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Draft Basic Assessment Report for:

BASIC ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION FOR THE PROPOSED RE-ALIGNMENT OF ROAD P75/2 WITHIN UMDONI, AND UMZUMBE LOCAL MUNICIPALITIES, UGU DISTRICT MUNICIPALITY, KWAZULU-NATAL

Submitted for commenting by stakeholders in terms of the 2014 Environmental Impact Assessment Regulations promulgated in accordance with the National Environmental Management Act 107 of 1998 (Act No. 107 of 1998), as amended.



Environmental Authorisation Reference: **To be confirmed**

Name of Applicant: The Department of Transport

Submitted on behalf of: Samani Consulting (Pty) Ltd

DOCUMENT INFORMATION

Title	Re-alignment of Road P75/2
Project Manager	Samani Consulting (Pty) Ltd
Author	Mrs Joleen Wilson
Reviewer	Ms Adrienne Edgson
Client	The Department of Transport
Project Reference Number	To Be Confirmed
Issue Date	17 th August 2017

REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT

This Draft Basic Assessment Report is available for commenting for a period of **30 days** (excluding public holidays) from 17th August 2017 to 18th September 2017. A copy of the Basic Assessment Report is available at the Malangeni Library and the public clinic near the uMthwalume High School and upon request from Afzelia Environmental Consultants (Pty) Ltd.

Please send your comments and queries before 18th September 2017 to:

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EXECUTIVE SUMMARY

PROJECT BACKGROUND AND LOCATION

Afzelia Environmental Consultants (Pty) Ltd have been appointed by Samani Consulting (Pty) Ltd to undertake an environmental impact assessment for the proposed re-alignment of Road P75/2. The road to be re-aligned falls within the Umdoni, and Umzumbe Local Municipalities within Ugu District Municipality in southern KwaZulu-Natal. Refer to Figure 1 below for the Locality Map for P75/2.

Initially the road re-alignment was going to start along the R102, however it was requested by the Project Manager (Samani Consulting (Pty) Ltd) at a later stage that the assessment should begin at the iFafa River crossing therefore, starting at km 5 and not km 0. Fifteen kilometres of Road P75/2 is planned to be re-aligned from kilometre (km) 5 to km 20. The KwaZulu-Natal Department of Transport (KZN DoT) proposes to upgrade the existing P75/2 road from gravel to a blacktop surfaced road. The existing road is a Type 6 District Gravel Road standard and is in a poor condition. The road will be upgraded to a Type 3 road and will include verge clearing, improvements to stormwater system and changes to the existing road alignment will be made where required.

The GPS co-ordinates for this road are:

Start: 30°23'28.90" S | 30°38'59.00" E

Middle (split in the road towards Friedenau): 30°25'18.46" S | 30°31'59.19" E

End: 30°27'27,48" S | 30°31'51.18" E

The proposed iFafa River Bridge is located at:

Start (east side): 30° 23' 59.48" S | 30° 36' 28.52" E

End (west side): 30° 23' 59.77" S | 30° 36' 25.27" E

With the addition of a new river bridge, the approach on both sides of the bridge is in a different / new position as compared to the existing gravel road.

LEGISLATION AND REGULATORY REQUIREMENTS

ENVIRONMENTAL IMPACT ASSESSMENT

The proponent is required to undertake a Basic Assessment (BA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended; the Environmental Impact Assessment Regulations (2014) as published in the Government Gazette 38282, Notice No. GNR 982 amended by GNR 326. This Basic Assessment Report (BAR) has been compiled to satisfy these requirements.

Activities to be carried out during the proposed re-alignment which trigger the requirement of a Basic Assessment Report are found in Listing Notice 1 (GNR 983 as amended by GNR 327) and are:

Government Listing Notice	Activity No.	Description
Listing Notice 1	12	The development of - (iii) bridges exceeding 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs – (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. Excluding – (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing road and road reserves.
	19	The infilling or depositing of any material or more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 10 cubic metres from: (i) a watercourse.
	24	The development of – (ii) a road reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres (applicable to approach roads on both side of the new bridge, approximately 50 metres on each site)
	31	The decommissioning of existing facilities, structure or infrastructure for– (v) any activity regardless the time the activity was commenced with, where such activity (b) is still in operation

Public participation was carried out in accordance with Section 24 J of the National Environmental Management Act as amended in the EIA regulations, 2014. Any comments received concerning this project will be included in the final report.

WATER USE

A Water Use License Authorisation (WULA) is required in accordance with the National Water Act, 1998 (Act No. 36 of 1998) in terms of Section 21:

- (a) Taking water from a water resource;
- (c) Impeding or Diverting the flow of water in a watercourse; and
- (i) Altering the bed, banks, course or characteristics of a watercourse.

Public participation is in progress and any comments will be included in the water use license application and in the final basic assessment report.

MOTIVATION

The direct need for re-aligning and upgrading P75/2 is primarily to improve the road infrastructure in the area. This road is seen as a 'main' route used by the communities in the area and allows access to various villages, schools and clinics. Additionally, as population increases in these area, the demand for transport will increase, thereby increasing the amount of vehicles on the road, which results in further degradation of gravel roads. Furthermore, the maintenance of gravel roads are expensive to keep in a good condition, stormwater control on a gravel road is challenging due to

silting up, dust generation is greater than on a sealed road and gravel roads have greater environmental impacts with sediment being washed into rivers and into receiving environments such as wetland areas and covering vegetation.

Social benefits associated with upgrading of P75/2 include:

- Short term employment opportunities;
- Improved safety for motorists, passengers and pedestrians;
- Reduction in road inconveniences (slowing down due to rutting and slippery conditions during wet weather) and delays;
- Improvement in traffic efficiency;
- Convenient access to schools, clinics, shops and villages; and
- Roads are cheaper to maintain.

Environmental benefits associated with the upgrading of P75/2 include:

- Improved storm water infrastructure;
- Decreased soil erosion;
- Decreased sedimentation downstream of drainage channels and the main rivers linked to this road;
- Decrease in alien invasive vegetation cover as a result of the implementation of an alien invasive plant control plan (as outlined in the Environmental Management Programme);
- Less dust being generated when the road is in use; and
- Stormwater control is easier to maintain and will reduce the amount of siltation occur which may have led to flooding of the road.

ALTERNATIVES

The project is aimed at upgrading and re-aligning an existing gravel road (P75/2) and therefore no other road alternatives have been assessed. The no-go alternative would leave the existing road P75/2 remaining the same which is comprised of gravel and is subject to easy degradation during adverse weather conditions.

SPECIALIST STUDIES

Section B of this report highlights the findings of the specialist reports carried out for this project. These investigations were carried out as part of the Basic Environmental Impact Assessment, and include:

- Wetland Delineation and Functionality;
- Wetland Rehabilitation Plan;
- Aquatic Impact Assessment;
- Heritage Impact Assessment; and
- Vegetation Assessment.

Key findings from the specialists' investigations are discussed below.

Wetland Delineation and Rehabilitation Plan

Six channelled valley bottom wetlands and 14 seepage wetlands were identified within a 500m buffer around the existing P75-2. The two river systems, iFafa and Mtwalume have been characterised as C-Sections (Channels that always have baseflow).

The channelled valley bottom wetlands delineated generally received high scores regarding services which they offer such as flood attenuation; sediment trapping; phosphate, nitrate and toxicant trapping; erosion control and the provision

of natural resources including the abstraction of water. All of these wetland systems were found to be moderately or largely modified as a result of planting of crops, excessive grazing and the creation of home-style gardens.

The 14 hillslope seepage wetlands delineated generally received moderate to high scores for the provision of natural resources, water supply for human use and the cultivation of foods. These wetlands provide flood attenuation, streamflow regulation, sediment trapping and erosion control.

The ecological importance and sensitivity of the wetlands have been recorded as being both low and medium in all seepage wetlands. Medium scores were recorded where indigenous vegetation cover was thicker and not completely transformed by sugarcane cultivation.

The impacts identified for the hardening of the P75-2 road on the wetlands include: soil erosion and sedimentation; disturbance and degradation of wetland areas; reduction in hydrophilic vegetation (construction and operations); pollution of water resources and soil (construction and operations) and spread of alien invasive vegetation species.

A wetland management plan has been compiled for this project and is discussed in the specialist studies section of this document.

Aquatic Assessment

The assessment found the iFafa River health to be in fair condition and the water samples were found to be of acceptable levels when compared to the Department of Water and Sanitation water quality guidelines. The Index Habitat Integrity (IHI) indicates that the instream habitat is in good condition and riparian habitat is in a fair condition. The main impacts to this river is flow modification and growth of exotic vegetation.

The Mtwalume River is in a good condition and water samples were found to be within acceptable levels when compared to the Department of Water and Sanitation water quality guidelines. The instream and riparian habitat was in a good to near-to-natural condition. Impacts to this river relate to exotic plants and some instream disturbance.

Heritage Impact Assessment

The road P75-2 runs close to many homesteads and in some cases hidden graves may be in close proximity to the project area, however none were observed within the project footprint.

No visible archaeological, or heritage sites were found during the heritage impact assessment. The report states that there is no known archaeological reason why the development may not proceed as planned. The area is not part of any known cultural landscape, however possible sensitive sections have been indicated along the route. The route map has been provided in the specialist studies section of the report.

Vegetation Assessment

The vegetation type of this area is KwaZulu-Natal Coastal Belt Grassland (CB3) and is considered endangered. However, the majority of the vegetation observed was very transformed or in a degraded state and consisted of mainly alien and pioneer indigenous species. The project area is affected by extensive sugar cane fields, timber plantations, informal settlements. The erosion risk for the area is considered high.

Several features were found along the road alignment (within 10 and 15 metres of the road on both sides) which are considered to be of environmental significance and conservation importance.

Three plant species were found to be protected by provincial legislation, the KwaZulu-Natal Nature Conservation Management Act (Act 9 of 1997) and are: *Scadoxus puniceus* (Paintbrush lily), *Kniphofia cf. coddiana* (Red-hot poker) and *Albuca spp* (Slime lilies). A total of 114 plant species were recorded and 59 of them were identified as alien or exotic.

MONITORING

An Independent Environmental Control Officer (IECO) with suitable experience must be appointed for the duration of the construction and rehabilitation phases. It is recommended that an Environmental Site Officer with suitable experience be appointed to be present on site (daily) to oversee the construction activities and ensure compliance with the Environmental Management Programme (EMPr) as well as any conditions stipulated in the Environmental Authorisation and the Water Use License.

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ACRONYMS AND ABBREVIATIONS

EDTEA	Department of Economic Development, Tourism and Environmental Affairs (KZN)
DMOSS	Durban Metropolitan Open Space System
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control officer
EIA	Environmental impact Assessment
EIS	Ecological Impact and Assessment
EMPr	Environmental Management Programme
GIS	Geographic information System
HGM	Hydrogeomorphic Unit
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
PAHs	Polycyclic Aromatic Hydrocarbons
WULA	Water Use License Application
KZN	KwaZulu-Natal
NEMA	National Environmental Management Act (107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act (No 36 of 1998)
PES	Present Ecological State
PPP	Public Participation Process
SABS	South African Bureau of Standards
SANS	South African National Standards
SDF	Spatial Development t framework
SMP	Stormwater Management Plan
SUDS	Sustainable Urban Drainage Systems
TWQR	Target Water Quality Range
VOCs	Volatile Organic Compounds
KM	Kilometre

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER, SPECIALISTS AND PROPONENT

NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)'S ORGANISATION

CONTACT DETAILS OF THE EAP'S ORGANISATION

Contact details of the EAP's organisation	
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NAMES AND DETAILS OF EXPERTISE OF THE EAP INVOLVED IN THE PREPARATION OF THE REPORT

Names of the EAP	Education Qualifications	Professional Affiliations	Experience at Environmental Assessments (yrs)
Mrs Joleen Wilson	BSc (Hon) Environmental Management	IAIAsa	2.5
Ms Adrienne Edgson (Reviewer)	SAQA qualifications from Rhodes University: Environmental Risk Assessment, Environmental Law, Environmental Impact Procedures, Coastal & Environmental Services etc.	IAIAsa, IAP2SA, ELA, LaRSSA	18

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

Name of Specialist	Educations Qualifications	Field of Expertise	Title of Specialist Report/s as attached in the Appendices
J. Tedder	BSc Ecology and Wildlife Science	Aquatics	Baseline aquatic assessment to inform basic assessment reporting for the P75/2 road re-alignment.
R. Harrison	MSc Soil Science	Soil Science	Wetland assessment and rehabilitation plan.
S. Hall	Bachelor of Honours in Anthropology	Heritage	Heritage impact assessment of the re-alignment of the main road P75/2.
F. Prins	Master of Archaeology		
L. Bertolli	MSc Environmental Sciences	Vegetation	Vegetation assessment for the upgrading of main road P75-2.

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SECTION A:

1. PROJECT DESCRIPTION AND BACKGROUND

The Department of Transport, KwaZulu-Natal proposes to re-align and upgrade (to blacktop) 15kms of the existing provincial road, P75 section 2 (P75-2), which will include road re-alignment (at the proposed vehicular bridge), blacktopping of the gravel surface and formalising storm water management infrastructure. The road P75-2 lies within three local municipalities namely, Umdoni, and Umzumbe within Ugu District Municipality, southern KwaZulu-Natal.

Afzelia Environmental Consultants (Pty) Ltd (Afzelia) were appointed by Samani Consulting (Pty) Ltd (Samani) on behalf of the Department of Transport, KwaZulu-Natal to undertake a Basic Assessment in order to comply with the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended; the Environmental Impact Assessment Regulations (2014) as published in the Government Gazette 38282, Notice No. GNR 982 as amended.

The road re-alignment is proposed to begin at the iFafa River, moving in a south westerly direction and end at the Mtwalume River. The road P75-2 will be accessed by road P197-3 in the east and P75-3 in the west. Refer to Figure 1 showing the locality of the proposed re-alignment.

The existing causeway across the iFafa River will be demolished and replaced with a vehicular bridge approximately 40metres to the north. The existing river crossing structure is approximately a 60 metre long vented causeway comprising 600 diameter concrete stormwater pipes overlaid by a concrete slab. Concrete ramps extend for approximately 11 metres on either side of the causeway. The P75/2 road is gravel on the western side of the causeway and blacktop on the eastern side. The existing gravel road is negatively affected by inclement weather which creates potholes and slippery conditions.

The area through which the Road P75/2 traverses can be described as semi-mountainous, consequently there are steep inclines and declines and several sharp turns on this road. For most part of the road, the gravel wearing course is generally well compacted and intact, however erosion ruts have formed due to heavy rainfall events experienced in the months between June and August 2016. The wearing course becomes looser at sharp bends and along steep gradients creating an unsafe driving conditions.

Road P75/2 will have a new alignment in various parts of the route as per the design requirement, however will not be widened thus maintaining the current width of 8.5 metres. The road will follow the existing alignment where possible with improved curves to satisfy engineering design requirements. The road alignment approaching the proposed vehicular bridge (iFafa River) will be different to the original. The proposed vehicular bridge will be approximately 140 metres in length and will be constructed with two abutments to the vertical level of the new road. The existing causeway will be removed only after construction of the bridge. The bridge will be designed with a width of 13.5 metres and will accommodate a pedestrian sidewalk. The proposed bridge will be built approximately 40 metres north of the existing causeway. The height of the bridge will be determined from the hydraulic data and will be designed to accommodate a 1:20 year flood.

Currently, only a few culverts have been provided along the road which results in uncontrolled stormwater leading to environmental degradation.

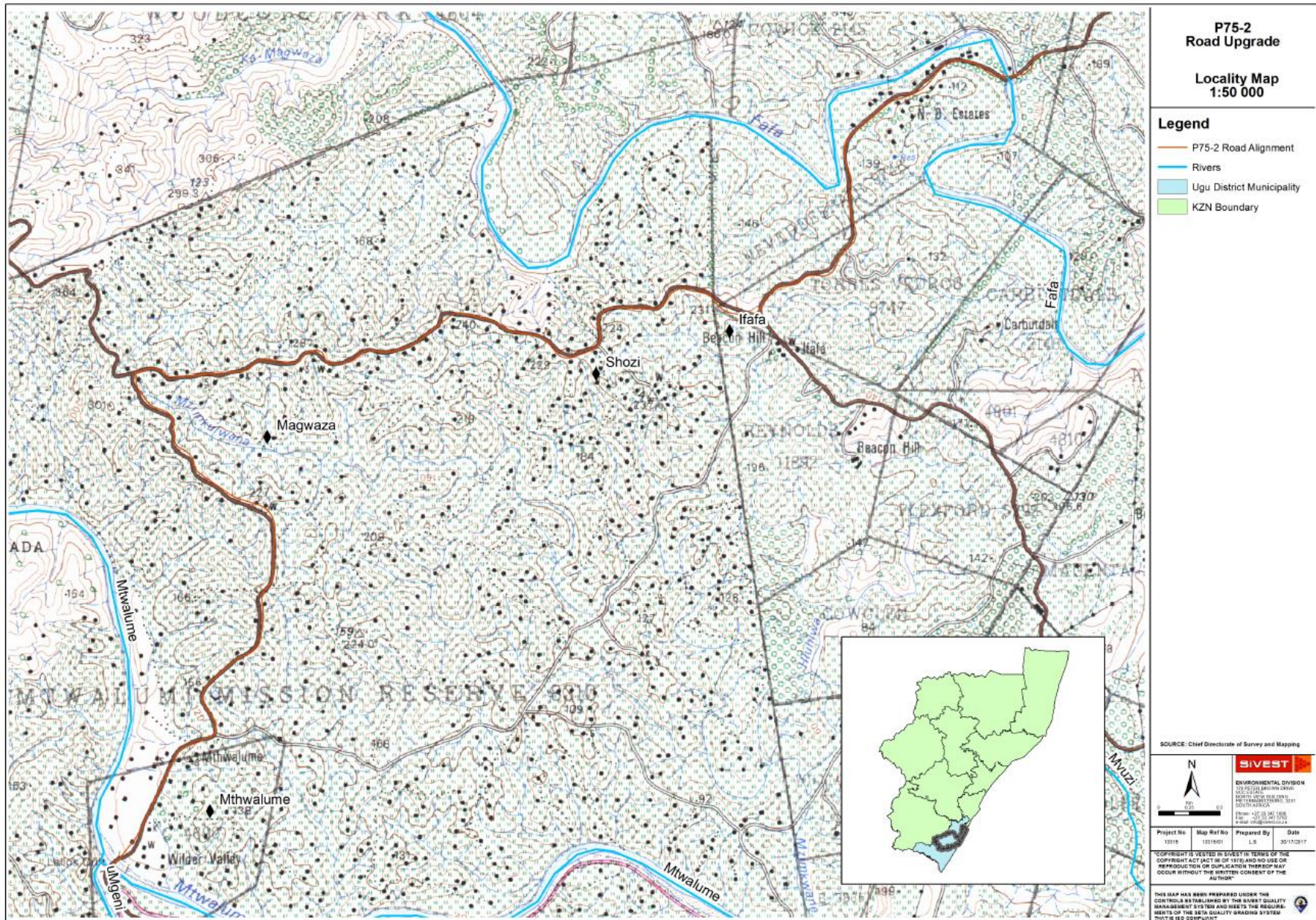


FIGURE 1: LOCALITY MAP



Figure 2: Aerial Map

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1 CLIMATE

The climate in Ugu District Municipality is known as subtropical characterised by summer rainfall patterns, with most rain occurring between October and April. Tropical thunderstorms occur particularly in the summer months of December, January and February. This area receives an average of 776mm of rain throughout the year, the lowest amount of rain occurring in June and the highest rainfall occurring in March. The average temperatures range from 22°C in July to 26.7°C in February. Winters are mild to warm and temperatures experienced are on average of 20°C degrees. The probability of rain during winter months is low. No frost was observed during field work.

2.2 VEGETATION

According to the Botanical Report done by Sivest, the study area falls within Bioresource Unit Ya12 – South Coast, which is in the Bio Resource Sub-Group 1.5: Moist Coastal Forest, Thorn and Palm Veld. The primary vegetation found in this type is: grassland and bushland thicket with the following indicator species were identified: *Acacia karroo* (Sweet Thorn), *Acacia nilotica* (Scented Pod Acacia), *Acacia robusta* (Splendid Thorn), *Acacia sieberiana* (Paperbark Thorn), *Albizia adianthifolia* (Flat Crown), *Aristida junciformis* (Wire Grass), *Combretum spp.* (Red Bushwillow), *Digitaria eriantha* (Pangola-grass), *Hyphaene natalensis* (Fan Palm), *Lantana camara* (Latana), *Panicum maximum* (Guinea Grass), *Phoenix reclinata* (Wild Date Palm), *Pteridium aquilium* (Bracken), *Sclerocarya birrea subsp. caffra* (Marula), *Sterlitzia Nicolai* (Natal Wild Banana), *Syzygium cordatum* (Umdoni) (Vegetation Assessment, Appendix C2).

No frost was observed during the field work.

2.3 GEOLOGY

The geology of the area is dominated by Karoo Supergroup sediments and intruded by Karoo Dolerite Suite dykes and sills (AGIS¹; Camp, 1999). The parent material at the site is Dolerite and Ecca Shale (Wetland Assessment and Rehabilitation Plan, Appendix C4).

2.4 CATCHMENT CHARACTERISTICS

Road P75-2 is located on the boundary of the U80G and U80F quaternary catchments. These quaternary catchments are part of the coastal Mvoti Sub Water Management Area and the Mvoti to Umzimkulu Water Management Area. The iFafa River within catchment U80G marks the start of the road re-alignment and the Mtwalume River within catchment U80F marks the end of the project.

The rural areas of these catchments are characterised by subsistence and commercial farming which sugar cane cultivation and commercial forests in the higher rainfall areas.

According to the National Water Resource Strategy, 2004, the requirements for water in this area already exceeds its availability and further growth in requirements is anticipated. The deficits mainly occur in low-flow periods as a result of insufficient storage.

The deficit in water supply is not expected to affect the re-alignment of road P75-2 as long as no water is taken from the nearby water resources. All abstraction of any water resource must have a valid permit / license issued by the Department of Water and Sanitation.

¹ Land type information was obtained from the Department of Agriculture's Global Information Services (AGIS) January 2014 – www.agis.agric.za.

2.5 *SURROUNDING LAND USES AND EXISTING IMPACTS*

The land use around road P75-2 is rural residential which include subsistence farming / vegetable gardens and commercial sugar cane farms and forestry. Small informal shops are found along road P75-2, towards the Mtwalume River (end of the road re-alignment) schools, a clinic and churches are found.

The activities associated with the land uses found along road P75/2 add to the impact of the gravel road, such as heavy sugar can trucks using the route as well as taxi's and buses commuting people from the various communities. The use of heavy vehicles along the gravel road wear the roadway down and add to the degradation of the road condition. Buses and taxis make multiple trips along this road everyday also leading to degradation of the road.

2.6 *FEPA WETLANDS*

The examination of the Freshwater Ecosystem Priority Areas (FEPA) database identified numerous channelled valley bottom wetlands within the 500m assessment buffer of the road. The wetlands have been classified as FEPA wetlands as a result of their largely natural conditions, however ground-truthing is important to understand the local conditions which have an impact on the wetland systems and their functional integrity and health.

A total of 21 Hydro-geomorphic Units (HGM) were identified during the wetland delineation and assessment process, six (6) of which are channelled valley bottom wetland and fourteen (14) were identified as hillslope seepage wetlands, refer to figure 2 below showing the HGM units identified. These wetlands will be discussed in detail in the specialist section of this report.

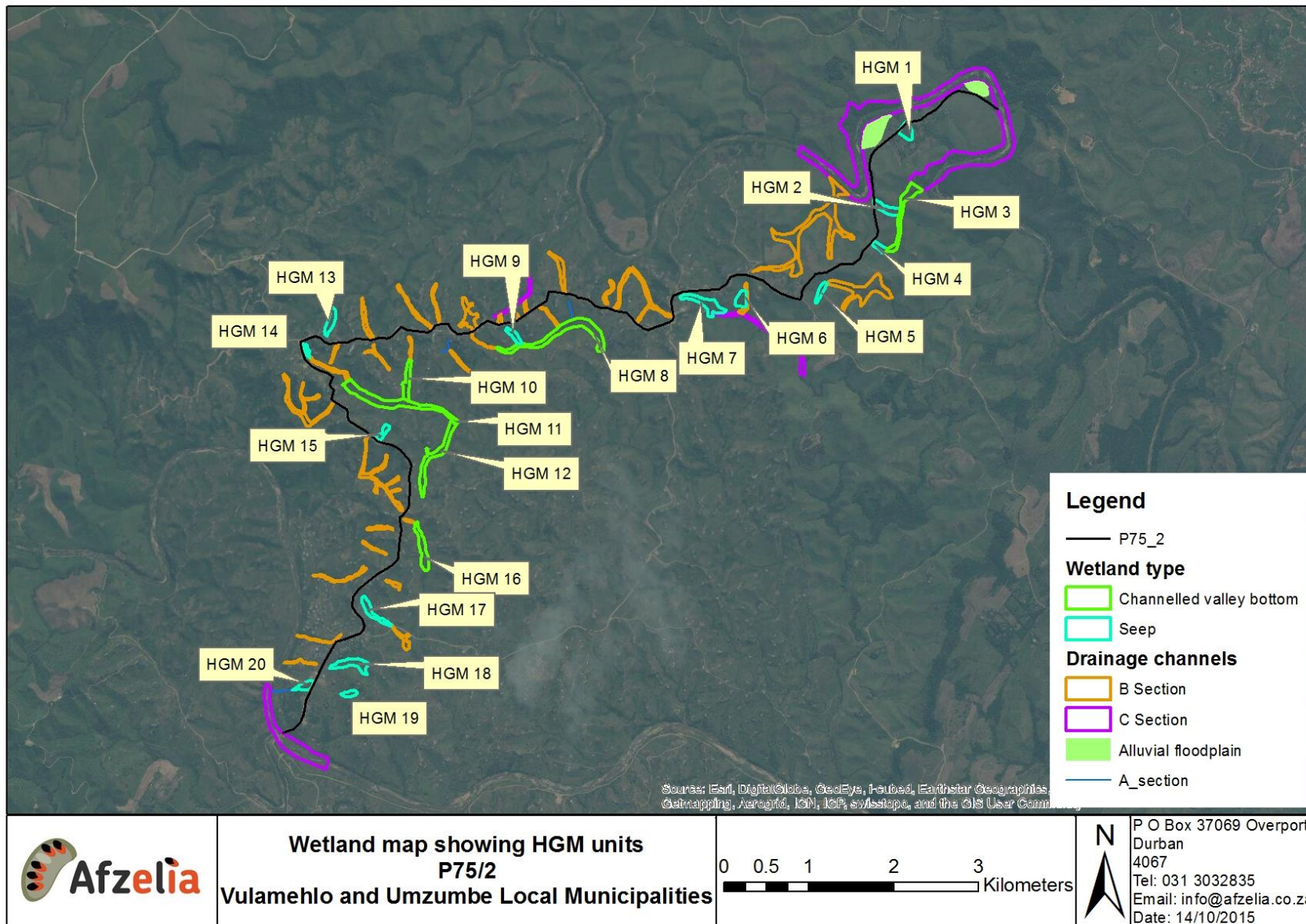


Figure 3: Hydro-geomorphic Units Identified

3. ENVIRONMENTAL LEGAL REQUIREMENTS APPLICABLE TO THIS PROJECT

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)

The proponent is required to undertake a Basic Assessment (BA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended; the Environmental Impact Assessment Regulations (2014) as published in the Government Gazette 3822, Notice No. GNR 982 amended by GNR 326 This Basic Assessment Report (BAR) has been compiled to satisfy these requirements.

Activities to be carried out during the proposed development which trigger the requirement of a Basic Assessment Report are found in Listing Notice 1 (GNR 983 amended by GNR 327) and are:

Government Listing Notice	Activity No.	Description as per the regulations	Description as per the project description
Listing Notice 1	12	The development of - (iii) bridges exceeding 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs – (b) within a watercourse; (d) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. Excluding – (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing road and road reserves.	The construction of the new river bridge at iFafa will be approximately 945 square meters in size and will be occurring within a watercourse. This area does not fall within an urban area or with an existing road reserve. In few areas along the P75/2 alignment, the road will be within 32 metres of a river.
	19	The infilling or depositing of any material or more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 10 cubic metres from: (i) a watercourse.	During the construction of the new river bridge at the iFafa river crossing, material, soil and rock may be removed and construction material will be deposited within a watercourse.
	24	The development of – (ii) a road reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres (applicable to approach areas on both sides of the new bridge)	The approaches to the new iFafa river bridge will be constructed to meet a 13.5m road reserve which may not have been established previously.
	31	The decommissioning of existing facilities, structure or infrastructure for– (v) any activity regardless the time the activity was commenced with, where such activity (b) is still in operation	The existing river crossing (causeway) will be removed once the new bridge has been constructed. The existing causeway is located at the iFafa river crossing at KM.5 of the upgrade and alignment project. Concrete pipelines will also be removed where found along the road alignment if they are not in a reusable condition.

Public participation is currently being carried out in accordance with Section 24 J of the National Environmental Management Act as amended in the EIA regulations, 2014.

3.2 NATIONAL WATER ACT (ACT NO. 36 OF 1998)

The proposed road re-alignment requires a water use license authorisation in terms of Section 21 (a), (c) and (i); in accordance with the provisions of the National Water Act 1998 (Act No. 36 of 1998)

Activity Number	Water Use	Description
Section 21 (a) of NWA, 1998	Taking of water	<ul style="list-style-type: none"> Taking of any water from a watercourse, i.e. to be used for cement mixing, wetting of roads (dust suppression) and road compaction.
Section 21 (c) of NWA of 1998	Impeding or diverting the flow of water in a watercourse	<ul style="list-style-type: none"> Impeding flow means the temporary or permanent obstruction or hindrance to the flow of water into a watercourse by structures built either fully or partially in or across a watercourse Diverting flows means a temporary or permanent structure causing the flow of water to be re-routed in a watercourse for any purpose
Section (i) of NWA of 1998	Altering the bed and banks of a watercourse or characteristics of a watercourse	<ul style="list-style-type: none"> Altering the bed and banks means any change affecting the resource quality of the watercourse (the are within the riparian habitat or 1:100 year floodline, whichever is greatest)

3.3 NATIONAL FORESTS ACT (ACT NO. 84 OF 1998)

The National Forests Act, (Act No. 84 of 1998) (as amended) provides the most comprehensive legislation and mandate for the protection of all natural forests in South Africa. Section 7 of the Act prohibits the cutting, disturbance, destruction or removal of any indigenous living or dead tree in a forest without a licence, while Section 15 places a similar prohibition on protected tree species listed under the Act.

According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected (forest). The prohibitions provide that: *“No person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.”*

Any disturbance, removal, pruning or transplanting of this species would require a licence from the administrators of the National Forests Act, who are an extension of the Department of Agriculture, Forestry and Fisheries (DAFF). When the road is marked out, any vegetation which needs to be removed, transplanted or disturbed must be identified and the appropriate permit applied for. A botanist must be available during the marking out of the route to identify these species.

3.4 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10 OF 2004)

In terms of the Biodiversity Act, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).
- Promote the application of appropriate environmental management tools to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

This act together with the Conservation of Agricultural Resources Act (Act No. 43 of 1983) must be adhered to, to eradicate and control alien invasive vegetation found within the proposed road reserve.

3.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO. 43 OF 1983) AS AMENDED IN 2001

Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:

- **Category 1 plants:** *are prohibited and must be controlled.*
- **Category 2 plants:** *(commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.*
- **Category 3 plants:** *(ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.*

3.6 PERMIT / LICENCE REQUIREMENTS

In terms of the National Forests Act, 1998 (Act No. 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act, 1984 (Act No. 122 of 1984) for protected tree species), the removal, relocation or pruning of any protected plants, or 3 or more indigenous trees will require a Department of Agriculture, Fisheries and Forestry (DAFF) license.

Protected indigenous plants in general are controlled under the relevant provincial Ordinances or Acts dealing with nature conservation. In KZN the relevant statute is the 1974 Provincial Nature Conservation Ordinance. In terms of this Ordinance, a permit must be obtained from Ezemvelo KZN Wildlife to remove or destroy any plants listed in the Ordinance.

A botanist must be onsite during pegging / marking out of the road before construction begins to ensure that if any plant species are to be removed, it is done in the correct manner (with the required permit).

3.7 ADDITIONAL APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Title of legislation, policy or guideline	Administering authority
South Africa's Constitution (Act 108 of 1996), specifically the Bill of Rights (Chapter 2, Section 24)	The State
Hazardous Substances Act (Act 15 of 1973)	Department of Health (DoH)
The Occupational Health and Safety Act (Act 85 of 1998)	Department of Health (DoH)
National Environmental Management: Waste Act (Act 59 of 2008)	National or Provincial Department of Economic Development, Tourism and Environmental Affairs
KwaZulu-Natal Provincial Roads Act (Act No. 4 of 2001)	Department of KZN Transport
National Road Traffic Act (No. 93 of 1996)	KwaZulu-Natal Department of Roads and Transport
Ugu District Municipality IDP 2015/ 2016	Ugu District Municipality
South African Water Quality Guidelines. Volume 8	Department of Water and Sanitation

4. EXISTING ROAD CONDITIONS

The proposed road P75-2 runs through an area which is predominately used for Sugar Cane farming. The road navigates along a ridge line resulting in steep banks alongside majority of the road. The beginning and the end of the road (at the iFafa and Mthlume River) the topography becomes flatter with less steep banks. Along the first section of the road, from the iFafa River to Shozi (km 5 to km 10.5), fewer houses are found closer to the road and the sugar

cane farms can be seen on both sides. From Shozi, through Magwaza and Mthwalume (km 10.5 to km 20), residential housing is denser and found closer to the road.

The existing road is a Type 6 District Gravel Road and is in a moderate to poor condition. For most parts of the road, the gravel wearing course is well compacted and intact, however erosion ruts have been created due to heavy rainfall events that have occurred between the months of June and August 2016. Due to the gravel nature of the road, it is subject to wear resulting in ruts and slippery conditions especially in wet weather. Sections of the road which have steep gradients and sharp bends are prone to easier wear and degradation. Due to the loose nature of the gravel wearing course, driving conditions at various points of the road (steep declines and sharp bends) becomes dangerous. Refer to the photos below showing existing conditions of the road.

Approximately eight (8) culverts are present along P75-2, which assist in draining surface runoff from the one side of the road to the other, where the water is discharged into natural drainage channels. No velocity dissipaters have been provided in these areas, which has resulted in soil erosion during times of heavy rainfall. Drainage channels have also become incised to due to the lack of stormwater velocity control and in some areas the culverts have become blocked up with sediment from the road runoff. No other formal means of storm water management (e.g. v-drains) have been provided.

The iFafa River causeway will be removed and a new bridge and associated infrastructure will be constructed just to the north of the current bridge. The construction of the new Mthwalume River Bridge does not fall within the scope of this assessment, however is a part of the continued upgrade of P75/3 and is being assessed by another environmental consultancy.

The proposed site is found within the Quarter Degree Grid Square 3030BC, situated in KwaZulu-Natal.

Approximate geographical co-ordinates for the proposed road re-alignment are:

	SOUTH	EAST
START – at iFafa River crossing	30°23'28.90"	30°38'59.00"
MIDDLE – where the road splits towards Friedenau	30°25'18.46"	30°31'59.19"
END – at Mthwalume River crossing	30°27'27.48"	30°31'51.18"



Photograph 1: Shows the existing condition of road P75-2



Photograph 2: Shows the existing condition of road P75-2. Note, no storm water management system has been provided.



Photograph 3: Shows the existing condition of road P75-2. Note, no storm water management system has been provided, resulting in pooling of water.



Photograph 4: Shows the existing condition of road P75-2 and the erosion that is currently occurring. This clearly shows rutting of the road.



Photograph 5: Shows the condition of the road and erosion exposing rock.



Photograph 6: Shows erosion found alongside road P75-2 due to the lack of storm water control.



Photograph 7: Shows one of the culvers along road P75-2, which is seen to be blocked and eroded.



Photograph 8: Shows a stormwater surrounded by sediment which will either build up overtime and block the pipe or in heavy rainfall, be washed down the steep banks and cause erosion.

4.1 GENERAL IMPACTS WITH LEGISLATIVE REQUIREMENTS

WASTE, EFFLUENT, EMISSION, DUST AND NOISE GENERATION

Solid Waste Management

During the construction activities, solid waste will be generated. Solid waste must be disposed of at a registered and operational landfill site. The nearest which accepts both hazardous and non-hazardous (domestic) waste is Oatlands Landfill site which is situated in Margate which is approximately 60 kilometres away from P75-2. Any hazardous waste must be separated from the non-hazardous waste before being disposed of.

Liquid Effluent and Waste

Portable toilets must be provided along the working route and they must be serviced by an independent service provided. The toilets must be serviced and sewage removed at least twice per week. The sewage must be disposed of at the nearest municipal waste water treatment works (WWTW). A receipt of collection and disposal must be kept in the environmental file at all times.

Atmospheric Emissions

During the construction activities of P75-2, dust and vehicular emissions will be produced. Dust suppression must be used to control the amount of dust created and released into the atmosphere and working environment. Potable water must not be used for dust suppression. Mitigation measures stipulated in the Environmental Management Programme (EMPr) must be adhered to.

Noise

Noise levels in the area will increase during the construction phase due to the operation of heavy machinery. Noise levels are not expected to exceed the guideline levels as per SANS 10103. Also, construction will only occur during working hours i.e. 7h00 – 17h00 and therefore will not cause a noise disturbance during the night time.

The above-mentioned impacts are considered short term impacts as these will only occur during the construction phase.

Surface water contamination during rainfall events

First flush² is the initial surface runoff following a rainfall event, particularly runoff from impervious surfaces. Pollutants accumulate on hard surfaces during preceding dry periods. Polluted water is discharged directly into streams and rivers via storm water infrastructure. This is considered a significant form of diffuse pollution, contaminating receiving water with considerable heavy metal loads. Efficient and effective storm water management techniques incorporated with sustainable urban drainage systems / soft engineering techniques help minimise the contaminants from entering water resources as these techniques filter out contaminants before discharging into the water resource.

The first flush effect is seen as an on-going impact as a result of the road hard topping which occurs during every rainfall event.

² First flush is the initial surface runoff following a rainfall event, particularly runoff from impervious surfaces. Pollutants accumulate on hard surfaces during preceding dry periods.

5. PROPOSED RE-ALIGNMENT

5.1 DESIGN

Afzelia was instructed by Samani to make use of the engineering report compiled by Samani for the road re-alignment of P245-1 (2014), therefore according to the above-mentioned report as well as information from the design drawings, road P75-2 re-alignment and upgrade is proposed as follows.

The project will start in Umdoni Local Municipality at the iFafa River crossing. From this starting point (km 5), the road is 15km long and passes through Umdoni and Umzumbe Local Municipalities where it ends at the Mtwalume River Crossing (km 20). The bridge to be built at the Mtwalume River is not part of this assessment and therefore will not be discussed.

iFafa River Bridge

A new river bridge is planned for this project, which will provide a crossing of the river for vehicles and pedestrians. The existing river crossing is a causeway. The new bridge is positioned approximately 41 metres north (upstream) of the existing causeway. The bridge is designed to accommodate a 1:20 year flood.

The GPS co-ordinates for the existing causeway and proposed bridge are:

Structure	Start	End
Existing Causeway	30°24'0.27" S 30°36'27.64" E	30°24'1.35" S 30°36'25.99" E
Proposed Bridge	30°23'59.48" S 30°36'28.46" E	30°23'59.85" S 30°36'24.39" E

The setting out co-ordinates for the bridge are:

Side	Upper Abutment	
	S	E
1	30° 26' 59.56"	30° 36' 29.70"
2	30° 23' 59.58"	30° 36' 29.53"
3	30° 23' 59.30"	30° 36' 29.67"
4	30° 23' 59.28"	30° 36' 29.49"
Lower Abutment		
1	30° 24' 0.00"	30° 36' 24.76"
2	30° 24' 0.00"	30° 36' 24.58"
3	30° 23' 59.76"	30° 36' 24.73"
4	30° 23' 59.78"	30° 36' 24.54"

The image below shows the existing causeway and the location of the proposed bridge.



Figure 4: Google Earth Imagery showing the location of the existing causeway and proposed bridge.

The proposed bridge has the following design parameters:

Height: 9.6 metres

Length: 140 metres

Width: 13.5 metres

The bridge is cambered at 2% from the centre towards both edges to allow for stormwater to flow towards the kerb. A pavement will be provided along both sides of the bridges which will be 2 metres on length.

Precast parapets will be used on both sides of the bridge which will act as traffic collision protection. These parapets will be 1 metre in height and will be connected to the bridge deck.

Scupper pipes are proposed in the design to allow stormwater to flow from the bridge directly into the river below. **The use of scupper pipes is not supported** by the environmental assessment practitioner. **It is suggested that an alternative design is used to capture and remove water such that it is directed from the kerb into a box gutter which is attached to the bridge parapet / deck along the full length of the bridge. The water is then directed into a downpipe at the end of the bridge and then into an attenuation pond which allows the water to be discharged through groundwater seepage at a normal rate into the river. Groundwater seepage will also allow filtration of the water before entering the river.**

The main bridge structure will be constructed from concrete in situ. Precast concrete will be used for pavements and parapets.

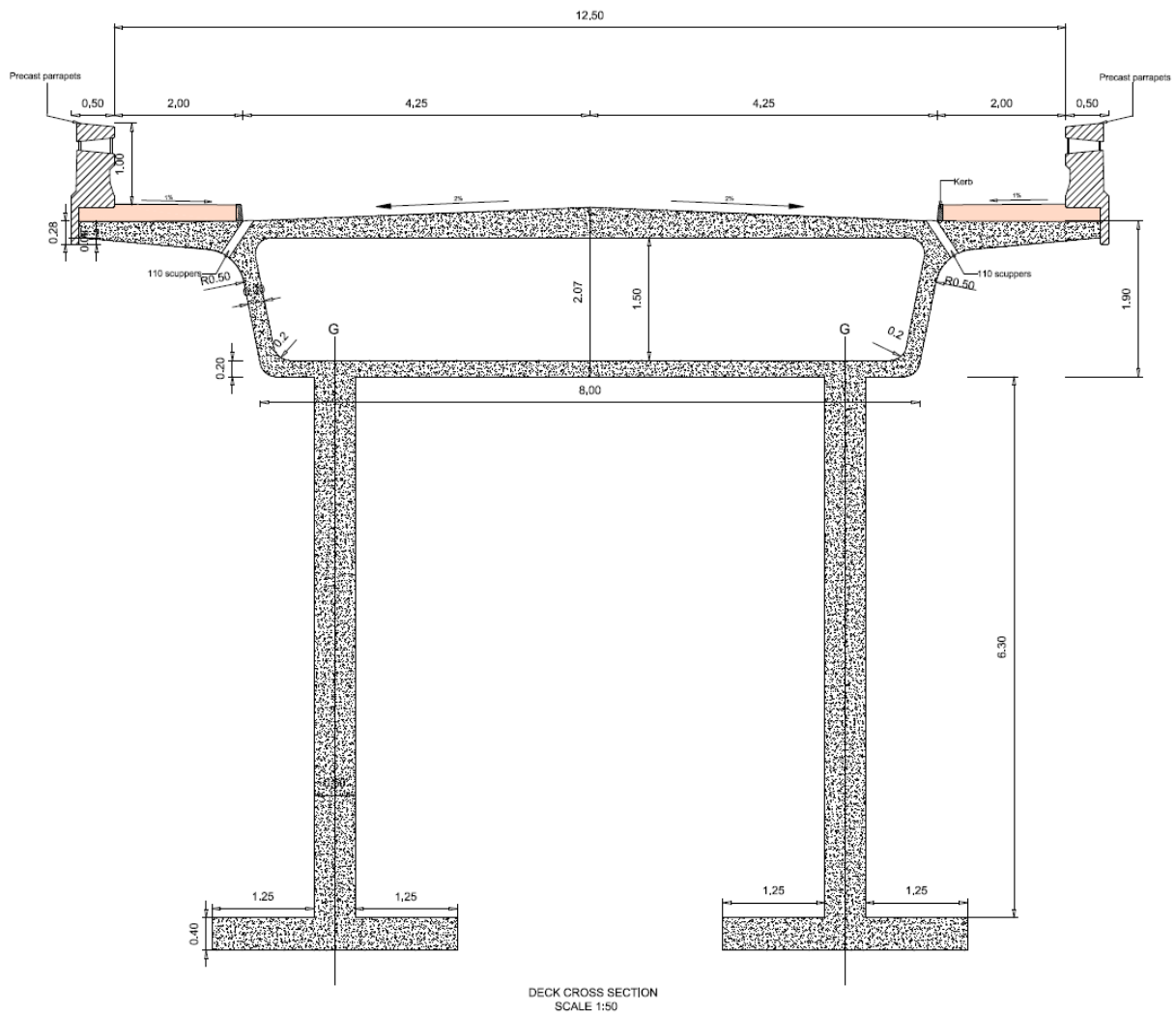


Figure 5: Design of the proposed bridge (Refer to Appendix B6 for the full design drawing)

Footpaths

Footpaths will be constructed along the length of P75/2 and will be designed for a medium to high traffic. It is proposed that these footpaths be paved, however, an alternative would be precast slabs or blocks.

The footpath will be 1.5metres wide, at the toe of the footpath, a kerb and channel will be provided. Beneath the paved surface of the footpath, G7 quality material will be used and compacted to 93% maashto.

Refer to figure 5 and 6 below which shows the detail of a footpath in a cut condition as well as the footpath detail.

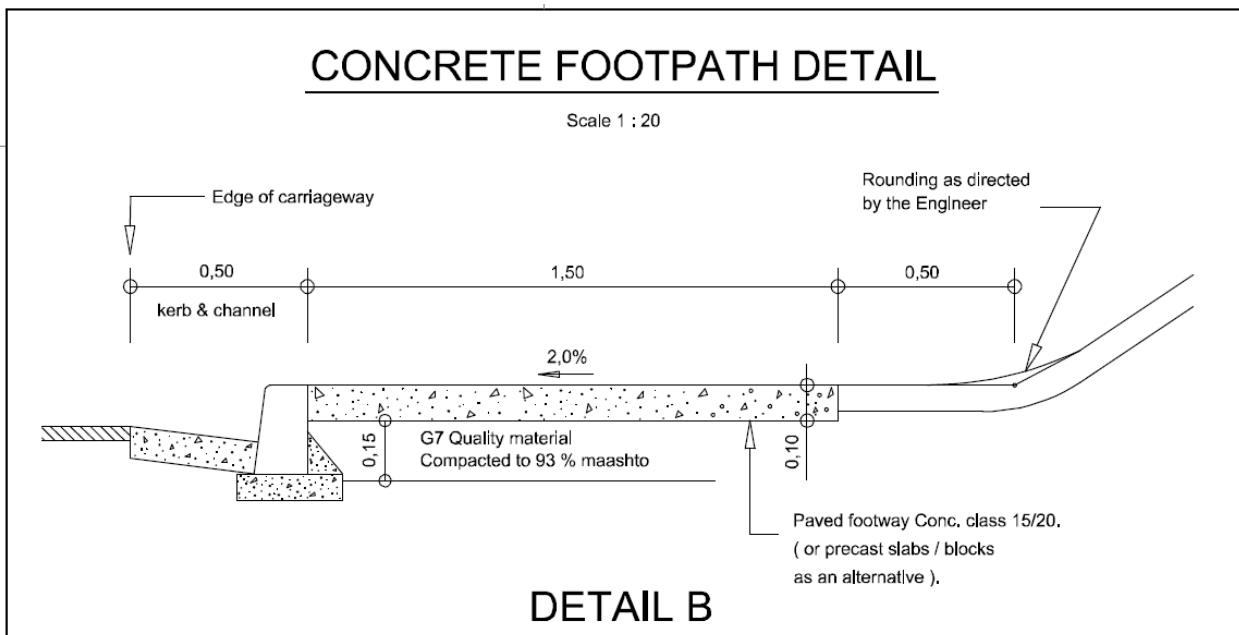


Figure 6: Concrete Footpath Detail (Refer to Appendix B1 for the full design drawing)

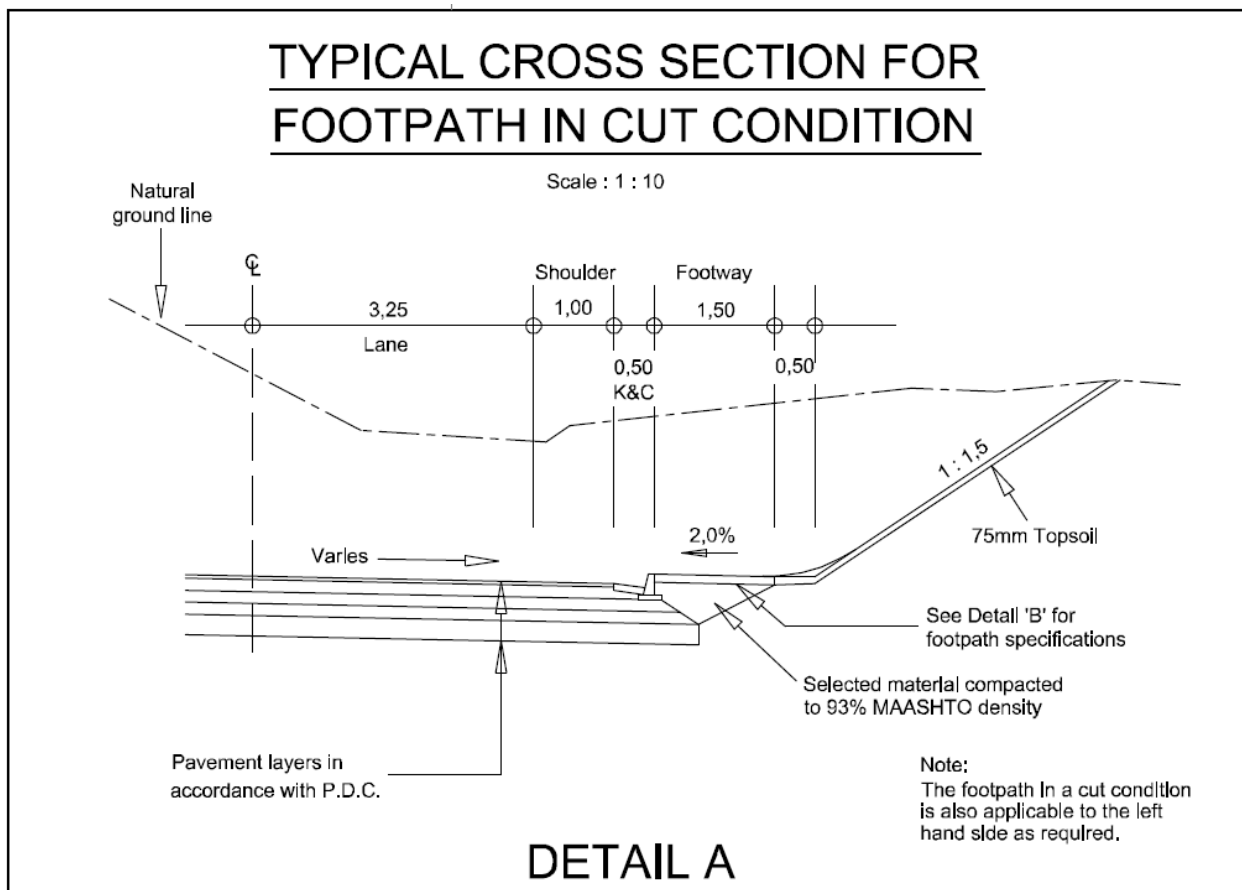


Figure 7: Typical cross section for footpath in a cut condition (Refer to Appendix B1 for the full design drawing).

Culverts

All existing drainage culverts and stormwater pipes are to be inspected and any found in unserviceable condition are to be replaced. New drainage culverts will be laid in accordance with SD 0401 with headwalls as per SD 0402, SD 0403 or SD 0406. Culverts and stormwater pipes will have a minimum diameter of 450mm for minor access roads and access bellmouths and a minimum diameter of 600mm for major road cross drainage. Where box culverts are required,

when less than 1.8m high they must be constructed in accordance with SD 0404 and where they are bigger than 1.8m high, must be appropriately designed by a structural engineer in accordance with KZN DoT standards.

For erosion control (at culvert inlets and outlets), cement grouted stone pitching or gabion mattresses are to be used. Earth berms are proposed to be constructed at culvert inlets to direct stormwater into culverts where necessary.

Rock bolsters are to be placed across the invert of drains susceptible to erosion for every 2m vertical drop.

Grassed lined V-drains as per SD 0601, SD 0603 and SD 0604 are recommended for shallow cuttings of depth less than 5mm measured at a point of 6m from the edge of the carriageway. Concrete lined 1000 V-drains as per SD 0601 and SD 0602 are recommended for deep cuttings of depth greater than 5m measured from the point of 6m from the edge of the carriage way.

Subsoil drains are to be installed with the 1000 V-drains or where high-water tables are encountered. This must be done in accordance with SD 0501.

Kerb and channel drains are to be provided where fill embankments exceed 3m in height.

Road and Re-alignment

The length (of the road P75/2 will be 15kms) will be upgrade to Type 3, Standard Provincial Road. The upgrade will include verge clearing, improvements to stormwater system and changes to the existing road alignment will be made where required. The design speed will be 60km/hr with the minimum radius of 110m and a minimum K value of 16.

The road in a cut position will be upgraded to an 8.5m wide carriage way, the shoulder of the road will be 1m wide on each side and V-drains will be provided. The road will be cambered at 2.0% on each side to allow surface runoff to be directed to the V-drains. The increased size of hardened surfaces to be created through the upgrade with the black-topping of the road and installation of footpaths where possible as well as concreted V-drains, will result in an increase in surface water runoff. The hardened surface will also increase the velocity of the stormwater runoff, which will create erosion if soil and vegetation is not protected. It is critical that stormwater systems are provided with velocity dissipaters to slow down water flow and reduce the chance of erosion.

The road in a fill position will be upgraded to a 8.5m wide carriage way, the shoulder of the road will be 1m wide on each side kerb, channels and footpaths will be 2.5m in width thereafter a 3m toe distance will be allowed with a further 3m allowed for within the road reserve. The road reserve will be 30m wide. The working servitude must be kept within the road reserve.

The layers of the road will consist of (from top to bottom):

- 40mm AC Continuously Graded Asphalt;
- 150mm G1 Crushed Stone Basecourse compacted 88% apparent density;
- 300mm C4 Subbase compacted to 97% Mod Aashto density (stabilised);
- 150mm G7 Selected (2) compacted to 95% Mod.Aashto density;
- 150mm G7 Selected (1) compacted to 95% Mod.Aashto density; and
- 150mm G10 Subgrade Rip and Recompacted to 90% Mod.Aashto density.

Although the upgrade is including re-alignment of the road in certain areas, the realignment is not seen as significant, except for the new iFafa River bridge and approaching roadways which will be set approximately 41 metres north of the existing river crossing.

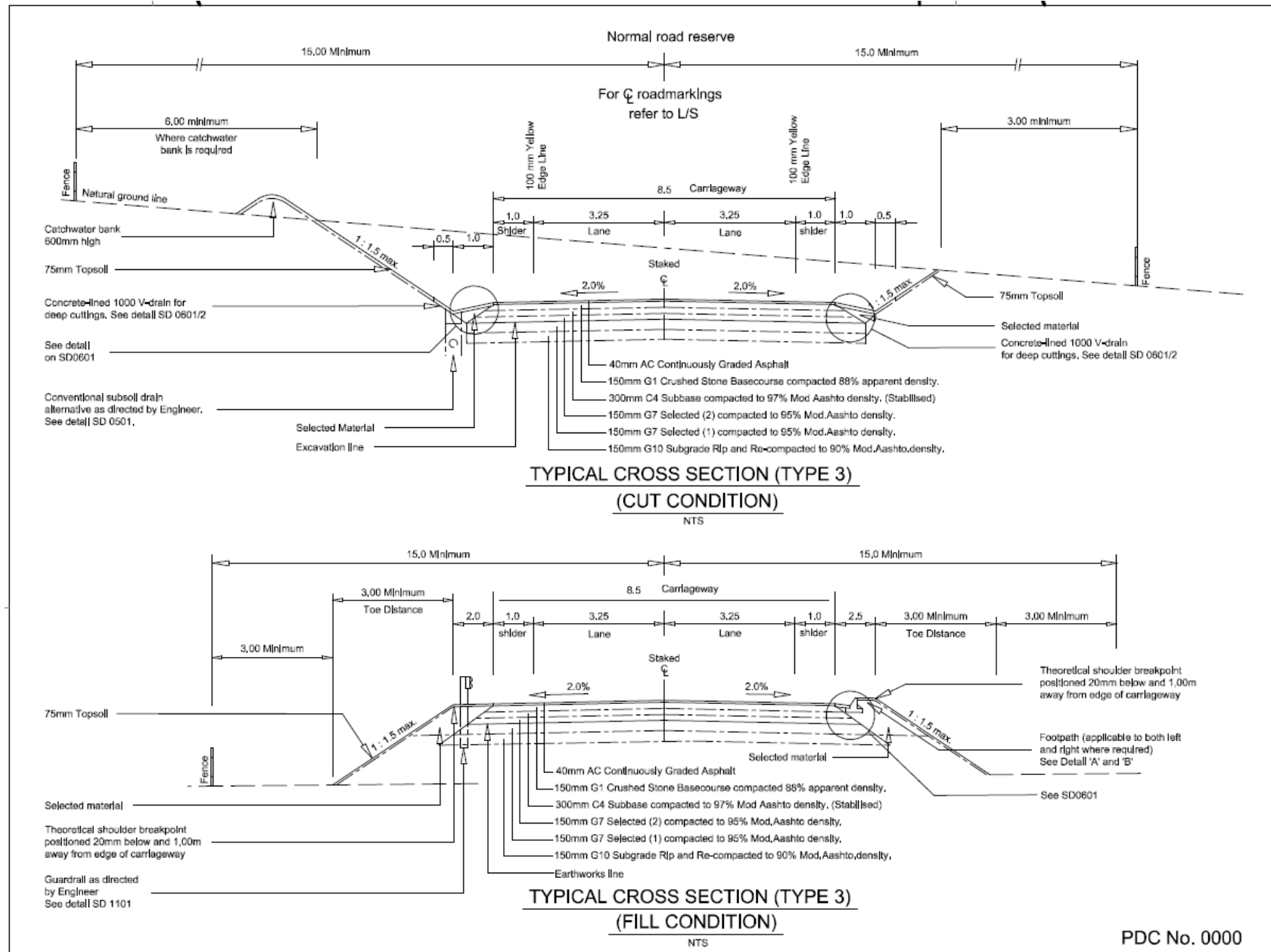


Figure 8: Typical cross section of the road upgrade in a cut and fill condition. (Refer to Appendix B1 for the full design drawing)

5.2 STORM WATER MANAGEMENT

Stormwater along road P75/2 will be managed and directed into V-drains and culverts to ensure that surface water runoff is directed away from the road and into drainage channels. All drainage crossings will be identified and culverts will be designs for these areas. The required culvert sizes will be determined and designed appropriately. At crossings, culverts will be constructed with associated inlet and outlet structures.

For erosion control, cement grouted stone pitching or gabion mattresses must be installed at culvert inlets and outlets. Rock bolsters must be placed across the invert of drains susceptible to erosion for every 2m vertical. Earth berms are to be constructed at the inlet side of culverts to direct stormwater into culverts where necessary.

V-drains at shallow cuttings of a depth less than 5mm will be grassed and deep cuttings greater than 5m will be concrete lined.

Subsoil drains must be installed with 1000 V-drains or where high-water table are encountered.

It is recommended that the following Sustainable Urban Drainage Systems (SUDS) be implemented in the storm water management plan where possible along road P75/2. The prime function of SUDS is to provide effective surface water drainage, ensuring the greatest degree of flood risk protection and prevent pollution and habitat degradation.

The SUDS recommended to be used throughout this project are:

Permeable Paving – allows rain and storm water to be absorbed by filtration into ground water systems as it would happen naturally. This system allows natural biological processes to continue as the soil will filter and break down runoff pollutants in the water. Permeable pavements promote water infiltration which reduces flooding and non-point source pollution, minimises storm water infrastructure costs and maximises groundwater recharge improving ecological functions of nearby drainage channels and wetlands. This has a positive effect on the surrounding biodiversity.



Example of permeable paving

Filter strips – Filter strips are maintained grassed areas of land that are used to manage *shallow* overland storm water runoff through several filtration processes in a similar manner to buffer strips. They are most effective as pre-treatment options to aid the storm water management processes of bio-retention areas, infiltration trenches and swales. They intercept and spread out storm water runoff resulting in the attenuation of flood peaks. Filter strips are commonly used along stream banks as vegetated buffer systems and used downstream of agricultural land to intercept and infiltrate storm water runoff. They are particularly useful for providing a first line of defence against sheet flows from large paved areas such as roads. Filter strips use vegetative filtering as a primary means of storm water runoff pollutant removal. Properly designed filter strips remove most sediment and pollutants such as hydrocarbons and nitrates. Furthermore, with the use of appropriate indigenous vegetation, filter strips have the potential to provide a habitat corridor for wildlife.



Example of a filter strip adjacent to a road

Swales - linear grass covered depressions that typically remain dry between rainfall events. Swales lead surface water overland from the drained surface to a storage or discharge system, typically using road verges. It provides temporary storage for storm water and reduces peak flows. Furthermore, they use partial infiltration and bio-infiltration to remove pollutants from storm water runoff. Swales avoid the need for expensive roadside kerbs and related maintenance.

The advantages of swales include:

- Vegetated swales are normally less expensive and more aesthetically pleasing than kerbs and their associated concrete- and stone-lined channels;
- Runoff from adjacent impermeable areas is completely infiltrated on site using swales;
- Swales retain particulate pollutants as close to the source as possible; and
- Swales reduce storm water runoff volumes and delay runoff peak flows.



Example of a swale alongside a road.

In addition to these features of preventing soil erosion, reducing costs of installation and maintenance of concreted storm water channels, attenuating flood peaks and generally trapping and filtering out pollutants close to the source, the implementation of permeable paving, filter strips and swales will also assist in uplifting the surrounding area aesthetically and improve the ecosystems within the nearby sensitive environments.

Storm water management must be designed and implemented during the early stages of construction as to ensure that rain and other surface run-off is captured, filtered and released into the environment in a controlled manner to reduce the impacts of soil erosion and limit riparian and wetland degradation.

5.3 ALTERNATIVES

Alternative 1 (preferred) – The proposed project involves the re-alignment and upgrade of a specific road, P75-2, which is found on an existing footprint which includes one bridge (iFafa River Bridge). Site alternatives other than the location of the current road have not been assessed as this is an existing road re-alignment. The proposed re-alignment is located within Umdoni, and Umzumbe Local Municipalities of the Ugu District Municipality.

Alternative 1 will result in short term negative impacts to rivers, wetlands, vegetation, fauna, residents and surrounding land owners, however if mitigation measures are adhered to these impacts will be reduced and managed throughout the construction phase. If the rehabilitation measures are implemented effectively, the area would benefit from positive impacts as a result of the road re-alignment and upgrade.

Temporary job opportunities and skills development is expected during the construction phase of the road upgrade.

No-Go Alternative – The no-go alternative would leave the existing road P75-2 in its current degraded state. Along steep gradients and sharp bends, degradation to the shape of the road surface, extensive soil erosion and formation of potholes and deep ruts will continue to occur, becoming worse with heavy rain and wet conditions. Erosion will continue to occur on the road as a result of uncontrolled stormwater and run-off, drainage channels will also be eroded further over time due to the velocity stormwater flow.

The no-go alternative will not require any construction work however the nature of the existing road will continue to have negative impacts on the existing environment (rivers, wetlands, vegetation, fauna, surrounding land owners and residents). However, the threat to biodiversity as a result of continuing to use the existing road will result in further soil erosion, sedimentation of stormwater channels and rivers downstream, encroachment of alien invasive species and dust affecting passers-by as well as plant growth and function due to falling on the leaves. These conditions will remain and progressively worsen over time with the use of the existing gravel P75/2 road.

No temporary job opportunities or skill development will occur for the local communities during the construction phase.

6. NEED AND DESIRABILITY OF THE ACTIVITY

The Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 – GN 891 issued in April 2017 has been used to inform and provide structure for this Need and Desirability section (DEA, 2017).

The vision of the Ugu District Municipality is:

“A place where everyone benefits equally from socio-economic opportunities and services”.

Ugu District Municipality, Integrated Development Plan. 2014/2015 Annual Review.

The following policies, statutes and documents were interrogated to inform the need and desirability of this project:

1. Ugu District Municipality – Integrated Development Plan;
2. Ugu District Municipality – Spatial Development Framework;
3. Ugu District Municipality – Growth and Development Strategy;

The documents are discussed as follows:

Integrated Development Plan

The core mandate for the Ugu District Municipality is to provide access to basic infrastructure and services. One of the challenges that the municipality is facing is addressing roads infrastructure especially in rural areas. The upgrading of road P75-2 will assist in meeting this challenge.

Upgrading of roads within the Ugu District Municipality will also show progress in reaching the National Development Plan: 2030 based on creating jobs, expanding infrastructure and transforming urban and rural spaces.

The IDP highlights that a road in poor condition also impacts negatively on journey speed and road safety, decreasing the accessibility or desirability of the region for business. Upgrading the road P75-2 will assist with remediating this negative aspect for at least a portion of a route within the area.

The Expanded Public Works Programme (EPWP) is a national strategy aimed at eradicating poverty, while creating jobs and providing opportunities to the previously disadvantaged communities through the provision of temporary employment opportunities. The upgrading activities of road P75-2 will provide temporary employment to individuals within close proximity of the route.

The Ugu District Strategic Development Matrix is aligned to the National, Provincial and District priorities. The re-alignment of road P75-2 meets four of the 9 priorities that have been set. These are:

1. Infrastructure Investment (upgrading of a gravel road);
2. Economic and Sectoral Development (temporary employment through construction activities);
3. Education and skills development (skills development required to perform construction activities);
4. Clean Environment (hard topping and installing storm water management for the road will assist in reducing environmental impacts such as soil erosion occurring at present).

Spatial Development Framework

The SPD has been incorporated into the IDP and therefore is not detailed and needs to be reviewed.

The SPD section of the IDP has identified priority road corridors for development which will promote spatial integration of the district and increase accessibility for rural communities. Although road P75-2 is has not been identified as a priority road, it will assist in promoting spatial integration and will connect the surrounding communities to hubs within the area.

Growth and Development Strategy

The Ugu Growth and Development Strategy commits to achieving a vision by 2030 that will see Ugu district as a leading tourism destination, agricultural and manufacturing hub where jobs are created and everyone benefits equally from socio-economic opportunities and services.

The environmental 'thinking' and 'implementation' of the mitigation measures set out in the Growth and Development Strategy document will assist with ensuring that one of the six key drivers of the growth and development strategy is met. This driver is Environmental Sustainability and is explained as a commitment to reversing the environmental degradation that has taken place within the district. Implementation of the mitigation measures presented in the Impact Assessment section of this report focuses on addressing environmental impacts and degradation which has occurred throughout the route.

The element of temporary employment during the construction phase will assist in contributing to the growth and development of the immediate areas such as Umzumbe and Umdoni Municipalities and at a further scale to the Ugu District Municipality.

A recommendation would be to create permanent jobs performing maintenance along this re-aligned and upgraded route to further contribute to long term growth and development of the district municipality.

Through the interrogation of the IDP, SDF and Growth and Development Strategy, the proposed development supports the views and plans of the Ugu District Municipality.

SECTION B

7. SPECIALIST STUDIES

Specialists were consulted during the completion of this section. The full reports are attached in Appendix D.

7.1 GEOTECHNICAL ASSESSMENT

The Geotechnical Assessment was completed by Geosure (Pty) Ltd, refer to Appendix D1 for the full report.

The assessment sets out the results of a materials investigation and laboratory testing carried out for Road P75/2 from km 5+000 to km 10+000. Samani provided a list for the test pit positions required along Road P75/2.

No groundwater seepage was observed during the investigation. However, a perched water table is considered likely both during and after periods of rainfall and/or during summer rainfall season. Due cognisance of this likely perched water table will need to be considered during the construction phase.

The results of the DCP tests are given in Appendix B of the report. The results of the laboratory tests are given in Appendix C of the report.

7.2 HERITAGE IMPACT ASSESSMENT

The Heritage Impact Assessment was carried out by Active Heritage CC, the full report, refer to Appendix D2.

No visible archaeological, or heritage sites were found during the heritage impact assessment. The report states that there is no known archaeological reason why the project may not proceed as planned. The area is not part of any known cultural landscape, however possible sensitive sections have been indicated along the route, refer to figure 3.

The road runs close to many homesteads and in some cases hidden graves may be in close proximity to the project area, however none were observed within the project footprint.

Attention must be drawn to the South African Heritage Resources Act (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 must cease immediately, pending evaluation by the provincial heritage agency. During construction, great care must be taken not to intrude on cultural and living spaces along the P75-2 route, as cultural and heritage material is often associated with homesteads and domestic activity areas, but not always visible above surface.

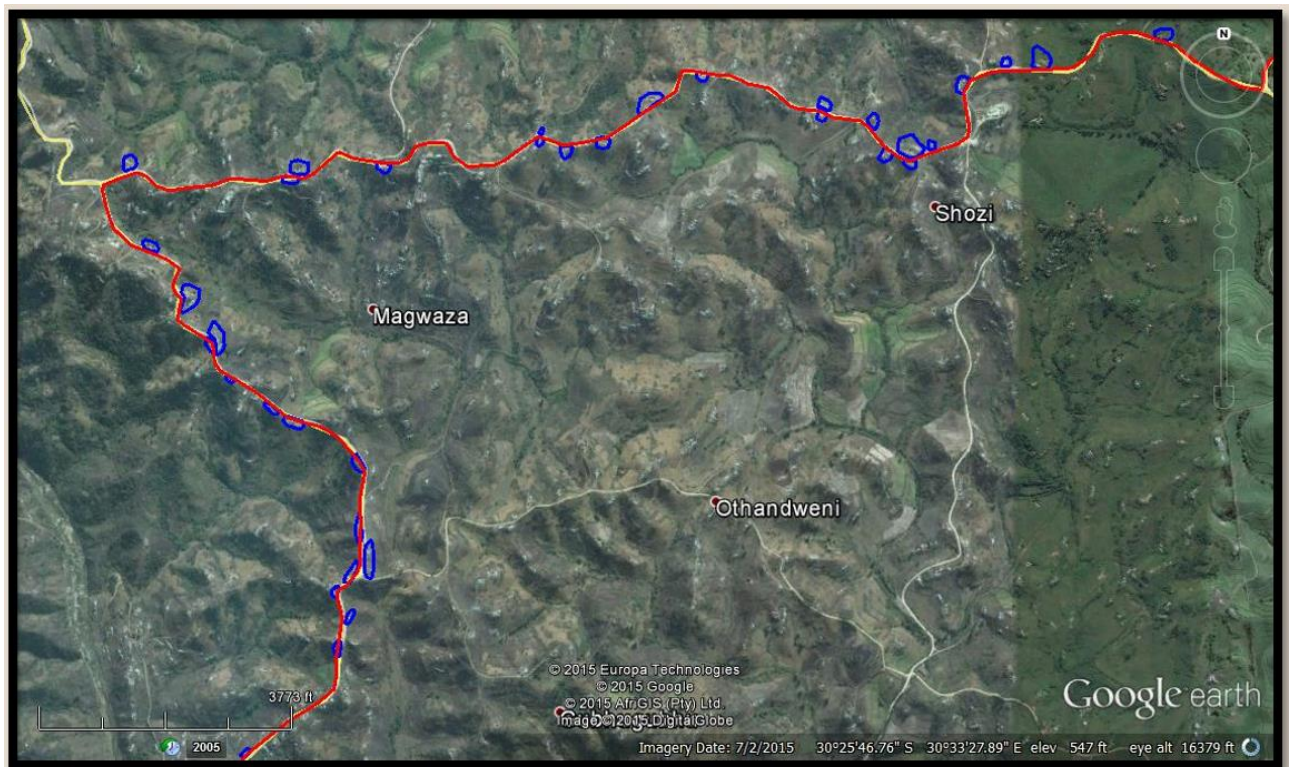


Figure 9: The blue indicators show possible sensitive sections along the P75-2.

7.3 VEGETATION ASSESSMENT

SIVEST Environmental Division completed the vegetation assessment for this project. The full report can be found at Appendix D3.

According to the Ezemvelo KZN Wildlife C-Plan Biodiversity Features analysis, there is unlikely to be a biodiversity concern with the development of the site. The C-Plan MINSET analysis shows the same result stating that the area is deemed as not requiring protection. The Biodiversity Sector Plan map indicates that majority of the site has been classified as Natural Land with some areas reflected as Critical Biodiversity Area's (CBA): Irreplaceable and others as Transformed. Ground-truthing of the site was undertaken to verify the findings of the desktop studies. The ground-truthing revealed:

There are several features present on site which are considered to be of environmental significance and conservation importance. Through the physical characteristic present on site a number of groups have been identified as potentially present and these groups are significant in terms of conservation significance.

Table 1 and 2 below identify groups which are significant and may be present in the site area.

Table 1: Species within Project Area (SEA) data taken from Ezemvelo KZN Wildlife

YES	NO
Invertebrates	Frogs
Protected Plants	Mammals
Medicinal Plants	Vegetation - Forests
Vegetation - Grasslands	Reptiles
Vegetation - Wetlands	
Avi-fauna	

Table 2: C-Plan Data Taken from Ezemvelo KZN Wildlife

Species name	Type
South Coast Grassland	Grassland
KwaZulu-Natal Coastal Forests	Forest
<i>Centrobolus anulatus</i>	Millipede
<i>Doratogonus infragilis</i>	Millipede
<i>Doratogonus montanus</i>	Millipede
<i>Edouardia conulus</i>	Snail
<i>Gulella separata</i>	Snail
<i>Begonia rudatisii</i>	Plant
<i>Dahlgrenodendron natalense</i>	Plant
<i>Gerrardanthus tomentosus</i>	Plant
<i>Pseudoscolopia polyantha</i>	Plant
<i>Streptocarpus molweniensis</i>	Plant

There is no frost hazard and the erosion risk for the area is high. The vegetation type of this area: KwaZulu-Natal Coastal Belt Grassland (CB3) is considered Endangered.

At present the vegetation is affected by a mosaic of very extensive sugarcane fields and timber plantations with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld. Although vegetation types are classified as endangered, the majority of the vegetation surveyed was in a very transformed or degraded state and consisted of mainly alien and pioneer indigenous species typical of such areas.

Biodiversity Assessment

A total of 114 plant species were recorded during the field assessment, 59 of which were alien / exotic. Three (3) plant species were found to be protected by provincial legislation.

The plant species that fall under the protection of the KwaZulu-Natal Nature Conservation Management Act (Act No. 9 of 1997) are:

- *Scadoxus puniceus*
- *Kniphofia cf. coddiana*
- *Albuca* spp.



Scadoxus puniceus



Kniphofia cf. coddiana



Albuca spp. (An example of *Albuca setosa* is shown here)

Table 3: GPS co-ordinates for the identified protected plant species are:

Scientific Name	Common Name	South Co-ordinates	East Co-ordinates
<i>Scadoxus puniceus</i>	Paintbrush Lily	30° 25' 41.33" S	30° 32' 16.94" E
<i>Kniphofia cf. coddiana</i>	Red-hot Poker	30° 25' 51.52" S	30° 32' 34.17" E
<i>Albuca spp.</i>	Slime Lilies	30° 25' 52.14" S	30° 32' 35.11" E

Scadoxus puniceus was found in the understory of the larger clumps of trees and shrubs and generally on steeper slopes that had thicker vegetation, this minimising the chance of trampling disturbance from humans and cattle. The other two species were found growing on the steep cut banks along part of the road alignment. Refer to figure 10 for the location of these species. If these are to be relocated, an appropriate permit must be obtained before they are moved. The relocation must be done under the supervision of an experienced botanist to ensure that success of the relocation.

Majority of the indigenous large trees found along the road include: *Acacia caffra* (Hook thorn); *Grewia occidentalis var. occidentalis* (Cross berry); *Erthrina lysistemon* (Common coral tree); *Albizia adianthifolia* (Flat crown) and *Ficus natalensis subsp. Natalensis* (Natal fig).

Alien vegetation found interspersed amongst the trees include *inter alia*: *Lantana camara* (Lantana); *Solanum mauritianum* (Bugweed); *Solanum (incanum) lichtensteinii* (Sodom Apple); and *Ageratum conyzoides* (Goatweed). In some areas the vegetation was completely enveloped by exotic creepers such as *Ipomoea spp.* (Morning glory); *Passiflora foetida* (Passion flower); *Cardiospermum grandiflorum* (Balloon vine) and *Convolvulus arvensis* (Bindweed).

The graminoid components were dominated by *Aristida junciformis* (Wire grass); *Stenotaphrum secundatum* (Buffalo grass); *Melinis repens* (Natal grass) and *Setaria megaphylla* (Big leaf bristle grass). There was evidence of overgrazing and lack of fire management in some areas and mismanagement of burning regimes in other areas.

Alien trees were found along the verge of sugar cane fields, these trees include: *Melia azedarach* (Syringa); *Mangifera indica* (Mango); *Musa acuminata* (Banana); *Psidium guajava* (Common guava) and *Nerium Oleander* (Oleander). These trees are generally associated with homesteads and provide shade, living fences, dust and wind screening and fruit. *Casuarina equisetifolia* (Pine tree) was found closer to the river banks, this tree has an extensive root system that serves to assist in bank stabilisation.

Typical road side scrub includes *Erythrina lysistemon* trees, *Rubus cuneifolius* (American bramble) and *Senna didymobotrya* (Peanut butter cassia). The American bramble and Peanut butter cassia are both alien invasive species.

Although not anticipated, if indigenous trees are required to be cut / removed during the construction phase, the required permit must be obtained **BEFORE** the tree is removed. If removal is carried out, the same type of tree (at least 1 metre in height) must be procured and planted within the road construction footprint (in a suitable location) to "off-set" the loss of the tree. An off-set of 1:3 must be applied. Therefore, three trees must be planted for every one tree that is removed.

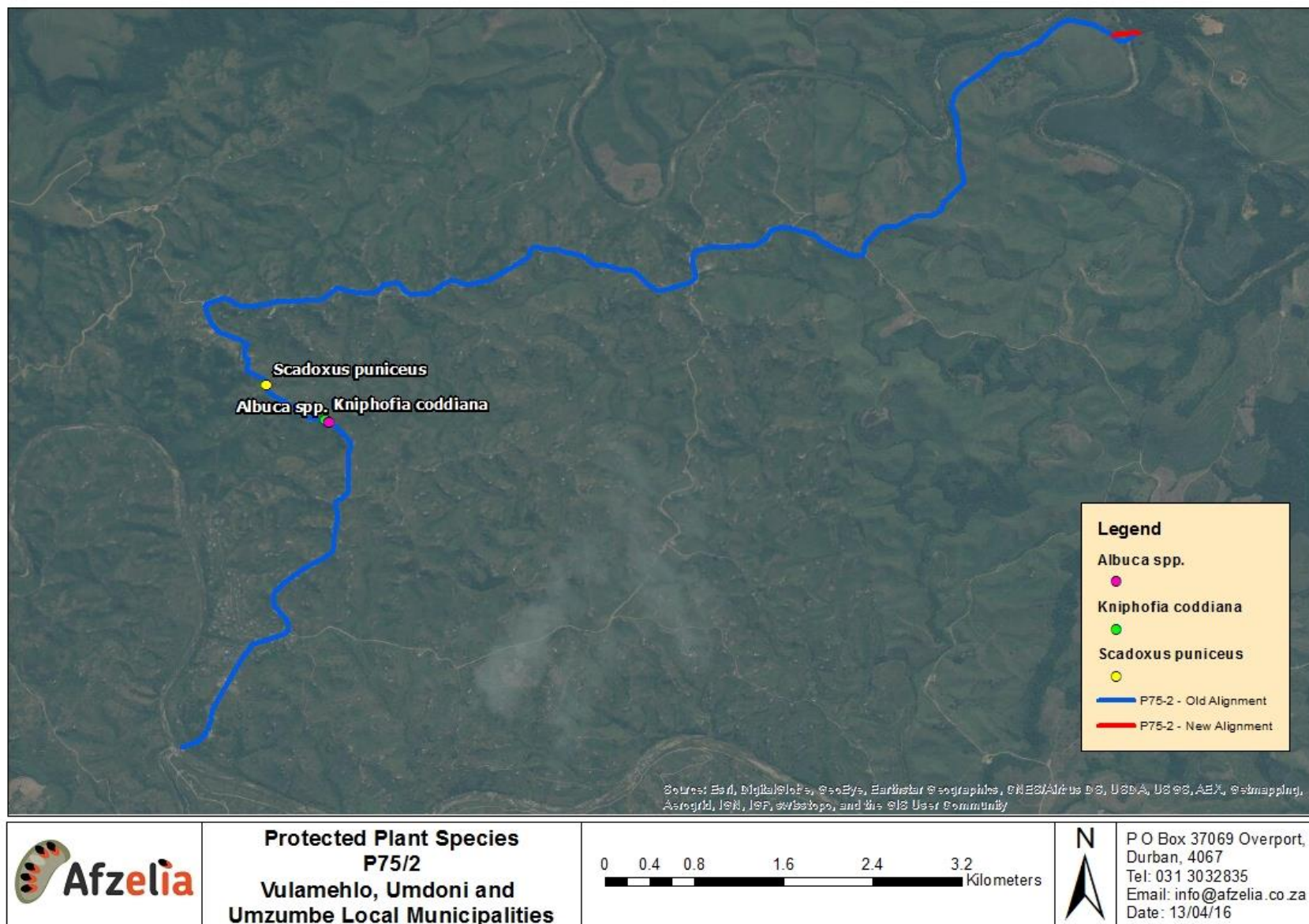


Figure 10: Map showing the location of the species protected by the provincial legislation

Biodiversity Noteworthiness

Several vegetation types were found along the road alignment, these include:

- Sugarcane land;
- Fallow sugarcane land;
- Plantations (Black wattle);
- Grasslands, which are degraded and mainly found around the homesteads and some road verges;
- Bush clump; which was found to line the road reserve which act as a barrier against dust and wind and
- Active pastures and community vegetable gardens.

According to the Biodiversity Rating Scale the following rating has been given to each of the vegetation types:

1. Sugarcane and verge vegetation are seen to have a low biodiversity rating of (0). The expected impact of the proposed activity on this vegetation type was rated as moderately low (1.2).
2. Fallow sugar cane vegetation was given a biodiversity rating of low (0.4) and the expected impact of the proposed activity on this vegetation was rated as low (0.8).
3. A moderately low (1.4) rating was given to the plantation and understory vegetation with a rating of low (0.6) as the expected impact of the proposed activity.
4. Degraded grassland vegetation was rated as moderate low (1.6), the rating stays the same when considering the expected impact of the proposed activity.
5. Bush clump vegetation was given a rating of moderately high (3.2) with the rating dropping to moderately low (1.4) when considering the expected impact of the proposed activity.

The average score is 1.8 which shows that the vegetation types are functioning at a moderately low ecological level and have limited ability to maintain biodiversity under current practices. This is mainly caused by dominant presence of alien vegetation due to veld mismanagement. Veld mismanagement includes overgrazing, monoculture, irregular burning and / or no burning regimes).

In order to assist in reducing the expected impacts on the various vegetation types, the following recommendations must be implemented:

- Avoid disturbance outside of the proposed road reserve in order to protect the sensitive areas near the site;
- Protected species must be found and relocated by a qualified botanist. Relocation of protected species must be done during summer months. Plants must be relocated into areas with the same aspect, soil conditions and elevation to ensure success. The botanist must approve the relocation location.
- Should the need arise for indigenous trees to be cut and / or destroyed, a DAFF permit will need to be obtained;
- An offset must be made for the loss of indigenous trees which will be determined during the permitting process, usually 5 individuals of the same species must be planted for each tree that will be lost.

7.4 BASELINE AQUATIC ASSESSMENT

The Baseline Aquatic Assessment was carried out by GroundTruth, Water, Wetlands and Environmental Engineering, refer to Appendix D4 for the full report.

The aquatic assessment found that the iFafa River health is in a fair condition as indicated by the SASS5 scores. According to the diatom indices, the river is found to be in a near natural condition. The water sample found that all determinants to be within acceptable levels when compared to the DWS water quality guidelines. The Index of Habitat Integrity (IHI) indicated that the instream habitat was in a good condition and riparian habitat was in a fair condition. The main impacts related to this river is flow modification and growth of exotic vegetation.

During the sampling, water levels in the Mtwalume River were higher than other rivers in the area. The SASS5 assessment revealed that the conditions are good. The diatom results show the site to be in a near to natural ecological condition and all water quality samples were within acceptable levels when compared to the DWS guidelines. The instream and riparian habitat were in a good to near-to-natural condition with minor impacts relating to exotic plants and some instream disturbance.

The Umgeni River was also assessed for this project as it is found upstream and confluences with the Mtwalume River near the end of the road re-alignment. The water level in the river was low and habitat was limited. Diatoms were used to determine the ecological condition of this river. The results showed the site to be in a good condition. All water quality samples were within acceptable levels when compared to the DWS guidelines. The instream habitat was in a near-to-natural condition with minor impacts present. The riparian condition was only considered to be fair due to exotic vegetation, vegetation removal and bank erosion (worsened by sand mining).

The impacts associated with the rivers assessed are shown in the table below with the corresponding impact significance.

Table 4: Basic risk assessment for the proposed P75-2 road re-alignment route river crossing

Activity	Probability	Duration	Extent	Magnitude	Significance points	Impact significance	Impact significance with mitigation
Riparian vegetation loss	3	2	1	2	15	Low	Low
Vegetation removal for construction activities	3	5	1	2	24	Low	Low
Pollution from construction activities entering the river	3	1	1	4	18	Low	Low
Erosion related to construction activities	3	2	1	4	21	Low	Low
Increase in turbidity from run-off related to construction activities	4	1	1	4	24	Low	Low

Recommended mitigation measures:

- A small designated construction work area must be demarcated on the riparian zone, banks and instream. This area must be as small as possible and construction equipment must stay within this demarcated work area. No refuelling or servicing of equipment is allowed in this area. Access to this area must be through a single route to limit disturbance;
- The preconstruction river bed structure and roughness must be preserved post construction to maintain hydrological functioning;
- Construction must occur during the dry or low flow season, when the volume of water in the river is at reduced levels;
- Erosion berms, silt traps, etc. must be in place for all areas where vegetation removal or excavation activities occur to ensure excess sedimentation does not enter the river;
- Vehicles and other equipment and machinery must be kept out of the river;
- Construction materials must be stored at least 30m away from the river bank and riparian areas and have suitable retention and bunding structures in place to prevent spills or run-off entering the river and riparian zone;
- Re-fuelling and maintenance of equipment and vehicles must not take place within 30m of the riparian and in-stream areas;

- Areas where vegetation is removed or damaged during the construction process need to be suitably rehabilitated with an approximate mix of grasses and shrubs as determined by a botanist or vegetation ecologist familiar with the area and the riparian species
- No riparian flora outside of the construction footprint must be disturbed.

7.5 WETLAND DELINEATION AND REHABILITATION PLAN

The Wetland Assessment and Rehabilitation Plan was carried out by Afzelia Environmental Consultants (Pty) Ltd. The full report can be found at Appendix D5.

Six (6) channelled valley bottom wetlands and fourteen (14) seepage wetlands were identified. The wetlands were delineated within a 500m buffer around the existing P75-2 road and does not include the entire wetland system.

Where no wetland characteristics were identified, the scope of the assessment was changed to the delineation of riparian areas associated with a drainage channel. There are three types of channels or sections:

- A Sections – channels that do not have baseflow;
- B Sections – channels that sometimes have baseflow; and
- C Sections – Channels that always have baseflow.

Two C Sections delineated are the iFafa River and the Mtwalume River.

The six (6) channelled valley bottom wetlands delineated generally received moderate to high scores. The predominant attribute provided by these wetlands are flood attenuation, sediment trapping, phosphate, nitrate, toxicant trapping, erosion control and the provision of natural resources including the abstraction of water.

All channelled valley bottom wetlands were assessed in terms of their health and were found to be either categorised as moderately or largely modified (PES Category C or D).

Modifications to the systems which have an effect on the health of wetlands is predominately related to the cultivation of sugarcane and the direct abstraction of water from the wetlands and the use of the systems for small scale crop cultivation as well as livestock grazing.

The ecological importance and sensitivity of the channelled valley bottom wetlands has generally been recorded as being medium. The hydrological importance and sensitivity of all wetland systems have been recorded as moderate.

The fourteen (14) hillslope seepage wetlands delineated generally received moderate to high scores for the provision of natural resources, water supply for human use and the cultivation of foods. These wetlands provide flood attenuation, streamflow regulation, sediment trapping and erosion control.

The hillslope seepage wetlands varied from being moderately modified, to largely modified and to seriously modified in regards to their health (PES). Modifications to the systems include the cultivation of crops within the boundary including both large scale sugarcane and smaller scale vegetable cultivation, the use of wetlands as grazing as well as infrastructural development which is adjacent to and intersects the wetlands.

The ecological importance and sensitivity of the wetlands has been recorded as being both low and medium in all seepage wetlands. Medium scores were recorded where indigenous vegetation cover was thicker and not completely transformed by sugarcane cultivation.

The hydrological importance and sensitivity was recorded as medium in all seepage wetlands as a result of the functions they provide. Cultivation of the wetland areas has had a significant detrimental impact on the hydrological and geomorphological integrity of these systems.

The following were identified as significant impacts that the re-alignment and upgrading hardening of the P75-2 road and the construction and demolition of the existing river crossing would have on the associated wetlands:

- Soil erosion and sedimentation;
- Disturbance and degradation of wetland areas;
- Reduction in hydrophilic vegetation (construction and operations);
- Pollution of water resources and soil (construction and operations); and
- Spread of alien invasive species.

The mitigation measures are discussed in the Impact Assessment section.

Wetland Management

The hardened surfaces adjacent to wetland areas will increase the velocity and volume of storm water entering the wetland areas. Storm water coming off the road will substantially increase in velocity due to the steep topography before entering the wetland areas. The current lack of adequate storm water control impacting on the existing road has created erosion in all the wetland areas. Failure to address this is likely to lead to the complete destruction of the majority of the wetland systems in the future.

Findings that are associated with the causes of wetland degradation are summarised as:

- Soil erosion and gully formation, either as a result of a lack of storm water management in the larger catchment or as a result of local activities that include overgrazing;
- Large scale sugar cultivation in the wetland systems, particularly the hillslope seeps;
- The use of the wetlands for direct water abstraction, livestock grazing and small scale cultivation of crops;
- The dominance of alien invasive species in large areas of the various wetland systems.

A wetland management plan is required in order to address these impacts; this will allow for the regeneration of the functional integrity of the wetlands. A wetland management plan has been provided in the full wetland delineation report, refer to Appendix D5, which will also be discussed in the impact assessment section.

SECTION C

8. PUBLIC PARTICIPATION

It is stipulated in the National Environmental Management Act, 1998 (Act No. 107 of 1998) and associated Environmental Impact Assessment Regulations (2014) that a public participation process must be conducted as part of the basic assessment process. A Public Participation Guideline was gazetted which gives instruction on the requirements of public participation. This section outlines the public participation process followed in fulfilment of these requirements, being:

- Notify potentially interested and affected parties of the proposed application (include steps that were taken to achieve this);
- Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given;
- A list of all persons, organisation and organs of state that were registered as interested and affected parties in relation to the application; and
- A summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues.

8.1 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Afzelia has developed an initial I&AP's database consisting of key I&AP's and authorities. This database was maintained throughout the public participation process. Table 5 lists the I&AP's identified.

Table 5: Initial I&AP database compiled for this project

NAME	ORGANISATION
Zweli Xaba	Commission on Restitution of Land Rights: Regional Land Claims Commission (Department)
Lynn Boucher	Regional Land Claims Commission: KZN Department of Rural Development and Land Reform
Melissa Puckree	KZN Department of Economic Development, Tourism and Environmental Affairs
Nonhlanhla Myeni	Department of Agriculture, Environmental Affairs and Rural Development
Nandipha Myeni	Department of Agriculture, Forestry and Fisheries
Dheevashnee Pillay	Provincial Department of Co-operative Governance and Traditional Affairs – Professional Town and Regional Planner
Judy Reddy	Department of Transport – Road and Infrastructure Development and Management
Michele Nicol	ESKOM
Shameela Ramburan	Department of Water and Sanitation
Khethiwe Dlamini	Ugu Municipality
MH Myuswh	Umdoni Municipality – Ward 7
NE Mhlangu	Umzumbe Municipality – Ward 11
MPL Zungu	Umzumbe Municipality – Ward 15
Michelle Nicol	ESKOM
Michele Schmid	Department of Transport – Engineering Services: Road Control
Bernadet Pawandiwa	AMAFA AkwaZulu Natali
Dominic Wieners	Ezemvelo KZN Wildlife
Pravesh Manipersadh	Ingonyama Board Thrust
Alex Skene	Sezela Conservancy
Rob Crankshaw	
Riona Dhanraj	Conservation of Agricultural Resources
Anthony Drummond	Owner of ND Estates (Sugar Cane Farmer)
Kembali	Sugar Cane Estate
Admin	WESSA

8.2 NOTIFICATION OF THE INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&AP's) were notified of the project through the following ways:

- Fixing a notice board at a place conspicuous to and accessible by the public the route of P75-2;
- Written notice has been given to I&AP's, property and business owners, persons in control of and occupiers of land along the alignment, municipal councillors, municipality, applicable government departments. This has been done through email and hand delivered notices;
- Placing of an English and isiZulu newspaper advertisements in local newspapers. During the first round of public participation in 2016, the English advertisement was published in the Mercury Newspaper and the isiZulu advertisement was published in the Isolezwe. During the second round of public participation the English and isiZulu adverts were placed in The Rising Sun.

The notices put up and information given out include the following: :

- Details of the proposed application / project;
- What procedure is being undertaken, i.e. Basic Assessment and Water Use License;
- The nature and location of the proposed activity;
- Where further information on the application can be obtained; and
- Contact details for the person whom represents the applicant.

A background information document (BID) was sent to these individuals via email. Background information documents were also placed at some bus / taxi stops and also some of the “spaza” shops along the route.

**Note: Due to the type and number of residential properties, notices were not left at each property (no post boxes exist).*

8.3 ADVERTISEMENT OF THE PROJECT

To distribute the information regarding the proposed development to the broader public and to ensure that all potential I&AP’s are given the opportunity to comment, during the first round of public participation in 2016 an isiZulu advertisement was placed in the Isolezwe and an English advertisement was published in the Mercury Newspaper on the 18th March 2016. A commenting period of 30 days was given with regards to the Basic Assessment process and 60 days for the water use license application processes. During the second round of public participation both the English and isiZulu advertisements were placed in The Rising Sun on the 1st August 2017, also allowing a 30 day commenting period.

Public Participation Round One

A total of eight (8) site notices were erected along the proposed road route which displayed the details of the proposed project, location and application process. The Environmental Assessment Practitioners details were also displayed. These notices served to inform I&AP’s of the project and afforded them the opportunity to comment.





Photograph 4: Shows the notice erected along the P75-2 route outside residential houses.



Photograph 5: Shows the notice erected near the iFafa River crossing



Photograph 6: Shows the notice erected leading from the main road towards P75-2 in the direction of the iFafa River crossing.

A second round of public participation will be held, starting in August 2017. Due to the lapse in time since the last public participation was done it is deemed necessary to re-do the public participation.

Public Participation Round Two

A total of eight (8) site notices were erected along the proposed road route which displayed the details of the proposed project, location and application process. The Environmental Assessment Practitioners details were also displayed. These notices served to inform I&AP's of the project and afforded them the opportunity to comment.

Site Notices were erected on the 11th August 2017.



Photograph 1 – Shows the site notice put up approaching the iFafa River (travelling westerward) which marks the start of the proposed project area.



Photograph 2 – Shows a site notice put up after the iFafa River approximately 2kms apart from the first notice.



Photograph 3 – The site notice put up outside of a shop.



Photograph 4 – Shows the site notice near some residential housing along the proposed route.



Photograph 5 – The site notice put up near an intersection.



Photograph 6 – Shows the site notice outside a shop.

8.4 INTEREST AND AFFECTED PARTIES ISSUES AND CONCERNS

Comments and issues received during the public participation process to date, have been captured. See table 6 below:

Table 6: Interest and Affected Parties Issues and Concerns

I&AP NAME / ORGANISATION / DEPARTMENT	COMMENTS / ISSUES	DATE RECEIVED	RESPONSE
Public Participation Round One			
Anthony Drummond	Mr Drummond requests to be registered as an Interested and Affected Party (I&AP)	6 April 2016	Thank you for submitting your Interested and Affect Persons registration form. You will be recorded on our database and will receive updates regarding the upgrading of P75-2.
	Questions asked by Mr Drummond: 1. Whilst the road is under construction, will I be able to get my crop hauled? A tractor and trailer will need to be taken from zone and hilo with sugar cane along P75-2, crossing over the iFafa River bridge to the sezela mill.		In response to your questions: I will submit your questions to the Engineers who are in a better position to answer with regards to the use of the road while under construction.
	2.How will my land on either side of the road be affected? (from iFafa River crossing up to beacon Hill)		The construction footprint should not encroach on any property on either side of the road, however this will be confirmed by the engineers as well.

	3. With regards to the water use license – where will the water be taken from and for what use?		The abstraction point for the water is under discussion at the moment. Once it has been decided, you will be notified. The water abstracted will be used for dust suppression and road wetting processes during the road construction process.
Department of Agriculture, Forestry and Fisheries	Received the Background Information Document and requests that Afzelia sends the BAR and the KML for this project.	1 June 2016	These will be sent when the BAR is available for comment.
Department of Agriculture and Rural Development	The Background Information Document has been received and has been captured in the electronic Land Use Database. Reference Number: 2016/06/4436	13 June 2016	Department was thanked for sending through the acknowledgement.
Public Participation Round Two			
Anthony Drummond	<p>Concerns that Mr. Drummond has concerning this project are:</p> <ol style="list-style-type: none"> 1. Loss to indigenous trees 2. Loss to valuable agricultural land 3. The requirement of moving a recently built powerline 4. Loss of buildings 5. Speeding vehicles and taxis due to improved surface <p>Mr Drummond further commented that he agrees with the construction and re-alignment of the new bridge, however he feels that the widening and tarring of the existing road would be sufficient as it has a very low traffic flow (apart from month end).</p> <p>Mr Drummond's opinion is that upgrading road P75/2 to the proposed extent is a waste of taxpayers money (for the demolishing of buildings, moving powerlines, destroying old indigenous trees) and that the road has virtually no traffic between 6pm and 6am.</p> <p>Another concern from Mr Drummond is that his farm workshop is across the road from the staff quarters which pose a safety concern during crossing as the speeds of vehicles travelling through the area will increase.</p>	8 August 2017	<p>Afzelia thanked Mr Drummond for his concerns and comments regarding the proposed project.</p> <p>The EAP forwarded the concerns on to the engineers (Samani) for an input into the response.</p> <p>Samani has responded that: <i>“that infrastructure improvement from Govt. must be seen as positive even at the expense of a few inconveniences caused as a result. If there are more specifics that is required from our side, let me know so that we can address it”.</i></p>

8.5 PUBLIC MEETING

Due to the lack of public response received regarding the proposed road re-alignment, a public meeting was not held. All comments and concerns raised during the public participation process have been answered through email correspondence directly with the individual.

8.6 DISTRIBUTION OF THE DRAFT AND FINAL BASIC ASSESSMENT REPORTS

This draft BAR is distributed to all Interested and Affected Parties for comments as part of the Public Participation Process.

SECTION D

9. IMPACT ASSESSMENT

Significance scoring assesses and predicts the significance of environmental impacts through the evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact. The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Each of the above impact factors have been used to assess each potential impact using ranking scales.

Unknown parameters are given the highest score (5) as significance scoring follows the Precautionary Principle. The Precautionary Principle is based on the following statement: *When the information available to an evaluator is uncertain as to whether or not the impact of a proposed development on the environment will be adverse, the evaluator must accept as a matter of precaution, that the impact will be detrimental. It is a test to determine the acceptability of a proposed development. It enables the evaluator to determine whether enough information is available to ensure that a reliable decision can be made.*

This section provides an indication of significant potential positive and negative environmental impacts associated with the proposed upgrading of P75-2 which will include the construction of two (2) river crossing bridges.

9.1 Methodology used for the Risk Assessment

Table 7: Risk Assessment

Formula for Significance Scoring SS = (Magnitude + Duration + Scale) x Probability			
Duration		Magnitude	
Permanent	5	Very High / Don't Know	10
Long Term (Ceases with operation life)	4	High	8
Medium Term (5-15 years)	3	Moderate	6
Short Term (0-5 years)	2	Low	4
Immediate	1	Minor	2
Scale / Extent		Probability	
International	5	Definite	5
National	4	Highly Probable	4
Regional	3	Probable	3
Local Area	2	Improbable	2
Site Only	1	Very Improbable	1

Scoring Calculation:

$$\text{Significance Scoring (SS)} = (\text{Magnitude} + \text{Duration} + \text{Scale}) \times \text{Probability}$$

Table 8: Significance Scoring (Negative Impact Results)

Low significance (<30 significance points)	Low environmental significance	Impacts with real little effect and which should not have an influence on or require modification of the project design.
Medium significance (31-59 significance points)	Moderate environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless mitigated.
High significance (>60 significance points)	High environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.

Table 9: Significance Scoring (Positive Impact Results)

Low significance (<30 significance points)	Low environmental significance	Impacts with real little positive effect and which should not have an influence on or require modification of the project design.
Medium significance (31-59 significance points)	Moderate environmental significance	A positive impact or benefit which is sufficiently important to which could have an influence on the decision taking into consideration set mitigation measures.
High significance (>60 significance points)	High environmental significance	A positive impact which could influence the decision in a positive way about whether to proceed with the project regardless taking into consideration set mitigation measures.

The impacts discussed below are based on generic construction methods used for the upgrading of a road and the construction of bridges. Impact scores given “with mitigation” are based on the assumption that the mitigation measures recommended in this assessment are implemented correctly and at all times and that rehabilitation of the site is fully and correctly undertaken. Failure to implement mitigation measures during construction and rehabilitation will keep the impacts at an unacceptably high level.

The impacts discussed in the specialist reports have been incorporated into this section.

9.2 POTENTIAL ENVIRONMENTAL IMPACTS DURING THE CONSTRUCTION PHASE

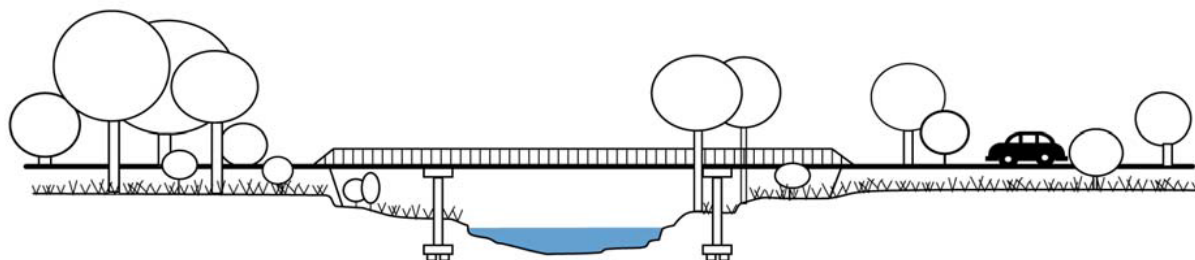
Riparian / Hydrophilic Vegetation Loss

Riparian / hydrophilic vegetation will be lost during the construction of the new bridge at the iFafa River crossing due as activities will be undertaken within the river stream.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Riparian vegetation loss	5	2	2	8	60 High	5	2	1	6	45 Moderate

Mitigation Measures –

- Bed level crossings or bridges which fully span the watercourse channel provide the best opportunities for maintaining channel functions, as illustrated below:



- Areas where vegetation is removed or damaged during the construction process must be suitably rehabilitated with an approximate mix of grasses and shrubs determined by a botanist or vegetation ecologist familiar with the area and riparian species. Rehabilitation must occur once work in the area has been completed and must not wait until the end of the project.
- Protect as much indigenous hydrophilic vegetation as possible.
- No riparian flora outside of the direct construction boundary must be disturbed on account of the endangered nature of this veld type.
- Activities must be managed in such a way to ensure that there is no net decline in aquatic or riparian health as a result of the construction and associated activities.
- No mining of soil / sand required for construction purposes from the banks of rivers, channels or wetlands is allowed. Sand must be brought to the site if required for construction. This material must be stockpiled at least 30m away from the rivers' and wetlands' edge.
- Use vehicular digging of the banks of the stream only in areas where this is deemed absolutely necessary. Working during the winter months will reduce soil erosion potential in disturbed areas.
- Rehabilitate disturbed hydrophilic vegetation as soon as construction in this area has ended. An aquatic rehabilitation plan must be compiled by a suitable / experienced specialist and complied on site.

- Wetland and riverine vegetation must be carefully harvested prior to construction activities commencing so that sufficient and appropriate vegetation will be available for the rehabilitation of the wetland and riverine systems. Plants that are harvested must be kept on site in a condition conducive to their existence. Hydrophytic plants must be kept damp in streams / rivers that will be crossed, using for example a coffer dam. Species provided in Appendix A of the Wetland Assessment Report must supplement these plants where necessary.
- Site Preparation:
 1. Use erosion and sediment control techniques where needed;
 2. Grade the disturbed area to a stable uniform slope. Vegetative cover will not develop on an unstable slope;
 3. Loosen the soil by hand;
 4. Plant when the weather will permit, e.g. suitable temperatures and moisture for plant growth. Spring plantings give the best results;
 5. On unstable soils use a soil saver to protect bare soil before planted vegetation has become established.

Terrestrial Vegetation Removal

Vegetation will be removed during the establishment of the work servitude along the road route.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Vegetation removal for construction activities	5	2	2	8	60 High	5	2	1	6	45 Moderate

Mitigation Measures –

- Prior to the commencement of construction, a designated work area on the riparian zone, banks and instream must be demarcated. This area must be as small as possible and construction activities and equipment must stay within this demarcated work area.
- Access to the demarcated work area must be via a single route to limit disturbance.
- Use vehicular digging of the banks of the stream only in areas where this is deemed absolutely necessary. Working during the winter months will reduce soil erosion potential in disturbed areas.
- Areas where vegetation is removed or damaged during the construction process must be suitably rehabilitated with an approximate mix of grasses and shrubs determined by a botanist or vegetation ecologist familiar with the area and riparian species. Rehabilitation must occur once work in the area has been completed and must not wait until the end of the project.
- If there is a need to cut, destroy or remove an indigenous tree, a DAFF permit must be obtained prior to the activity. The permit and application will need to be made and an offset for the loss of these individuals will be required. The offset must be the planting of 3 individuals of the same species for each tree that will be lost.
- Relocation of some of the provincially protected species will be required and must be carried out by a qualified botanist or similarly qualified individual. The plants must be relocated into areas with the same aspect, soil conditions and elevation to ensure successful relocation. Relocation must occur during summer months.

Soil Erosion and Sedimentation

Soil will be exposed to wind and water erosion once the vegetation has been cleared. Soil erosion will result in sedimentation of nearby rivers and tributaries.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Soil erosion and sedimentation	5	2	3	10	75 High	5	2	2	8	60 High

Mitigation Measures –

- Storm water management techniques must be designed and placed correctly to ensure that storm water runoff is controlled and channelled effectively to prevent soil erosion and vegetation disturbance;
- Erosion protection measures must be installed at all pipe culverts or storm water drainage pipes outlets located along the route, this is a requirement in addition to velocity control measures.
- Care must be taken at the design phase to ensure correct placement of water directing techniques within the road reconstruction servitude, so that they are designed and specified in a manner that will best mitigate the effects of storm water run-off.
- The use of sustainable drainage systems must be incorporated into the design of the road and stormwater infrastructure such as swales and infiltration trenches / filter drains.
- Vegetation clearance must not be undertaken more than 10 days in advance of the work front. Vegetation clearing within 50m of a wetland or river must only be undertaken when construction is actually underway and these areas must be rehabilitated within 2 weeks of initial clearing;
- Stockpiling of any materials must not occur within 30m from or adjacent to any of the channels, wetlands or rivers;
- Stockpiles of material must be protected during the construction phase, to prevent material from entering drainage channels and water resources.
- Erosion control measures must be implemented in areas sensitive to erosion. Such measures must include *inter alia* the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells;
- Water must not be allowed to flow down cut and fill slopes without adequate soil erosion protection in place;
- **No scupper pipes may be placed onto any bridges at the river crossing;** stormwater must be capture and directed into an attenuation area allowing underground filtration back into the river.
- Heavy machinery must be limited to the work servitude only.
- Inspect and maintain erosion control structures at storm water outlets at least once per week during construction and rehabilitation.
- Disturbed sites must be rehabilitated as soon as construction in an area is complete and or near complete and not left until the end of the project;
- No mining of soil / sand required for construction purposes from river banks, channels or wetlands is allowed. Sand must be sourced from a legally permitted borrow pit and must be stockpiled away from the rivers' and wetland edges.

Surface and Groundwater Pollution from In-Situ Concrete Casting

Water pollution will occur during the in-situ concrete casting of the new iFafa River bridge and associated structures. In general, in-situ concrete casting is not support, however in this case, due to the location of the proposed new bridge, an alternative area is not available within close proximity to be used as a casting yard.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Surface and ground water pollution due to in situ concrete casting	5	2	3	10	75 High	5	2	2	8	60 High

Mitigation Measures –

- In-situ concrete pouring must take place during winter / low flow season to reduce the risk of contaminating the water in the iFafa River.
- In-situ concrete casting must be controlled and must not escape the structure the cement is poured into.
- Water in the stream must be diverted around the in-situ structures until they are completely set and do not pose a risk of water contamination.
- No washing of pouring objects or any object that is contaminated with cement will not be allowed to be washed in any river resource. No concrete mixing trucks must be washed on site.
- Concrete must not be mixed on site. Pre-mixed concrete must be brought onto site.
- A batching plant must not be constructed for this project.
- Bridge abutments must not constrict the width of the river channel and the face of the abutment must be parallel with the banks of the watercourse.
- At all times during the construction period at least two thirds (2/3) of the channel must remain unobstructed to allow fish passage.

Increase in turbidity

Sand and other particles (from construction materials i.e. cement, gravel) generated through the construction process causing turbidity when they reach the river systems which mostly occurs during run-off. Turbidity decreases water quality and disturbs aquatic processes.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Increase in turbidity from run-off related to construction activities	5	2	3	10	75 High	4	2	2	6	40 Moderate

Mitigation Measures –

- Sediment traps, sediment curtains or geofabric must be used between the construction activities and river and drainage channels.

- At all times the integrity of the river system is to be protected against pollution or degradation from substances that may cause pollution and/or degradation such as oil; cement; paint etc.
- The condition of any water that may occur in the river is to remain clear and no increase in turbidity is allowed as a result of increased sediment levels resulting from working on the banks or bed.
- The contractor is to put in place a silt curtain that transverses the river. This curtain must be placed 3 meters from the end of the work-face and is to be in place throughout the construction period including after hours and over weekends until such time as ALL construction work has ceased; the site has been cleared up and rehabilitation has been completed.
- Two such curtains must be available so that they can be swapped out on a daily basis.
- The curtain must be fixed to two sturdy poles which are then imbedded into the Ifafa River banks in such a way as to allow the bottom of the curtain to lie on the river bed by approximately 30cm.
- The bottom of the curtain must be folded so that it faces upstream. It should then be weighted down with rocks or cleaned bricks to ensure that it does not lift.
- At the end of each work day the curtain is to be carefully lifted from the river bed and removed in such a way as to not allow any of the material/substances that have been caught by the curtain to spill. It must be cleaned in a bunded area so all such debris can be collected and removed off site.
- A clean curtain must be put in place prior to any further work commencing.
- At no time must the curtain be torn or damaged. If this occurs it must immediately be replaced before work can continue.
- Where necessary, turbid water that is pumped from excavations within the river must be passed through a sand filter or settling pond before being released back into the river. This discharge of the water must be done in a controlled manner and no erosion may result.
- Timing of instream work is imperative and is recommended to occur during the winter low flow periods. This will reduce the amount of sediment entering the river and reduce damage to any sensitive faunal life cycle periods.
- Further to this it is easier to isolate low flows to work in isolation of streamflow. Isolating high flows could lead to flooding and increase the risk of introducing sediment into the watercourse.

Surface water pollution

Pollution caused throughout the construction process will result in water pollution of rivers and drainage channels. Pollution is caused using of hazardous chemical substances (i.e. oil, diesel, cement, paint, and bitumen) as well as general construction material such as sand and gravel. General waste generated throughout the construction site (i.e. litter) will also result in surface water pollution.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Surface water pollution from construction activities (hazardous chemical substances, general litter, construction material)	5	2	3	10	75 High	4	2	2	6	40 Moderate

Mitigation Measures –

- Work within the riparian instream must be kept to a minimum.
- The preconstruction river bed structure and roughness must be maintained post construction to maintain hydrological functioning.
- Construction of the bridge must be conducted during the dry or low flow season, when the volume of water in the river is at reduced levels.
- Erosion berms, silt traps etc. must be put in place for all areas where vegetation removal or excavation activities occur to ensure excess sedimentation does not enter the river, wetlands and drainage channels.
- Vehicles or other potentially polluting equipment / machinery must be kept out of the river.
- Construction materials and equipment must be stored at least 30m away from the river bank and riparian areas and have suitable retention and bunding structures in place to prevent spills or run-off entering the river and riparian zone.
- Re-fuelling and maintenance of equipment and vehicles must not take place within 30m of the riparian and instream areas.
- No washing of construction equipment (e.g. paintbrushes, spades, cement trucks, wheelbarrows, picks etc.) is permitted in any watercourse or stream.
- Proper management and disposal of construction waste must occur during the lifespan of the project.
- No substances (e.g. Cement, oil, fuel, paint, bitumen etc.) must be released into any stream, watercourses or wetlands.
- Do not locate the construction camp within 100m of the wetlands.
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using permitted hazardous waste landfill sites. Any contaminated soil must be uplifted and removed and disposed of at a permitted hazardous waste landfill site.

Soil and ground water pollution

Soil and ground water pollution may occur through hazardous chemical substance spills, such as petroleum hydrocarbons, paint and bitumen. The spread of hazardous substances to ground water depends on the structure of the soil. In some cases, the substances will move easily through the soil and contaminate groundwater.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Soil and ground water pollution	5	3	3	8	70 High	5	2	2	6	50 Moderate

Mitigation Measures –

- Hazardous chemical substances must be stored within a bunded and roofed area to prevent spills from occurring directly on the ground / soil.
- Handling of hazardous chemical substances (i.e. re-fuelling, pouring of oil etc.) must be done within a spill tray.
- Bitumen must be handled with care and uncontrolled releases must be prevented.

- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using permitted hazardous waste landfill sites.
- Any contaminated soil must be uplifted and removed and disposed of at a permitted hazardous waste landfill site.

Noise

Noise levels along the road will increase during the construction activities due to the use of heavy machinery and vehicles.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Increase in noise	5	2	2	8	60 High	4	2	1	6	36 Moderate

Mitigation Measures –

- All machinery must be serviced on regular intervals to ensure that they are in good working order and do not emitted unnecessary noise.
- Vegetation along the road servitude must not be removed unnecessarily to maintain a vegetative barrier which will assist with preventing noise from travelling to residents and neighbouring farms.
- Working hours must be limited from 7:00am to 5:00pm to prevent noise affecting nearby residents.
- Workers must be made area of their conduct while working to prevent unnecessary noise (screaming and shout to one another)

Alien invasive vegetation

Disturbance of vegetation results in the proliferation of alien invasive vegetation.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Proliferation of alien invasive vegetation species	5	5	2	8	75 High	4	3	2	6	44 Moderate

Mitigation Measures –

- An alien invasive management programme must be incorporated into Environmental Management Programme (EMPr) and implemented throughout the construction and rehabilitation phases of the project.
- Ongoing alien plant control must be undertaken along the road route and particularly in the disturbed wetland and riparian areas.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring must take place through the whole construction phase and must continue for an additional 5 years (every 3 months) once the construction is complete.

Waste generation during construction

Waste will be generated on site due to the construction activities. Waste will include litter and domestic waste, construction waste, effluent and hazardous waste.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Temporary waste generation – litter, domestic, construction and hazardous waste and effluent.	5	2	2	8	60 High	5	2	1	6	45 Moderate

Mitigation Measures –

- The construction site (work servitude) and camp must be cleaned on a daily basis and all litter must be collected and stored in suitable waste bins on site.
- Waste must be stored in a clearly demarcated waste area.
- An appropriate collection and disposal strategy must be implemented to ensure that waste is removed at least once per week and taken to a permitted landfill site.
- Hazardous waste must be stored separately and disposed of at a permitted hazardous landfill site at least once per week.
- Waste bins must be secured and have lids to prevent litter from being blown and spread over the site.

Temporary disturbance for pedestrians and vehicular traffic

The construction activities will result in a disturbance in vehicular and pedestrian traffic.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Temporary pedestrians and vehicular disturbance	5	2	1	8	55 Moderate	5	2	1	6	45 Moderate

Mitigation Measures –

- A traffic management plan must be designed for this road during construction, this must be circulated to residents in the area.
- Warning signs regarding the construction activities must be erected to warn pedestrians and drivers in the area.
- A suitably trained and experienced traffic controllers / flag man must be used on the roads to slow traffic and warn of upcoming workers and construction activities.

Air pollution

Use of heavy machinery in the area will result in increased levels of diesel emissions (carbon monoxide). General construction activities will also result in an increase in dust pollution.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Increased air pollution – dust and vehicular emissions (diesel emissions / carbon monoxide)	5	2	2	8	60 High	5	2	1	6	45 Moderate

Mitigation Measures –

- Dust suppression must be implemented along the road during construction to prevent dust from being blown from the project site into neighbouring properties and from causing visibility problems for users on the road.
- Heavy machinery and vehicles must not exceed a speed limit of 40 km/hr along the area under construction.
- Heavy machinery must be serviced at regular intervals in order to ensure that they are operating at optimum to reduce the chance of excessive emissions from being emitted.
- Heavy machinery must not be left idling unnecessarily on site / along the construction route.

First flush effect

First flush is the initial surface runoff following a rainfall event, particularly runoff from impervious surfaces. Pollutants (such as hydrocarbons and rubber from tyres etc) accumulate on hard surfaces during preceding dry periods. Polluted water is discharged directly into streams and rivers via inadequate storm water infrastructure. This is considered a significant form of diffuse pollution, contaminating receiving water with considerable heavy metal loads. Efficient and effective storm water management techniques supplemented by soft engineering techniques help minimise the contaminants from entering water resources.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
First flush effect – contaminated water released into water resources	5	5	2	10	85 High	3	5	1	6	36 Low

Mitigation Measures –

- Sustainable Urban Drainage Systems (refer to 5.2 on page 32) / soft engineering techniques must be implemented along the entire road length to assist in capturing surface runoff and filtering out contaminants before the water reaches the water resources.
- **No scupper pipes may be placed onto any bridges at the river crossing;** stormwater must be capture and directed into an attenuation area allowing underground filtration back into the river.

9.4 IMPACTS ASSOCIATED WITH THE CONSTRUCTION OF A NEW BRIDGE

Degradation of river functionality

The demolition of the existing causeway and the construction of the new bridge will lead to further exposure of soil to erosion consequently leading to sedimentation of the river, having knock-on negative effects on aquatic life in this system. Furthermore, the new alignment will lead to the clearing of riparian vegetation along the banks of the river causing further degradation of this zone.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Degradation of river functionality	4	5	3	8	64 High	3	5	2	6	39 Moderate

Mitigation Measures –

- A bed level crossing or bridge which fully spans the watercourse channel must be used for the bridge to maintain channel functions;
- The condition of any water that may occur in the river is to remain clear and no increase in turbidity is allowed as a result of increased sediment levels;
- A silt curtain must be placed, traversing the river and be placed 3 metres from the end of the work-face. The silt curtain must remain in place throughout construction and rehabilitation. A second silt curtain must be available to ensure that it can be changed out (cleaned) on a daily basis;
- Use vehicular digging of the banks only in areas where it is deemed absolutely necessary.
- No mining of soil/sand must occur from the banks of the river.
- Timing of instream work is imperative and is recommended to occur in the winter low flow periods;
- Low flows must be isolated in order to work in isolation of the streamflow;
- River abutments must not constrict the width of the river channel and the face of the abutment must be parallel with the banks of the watercourse;
- At least two thirds of the channel must remain unobstructed during the construction period;

Pollution of Water and Soil

The demolition of the existing causeway and the construction of the new bridge will lead to further pollution to the water and soil.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Pollution of Water and Soil	5	5	2	6	65 High	3	5	2	4	33 Moderate

Mitigation Measures –

- Prior to demolishing the old bridge, effective and safe disposal methods must be identified.
- At all times the river system must be protected against pollution from substances that may cause pollution such as oil, cement, bitumen and paint, etc.
- Soil must be stockpiled away from the river and the alluvial floodplain;
- Turbid water pumped from excavations must be passed through a sand filter or settling pond before being released back into the river. The discharge of water must be done in a controlled manner and no erosion must result;
- No scupper pipes must be placed into the watercourse crossings. Pollutants are washed directly into the river from the bridge in this drainage system.
- Building material must be reused if possible before disposal to reduce the amount of material going to the landfill site.

9.5 POTENTIAL ENVIRONMENTAL IMPACTS DURING THE DECOMMISSIONING PHASE

Decommissioning of the existing causeway crossing the iFafa River (km.05) will occur once the new bridge has been constructed. Old concrete pipes which are not in a reusable condition found along the road alignment will also be decommissioned.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Disturbance of soil and riparian habitat as well as pollution (cement and possibly rebar) entering the river	5	2	2	8	60 High	5	2	1	6	45 Moderate

Mitigation Measures –

- Prior to decommissioning the causeway and other structures (i.e. concrete pipes), effective and safe disposal requirements must be identified. The nearest registered landfill site must be contacted before commissioning begins to ensure that they are able to receive the required volumes.
- Any of the structures being removed must be reused (either for the proposed project or given to local communities) if possible to reduce the volume of construction going to the landfill.
- Silt fences must be placed across the iFafa River to prevent construction waste from travelling down the river. All construction waste must be removed from the river at the end of each working shift and none must be left behind after the decommissioning has been completed.
- Additional specific requirements to prevent pollution during demolition must be identified prior to decommissioning and put in place.
- If no options are available for reuse of the structures being removed, then construction waste must be disposed of at the nearest permitted landfill site.

9.6 POTENTIAL ENVIRONMENTAL IMPACTS DURING THE OPERATION PHASE

Pollution entering water resources

Litter and other contaminants may enter the water system during the operation phase of the road.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Pollution entering the river	5	5	2	8	75 High	5	5	1	6	60 High

Mitigation Measures –

- No scupper pipes may be placed onto any bridges at the river crossing; stormwater must be capture and directed into an attenuation area allowing underground filtration back into the river.
- Grids must be placed on storm water inlet structures to capture litter before being discharged into water resources.
- Storm water outlet structures must be inspected on a monthly basis to ensure that litter is removed and discarded of correctly (at a permitted landfill site).

First flush effect

First flush is the initial surface runoff following a rainfall event, particularly runoff from impervious surfaces. Pollutants, such as hydrocarbons and rubber from tyres accumulate on hard surfaces during preceding dry periods. Polluted water is discharged directly into streams and rivers via inadequate storm water infrastructure. This is considered a significant form of diffuse pollution, contaminating receiving water with considerable heavy metal loads. Efficient and effective storm water management techniques supplemented by soft engineering techniques help minimise the contaminants from entering water resources.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
First flush effect – contaminated water released into water resources	5	5	2	10	85 High	3	5	1	6	36 Low

Mitigation Measures –

- Sustainable Urban Drainage Systems (refer to 5.2 on page 32) / soft engineering techniques must be implemented along the entire road length to assist in capturing surface runoff and filtering out contaminants before the water reaches the water resources.
- Oil / grease traps must be incorporated into the stormwater management at inlets to prevent pollutants from entering the water resource.

9.7 POTENTIAL POSITIVE IMPACTS AS AN OUTCOME OF THE PROPOSED RE-ALIGNMENT

Improved transport system

Through the upgrading activities, P75-2 road will be hard topped which provides an improved transport system in this area.

Impact	During operation				
	Probability	Duration	Extent	Magnitude	Rating
Improved transport system	5	4	2	10	* 80 High

** Positive outcome*

On-going Recommendations –

- The road must be inspected once every six months for the first 3 years and thereafter once a year to ensure that any faults with the road are reported and repaired.
- Road maintenance must occur in order to ensure that the road is maintained.
- Any reports regarding potholes or deterioration of the road must be addressed as soon as practicably possible to ensure that the positive impact created is maintained.

Reduction in soil erosion

Hardening of the road surface will reduce soil erosion experienced at present along P75-2. Formalised storm water management will also reduce soil erosion along the route.

Impact	Without mitigation				
	Probability	Duration	Extent	Magnitude	Rating
Reduction in soil erosion	5	4	2	10	* 80 High

** Positive outcome*

On-going Recommendations –

- The road and associated storm water management must be inspected once every six months for the first 3 years and thereafter once a year to ensure that any faults with the road are reported and repaired.
- Any reports regarding storm water management damages or deterioration of the road must be addressed as soon as practicably possible to ensure that the positive impact created is maintained.

Temporary employment and long-term skills development

Communities around the P75-2 area have the opportunity to be employed during the construction phase. This short-term employment could lead to long term skills development.

Impact	Without mitigation				
	Probability	Duration	Extent	Magnitude	Rating
Creation of temporary employment and long term skills development	5	2	2	8	* 60 High

* Positive outcome

Reduction in air pollution (dust)

Once the road has been hard topped, dust emitted into the area and surrounding residential properties will be reduced if not eliminated.

Impact	Without mitigation				
	Probability	Duration	Extent	Magnitude	Rating
Reduction in air pollution – dust eliminated due to hard topped surface	5	4	2	8	* 70 Moderate

* Positive outcome

SECTION E

10. ASSUMPTIONS AND GAPS IN KNOWLEDGE

Construction work method statements have not been provided, as this is developed / provided by the contractors once appointed (A generic work method statement has been provided at Appendix F in the interim). The construction work method statements must be provided and submitted to the environmental assessment practitioner and the Department of Economic Development, Tourism and Environmental Affairs for review and approval before construction activities begin.

The drawings submitted by the engineers have been assessed, if there are any changes in the design this must be submitted to the environmental assessment practitioner and the Department of Economic Development, Tourism and Environmental Affairs for review and approval before construction activities begin.

Locations of existing culverts / stormwater structures have not been provided by the engineers and therefore are not included in the assessment. Once this information is available, the responsible engineers must provide the GPS co-ordinates to the environmental assessment practitioner and the Department of Economic Development, Tourism and Environmental Affairs.

SECTION F

11. PROPOSED MONITORING AND AUDITING

The following monitoring and auditing strategies are recommended for the proposed re-alignment of road P75/2:

General – An Independent Environmental Control Officer (IECO) with suitable experience must be appointed for the duration of the construction and rehabilitation phase. The ECO duties must include at least one site inspection and one audit every month (therefore at least two visits to the site per month). The ECO must also ensure that they are present at the progress meetings each month.

Aquatic – Although no riverine monitoring was recommended by the specialists, if it is deemed necessary that a monitoring programme which must include water monitoring upstream and downstream of the construction activities (of the old causeway and new bridge). This will assist in determining whether the water quality is being impacted on by the construction activities. During general construction, the risks identified for the riverine habitat must be monitored visually by the ECO. Any concerns must be noted and prioritised for immediate corrective action.

The Aquatic specialist recommends that a follow up survey must be conducted after construction is completed to reassess the river and riparian health.

Wetland – No wetland monitoring has been included in the Wetland Assessment, due to the location of the wetlands in relation to the road re-alignment. However, in order to maintain the wetlands and the surrounding areas, it is suggested that an Alien Invasive Species Removal programme be implemented during the construction, rehabilitation and operation phase of this project. The Alien Invasive Species Removal Plan provided in the wetland assessment may be used.

SECTION G

12. ENVIRONMENTAL IMPACT STATEMENT AND EAP'S RECOMMENDATION

It is the recommendation of the Environmental Assessment Practitioner that the re-alignment and upgrade of P75/2 be approved with the condition that the mitigation measures are implemented during the pre-construction, construction, post construction, decommissioning and operation phases.

The following conditions should form part of the Environmental Authorisation should a positive decision be granted by the Competent Authority:

- Construction of the new bridge crossing the iFafa River must be planned well before activities start. As much indigenous hydrophilic vegetation must be protected as possible. Areas where vegetation will be damaged, vegetation must be harvested carefully, kept and maintained on site to be used during the rehabilitation process. Hydrophilic plants must be kept damp in streams / rivers (using for example coffer dams) to be used during rehabilitation.
- No riparian vegetation outside of the direct construction boundary must be disturbed.
- An experienced botanist must be onsite during the pegging out of the road, bridge and construction footprint to ensure that no sensitive vegetation is damaged and where necessary, permits can be applied for. Demarcated work areas within the riparian zone must be kept as small as possible to limit disturbance.
- Silt fences must be placed across the iFafa River before construction of the new bridge as well as before the commissioning of the old causeway to prevent pollution / construction rubble from moving down the river.
- Silt fences must be placed between the construction areas and the iFafa River (along the banks) to prevent construction waste from reaching the water and flowing down the river. A second silt fence must be available to ensure that it can be changed out (cleaned) on a daily basis.
- There must be NO net decline in aquatic or riparian health as a result of the construction activities. An aquatic specialist must be appointed to monitoring the construction activities of the iFafa river bridge. Baseline and monthly monitoring must be conducted as well as final monitoring once the activities are complete to assess whether any decline in aquatic or riparian health has occurred.
- No mining of soil / sand must take place from banks of rivers, channels or wetlands are allowed.
- Rehabilitation of hydrophilic vegetation must occur as soon as construction is complete in that area. The rehabilitation must be monitored to ensure success.
- If there is a need to cut, destroy or remove an indigenous tree, a DAFF permit must be obtained prior to the activity. The permit and application will need to be made and an offset for the loss of these individuals will be required. The offset must be the planting of 3 individuals of the same species for each tree that will be lost.
- Relocation of some of the provincially protected species will be required and must be carried out by a qualified botanist or similarly qualified individual. The plants must be relocated into areas with the same aspect, soil conditions and elevation to ensure successful relocation. Relocation must occur during summer months.
- Scupper pipes **MUST NOT** be used on the bridge. Stormwater must be captured and directed into an attenuation area allowing underground filtration back into the river.
- In-situ concrete pouring must take place during winter / low flow season to reduce the risk of contaminating the river water.
- In-situ concrete casting must be controlled and must not escape the structure the cement is poured into to prevent pollution.
- Water in the stream must be diverted around the in-situ structures until they are completely set and do not pose a risk of water contamination.
- Sediment traps, sediment curtains or geofabric must be used between the construction activities and river, wetlands and drainage channels.
- Erosion berms, silt traps etc. must be put in place for all areas where vegetation removal or excavation activities occur to ensure excess sedimentation does not enter the river, wetlands and drainage channels.

- Velocity dissipaters must be provided with the stormwater management systems to slowdown surface water runoff and prevent erosion further downstream (in drainage channels, wetlands and rivers).
- At no point, must water runoff be allowed to flow directly onto unprotected soil or vegetation.
- Due cognisance of the likely perched water table will need to be considered during the construction phase.
- The alien invasive management programme (in the EMP) must be implemented throughout the construction, rehabilitation phases and continue in perpetuity.