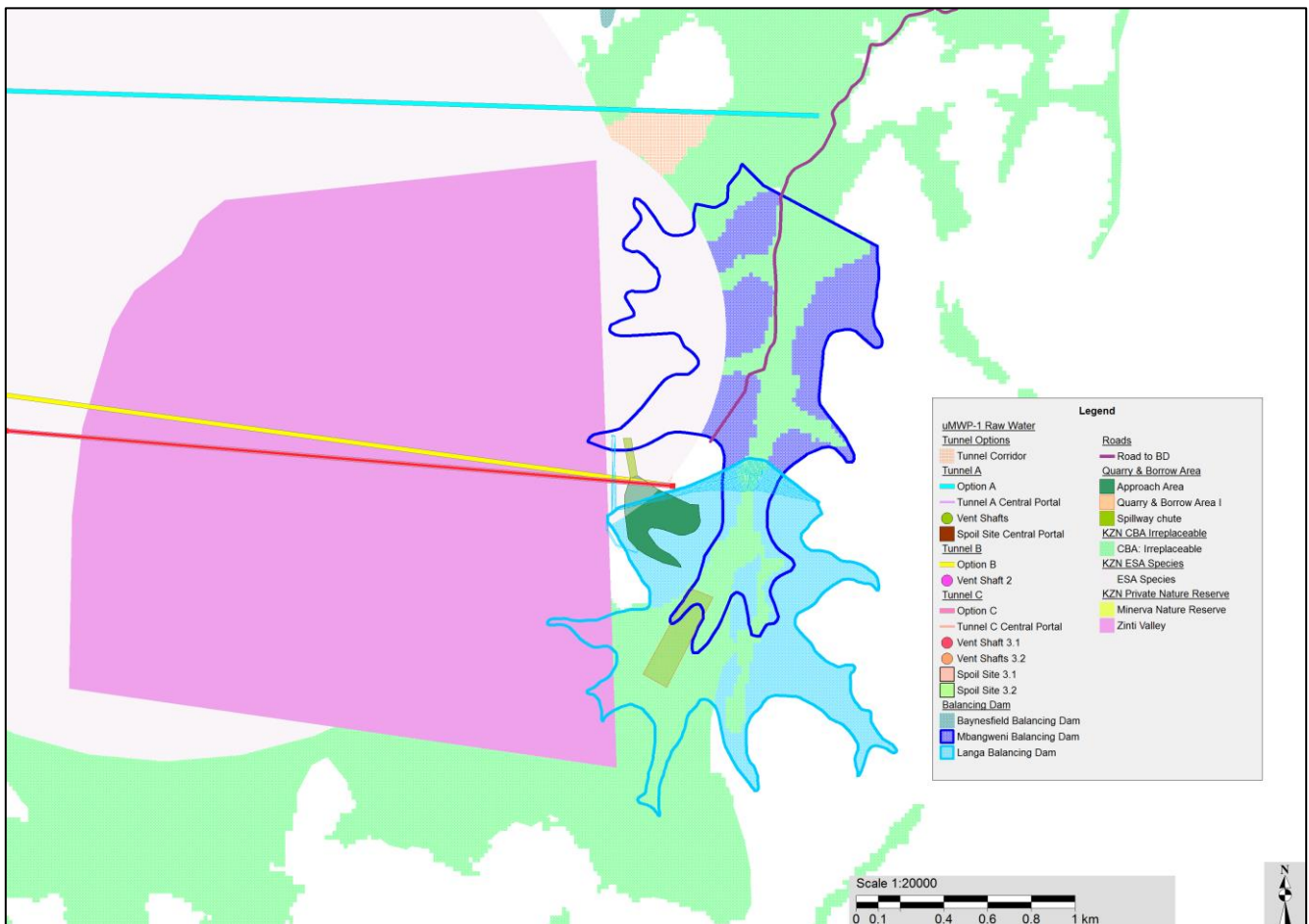


Figure 7. KZN CBA: Irreplaceable areas in relation to the proposed tunnel alternative options

The proposed tunnel will be underground and only the ventilation shafts, spoil sites, adits and access routes will be situated above ground. Adit 2 route east (Tunnel C Central portal) and Tunnel A Central Portal (west) are located within a CBA Irreplaceable areas (**Figure 8**), however the sites where these portals are situated are dominated by plantations and watercourses (**Figure 9**) and therefore the Aquatic and Wetland specialist's mitigation measures must be implemented.

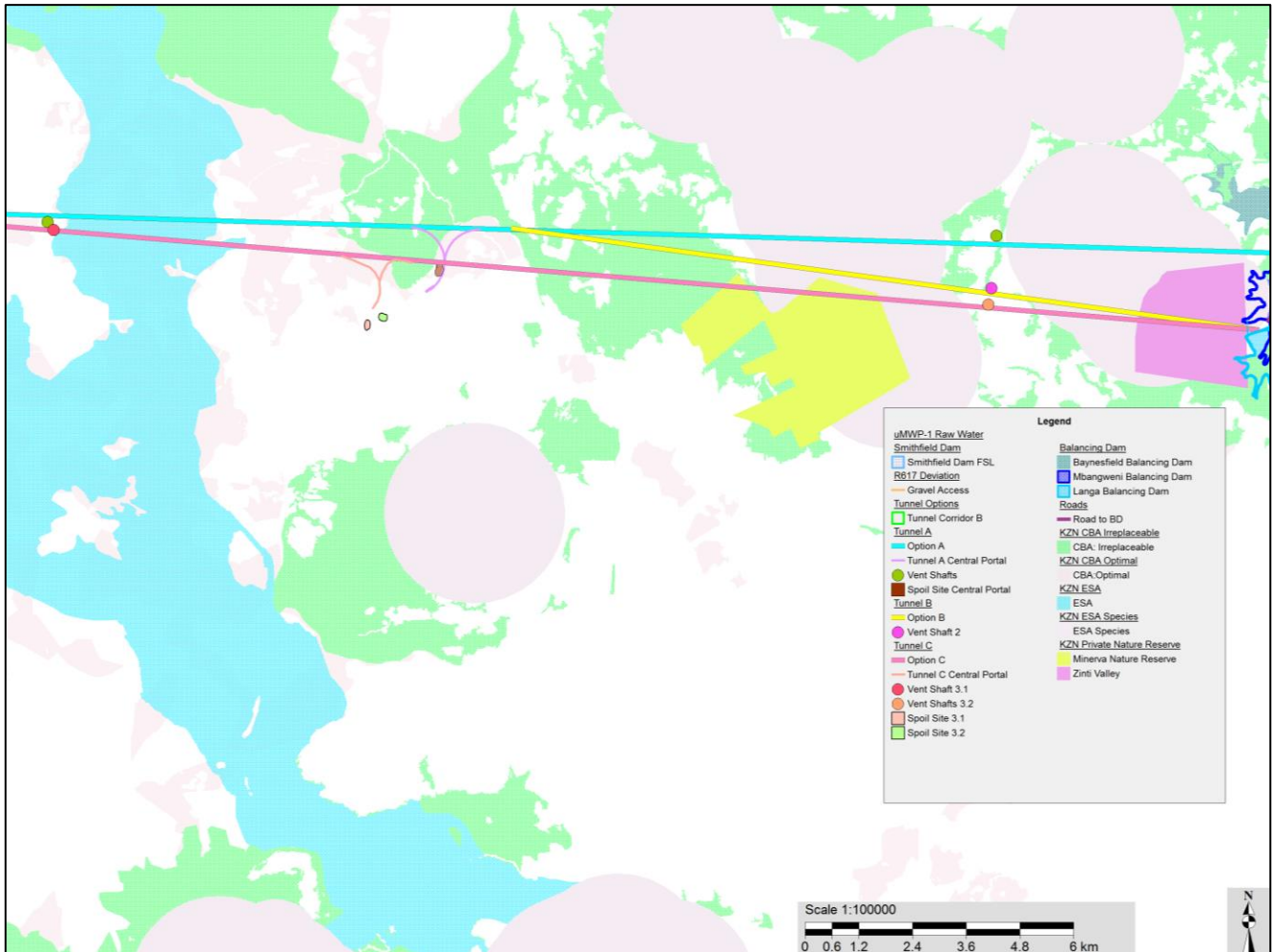


Figure 8. Adit 2 route east (Tunnel C Central portal) and Tunnel A Central Portal (west) are located in a CBA Irreplaceable areas

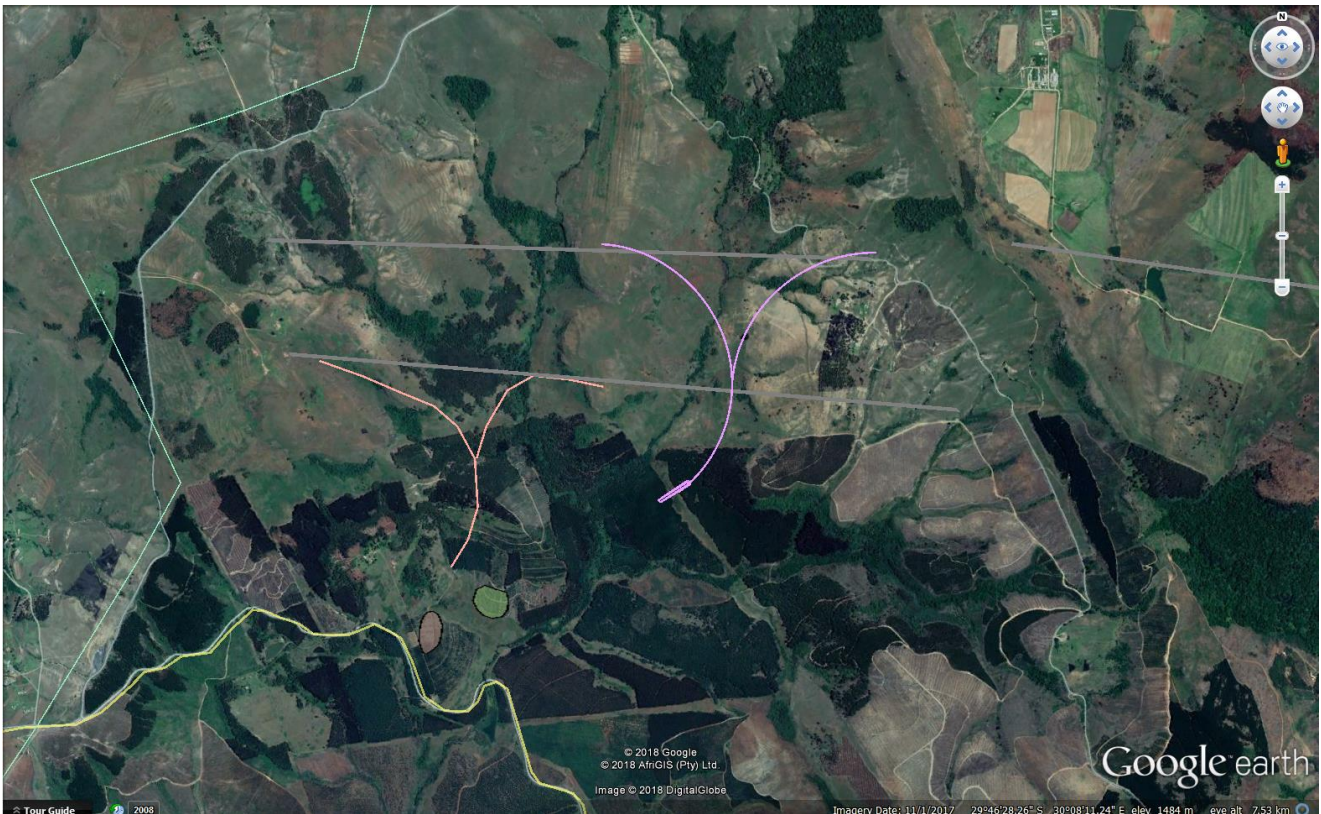


Figure 9. Adit 2 route east (Tunnel C Central portal) and Tunnel A Central Portal (west) are situated in areas dominated by plantations and watercourses

The Spoil Site Central Portal, Adit 2 route west and Tunnel A Central Portal (east) are situated in CBA Optimal areas. These sites and portals are situated in plantation areas and also near the watercourses and therefore the Aquatic and Wetland specialist's mitigation measures must be implemented. Ventilation shaft for Option A falls within the plantation whereas Ventilation shafts for both Options B and C fall within wetland habitat and therefore the Aquatic and Wetland specialist's mitigation measures must be implemented.

4 ANALYSIS OF ALTERNATIVES

The table to follow compares the road realignment routes and tunnel outlets options based on factors associated with the terrestrial flora and fauna.

Table 1. Comparison of Road realignments options and Tunnel outlet options

Components	Alternatives	Order of preference - 1 (most preferred) to 2 (least preferred)	Motivation	Fatal Flaws / Significant residual impacts after mitigation
R617 realignment options	Option 1A	1	Almost the entire route follows the existing gravel road, with less natural areas. Approximately only 48m of the proposed route alternative 1A falls within the CBA: Irreplaceable Areas, however these sections are along the road servitude with little or no natural vegetation remaining.	
	Option 1B	2	Sections of this route follow the existing road or situated along the road servitude, human settlements, and will also traverse the steep slopes which are dominated by natural vegetation. Approximately only 48m of the proposed route alternative 1A falls within the CBA: Irreplaceable Areas, however these sections are along the road servitude with little or no natural vegetation remaining.	
	Option 2	3	Approximately 300m of this route will follow the existing gravel road. About 600m of this route will traverse a habitat modified by agricultural activities. Only 1.5km of the proposed route falls within the CBA: Irreplaceable Areas.	
	Option 3	4	Almost 4km (52%) of the proposed Option 3 route falls within the CBA: Irreplaceable Areas, with only few sections of this route (about 440m) following the existing R617 road servitude.	These natural grasslands are not unique/endemic to the area. However, mitigation measures must

Components	Alternatives	Order of preference - 1 (most preferred) to 2 (least preferred)	Motivation	Fatal Flaws / Significant residual impacts after mitigation
				be followed in order to minimise the impacts on sensitive species and habitats
Tunnel outlet Options	Option A	2	This outlet is situated in a highly sensitive area (KZN CBA irreplaceable areas) and larger sensitive areas will be cleared during constructions activities.	These natural grasslands are not unique/endemic to the area. However, mitigation measures must be followed in order to minimise the impacts on sensitive habitats
	Option B	1	This outlet is situated in an area which is highly disturbed and habitat fragmented due to maize fields and plantations. No KZN CBA irreplaceable areas exists at the outlet.	
	Option C	1	This outlet is situated in an area which is highly disturbed and consists of maize fields and plantations. No KZN CBA irreplaceable areas exists at the outlet.	

5 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND SUGGESTED MITIGATION MEASURES

The previous impact assessment applies for the new alternatives.

With regards to CBA Irreplaceable areas and CBA Optimal areas, site specific mitigations are indicated below.

- The most significant way to mitigate the loss of habitat is to limit the footprint within the natural habitat areas remaining.
- All stockpiles, construction vehicles, equipment and machinery should be situated away from the natural vegetation and watercourses.
- Topsoil should be stored in such a way that does not compromise its plant-support capacity.
- Indigenous plants naturally growing on the proposed development sites, but that would be otherwise destroyed during clearing for development purposes should be incorporated into landscaped areas.
- Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary. Where possible, natural vegetation must not be cleared and encouraged to grow.
- No structures should be built outside the area demarcated for the development, especially in watercourses.
- Rehabilitate all disturbed areas as soon as the construction is completed within the proposed development areas.
- Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel.
- Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation.
- Disturbance of vegetation must be limited only to areas of construction.
- Prevent contamination of natural grasslands by any pollution.
- Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.
- Any fauna (mammal and reptile) that becomes trapped in the trenches or in any construction or operational related activity may not be harmed and must be placed rescued and relocated by an experienced person.
- Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.
- No trapping or any other method of catching of any animal or bird may be performed on site
- No storage of building materials or rubbles are allowed in the sensitive areas such as natural grasslands and watercourses.
- Avoid translocating stockpiles of topsoil from one place to sensitive areas in order to avoid translocating soil seed banks of alien species
- Any fauna (mammal, reptile and amphibian) that becomes trapped in the trenches or in any construction or operational related activity may not be harmed and must be placed rescued and relocated by an experienced person.

- Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.
- As much vegetation growth as possible should be promoted within the proposed development site in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. In terms of the percentage of coverage required during rehab and also the grass mix to be used for rehab, the EMPr will be consulted for guidance. However, the plant material to be used for rehabilitation should be similar to what is found in the surrounding area.

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