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Environmental Consultants

Draft Basic Assessment Report: Upgrade of the Draycott Roads (D449, L1135, L1346, D2283) in Estcourt, KwaZulu - Natal

Reference Number: dBAR/Draycott Roads/001

Applicant: KwaZulu-Natal Department of Transport

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edtea
Department :
Economic Development, Tourism and Environmental Affairs
PROVINCE OF KWAZULU-NATAL

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File Reference Number:	
Application Number:	
Date Received:	

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

DOCUMENT CONTROL					
Report Title	Draft Basic Assessment Report: Upgrade of the Draycott Roads (D449, L1135, L1346, D2283) in Estcourt, KwaZulu – Natal.				
Report Reference	dBAR/Draycott Roads/001	**Responsible Person**	Mr. Denzyl. Anthony		
Client Name	Nankhoo Engineers/ KwaZulu-Natal Department of Transport	**Client Contact Details**	**T:** 033 355 8657 **E:** Denzyl.Anthony@kzntransport.gov.za		
Revision	**Date**	**Revision Details/ Status**	**Author**	**Review No.01**	**Review No.02**
0	14/11/19		J. Maharaj	N/A	N/A
01	29/11/2019			C.Singh	N/A
02	04/12/2019		J. Maharaj		N/A
Current Revision	**Date**				
0	04/12/2019				
APPROVAL					
Responsibility	**Name**	**Qualification**	**Contact Details**	**Signature**	
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Reviewer 02	N/a	N/a	N/a		

PURPOSE OF THIS DOCUMENT

This Draft Basic Assessment Report (DBAR) is available for commenting for a period of 30 days (excluding Public Holidays) **from 09/12/2019 until 11/12/2019**. The objective of circulating the Draft Report into the public domain will provide an opportunity for all stakeholders and Interested and Affected Parties (I&AP's) to raise any concerns/issues with the proposed project. All state departments and I &AP's are reminded that in terms of EIA Regulations (2014) as amended, all state departments administering a law relating to the matter affecting the environment must submit comments within 30 days to Hanslab Pty (Ltd). Should no comments be received within the 30-day commenting period, according to sub-regulation 3(4) of the EIA Regulations (2014), it will be taken as the state department has no comments on the proposed project. This Draft Basic Assessment Report will outline the following:

- A description of the project, including project motivation;
- A description of the environment affected by the project to aid informed decision making;
- The Public Participation Process to be followed;
- Assessment of impacts for the construction and operational phases;
- Recommendations to avoid or mitigate negative impacts and enhance the positive benefits of the proposed upgrade.

ABBREVIATIONS

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EAP	Environmental Assessment Practitioner
BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EA	Environmental Authorization
ECO	Environmental Control Officer
EDTEA	Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
PES	Present Ecological Sensitivity
EMPr	Environmental Management Programme
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
NEMA	National Environmental Management Act (Act 107, 1998)
NWA	National Water Act
OHS	Occupational Health and Safety
PM	Project Manager
PPP	Public Participation Process
SDF	Spatial Development Framework
SWMP	Stormwater Management Plan
VEGRAI	Vegetation Response Assessment Index
WULA	Water Use License Application
WUL	Water Use License

GLOSSARY OF TERMS

TERM	DEFINTION
APPLICANT *(EIA Regulations, 2014)*	Any person who applies for an authorization to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).
DEVELOPMENT (EIA Regulations, 2014)	The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pts, that is necessary for the undertaking of a listed or specified activity.
DEVELOPMENT FOOTPRINT (EIA Regulations, 2014)	Any evidence of physical alteration as a result of the undertaking of any activity.
ENVIRONMENT *(National Environmental Management Act, 1998)*	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing
ENVIRONMENTAL IMPACT ASSESSMENT *(EIA Regulations, 2014)*	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.
ENVIRONMENTAL MANAGEMENT PROGRAMME *(EIA Regulations, 2014)*	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
INTERESTED AND AFFECTED PARTY (EIA Regulations, 2014)	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
KEY STAKEHOLDER *(EIA Regulations, 2014)*	Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.
STAKEHOLDER *(EIA Regulations, 2014)*	Any person or group of persons whose live(s) may be affected by a project.
STUDY AREA *(EIA Regulations, 2014)*	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.

TERM	DEFINTION
WATERCOURSE *(EIA Regulations, 2014)*	Means: *a) a river or spring* *b) a natural channel in which water flows regularly or intermittently* *c) a wetland, pan, lake or dam into which , or from which water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No.36, 1998); and* *a reference to a watercourse included, where relevant, its bed and banks; and* *"***wetland***"* means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

EXECUTIVE SUMMARY

SECTION A : PROJECT DESCRIPTION

SECTION B : SITE/ AREA/ PROPERTY DESCRIPTION

SECTION C : PUBLIC PARTICIPATION

SECTION D : IMPACT ASSESSMENT

SECTION E : ENVIRONMENTAL IMPACT STATEMENT

SECTION F : RECOMMENDATIONS

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER/ SPECIALISTS/ APPLICANT

HANSLAB Environmental & Ground Engineering Specialists provides clients with a blend of traditional Environmental and Engineering Solutions complemented with "new school" dynamics and tools. We are determined to be the benchmark of quality within our industry by being the most innovative, diversified Environmental and Ground Engineering Specialists in South Africa.

OUR GOAL

Our goal is to ensure our clients are provided with the highest quality of services and to maintain high levels of professional ethics. We are enthusiastic about the implementation of modern technology which would in turn aid in providing our clients with the best possible information systems and solutions. We aim to contribute to the sustainability as well as the development of our country.

The company works closely with a trusted and accredited professional network of leading specialists, ensuring that a wealth of knowledge and innovation is brought to each customer experience. The company enjoys a staff complement of committed, highly trained, specialized and skilled employees, most of who are from previously disadvantaged backgrounds.

The core project team members that are involved in this Basic Assessment Application Process are provided below.

Details of the Environmental Assessment Practitioner (EAP)

ENVIRONMENTAL ASSESSMENT PRACTITIONER	ENVIRONMENTAL EXPERIENCE	CONTACT DETAILS
Ms. Jashmika Maharaj	4 years	Hanslab (PTY) Ltd Tell: (031) 563 1978 E-mail: jashmika@hanslab.co.za

Details of the Specialists

SPECIALIST DISCIPLINE	COMPANY	NAME	QUALIFICATION

Details of the Applicant

APPLICANT	CONTACT PERSON	CONTACT DETAILS
KwaZulu-Natal Department of Transport transport Department: Transport PROVINCE OF KWAZULU-NATAL	Mr. Denzyl Anthony	**Physical Address:** 172 Burger Street, Pietermartizburg, 3200 **Postal Address:** Private Bag X9043, Pietermartizburg, 3200 **Telephone:** 033 355 8657 **Facsimle:** 033 345 7537 **Email:** Denzyl.Anthony@kzntransport.gov.za

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SECTION A: ACTIVITY INFORMATION

A-1. PROJECT BACKGROUND

Hanslab was appointed to undertake the Basic Assessment Application Process for the upgrade of the Draycott roads in Estcourt, KwaZulu-Natal. Local Roads L1346 and L1135 and District Roads D2283 and D449, known as the Draycott Roads, are located in the Estcourt area within the Imbabazane Local Municipality, KwaZulu-Natal. The D2283, L1135 and D449 Roads start at the intersection with the P28-1. The D2283 Road travels to the south-west for approximately 2 km and then makes a sharp curve towards the west where it ends at km 2.76. The L1135 Road travels primarily in a westerly direction and then turns and travels south. The L1135 is 4.7 km in extent. The D449, is a short stretch of road, and links up with the L1135 again after the railway line. The L1346 Road ties in at km 1.01 of the D2283 and travels from south-east to north-west for 1.6 km and ends at the intersection with the L1135. These roads form part of the Provincial Road Network of the KwaZulu-Natal Department of Transport (KZN DoT).

The width of the wearing course on the roads varies from 6.5 m to 10.5 m. The L1135, L1346 and the D2283 will be upgraded from a gravel road to black top, while re-gravelling and drainage improvements will be undertaken on the D449. The upgrade will consist of the bulk earthworks, layer works, improvement of the drainage system and ancillary works. The roads have a total length of 9.645 km.

The proposed upgrade design is based on the expected future design traffic volumes. The upgrade proposal entails the improvement of horizontal and vertical alignment to achieve a surfaced width of 6.0 m on the roads, except for the L1135 which will be 7 m. The roads will consist of one lane in either direction with a road reserve of 20 m. Sidewalks will be incorporated on the L1135 and D2283 due to the pedestrian traffic. The existing alignment will be maintained except for a minor re-alignment of a curve on the D2283 at km 2.02 and realignment of a 370 m section of the L1135 which has been realigned to avoid the railway line.

The contract also comprises of the construction/realignment of two 2/1.8 m x1.8 m box culverts at km 0.645 and km 2.203 on the D2283. The existing drainage structures will require lengthening, cleaning, headwalls and gabion mattresses while clearing of vegetation and excavating of earth side drains will also be required.

A-2. PROJECT DESCRIPTION

The KZN Department of Transport (Applicant) proposed to upgrade of 4 Draycott roads, i.e. D449 (0.4km), L1135 (4.7km), L1346 (1.6km) and D2283 (2.8Km), which totals to 9.5Km. These roads will ultimately provide access to Provincial Road P28 which is a link to the N3 and the town of Estcourt. The road works encompasses the upgrade of 9.5km of gravel road to a blacktop standard and associated drainage infrastruture.

Furthrermore, two structures will be constructed within L1346 and D2283, and requires the removal of >10m3 of soil from a watercourse, therefore, triggering Listed Activity 12 and 19 of GNR 327, Lisiting Notice No.01 of the EIA Regulations, 2014 (as amended in 2017). The coordinates of the structures are listed in below.

Table 1: Coordinates of the roads proposed to be upgraded form gravel to blacktop.

	Point of Reference	**Latitude (South)**	**Longitude (East)**
D2283	Start Point	28° 58' 54.23"	29° 41' 34.61"
	Middle Point	28° 59' 27.01"	29° 41' 08.81"
	End Point	28° 59' 31.79"	29° 40' 42.10"
L1346	Start Point	28° 59' 38.26"	29° 41' 06.78"
	Middle Point	28° 59' 22.79"	29° 40' 50.27"
	End Point	28° 59' 05.35"	29° 40' 27.43"
L1135	Start Point	28° 58' 34.07"	29° 41' 37.61"
	Middle Point	28° 59' 15.83"	29° 40' 16.35"
	End Point	28° 59' 59.37"	29° 40' 01.87"
D449	Start Point	28° 58' 25.04"	29° 41' 40.24"
	Middle Point	28° 58' 28.34"	29° 41' 32.09"
	End Point	28° 58' 32.30"	29° 41' 24.79"

Table 2: Coordinates of the proposed culvert structures.

	Latitude (South)	Longitude (East)
D2283: Culvert 1	28°59'7.95"S	29°41'17.40"E
D2283: Culvert 2	28°59'47.62"S	29°41'2.53"E

A-3. LISTERED TRIGGERED ACTIVITIES

Table 3: Listing Notice No.01 of GNR 327, Listed Activity No.12 (EIA Regulations, 2014 as amended)

No. and date of relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each listed activity
GNR 327, Listing Notice 1 of 2014	Activity 12 as amended on the 07th April 2017. ***The development of –*** *(i) Dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or* ***(ii) infrastructure or structures with a physical footprint of 100 square meters or more;*** *where such development occurs—* ***(a) within a watercourse*** *(b) in front of a development setback; or* *(c) if no development setback exists, within 32m of a watercourse,* *excluding—* *(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(bb) where such development activities are related to the development of a port or harbor, in which case activity 26 in Listing Notice 2 or 2014 applies;*	**The Applicant (KZN DoT) proposes to construct no.02 causways within a watercourse along D2283. The causeways will both be more than 100m^2 each.** **The proposed development will occur within a rural area.** **Exclusions** The proposed development does not: aa) occur within a port/ harbour; bb) is not related to an activity related to the development of a port/ harbour; cc) trigger activity 14 in Listing Notice 3 of 2014; dd) occur within an urban area; ee) occur within existing road / road reserves or railway line reserves; ff) form part of temporary infrastructure.

	(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; ***(dd) where such development occurs within an urban area;*** *(ee) where such development occurs within existing roads, [or] road reserves or railway line reserves; or* *(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6weeks of the commencement of development and where indigenous vegetation will not be cleared.*	

Table 4: Listing Notice No.01 of GNR 327, Listed Activity No.19 (EIA Regulations, 2014 as amended)

No. and date of relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each listed activity
GNR 327, Listing Notice 1 of 2014	Activity 19 as amended on the 07 April 2017. ***The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*** *but excluding where such infilling, depositing, dredging, excavation, removal or moving—* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies*	**The department of Transport proposed to upgrade the Draycott Roads. Therefore, more than 15m^3 of soil will be removed for the construction of the roads and causeways from waterocurses.** **The development is proposed to occur within a rural area.** **Exclusions** The proposed development: a) will not occur behind a development setback; b) is not for maintenance purposes; c) does not fall within the ambit of activity 21; d) does not occur within an existing port/ harbpur; e) is not related to the development of a port or harbour.

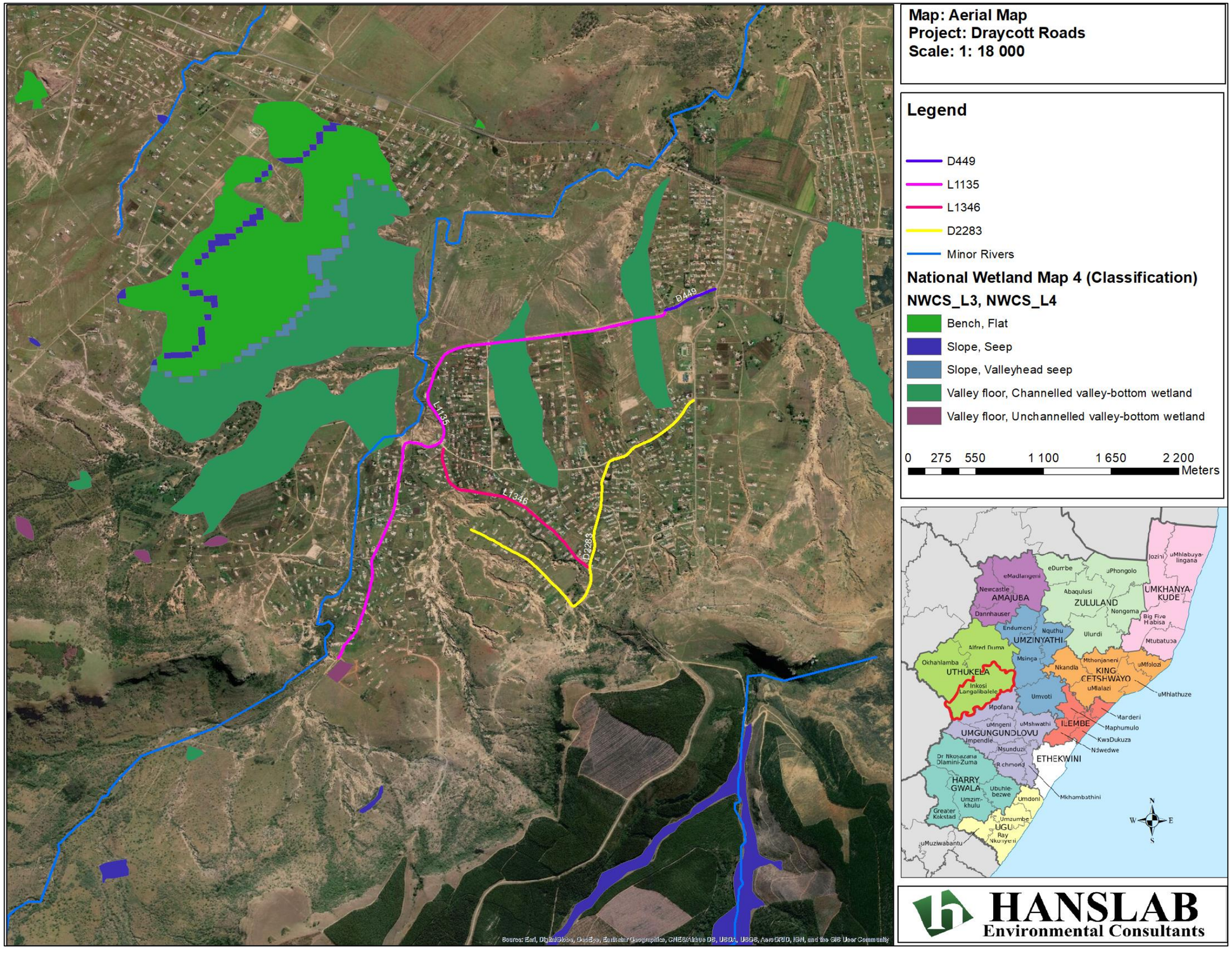

Figure 1: Aerial view of the proposed project site. (ArcGIS Version 10.0.5, 2019)

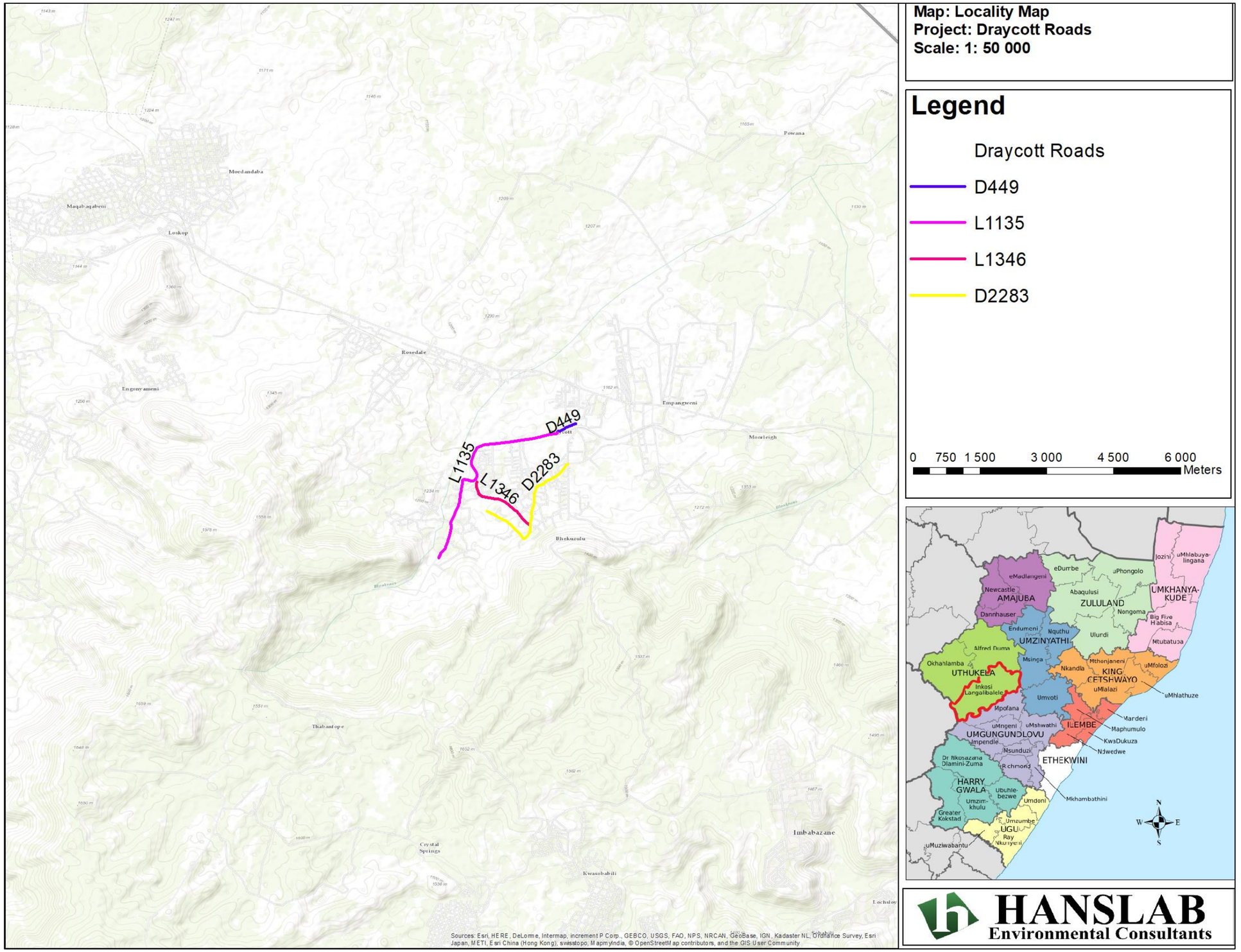

Figure 2:Locality of the proposed development (ArcGIS Version 10.0.5, 2019)

A-4. FEASIBLE AND REASONABLE ALTERNATIVES

A-4.1. Site/ Route Alternatives

Alternative routes were considered. However, rerouting the road seemed a rather futile exercise, as the purpose of the upgrade is to service the community and dwellings which exist adjacent to the road alignment. Rerouting would in fact reduce service to the community. It was for this reason that the final route follows that of the existing. Therefore, there are no site alternatives as the proposed roads follow an existing path that will be upgraded.

A-4.2. Design Alternatives

Preferred Alternative: Box Cuvlert structures

Two major structures in the form of culverts. All these structures have slopes to allow for the surface water to runoff towards the catchment and stormwater discharge positions. The culverts were designed to ensure that the drainage capacity of the culvert exceeds the pre-development stormwater flow at that point and attenuation storage was provided on the upstream side of the stormwater culverts. Outlet structures at a culvert or a natural watercourse were designed to dissipate the flow energy and unlined downstream channels were adequately protected against soil erosion.

The dimensions can be found in Section **A-6. PHYSICAL SIZE OF THE ACTIVITY** of this report.

A-5. NO-GO ALTERNATIVE

No structure will be constructed within the watercourse; therefore, no negative environmental impacts will be associated with construction activities within the watercourse. However, there will also be no positive impacts associated with the proposed project such as, the improved connectivity/access to basic services in the area, and improved safety for all road users. The area is dominated by alien invasive vegetation, and if the proposed construction does not occur the area will aid not be rehabilitated. No erosion control structures will be implemented to reduce the high levels of erosion within the proposed site.

A-6. PHYSICAL SIZE OF THE ACTIVITY

A-6.1. Activity within the watercourse

ALTERNATIVE	SIZE OF THE ACTIVITY
Preferred Alternative **(Culvert 1)** **Location: 28°59'7.95"S** **29°41'17.40"E**	**Area: 185m2**
Preferred Alternative **(Culvert 2)** **Location: 28°59'47.62"S** **29°41'2.53"E**	**Area: 195m2**

Kindly refer to the Design Layouts in Appendix C.2

A-7. SITE ACCESS

Using the KZN Department of Transport (Estcourt Cost Centre) as the start point, the traveler must head south towards the R103, thereafter, take the right onto the R103. Turn left onto Victoria Street, then right onto Phillips Street, then left at the first cross street, turn left, then right, and the destination is reached on the right.

A-8. AERIAL MAP

Refer to Appendix A.1

A-9. LOCALITY MAP

Refer to Appendix A.2

A-10. LAYOUT MAP

Refer to Appendix A. 3

A-11. SITE PHOTOGRAPHS

Refer to Appendix B.

A-12. CIVIL DESIGN INFORMATION

Appendix C.1 – Design Report

Appendix C.2 – Construction Method Statement

Appendix C.3 – Storm Water Management Plan (SWMP)

Appendix C.4 – Civil Design Drawings (Causeway Structure)

Appendix C.5 – Civil Design Drawings (Culvert Structure)

Appendix C.6 – Master Layout Plan (MLP)

A-13. ACTIVITY MOTIVATION (NEEDS AND DESIRABILITY)

The proposed upgrades will serve the local communities on either side of the stream, within the Municipality. Stream flow increases compared to any other river in KwaZulu-Natal, especially during the rainy seasons.

- During these periods, it is impossible to cross the river and the local residents are forced to commute long distances to get to work, school and other facilities. Many have risked their lives attempting to cross the river during floods with little success.
- A major beneficiary will be the large number of school children who risk their lives to cross the river so that they can attend schools on the opposite side.
- Children are presently using a make-shift floatation device which is extremely dangerous especially during rain events.

The Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 has been used to inform and provide structure for the Need and Desirability. The concept of "need and desirability" relates to, amongst others, the nature, scale and location of the development being proposed, as well as the appropriate land use. Need and desirability are inter-related and the two have been considered in an integrated and holistic manner.

Roads and culverts form an important aspect of crossing rivers in a safe manner where it previously was either not possible or difficult. Road infrastructure act as a means of access within areas. The proposed site for the development is located along a river course which is known to experience intermitted flash flood conditions during summer periods and little to no flow during the winter months. According to the 2017/18 Infrastructure Development Plan the municipality currently has a well-established road network servicing all settlements. The proposed development will form

part of the road network within the municipality as it will form the link between No.2 roads in the future. The aim of the proposed extension is to create a more permanent and ultimately safer crossing point for the surrounding community. The road network within a community plays an important role in economic and social development as areas with a lack of accessibility structures will have a limited access to economic and social opportunities (IDP, 2017/18).

- **Social:**

The development of river crossing points within an area will vastly improve the access to health and education facilities. The proposed development will provide a safe crossing point for vehicles and pedestrians and improved access to schools, clinics, and places of economic activity and in the process reduce travelling times. This becomes particularly essential during times of emergencies. The improvement of access will have a positive effect on the level of poverty as the development will increase the opportunities in the area whilst additionally contributing to the upliftment of the area. The IDP states that rural poverty has been linked to the isolation of communities from economic centres. The development of safe and easily accessible transportation systems will motivate persons within the community to venture out with no restrictions with regards to travelling. Furthermore, the construction phase of the project will create employment opportunities and lead to skills development within the local community.

- **Economic:**

Throughout the section "Broad Based Community Needs" of the Municipality Infrastructure Development Plan (2017/18), there is consistent mentioning of the requirements for roads/bridges including a request from Ward 6. The development of bridges is crucial to developing a functional road network which in turn is crucial to the economic development of an area. According to the draft District Growth and Development Plan (2014/2015) of the uThukela District Municipality the transportation network (road and rail infrastructure) is weak with insufficient linkages between the different areas therefore so are the various nodes that support economic development like manufacturing and tourism and insufficient linkages to the human settlements. Thus, the level of access to economic and social opportunities is severely limited. The communities of the areas require the infrastructure development not just for service delivery but also for the upliftment of the area to create opportunities for future developmental initiatives in the area.

The proposed development can have positive impacts on the environment of the surrounding area. The construction activities will steer towards aiding in the long-term improvement stormwater control structures thus assisting in the control of surface run-off entering the water resources. It is

encouraged in Section 2(2) of NEMA that Environmental Management place the needs of the people first and serve their physical. psychological, developmental, cultural and social interests equitably. The proposed development will allow the community increased access to access to health and education facility.

A-14. APPLICABLE LEGISLATION, POLICIES AND GUIDELINES

Table 5: Showing the Applicable Legislation/ Policies/ Guidelines

TITLE OF LEGISLATION, POLICY OR GUIDELINE	APPLICABILITY TO THE PROJECT	ADMINISTERING AUTHORITY	DATE
National Environmental Management Act, 1998 (Act No 107 of 1998)	Environmental Authorisation is required in terms of Regulation GNR. 983 of Dec 2014 (included within NEMA 107 of 1998)	Department of Economic Development, Tourism & Environmental Affairs (EDTEA)	1998
Environmental Impact Assessment Regulations 2014 (GNR 982 – 985 of December 2014) as amended on the 07 April 2017	Environmental Authorization required to undertake listed activities triggered by proposed development.	Department of Economic Development, Tourism & Environmental Affairs (EDTEA)	1998
Constitution of Republic of South Africa (Act No 108 of 1996)	The project falls within the boundaries of South Africa	Republic of South Africa	1998
National Heritage Resources Act (Act No 25 of 1999)	Any possible artefacts which could be of cultural or historical significance must be identified.	SAHRA	1999
National Environmental Biodiversity Act 10 of 2004	Damaging of, disturbance to or destroying of indigenous plant or animal species during the clearing of the site.	Department of Economic Development, Tourism & Environmental Affairs (EDTEA)	2004
Integrated Environmental Management Information Series 5: Impact Significance (2002)	Guideline considering during the identification and evaluation of potential impacts associated with the proposed development, and the reporting thereof in this Basic Assessment Report	Department of Economic Development, Tourism & Environmental Affairs (EDTEA)	2002
National Water Act, Act 36 of 1998	Legislation consulted during the impact assessment process to determine the legal requirements relating to the management of water resources, and the water-use authorization requirements applicable to the proposed development.	Department of Water and Sanitation (DWS)	1998
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	To provide for the health and safety of persons at work and for the health and safety of persons about the use of plant and machinery	Department of Labour	1993

A-15. WASTE, EFFLUENT AND NOISE MANAGEMENT

A-15.1. Solid Waste Management

Will the activity produce solid construction waste during the construction/initiation phase?	YES X	NO
If YES, what estimated quantity will be produced per month?	Approx. 5 m^3	

How will the construction solid waste be disposed of?
All solid waste accumulated during construction will be kept in designated areas/construction campsite and disposed by the contractor at the registered local landfill site. The contractor must provide the competent authority with disposal certificates from a registered landfill site.

Where will the construction solid waste be disposed of?
Although there is no formal landfill site for the Municipality, there are several landfill sites which cater for various types of waste and disposal, which is located in and around the local municipality. Depending on the frequency of disposal, the applicant may choose any of the local landfill sites for the disposal of construction waste.

In the uThukela family of municipalities, there are two municipalities that have system of diverting waste from the landfill, which is Emnambithi/Ladysmith, and Umtshezi local municipalities.

Will the activity produce solid waste during its operational phase?	YES	NO X
If YES, what estimated quantity will be produced per month?	N/A	
Can any part of the solid waste be classified as hazardous in terms of the NEM: WA?	YES	NO X
Is the activity that is being applied for a solid waste handling or treatment facility?	YES	NO X

A-15.2. Liquid Effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO X

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

A-15.3. Air Emissions

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

A-15.4. Noise Generation

Will the activity generate noise?	YES X	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO X
Describe the noise in terms of type and level: Noise will only be generated during the construction phase (from operating machinery, generators etc.) The level of the noise generated will be low and below 70 decibels threshold limit. No noise will be generated during the operational phase; therefore, the impact is temporary in nature and can be minimized with affective monitoring by the ECO.		

A-16. WATER USE

Municipal	Water board	Groundwater	River, stream, dam or lake	Other X	The activity will not use water
A water use license application must be lodged with the Department of Water & Sanitation prior to construction for water uses 21 (c) & (i).					

SECTION B: SITE/ AREA/ PROPERTY DESCRIPTION

B-1. PROPERTY DESCRIPTION/ PHYSICAL ADDRESS

Province		KwaZulu-natal
District Municipality		uThukela District Municipality
Local Municipality		Inkosi Langalibalele Local Municipality
Ward Number(s)		06
Property details for the road upgrades		
Road Name	**Farm Name and number**	**SG Codes**
D2283 L1135 L1346	RE of Farm 16467 Hlubi	N0GS00000001646700000
D2283 L1135 D449	Farm Lot 7 Empangwene 5255 Remaining Extent	N0GS00000000525500000
D449	Farm Lot 7 Empangwene 5255 Portion 1	N0GS00000000525500001
L1135 L1346	Farm Draycott B 6426 Portion 6	N0GS00000000642600006
L1135	Farm Droog Spruit 4935 Portion 7	N0GS00000000493500007
L1135 D449	Farm Draycott B 6426 Remaining Extent	N0GS00000000642600000
L1135	Farm Draycott B 6426 Portion 7	N0GS00000000642600000
D449	Farm Draycott B 6426 Portion 1	N0GS00000000642600001
Property details for the culvert structures		
D2283 L1346	**RE of Farm 16467 Hlubi**	N0GS00000001646700000

B-2. BASELINE BIOPHYSICAL CONDITIONS

B-2.1. Gradient of the Site

Flat	1:50 – 1:20 X	1:20 – 1:15	**1:15 – 1:10**	1:10 – 1:7.5	1:7.5 – 1:5	Steeper than 1:5

B-2.2. Temperature/ Climate

The climate around the project site is characterised by summer rainfall patterns with approximately 700mm of rain per year. The majority of the rainfall occurs between December and February through thunderstorms. These high intensity rainfall conditions are conducive to high levels of surface runoff and subsequent erosion where soils are shallow, occur on steep slopes or are overgrazed. Erosion often occurs in the area due to a combination of the factors. The climate is warm and temperate in Estcourt. When compared with winter, the summers have much more rainfall. This climate is considered to be Cwb according to the Köppen-Geiger climate classification. The temperature here averages 16.3°C. In a year, the average rainfall is 760 mm. The driest month is June, with 8 mm of rainfall. In January, the precipitation reaches its peak, with an average of 132 mm.

The warmest month of the year is January, with an average temperature of 20.8 °C. At 10.0 °C on average, June is the coldest month of the year. The difference in precipitation between the driest month and the wettest month is 124 mm. The variation in annual temperature is around 10.8 °C. Estcourt receives the lowest rainfall in June (1mm) and the highest in January (107mm). Maximum temperatures range from 18.70C in June to 26.40C in January. The region is coldest in July with minimum temperatures of 2.20C on average (Camp, 1995).

The region experiences approximately 15 frost days per annum (Mucina and Rutherford, 2006). The mean annual evaporation recorded at Estcourt is 1725mm.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	20.8	20.5	19.3	16.6	13.2	10	10.1	12.6	15.7	17.5	18.8	20.2
Min. Temperature (°C)	14.8	14.5	13.2	9.8	5.3	1.5	1.6	4.3	8	10.6	12.4	14
Max. Temperature (°C)	26.9	26.5	25.5	23.4	21.1	18.5	18.7	21	23.5	24.5	25.3	26.5
Avg. Temperature (°F)	69.4	68.9	66.7	61.9	55.8	50.0	50.2	54.7	60.3	63.5	65.8	68.4
Min. Temperature (°F)	58.6	58.1	55.8	49.6	41.5	34.7	34.9	39.7	46.4	51.1	54.3	57.2
Max. Temperature (°F)	80.4	79.7	77.9	74.1	70.0	65.3	65.7	69.8	74.3	76.1	77.5	79.7
Precipitation / Rainfall (mm)	132	106	91	46	16	8	9	21	36	70	97	128

Figure 3: The average temperatures for Estcourt by month. (Source: www.climate-data.org)

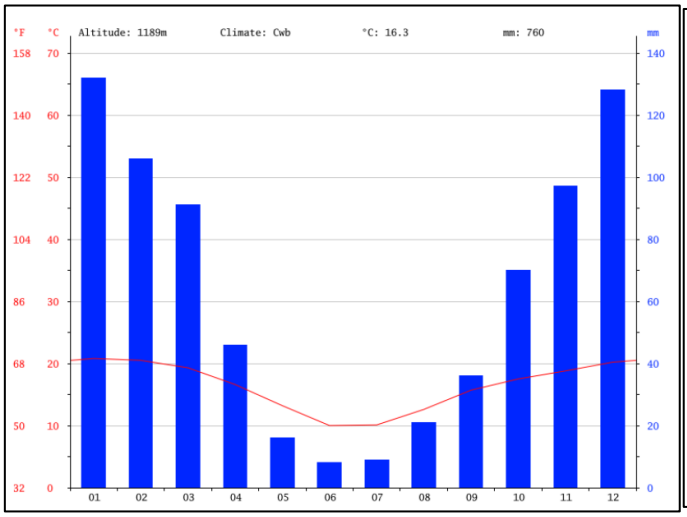

Figure 5: the annual average climate for the Estcourt region. (Source: www.climatedata.org)

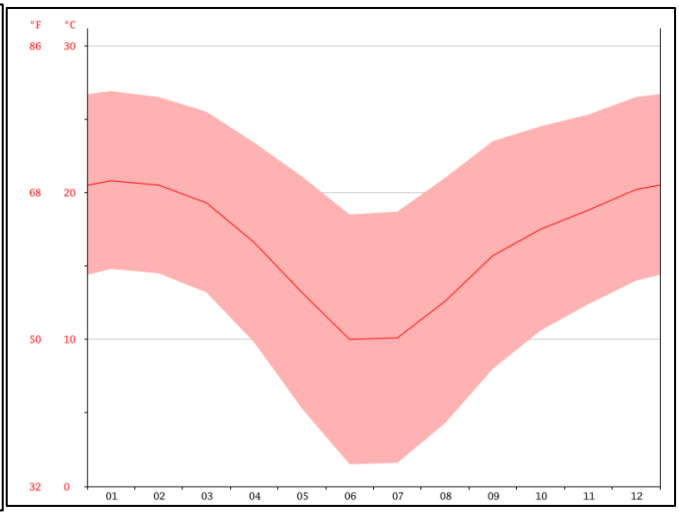

Figure 4: Average temperature in Estcourt. (Source: (www.climate-data.org)

B-2.3. Geology/ Topography

During the site survey no fossil localities were recorded. The development is likely to have minimal to zero impact on palaeontological resources and the likelihood of encountering fossil material is also very low. Due to the fact that most locations within the survey area have a buffering layer of Quaternary deposits before bedrock is reached and that foundations of the road will not reach a considerable depth, the probability of encountering palaeontological material is greatly reduced. Should such material be unearthed construction would need to cease immediately for a further field assessment to be conducted. Lastly, the people living within the study area will benefit from this development as the upgraded roads will make the area more accessible and will improve transportation networks in and out of the area.

B-2.4. Vegetation

The proposed road upgrade has the potential to adversely impact on terrestrial vegetation communities occurring within the road reserve, hence the need for a specialist Terrestrial Vegetation Survey and Impact Assessment to inform the application for Environmental Authorisation (EA).

The main findings of this specialist terrestrial vegetation report have been summarized below as follows:

- The study area occurs within the Mucina & Rutherford (2006) KwaZulu-Natal Highland Thornveld vegetation type, naturally characterised by tall tussock grassland usually dominated by Hyparrhenia hirta, as well as occasional savannoid woodlands scattered with *Acacia sieberiana var. woodii*, *Vachellia karroo* and *V. nilotica*. Due to high levels of transformation/degradation, this vegetation type was no longer represented in the area of study based on the surveys undertaken.
- During site visits and surveys conducted on the 15th of March 2016 and the 2nd of November 2018, it was established that the study area was largely limited to a narrow section of the road reserve between the edge of the existing dirt road and private property boundaries demarcated by wire fences, with vegetation occasionally extending beyond this narrow section. This narrow area therefore formed the focal area of the assessment along with a few vegetation patches encountered that were more extensive.
- The vegetation adjacent to the existing dirt roads which is at risk of being directly impacted by the development (either through direct loss or disturbance linked with construction activities), comprised a single **Secondary Ruderal Grassland** community type, characterised by a high abundance of ruderal grass species particularly *Sporobolus pyramidalis*, *Sporobolus africanus* and *Paspalum notatum*, with a few ruderal forbs/herbs and generally low levels of Invasive Alien Plants (IAPs) recorded. Consequently, the vegetation community was assessed as being of 'low' ecological importance and sensitivity.
- Alien/Exotic plants and weeds were generally in low abundance despite high levels of degradation and disturbance. A total of 17 alien plant species were recorded of which 7 are category 1b and subject to compulsory control according to the NEM:BA. Given the low abundance of alien plants and weeds, it is recommended that mechanical control methods be employed including uprooting and digging out of plants. This method is the most cost-effective and has a high success rate.

- Other key potential impact linked with the development may include the direct and permanent loss of terrestrial vegetation and habitat, indirect loss of vegetation and habitat through pollution, loss of plants species of conservation concern and fragmentation of habitat, and the potential loss of ecosystem goods & services provided by the terrestrial vegetation and habitat, including erosion control and biodiversity support among others.
- The ecological significance of impacts was assessed as being moderately-low if 'standard mitigation' is applied but could be reduced to a low to negligible significance if 'best-practice mitigation' measures are employed. Minimising the construction footprint particularly within the road reserve, controlling I&APs, properly managing pollutants and rehabilitating the site postconstruction will aid in limiting adverse impacts linked with the development and reducing the ecological significance of all potential impacts to an acceptably low level. To this end, recommendations and guidelines for impact management and rehabilitation of disturbed terrestrial habitats have been included in Section 6 of the report.
- The proposed development is considered acceptable, based on the premise that the suite of mitigation measures proposed in this report are strictly adhered to. It is therefore recommended that Chapter 6 of this report which deals with 'Impact Mitigation/Management' be included in the Construction Environmental Management Programme (EMPr) and also referenced in the Environmental Authorisation (EA) for this project as a specific condition of the EA.

Table 6: Summary of the significance assessment for the proposed Draycott roads upgrade development on terrestrial vegetation and habitat. (Source: Eco-pulse, 2018)

Ecological Impacts		'Standard' Mitigation Scenario	'Best-Practice' Mitigation Scenario
1	Destruction/loss of vegetation and habitat	Moderately-Low	Low
2	Modification of vegetation community and habitat through disturbance	Moderately-Low	Low
3	Pollution of soils, water and vegetation	Moderately-Low	Low
4	Reduction/loss of ecosystem goods and services	Low	Low

- **Plant permit/licence requirements**

Ledebouria ovatifolia is a 'Specially Protected Plant' listed in terms of Schedule 12 of the Natal Nature Conservation Ordinance (No. 15 of 1974). The plant was identified in the northern part of the study area just beyond the 50m corridor surveyed. Should there be a chance that this plant could be disturbed, damaged or destroyed during road construction, an ordinary permit/license in terms of Schedule 12 of the Natal Nature Conservation Ordinance (No. 15 of 1974) will need to be obtained from Ezemvelo KZN Wildlife.

A simple 'protected plant rescue and translocation programme' should be implemented if there is a risk of this species being impacted, in which case individual plants can be rescued and relocated outside of the development footprint in similar grassland habitat.

B-2.5. Catchment Characteristics

The proposed road (D2283, D449, L1346 and L1135) upgrade project is located within the Pongola-Mtamvuna WMA (Water Management Area) and within a small headwater catchment within the DWS Quaternary catchment V14C. The water resources in the study area are characterised by seeps, valley bottom wetlands and incised channels / gullies which flow in a northerly direction, and ultimately into the perennial Bloukrans River. The Bloukrans River flows into the Thukela River some approximately 50km downstream. The local drainage setting and relevant quaternary catchments are shown in Figure 6 below.

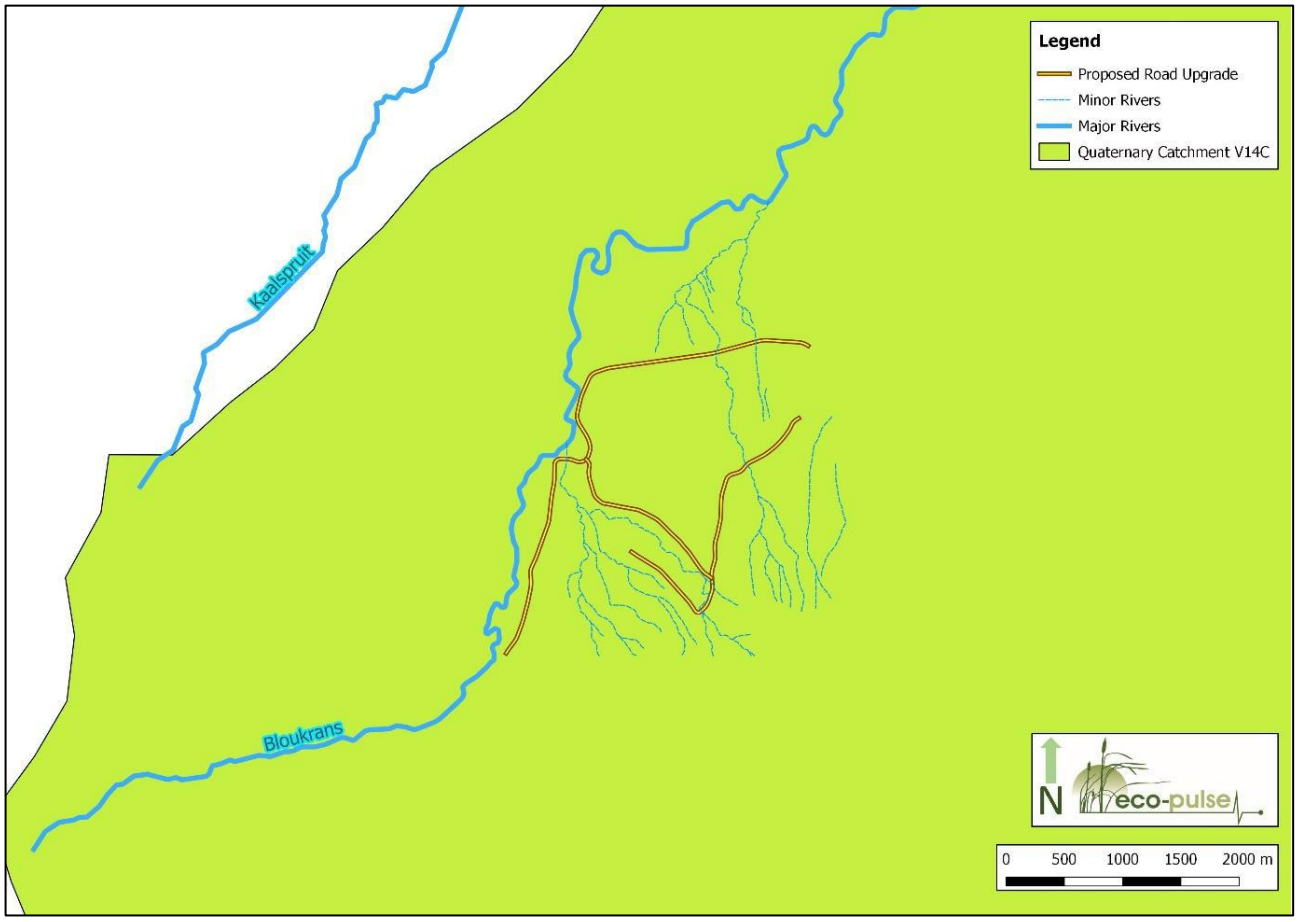

Figure 6: Map showing the drainage setting in relation to the proposed Draycott road upgrade development project. *(Source: Eco-pulse, 2018)*

B-3. SPECIALIST STUDIES

B-3.1. Wetland Report (Freshwater Ecosystems)

B-3.1.1 Present Ecological System

The Present Ecological State (PES) is a measure of the deviation of the ecological integrity (health / condition) of a definable ecosystem unit from its reference state (Macfarlane et al., 2008). PES is synonymous with the terms 'ecological / ecosystem condition', 'ecosystem health' and 'habitat integrity'. Habitat integrity with reference to rivers refers to the "maintenance of a balanced composition of physic-chemical and habitat characteristics on a temporal and spatial scale that are comparable to the characteristics of natural habitats of the region" (Kleynhans, 1996).

The river reach assessment involved the application of the IHI (Index of Habitat Integrity) 1996, version 2 (Kleynhans, 2012) (referred to as the Q-IHI). As part of rapid Q-IHI assessment a specific set of definedimpact indicators were assessed qualitatively for both the instream and riparian components of the affected river / stream reach. Sampling involved the recording visual observations at selected points along the channel and such sampling was generally confined to the delineation transects. Key riparian features relevant to the IHI assessment were recorded using a hand-held GPS. This data was supplemented with desktop analysis of catchment land cover and land uses, and other within-channel impacts observed using colour aerial photography and Google Earth imagery.

Impact scores obtained for each of the modules reflect the degree of change from natural reference conditions. Resultant health scores fall into one of six health categories (A-F) on a gradient from "unmodified/natural" (Category A) to "severe/complete deviation from natural" (Category F). This classification is consistent with DWAF categories used to evaluate the present ecological state of aquatic systems.

B-3.1.2. Ecosystem Services

Since the importance of wetland goods and services is dictated not only by the supply (service availability) of a particular good/benefit but also on the need or demand (user requirement) for such a benefit, the overall importance of the ecosystem service is ultimately derived from a combination of supply and demand scores. For example, a wetland may supply a particular service at a high level; however this service may not be in great demand, limiting the importance of the benefit to society. The results of the assessment were therefore interpreted to reflect the perceived importance of each of the ecosystem goods and services assessed.

B-3.1.3. Present Ecological Importance & Sensitivity (EIS) Assessment

Ecological importance" of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales (Duthie, 1999). Therefore, ecological importance encompasses the role water resources play in maintaining biodiversity as well as the importance of regulating and supporting functions / services for maintaining and buffering freshwater ecosystems. "Ecological sensitivity" refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (Duthie, 1999). As an overarching measure of the importance of an ecosystem, EIS provides a guideline for determination of the Ecological Management Class (EMC) (Duthie, 1999).

Wetland EIS:

The wetland EIS assessment was undertaken using a tool developed by Dr. Donovan Kotze and Eco-Pulse adapted from both the 1999 Wetland EIS tool (Duthie, 1999) and the more recent Wetland EIS tool developed by Rountree & Kotze (2013) in the rapid ecological reserve determination manual (Rountree et al. 2013). The assessment involved three (3) components, namely:

- Biodiversity maintenance / importance assessment based on onsite biodiversity attributes.

Biodiversity maintenance / importance assessment based on maintaining the biodiversity attributes of downstream ecosystems. This involved incorporating the findings of the regulating services assessment, undertaken as part of the WET-EcoServices assessment, and the assessment of whether important ecosystems benefit from such regulating services.

• Ecological sensitivity assessment.

River EIS:

The River EIS assessment was undertaken using a tool developed by Eco-Pulse adapted from the published River EIS tool (Kleynhans, 1999).

Please refer to **Annexure B5 of the Wetland impact assessment,** for more details on the EIS and ecosystem services assessment methods employed.

B-3.2. Geotechnical Investigation

The report is in progress.

B-4. SOCIO ECONOMIC CHARACTERISTICS OF THE STUDY AREA

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	**NO**
Will any building or structure older than 60 years be affected in any way?	YES	**NO**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO**

B-4.1. Heritage Impact Assessment (HIA)

The project area is situated to the immediate east of the proposed buffer zone of the Maloti Drakensberg World Heritage Site. Although many archaeological sites, especially rock art, occur in the Maloti Drakensberg World Heritage Site, none were recorded on the actual footprint. A rock art site occurs approximately 1km to the south east of the proposed development at S 28° 59' 48.03" E 29° 41' 40.62" but is not threatened by the road upgrade. A historical period bridge occurs approximately 260m to the west of the proposed road upgrade at S 28° 58' 41.84" E 29° 40' 20.48". This site is also not threatened by the proposed road upgrade and merits no further discussion. The area is also not part of any known Cultural Landscape Residents interviewed had no knowledge of any 'living heritage sites' in the near vicinity of the occur proposed road upgrade.

However, sixteen grave sites (all younger than 60 years old) occur adjacent to the proposed road upgrade. All graves are protected by provincial heritage legislation in KwaZulu-Natal. All these grave sites are located within 50 m from the road. They are therefore threatened by the proposed road upgrade and mitigation applies. The consultant also located a grave site that contains potential Later Iron Age stone walling. Mitigation also applies to this site.

All the graves in the study area appear to be younger than 60 years old. However, all graves are protected by Provincial Heritage legislation. Sixteen heritage sites occur within 50m from the proposed road upgrade. These are all grave sites that appear to be younger than 60 years old. However, they are locally important and protected by provincial heritage legislation. No other categorties of heritage sites,

with the possible exception of a Later Iron Age stone walling structure, occur within 50m from the proposed road upgrade.

The following recommendations must be adhered to:

- No grave site may be altered, disturbed or destroyed.
- A buffer zone must be strictly maintained around each grave site. Due to the proximity of some grave sites to the road the buffer zone may change depending the specific circumstances of each site.
- Should it not be possible to adhere to these mitigation specifications then the developer may request a Phase 2 Heritage Impact Assessment by a 'grave relocation expert'. The Phase 2 study will assess the feasibility of a grave exhumation and translocation exercise. The consultant will also apply for a grave exhumation permit from the Amafa, the provincial heritage authority.
- It is important to take note of the KwaZulu-Natal Heritage Act that requires that any exposing of graves and archaeological and historical residues as well as fossil material should cease immediately pending an evaluation by the heritage authorities.

B-4.2. Palaeontological Impact Assessment (PIA)

Large sections of this development occur in a highly sensitive region in terms of palaeontological resources. However the survey of the exposed geology within the study area revealed no fossil material. Furthermore, no trace fossils in the form of footprints, invertebrate trails or coprolites were observed during the survey. The deep Quaternary sediment package covers large portions of the fossiliferous bedrock, protecting it from exposure to the elements and from anthropogenic activities at the surface. Even though no palaeontological material was observed, due to the fact that the rocks of this region are highly fossiliferous it is probable that fossil material may be located somewhere within the study area but was not observed because it was either buried or not immediately visible.

Although several fossil and archaeological sites are known within the broader district, none were recorded during the ground survey and the proposed road upgrades will likely have zero impact on palaeontological resources. The thick sediment package making up the Quaternary deposits acts as a buffer to protect fossiliferous bedrock from potential damage caused by construction activities above.

Based on the assessment from the field survey, my recommendation is that the road upgrades can proceed. Whilst it is probable that fossils may lay buried somewhere in the vicinity of the proposed development (based on the SAHRA sensitivity map), the new roads will be built on existing dirt roads

where the landscape is already disturbed as a result of the levelling out and overall construction process. The depth required for the foundations of the new roads is also insufficient to reach bedrock, thereby reducing the chances that sensitive strata will be encountered.

However, infrastructure upgrades should proceed with caution and in a sensitive manner as heavy machinery may expose fossils not visible during the ground survey. If further excavation and disturbance of the surface should reveal palaeontological material, construction would need to halt immediately. The relevant heritage resources agency (Amafa or SAHRA) would need to be informed and a field palaeontologist would be required to visit the site to evaluate such fossil discoveries.

During the site survey no fossil localities were recorded. The development is likely to have minimal to zero impact on palaeontological resources and the likelihood of encountering fossil material is also very low. Due to the fact that most locations within the survey area have a buffering layer of Quaternary deposits before bedrock is reached and that foundations of the road will not reach a considerable depth, the probability of encountering palaeontological material is greatly reduced. Should such material be unearthed construction would need to cease immediately for a further field assessment to be conducted. Lastly, the people living within the study area will benefit from this development as the upgraded roads will make the area more accessible and will improve transportation networks in and out of the area (Trower, 2018).

B-4.3. Population Statistics

B-4.3.1. Local Municipality

Local economic development is one of the municipality's priorities in line with the national key priorities and likewise, the major role and priority of Inkosi Langalibalele Local Municipality (ILM) in local economic development is to coordinate, facilitate and stimulate sustainable economic development within the area of its jurisdiction through appropriate mechanism such as Local Economic Development Strategy and other policies.

The objectives of the Inkosi Langalibalele Local Municipality LED seek to increase employment and stimulate economic growth by:

- Promotion and development of SMME's
- Regulation, by-laws and Council policies that promote and encourage business investment and local labour incentives
- Stimulate economic growth and business development through incentives for business retention, expansion and attraction.

- Promote and stimulate the opportunities for Private/Public Partnership (PPPs) for infrastructure and service delivery
- Promote and market the local area through tourism development and establishment of ongoing linkages with other regional economic development.

Section 152 1(1) of the Constitution suggest that "The objects of local government is to promote social and economic development" this means that municipalities has a constitutional mandate and obligation to work together with local communities to find sustainable ways to meet their needs and improve the quality of their lives.

The White Paper on local government state that local government is responsible for the achievement of local economic development, playing an important role in job creation and boosting the local economy through the provision of business-friendly services, local procurement, investment promotion, support for small business and growth sectors.

Inkosi Langalibalele does not have a local economic development strategy. The formation of the municipality from the merging of two municipalities prior to the local government election in 2016 has created a need for the municipality to develop and adopt a credible LED strategy.

Table 7: Showing the population of the Inkosi Langalibalele LM. *(Source: IDP, 2017)*

2011			2016		
	Male %	**Female %**		**Male %**	**Female %**
uThukela	46.5	53.5	uThukela	47.2	52.8
uMtshezi	46.4	53.6	Inkosi Langalibalele	47.3	52.7
Imbabazane	46.7	53.3			

B-4.3.2. Economic profile of the local municipality

The main economic contributors in Inkosi Langalibalele LM are as follows:

- Tourism (the municipality is situated in Battlefield and Next to World Heritage Site – Drakensberg Mountain)
- Agriculture (vast arable land in rural Ntabamhlophe/ Loskop and Weenen as well as commercial farming found in Estcourt and Weneen)
- Manufacturing - Nestle, Masonite, Bacon Factory, Kwazulu Company Shoe, Industrial Braiding Mining, Quarry
- Transport and Communication

- Government Services
- Finance and Business Services
- Agriculture and Forestry

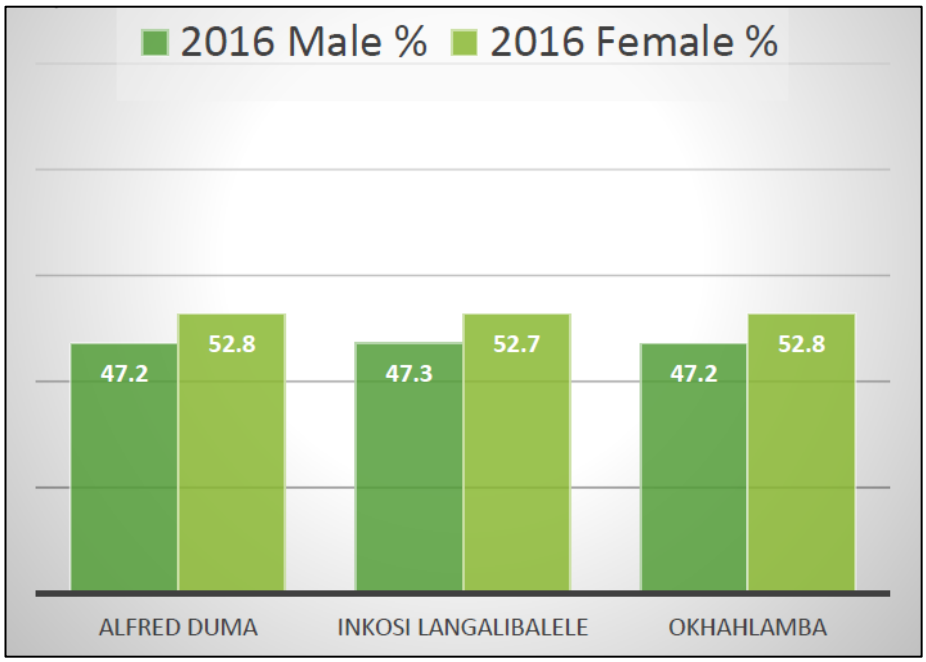

Figure 7: The economic profile reflected for both male and females within the municipality

(Source: Stats SA- Census 2011-CS 2016)

The Municipality is highly rural in character and presents limited employment opportunities for its local inhabitants. There are agricultural (mainly subsistence farming) activities and limited food security projects that can assist to alleviate the levels of poverty. To date, inhabitants rely on some form of government grant. Although the municipal unemployment rate has decreased over time, communities are now involved in some income generating activity located within the informal sector. The lack of skills, financial support and particularly access to markets has also been identified as a major contributor to unemployment and high levels of poverty. Importantly, the level of education, particularly access to tertiary education has increased sharply between 2001 and 2011 Census data.

B-4.3.3. Education levels

Table 8: Level of education for the Inkosi Langalibalele Municipality.

LEVELS OF EDUCATION	NUMBER OF PERSONS
Pre-school including day care; crèche; Grade R and Pre-Grade R in an ECD centre	198
Ordinary school including Grade R learners who attend a formal school; Grade 1-12 learners & learners in special class	67 795
Special school	219
Further Education and Training College FET	495
Other College	239
Higher Educational Institution University/ University of Technology	2057
Adult Basic Education and Training Centre ABET Centre	2208
Literacy classes	1002
Home based education/ home schooling	259
N/A	103105
Grand Total	**177 577**

B-5. SOCIO ECONOMIC VALUE OF THE ACTIVITY

Anticipated CAPEX value of the project on completion	**To be confirmed**
What is the expected annual turnover to be generated by or as a result of the project?	**To be confirmed**
New skilled employment opportunities created in the construction phase of the project.	**To be confirmed**
New skilled employment opportunities created in the operational phase of the project.	**To be confirmed**
New un-skilled employment opportunities created in the construction phase of the project.	**To be confirmed**
New un-skilled employment opportunities created in the operational phase of the project.	**To be confirmed**
What is the expected value of the employment opportunities during the operational and construction phase?	**To be confirmed**

SECTION C: PUBLIC PARTICIPATION

C-1. ADVERTISEMENT AND SITE NOTICES

The *EIA Regulations, 2014 (as amended in 2017),* under Chapter 6 of the public participation process under *Subregulation 2(d)* states that an advertisement must be placed at least one provincial newspaper or national newspaper. A newspaper article (Zulu) was published in the Ilanga Newspaper under the classified section on the **21st October 2019**. This notice provided an opportunity for the public to register as an Interested &Affected Party (I&AP). **(Refer to Appendix E.1 for newspaper advertisement).**

Sub-regulation 2(a) of the EIA Regulations (2014) under Chapter 6 of the public participation process states that a person conducting the Public Participation Process must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by— fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor (Sub-regulation 2). This process was adhered to by placing Site Notices at strategic points along the route to allow Interested and Affected Parties to register and comment on the proposed development. Site notices were placed on site and at the local court-house.
Refer to Appendix E.2 for proof of site notices.

C-2. WARD COUNCILLOR/ COMMUNITY MEETING

The elected ward councillor (Ward 06) was made aware of the proposed development at a community meeting. A meeting was held on the 22nd October 2019. During the meeting, the ward councilor was informed of the proposed construction and was briefed on the formal project description. The ward councillor had no objections to the proposed development. A formal letter outlining the nature of the proposed development was made available to the ward councillor prior to the meeting. The letter affirms that the ward councillor was made aware of the proposed development and was given 14 days to notify the community and/ or affected parties of the development.
Furthermore, the Induna (Chief) was also present at the meeting as the Tribal Authority is the landowner for the proposed development. Minutes for the meeting were taken and the necessary timeframes were established.
Refer to Appendix E.3 for the ward councilor letter.
Refer to Appendix E.4 for the community meeting attendance register.

C-3. KEY STAKEHOLDERS

Table 9: Key stakeholders involved in the Public Participation Process.

Name	Title	Affiliation	Contact Details
Mr. Eugine Simon Ndumo	Ward Councillor: Ward No.06	Inkosilangalibalele Local Municipality	

C-4. ISSUES RAISED MY ITERESTED AND AFFECTED PARTIES

A comments and responses report will be included on the Final Basic Assessment, this will include the comments from any/all Interested and Affected Parties.

C-5. STAKEHOLDER ENGAGEMENT

C-5.1. Department of Economic Development Tourism and Environmental Affairs (EDTEA)

The Department of Economic Development, Tourism and Environmental Affairs (EDTEA) was consulted during the initial stages of the project. The Department conducted a site visit in June 2019. The site visit/ pre-application meeting confirmed the Environmental Triggers in terms of the EIA Regulations, 2014 as amended. **Refer to Appendix G.3 for the EDTEA Pre-application meeting minutes & attendance register.**

C-5.2. Department of Water and Sanitation (DWS)

The Department of Water and Sanitation (DWS) was consulted for the pre-application meeting. The Department conducted a pre-application meeting on the 15th November 2019. The pre-application meeting confirmed the Triggers/ Water Uses in terms of the National Water Act, 1998. The draft BAR will be submitted to the Department for further input in terms of the impact to the water resources form the proposed development.

C-6. COMMENTS AND RESPONSES

The comments and responses report will be included in the Final Basic Assessment Report.

C-7. AUTHORITY PARTICIPATION

Table 10: The Authority Participation/ involvement for the proposed development.

Authority	Contact Person	Contact Details	Email Address	Postal Address
Inkosi Langalibalele Local Municipality	Mr. Philani Mazibuko	Tel: 036 342 7800	speaker@ilm.gov.za	PO Box 15, Estcourt, 3310 Civic Building,1 Victoria Street, Estcourt, 3310
Economic Development, Tourism and Environmental Affairs (EDTEA)	Ms. Yonela Ndamase	Tel: 076 943 9050	yonela.ndamase@kznedtea.gov.za	Private Bag X9905, Ladysmith, 3370
AMAFA	Ms. Sumeri Uys	Tel: 033 394 6543	phoarchaeology@amafapmb.co.za	195 Langalibalele Street, PO Box 2685 Pietermaritzburg, 3200
KZN Ezemvelo Wildlife	Mr. Dominic Wieners	Tel: 033 845 1999	dominic.wieners@kznwildlife.co.za	01 Pieter Brown Drive PO Box 13053, Pietermaritzburg, 3202
Department of Water and Sanitation (DWS)	Ms. Siphindile Shoba	Tel: 031 336 2786	shobas@dws.gov.za	88 Joe Slovo Street, Durban, 4000

SECTION D: IMPACT ASSESSMENT

D-1. PREFERRED ROUTE/ TECHNOLOGY ALTERNATIVE

The impact assessment outlined below is based on the preferred alternative. Impacts that may result from the Planning/ Design, Construction and Operational Phases are discussed further in this section. All mitigation measures have been outlined in specific detail in the Environmental Management Programme (EMPr), therefore, this section must be read in conjunction with the EMPr. All impacts outlined below relate to the activities applied for in the Environmental Application (i.e. Activity No. 12 & 19, EIA Regulations 2014 as amended). Due to the absence of a route alternative (as the proposed developments are site specific in nature), all impacts/ mitigations are based on the proposed technology alternatives.

D-2. RISK ASSESSMENT METHODOLOGY

For the purpose of assessing impacts of the proposed development, the project will be divided into two phases from which impacting activities can be identified, namely:

- **Construction Phase**: All the construction related activities on site, until the contractor leaves the site.
- **Operational Phase**: All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

The EIA Regulations, 2014 as amended, prescribes requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations, 2014 (as amended in 2017):

- Regulation 982, Appendix 1, Section 2 and Section 3 – Basic Assessment Impact Requirements; and
- Regulation 982, Appendix 2 and Appendix 3 – Environmental Impact Assessment Requirements.

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- A description and assessment of the significance of any environmental impact including:
    - Nature of the impact;
    - Extent and duration of the impact;
    - The probability of the impact occurring;
    - The degree to which the impact can be mitigated.

The overall significance of an impact / effect has been ascertained by attributing numerical ratings to each identified impact. The numerical scores obtained for each identified impact have been multiplied by the probability of the impact occurring before and after mitigation. High values suggest that a predicted impact /effect is more significant, whilst low values suggest that a predicted impact / effect is less significant.

D-3. RANKING SCALES FOR ENVIRONMENTAL RISK ASSESSMENT

D-3.1. Ranking Scale

Probability (P)	**Duration (D)**
1 – very improbable	1 – very short duration (0-1years)
2 – improbable	2 – short duration (2-5 years)
3 – probable	3 – medium term (5 – 15 years)
4 – highly probable	4 – long term (>15 years)
5 – definite	5 – permanent/ unknown
Extent (E)	**Magnitude (M)**
1 – limited to the site	2 – minor
2 – limited to the local site	4 – low
3 – limited to the region	6 – moderate
4 – national	8 – high
5 – international	10 – very high

D-3.2. Significance Ratings

Environmental Significance is divided into three ranking categories and applies to each potential impact associated with the various phases of the project.

The significance is calculated as follows:

Significance = (M+E+D) x P

Significant Points	Significance Rating
0 – 30 points	Low environmental significance
31 – 59 points	Moderate environmental significance
60 – 100 points	High environmental significance

D-4. POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

The following sections will provide a description of the potential impacts as identified by the specialists, and the EAP, and utilizing the ranking scales for environmental risk assessment as mentioned above. All potential impacts associated with the proposed development during the planning, construction and operation of the project life-cycle have been considered and assessed in the following sections including mitigation measures. As the activity (i.e. structural) is expected to be permanent in nature, the decommissioning phase impacts have not been considered in this report.

It is important to understand the potential impacts on the freshwater ecosystems associated with any form of development. Generally, the construction of linear features (such as roads, road related infrastructure and pipelines) are likely to have a negligible impact on the surrounding freshwater ecosystems. However, without proper onsite management and the implementation of mitigation measures during the construction phase of the project, the development is likely to have adverse impacts on the freshwater ecosystems and indirectly on the water resource, and consequently these need to be managed during construction.

D-4.1. Planning/ Design Phase

The planning/design phase involves the processes prior to the construction phase. The following points should be noted:

- All method statements must be submitted to the Engineer for approval;
- All new construction method statements must be brought to the knowledge of the ECO;
- A site layout plan must include the location of the campsite, the siting of the campsite must be approved by the Engineer/ECO prior to construction;
- No-go areas must be demarcated by the ECO prior to construction;
- The construction EMPr must be brought to the attention of the contractor;
- Liaise with the local municipality and community structures for relevant permissions;
- Setup of offices, toilets, stockpiling material and fencing around offices and material stockpiles;
- The surveyor to include the exact position of works to commence for drainage structures;
- All parties to carry out in-loco confirmation of the extent of works, identify possible.

The summary of the planning/ design phase for the proposed project involves:

- Project contract & programme;
- Appointments & duties of project team;
- Method statements;
- Emergencies, non-compliance & communication;
- Construction plans & schedules;
- Environmental Induction training;
- Establishing access roads;
- Campsite establishment;
- Establishing storage areas;
- Hazardous substances;
- Waste management

Refer to the site specific EMPr (Appendix F) for the details of the planning/ design phase.

Potential Impacts of the development:

Direct Impacts: are those impacts directly linked to the project (e.g. clearing of land, destruction of vegetation and habitat). Due to the proposed development being within close proximity of a watercourse or freshwater habitat, direct impacts are likely to be expected but limited. The direct impacts to the wetland are associated with the existing gravel access road being upgraded, widening and minor wetland infilling. The existing small pipe culverts will be replaced with adequately sized box culverts, such that the movement of water to downstream areas is likely to be improved.

Indirect Impacts: are those impacts resulting from the project that may occur beyond or downslope/downstream of the boundaries of the project site and/or after the project activity has ceased (e.g. migration of pollutants from construction sites). The indirect impacts that could impact in the wetland and possibly downstream aquatic ecosystems under a very poor (worst case) management scenario are sedimentation impacts, erosion risks and pollution impacts and risks during both construction and operational phases.

Impacts to watercourses were identified and described based on an understanding of the receiving aquatic environment, associated sensitivities and the location and extent of the proposed infrastructure. A summary of the potential risks and impacts is provided in Tables below.

D-4. CONSTRUCTION PHASE – BIOPHYSICAL IMPACTS

Potential Impacts of the development:

Direct Impacts: are those impacts directly linked to the project (e.g. clearing of land, destruction of vegetation and habitat). Due to the proposed development being within close proximity of a watercourse or freshwater habitat, direct impacts are likely to be expected but limited. The direct impacts to the wetland are associated with the existing gravel access road being upgraded, widening and minor wetland infilling. The existing small pipe culverts will be replaced with adequately sized box culverts, such that the movement of water to downstream areas is likely to be improved.

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Impacts to watercourses were identified and described based on an understanding of the receiving aquatic environment, associated sensitivities and the location and extent of the proposed infrastructure. A summary of the potential risks and impacts is provided in Tables below.

D-4. CONSTRUCTION PHASE – BIOPHYSICAL IMPACTS

D-4.1. Impacts associated with the proposed construction of the road upgrade

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
1. SOIL EROSION, SEDIMENTATION AND DEGRADATION WITHIN WATER RESOURCE SYSTEMS	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Construction activities (i.e. excavations and vegetation clearing) expose soil to environmental factors including rainfall and wind. The exposure to these factors will result in the erosion of soil within the disturbed area. This is particularly so, in areas where soil will be compacted by heavy machinery. The eroded soil will be deposited within the non-perennial channel, further affecting the hydrological flow of the watercourse. The increased high-suspended particulate matter will accumulate within the channel affecting the hydrological flow as well as the geomorphological integrity of the watercourse system, reducing the ecological integrity of the watercourse outside of the impacted area and leading to erosion along the bed of the channel.	Extent	**2**	Extent	**1**
	Magnitude	**8**	Magnitude	**4**
	Duration	**2**	Duration	**2**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**48**	**SIGNIFICANCE POINTS:**	**21**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- Use vehicular digging of the banks of the watercourse only in areas where this is deemed absolutely necessary. Working during the winter months, while the watercourse is at its lowest level and there is limited opportunity for flooding, will reduce soil erosion potential in disturbed areas.
- Effective rehabilitation of the development footprint as well as the implementation of erosion control measures is imperative to mitigate the effects of erosion.
- Increases in turbidity of the watercourse must be monitored and controlled. Ways to control turbid water include passing it through for example sediment traps or sediment catching curtains or stopping construction until sediment has settled.
- Where necessary, turbid water that is pumped from excavations within the watercourse 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 watercourse and also reduce damage to any sensitive faunal life cycle periods.
- Further to this, it is easier to isolate low flows in order to work in isolation of streamflow. Isolating high flows could lead to flooding and increase the risk of introducing sediment into the system.
- The culvert must not constrict the width of the watercourse channel.
- There shall be no mining of soil/sand required for construction purposes from the banks of the watercourse. Soil must be brought in, if needed for construction purposes. This must also be stockpiled away from the riparian zone's edge.
- No stockpiling of any materials may take place adjacent to the riparian zone. Erosion control measures must be implemented in areas sensitive to erosion and where erosion has already occurred such as edges of slopes, exposed soil etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes.
- Vegetation clearing must only be undertaken when construction activity is actually underway at this point and this area must be rehabilitated within 2 weeks of initial clearing occurring. The entire construction area must not be stripped of vegetation prior to commencing construction activities.

- The channel banks that will be affected must be re-profiled as per the original soil horizon structure and re-vegetated with indigenous grasses.
- Install sediment barriers across the entire construction right-of-way immediately upslope of the construction site to prevent sediment flow into the watercourse.
- Rehabilitate disturbed riparian vegetation as soon as construction in this area has ended.
- Rehabilitation must be aimed at improving the status and function of the ecosystem, through the removal of invasive alien species and the planting of indigenous species.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
2. IMPACTS ASSOCIATED WITH THE REMOVAL OF RIPARIAN ZONE	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
ACTIVITY: Construction of the culvert structures **IMPACT:** The removal of existing riparian vegetation in order to construct the culverts and access roads will have further negative impacts on the functionality of the vegetation community associated within this habitat. This will decrease the functional integrity of the riparian zone further making the area more vulnerable to encroachment by invasive alien species. Given the seriously degraded nature of the riparian zone and its dominance by terrestrial graminoid species, this impact is expected to be low.	Extent	**2**	Extent	**1**
	Magnitude	**4**	Magnitude	**2**
	Duration	**2**	Duration	**2**
	Probability	**5**	Probability	**3**
	SIGNIFICANCE POINTS:	**40**	**SIGNIFICANCE POINTS:**	**15**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- Protect as much indigenous vegetation as possible.
- Rehabilitate disturbed vegetation as soon as construction in this area has ended.

The following guidelines apply to re-vegetation:

- Site preparation

- Utilise erosion and sediment control techniques where needed.
- Grade the disturbed area to a stable uniform slope. Vegetative cover will not develop on an unstable slope.
- Loosen the soil by hand.
- Plant when the weather will permit e.g. suitable temperatures and moisture for plant growth. Spring plantings give the best results.
- On unstable soils use a soil saver such as fibre netting or a fibre mat. The sloped area is seeded and the mat placed on top to protect the bare soil before the planted vegetation has become established

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
3. IMPACTS ASSOCIATED WITH POLLUTION OF WATER RESOURCES AND SOIL	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
IMPACT: – Sediment release from a construction site into the receiving environment is one of the most common forms of waterborne pollution. Furthermore, mismanagement of waste and pollutants including hydrocarbons, construction waste and other hazardous chemicals will result in these substances entering and polluting these sensitive environments either directly through surface runoff during rainfall events, or subsurface water movement. The linked nature of the non-perennial watercourse downstream will result in pollutants being carried downstream from the construction site having consequences on further downstream users. – In addition to this, concrete surfaces are recognised as a source of various pollutants which can originate from a wide variety of sources. The pollutant concentration in road/bridge runoff can be highly variable and dependant on a wide variety of factors including location, traffic volumes, extent of dry period before a rainfall event, and nature of the surface. The increase in hardened surfaces as a result of the project will lead to the increase in the flushing of these pollutants into the watercourse during the operational phase of this development.	Extent	**2**	Extent	**1**
	Magnitude	**8**	Magnitude	**4**
	Duration	**2**	Duration	**2**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**48**	**SIGNIFICANCE POINTS:**	**21**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- All waste generated during construction is to be disposed of as per an Environmental Management Programme (EMPr) and washing of containers, wheelbarrows, spades, picks or any other equipment that has been contaminated with cement or chemicals within the watercourse, must be strictly prohibited.
- Proper management and disposal of construction waste must occur during the construction of the culverts.
- No release of any substance i.e. cements or oil that could be toxic to fauna or faunal habitats; Wet cement and/ or concrete must not be allowed to enter the watercourses.
- Portable toilets must be placed outside of the 1:100-year flood line of the River.
- Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of the riparian zone.
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed, and the affected area rehabilitated immediately – consult with a wetland/aquatic specialist if spills occur**.**

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
4. ALIEN INVASIVE SPECIES ENCROACHMENT	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
IMPACT: – Any removal of vegetation will lead to a disturbance within the area having a negative impact on the functionality of the already degraded vegetation community. Alien invasive species occur both within the riparian zone and surrounding areas and these will further encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010). Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004).	Extent	**2**	Extent	**1**
	Magnitude	**6**	Magnitude	**4**
	Duration	**2**	Duration	**2**
	Probability	**3**	Probability	**2**
	SIGNIFICANCE POINTS:	**30**	**SIGNIFICANCE POINTS:**	**14**
	LOW	**LES**	**LOW**	**LES**

MITIGATION MEASURES:

- An alien invasive management programme must be incorporated into the Environmental Management Programme.
- Ongoing alien plant control must be undertaken. Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.
- Construction staff and vehicles must stick to the construction servitude and not be allowed to access any sensitive areas.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. This requirement is in fulfilment of the terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004). Areas which have been disturbed will be quickly colonised by invasive alien plant species.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
5. IMPACTS ASSOCIATED WITH FLORA AND FAUNA	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activities: – Excavations – Unregulated vegetation clearance **Potential nature of the impacts:** – Disruption of access to grazing areas. – Loss of biodiversity of indigenous species within the area. – Will have an effect of the areas conservation status, considering a large portion of the proposed route cuts through Irreplaceable Critical Biodiversity areas.	Extent	**2**	Extent	**1**
	Magnitude	**4**	Magnitude	**2**
	Duration	**2**	Duration	**1**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**32**	**SIGNIFICANCE POINTS:**	**12**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- Selected workers must be given training on the possible fauna that may be encountered along the proposed route.
- Site workers are to be informed of any sensitive fauna on the site prior to construction activities commencing and be informed that poaching or disturbance is strictly prohibited.
- Under no circumstances shall any fauna be handled, removed, killed or interfered with by the Proponent, Project Manager, Resident Engineer, contractors, engineers, and their employees, including subcontractors or their subcontractors' employees. However, if construction activities are likely to injure, kill or interfere with any fauna encountered on the site, appropriate action must be taken to ensure their protection.
- Any fauna found within the construction corridor must be moved to the closest point of natural or semi-natural vegetation outside the construction servitude. This includes those species perceived to be vermin (such as snakes and rats). The latter species may require the services of a specialist to catch and relocate dangerous/venomous species.
- Ongoing alien plant control must be undertaken along the route and particularly in the disturbed areas. Areas which have been disturbed will be quickly colonized by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.
- Monitor all sites disturbed by construction activities for colonization by exotics or invasive plants and control these as they emerge. This requirement is in fulfilment of the terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004). Areas which have been disturbed will be quickly colonized by invasive alien plant species.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
6. IMPACTS ASSOCIATED WITH SOIL AND EARTHWORKS	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activities: – Excavations – Stockpiling of material, including gravel, sand, and stones – Construction of the culvert structures **Potential nature of the impacts:** – Construction of poor foundation in the event that earthworks are conducted in a manner that violates the SANS 1200 guideline.	Extent	**2**	Extent	**1**
	Magnitude	**8**	Magnitude	**4**
	Duration	**2**	Duration	**2**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**48**	**SIGNIFICANCE POINTS:**	**21**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- All earthworks should be carried out in a manner to promote stale development of the site. It is recommended that earthworks be carried out along the guidelines given in SANS 1200 (current version)

Fill embankments:

- Density control of placed fill material should be undertaken at regular intervals during fill construction.
- Where the natural ground slopes are steeper than 1 vertical to 6 horizontal (>9°), the fill must be benched into the slope, to engineer's detail.
- Placement of fill layers should be undertaken in layers not exceeding 200mm thick when placed loose, and compacted using suitable compaction plant to achieve at least 93% of modified AASHTO maximum dry density at ±2% (wet/dry) OMC. Boulders larger than $^{2}/_{3}$ of the layer thickness must not be included in the fill material.
- For fill embankments, terraces should be graded to direct water to drainage channels away from the fill edges, and small earth bunds should be constructed along the crests of fills, to prevent overtopping and erosion of fill embankment slopes. These bunds should be a minimum 450mm wide and 300mm high.

Cut slopes:

- Cuts in soils and fill slopes may be formed to not exceed a batter of 1 vertical to 2 horizontal (>26°) and height of more than 1,5m where retaining walls are not provided.
- Where excavations intersect or approach the shallow groundwater condition, the sidewalls will tend to become unstable and need to be drained and laterally supported or battered back at slopes of the order of less than 1 vertical to 5 horizontal (≤11°).
- Sidewall collapse of excavations not battered back or suitably stored is considered likely.
- Cut and fill embankment heights, in either soil and/or weathered bedrock, greater than 1,5m, should be inspected and approved by a geotechnical professional.

- Due to the prevalent groundwater condition and loosely consolidated nature of the alluvial soils, workers should not enter any excavations deeper than 1,5m that are not shored or battered back. Steeper batters can be considered but will be subject to inspection and approval by a geotechnical professional on site during construction. It remains, however, the responsibility of the contractor/engineer on site to ensure excavations are safe and shored in line with requirements as set down in the current "Occupational Health and Safety "Act 85 (1993 as amended).

Foundations:

- All foundations should be designed to act in end bearing on competent bedrock.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
7. IMPACTS ASSOCIATED WITH WASTE AND HAZARDOUS MATERIALS	SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION		SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
DIRECT IMPACT				
Activities: – Excavations – Stockpiling of material, including gravel, sand, and stones – Construction of the culverts **Potential nature of the impacts:** – Construction vehicles may leak oil that may contaminate soil. – The presence of fuels, cement and other chemicals on-site may have a negative impact on the soil and surrounding environment (if not maintained).	Extent	**2**	Extent	**1**
	Magnitude	**8**	Magnitude	**4**
	Duration	**1**	Duration	**1**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**44**	**SIGNIFICANCE POINTS:**	**18**
	LOW	**LES**	**LOW**	**LES**

MITIGATION MEASURES:

- Open trenches must be properly sealed to prevent infiltration of surface water runoff or contaminants.
- It is preferable that ready-mix concrete is used to prevent spillages. No cement batching should take place near the water course, and wetland systems
- Cement batching boards should be used and cement- based products must not be disposed in to the watercourse, or wetland and riparian systems.
- Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate soil or ground water on site.
- Temporary bunds must be constructed around chemical or fuel storage area and hazard signs indicating the nature of the stored facility or containment structure.
- Spills in bunded areas must be cleaned up with a spill kit, and thereafter be disposed at a registered landfill site. Alternatively, the spilled material must be stored temporarily in a bunded area.
- The bunded area must be located at least 50 metres away from the 1: 100-year floodline.
- Vehicles used during the construction phase must be parked in a designated area and drip trays must be placed underneath the vehicles to prevent any oil leaks from seeping into the soil.
- Plastic sheeting should be placed on bare ground when pouring the pre-mix cement
- Vehicles used during the construction phase must be parked in a designated area and drip trays must be placed underneath the vehicles to prevent any oil leaks from seeping into the soil.
- Oil residue shall be treated with oil absorbent such as Drizit or similar and this material must be appropriately disposed at a registered landfill site.
- It is recommended that the contractor uses a pre-mix cement to prevent potential spills on bare ground.
- **In the event of an accidental spill, the following steps must be taken:**
  - Stop the source of the spill
  - Contain the spill

- All significant spills must be reported to DWS.
- Determine if there will be any impacts on soil, and surface and groundwater
- If necessary, remedial action must be taken in consultation with DWS.
- The incident must be documented.

- Waste may not be dumped on or near the site, nor may it be burned or buried.

A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal.

- Collect site trash, including waste deposited by others, regularly (daily during rainy or windy conditions).
- Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).
- Waste will be collected by an accredited waste company and disposed of at an appropriate and licensed waste disposal facility.
- Litter, such as there may be, must be picked up on a daily basis and disposed of in the bins provided.
- Educate construction personnel about the types of solid waste and proper collection and handling procedures
- Designate on-site waste storage areas, provide adequate amount of waste storage facilities, and protect stored wastes from potential runoff by rain or wind.
- Finally, plan for regular disposal times to prevent waste from overtopping containers.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
8. IMPACTS ASSOCIATED WITH POLLUTION (NOISE POLLUTION)	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activities: – Excavations – Stockpiling of material, including gravel, sand, and stones – Construction of the culverts **Potential nature of the impacts:** – Disturbance may be caused to the local community should the construction activities take place outside of the designated working hours, and if the proper muffling devises are not employed.	Extent	**2**	Extent	**2**
	Magnitude	**4**	Magnitude	**2**
	Duration	**1**	Duration	**1**
	Probability	**5**	Probability	**3**
	SIGNIFICANCE POINTS:	**35**	**SIGNIFICANCE POINTS:**	**15**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

The noise generated by construction activities will be temporary and limited to the construction phase of the project:

- Working hours must be limited to day light only.
- Noise related to the construction activities are to be scheduled to occur within prescribed normal working hours and must comply with the provisions of SABS 0400-1990 with respect to working hours.
- In addition, construction vehicles and machinery should be fitted with the appropriate noise muffling devices and must be appropriately maintained so as to ensure that the machines and vehicles do not produce excessive noise disturbance.
- Any complaints about noise must be attended to in a reasonable manner and the ECO informed of the complaint.
- A complaints register should be maintained, in which any complaints regarding noise are noted.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
9. IMPACTS ASSOCIATED WITH POLLUTION (DUST POLLUTION)	SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION		SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
DIRECT IMPACT				
Activities: – Excavations – Stockpiling of material, including gravel, sand, and stones – Construction of the platforms **Potential nature of the impacts:** – During construction, dust particles are emitted into the atmosphere from construction vehicles, and excavations, causing pollution and contamination of construction and surrounding environment.	Extent	**2**	Extent	**2**
	Magnitude	**6**	Magnitude	**2**
	Duration	**1**	Duration	**1**
	Probability	**5**	Probability	**3**
	SIGNIFICANCE POINTS:	**45**	**SIGNIFICANCE POINTS:**	**15**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- Emissions into the air can be minimised by ensuring regular maintenance of construction vehicles and equipment in order to reduce emission of exhaust fumes.
- The application of best management practices for dust suppression will also aid in reducing air pollution. Dust control can be achieved by means of the periodic application of water to open sandy surfaces and to temporary dirt roads.
- Loads could be covered to avoid loss of material in transport, especially if material is transported off site.
- Dust and mud should be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the site boundary.
- Facilities for the washing of vehicles should be provided at the entry and exit points.
- A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas.
- During the transfer of materials, drop heights should be minimised to control the dispersion of mater being transferred.

D-4.2. Impacts associated with the construction phase: social impacts

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
10. CULTURAL HERITAGE/ ARTIFACTS	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activities: – Excavation and removal of soil along the proposed route. – Removal of vegetation **Nature of the potential impact:** Exposing heritage resources in the vicinity of the proposed road.	Extent	**2**	Extent	**2**
	Magnitude	**6**	Magnitude	**2**
	Duration	**1**	Duration	**1**
	Probability	**4**	Probability	**2**
	SIGNIFICANCE POINTS:	**32**	**SIGNIFICANCE POINTS:**	**10**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- As per the HIA specialist findings, no heritage sites or features were identified on the proposed development footprint
- The area is also not part of any known cultural landscape.
- Graves are associated with some of the homesteads in the area but none are located within 100m from the proposed road upgrade.
- Amafa should be contacted if any heritage objects are identified during earthmoving activities and all development should cease until further notice**.**
- As per the Amafa assessing officer no structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa.
- All the residential dwellings adjacent to the proposed road upgrade are younger than 60 years old
- No activities are allowed within 50m of a site, which contains rock art.
- Sources of all-natural materials (including topsoil, sands, natural gravels, crushed stone, asphalt, etc.) must be obtained in a sustainable manner and in compliance with the heritage legislation.

As per the PIA specialist findings, it was concluded that the bridge construction can go ahead, however, the following must be considered.

- Even though the area has a high rating for palaeo-sensitivity, the likelihood of encountering fossils is low.
- Should a fossil be encountered, the following contingency plan must be followed:
    - Identify areas which are dense in fossils
    - Obtain permission from the landowner to remove blocks of bedrock and prepare them with a pressured rock drill in a lab.
    - If a fossil is encountered, all construction activities within the area must cease immediately. Thereafter, the relevant custodians must be informed.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
11. SAFETY OF THE LOCAL COMMUNITY	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activity: – Construction laborers working near the local community. **Nature of the potential impact:** – There is potential for construction labour to trespass onto neighbouring properties; – Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users, landowners and local residents.	Extent	**2**	Extent	**2**
	Magnitude	**6**	Magnitude	**2**
	Duration	**1**	Duration	**1**
	Probability	**3**	Probability	**2**
	SIGNIFICANCE POINTS:	**27**	**SIGNIFICANCE POINTS:**	**10**
	LOW	**LES**	**LOW**	**LES**

MITIGATION MEASURES:

- No construction staff is permitted on private land.
- Any construction personnel found to be trespassing on private land must be immediately subjected to a disciplinary hearing;
- Construction workers / construction vehicles must take heed of normal road safety regulations; ensuring all personnel must obey and respect the law of the road.
- A courteous and respectful driving manner must be enforced and maintained so as not to cause harm to any individual;
- A safe designated speed limit must be set by the project managers to limit possible road strikes and accidents.
- A site-specific EMPr has been compiled to manage construction activities and is attached as **Appendix F**.

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
12. DISRUPTION OF THE SOCIAL DYNAMICS WITHIN THE LOCAL COMMUNITY	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activity: – Construction workers living temporarily within the local community during the construction phase. **Nature of the potential impact:** – There is a likelihood of job seekers moving into the study area. Even though it is not expected that the presence of temporary workers will have a major impact on the social dynamics of the area, the potential in-migration of workers is likely to result in other cumulative impacts, such as conflict with existing community members, social inconveniences and/or problems and pressures on existing infrastructure.	Extent	**2**	Extent	**2**
	Magnitude	**6**	Magnitude	**2**
	Duration	**1**	Duration	**1**
	Probability	**4**	Probability	**2**
	SIGNIFICANCE POINTS:	**36**	**SIGNIFICANCE POINTS:**	**10**
	MODERATE	**MES**	**LOW**	**LES**

MITIGATION MEASURES:

- Construction workers who are already housed within the Social Impact Zone of the proposed site should be employed as opposed to establishing temporary housing for workers.
- It is not advised that temporary workers assimilate with the local communities and suitable accommodation in larger centres should be considered.
- The contractor should consider the establishment of a Community Monitoring Forum (CMF) in order to monitor the construction phase and the implementation of the recommended mitigation measures.
- The CMF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local councillors, affected landowners and the contractor(s).
- The CMF should also be briefed on the potential risks to the local community associated with construction workers.

D-4.3. No-go option

POTENTIAL ACTIVITIES/ IMPACTS	CONSTRUCTION PHASE			
	SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION		SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
DIRECT IMPACT				
Activity: – The project will not be initiated. **Nature of the potential impact:** – Should the project not go ahead, this will lead to the degradation of the existing crossing point, which will become susceptible to erosion. Gaining access at the crossing points will become more difficult with time. Linkage to the District roads will not be present and the local municipality will be failing in its duty to focus on the development and maintenance of Local roads.	Extent	N/A	Extent	N/A
	Magnitude	N/A	Magnitude	N/A
	Duration	N/A	Duration	N/A
	Probability	N/A	Probability	N/A
	SIGNIFICANCE POINTS	N/A	**SIGNIFICANCE POINTS**	N/A

D-5. IMPACTS ASSOCIATED WITH THE OPERATIONAL PHASE

POTENTIAL ACTIVITIES/ IMPACTS	OPERATIONAL PHASE			
1. IMPACTS ASSOCIATED WITH SOIL EROSION, SEDIMENTATION AND DEGRADATION OF THE WATERCOURSE	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
INDIRECT IMPACT				
Activity: – The existence of the culverts. **Potential Impacts:** In the longer-term, sediment movement as a result of an inadequately designed culverts can lead to excessive erosion adjacent to the structure affecting the channel dynamics both at the site and downstream. This will have knock-on effects on the aquatic fauna which inhabit both this system and downstream.	Extent	**2**	Extent	**1**
	Magnitude	**4**	Magnitude	**2**
	Duration	**5**	Duration	**5**
	Probability	**3**	Probability	**3**
	SIGNIFICANCE POINTS:	**33**	**SIGNIFICANCE POINTS:**	**24**
	MODERATE	**MES**	**LOW**	**LES**

POTENTIAL ACTIVITIES/ IMPACTS	OPERATIONAL PHASE			
2. IMPACT ASSOCIATED WITH THE REMOVAL OF RIPARIAN ZONE	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activity: – The existence of the culvert. **Potential Impacts:** **No specific impact in the Wetland report**	Extent	**2**	Extent	**1**
	Magnitude	**4**	Magnitude	**2**
	Duration	**5**	Duration	**5**
	Probability	**3**	Probability	**3**
	SIGNIFICANCE POINTS:	**33**	**SIGNIFICANCE POINTS:**	**24**
	MODERATE	**MES**	**LOW**	**LES**

POTENTIAL ACTIVITIES/ IMPACTS	OPERATIONAL PHASE			
3. IMPACTS ASSOCIATED WITH POLLUTION OF WATER RESOURCES AND SOIL	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activity: – The existence of the culvert. **Potential Impacts:** **No specific impact in the Wetland report**	Extent	**2**	Extent	**1**
	Magnitude	**6**	Magnitude	**4**
	Duration	**5**	Duration	**5**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**52**	**SIGNIFICANCE POINTS:**	**30**
	MODERATE	**MES**	**LOW**	**LES**

POTENTIAL ACTIVITIES/ IMPACTS	OPERATIONAL PHASE			
4. IMPACTS ASSOCIATED WITH ALIEN INVASIVE SPECIES	**SIGNIFICANCE RATING OF IMPACTS BEFORE MITIGATION**		**SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION**	
DIRECT IMPACT				
Activity: – The existence of the culvert. **Potential Impacts:** **No specific impact in the Wetland report**	Extent	**2**	Extent	**1**
	Magnitude	**4**	Magnitude	**2**
	Duration	**5**	Duration	**5**
	Probability	**4**	Probability	**3**
	SIGNIFICANCE POINTS:	**44**	**SIGNIFICANCE POINTS:**	**24**
	MODERATE	**MES**	**LOW**	**LES**

Table 11: Summary of the significant environmental impacts identified for the Construction of the project.

CONSTRUCTION PHASE			
	POTENTIAL IMPACT	**SIGNIFICANCE POINTS BEFORE MITIGATION**	**SIGNIFICANCE POINTS AFTER MITIGATION**
1	soil erosion, sedimentation and degradation of the watercourse	48 (MES)	21 (LES)
2	impacts associated with the removal of riparian zone	40 (MES)	15 (LES)
3	pollution of water resources and soil	48 (MES)	21 (LES)
4	alien invasive species encroachment	30 (LES)	14 (LES)
5	impacts associated with flora and fauna	32 (MES)	12 (LES)
6	impacts associated with soil and earthworks	48 (MES)	21 (LES)
7	impacts associated with waste and hazardous materials	44 (MES)	18 (LES)
8	impacts associated with pollution (noise pollution)	35 (MES)	15 (LES)
9	impacts associated with pollution (dust pollution)	45 (MES)	15 (LES)
10	heritage/ cultural artifacts	38 (MES)	10 (LES)
11	safety of the local community	27 (LES)	10 (LES)
12	disruption of the social dynamics within the local community	36 (MES)	10 (LES)
	AVERAGE	40 (LES)	16 (LES)

Table 12: Summary of the significant environmental impacts identified for the Operational of the project.

OPERATIONAL PHASE			
	POTENTIAL IMPACT	**SIGNIFICANCE POINTS BEFORE MITIGATION**	**SIGNIFICANCE POINTS AFTER MITIGATION**
1.	**degradation of the river channel**	**45 (MES)**	**21 (LES)**
2.	**pollution of water resources and soil**	**48 (MES)**	**21 (LES)**
3.	**impacts associated with removal of riparian zone**	**55 (HES)**	**24 (LES)**
4.	**spread of alien invasive species**	**44 (MES)**	**24 (LES)**
	AVERAGE	**48 (MES)**	**23 (LES)**

SECTION E: ENVIRONMENTAL IMPACT STATEMENT

E-1. PREFERRED ALTERNATIVE

This basic assessment report focused primarily on the construction of the proposed upgrade of the Draycott Roads and no.2 causeways structures in the Inkosi Langalibablele Local Municipality, KwaZulu-Natal. **There are no site alternatives, and the proposed site is the preferred alternative, as it was determined to be the most suitable location for the proposed structure.** The location was chosen based on the characteristics of the site as well as the most feasible option with respect to length, width and height of the banks of the watercourses.

- **The findings of the impact assessment undertaken for the construction phase indicated:**

The most significant impacts associated with the project are likely to be associated with the (i) risk of increased sediment inputs during construction, (ii) the risk of modifying natural/pre-development flow characteristics with the development of hardened surfaces and (iii) risks associated with the potential contamination of watercourses potentially during site operation. These impacts are expected to be of 'Moderately-Low' to 'Low' impact significance and therefore environmentally 'acceptable' levels with best practice or 'good' mitigation (i.e. taking into consideration the impact mitigation recommendations made by Eco-Pulse in section 8 of this specialist wetland assessment report). Assuming these best practice mitigation/management measures are effectively implemented, an additional standalone conceptual rehabilitation plan should not be required, as the additional value therein would be negligible in this instance

E-2. NO-GO ALTERNATIVE

No structures or roads will be constructed within the watercourses along route, therefore there will be no negative environmental impacts will be associated with construction activities within the watercourse. However, there will also be no positive impacts associated with the proposed site such as the improved connectivity/access to basic services in the area, and improved safety for all road users. The area is dominated by alien invasive vegetation, and if the proposed construction does not occur the area will aid not be rehabilitated. No erosion control structures will be implemented to reduce the high levels of erosion within the proposed site.

SECTION F: RECOMMENDATIONS

F-1. EAP RECOMMENDATIONS

- The Environmental Management Program (EMPr) must be strictly adhered to and implemented during the construction and operational phases.
- An ECO should be appointed by the applicant to undertake Environmental Audits monthly and submit monthly audit reports to the Competent Authority.
- All mitigation measures and factors outlined in the BAR & EMPr must be considered and brought to the attention of the Contractor during the Environmental Awareness Training conducted by the appointed ECO.
- All mitigations outlined by the wetland specialist must be implemented accordingly and adhered to by the contractor.
- The site engineer must ensure that proper storm water management takes place on site during the construction phase.
- Any pollution arising from the activity must be addressed immediately by the contractor with the assistance of the appointed ECO.
- Site rehabilitation must take place directly after construction ceases. The ECO must monitor such rehabilitation and ensure all recommendations outlined in the EMPr is strictly adhered.
- Waste recycling must be encouraged among construction workers.
- Prior to construction all relevant permits must be obtained and kept on-site.
- Local labour must be recruited for the proposed construction where possible.
- Should cultural artefacts be found near the site, construction must cease immediately, and the applicant must appoint a heritage specialist to submit a report to AMAFA. The construction will continue thereafter depending on specialist recommendations.
- The activities are in keeping with the land use of the surrounding area and it is therefore the EAP ‘s recommendation that the preferred activities be approved by the Competent Authority.

F-2. SPECIALIST RECOMMENDATIONS

F-2.1. Wetland Impact Assessment

Monitoring is required in order to ensure that freshwater habitats associated with the proposed development are maintained in their current ecological state or improved but incurring no net loss to functionality as a result of the project. It is recommended that a Monitoring Programme be developed and implemented in accordance with the following guidelines:

A. Responsibilities for monitoring:

Compliance monitoring will be the responsibility of a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that monitoring is undertaken effectively and appropriately.

B. Construction monitoring objectives:

Key monitoring objectives during the construction-phase should include:

• Ensuring that management and mitigation measure are adequately implemented to limit the potential impact on water resources; and

• Ensuring that disturbed areas have been adequately stabilised and rehabilitated to minimise residual impacts to affected water resources.

C. Record keeping:

The ECO shall keep a record of activities occurring on site, including but not limited to:

• Meetings attended;

• Method statements received, accepted and approved;

• Issues arising on site and cases of non-compliance with the EMPr;

• Corrective actions taken to solve problems that arise;

• Penalties/fines issued; and

• Complaints from interested and affected parties.

D. Construction phase monitoring requirements:

• During construction:

This involves the monitoring of construction related impacts as identified in this report. Regular monitoring of the construction activities is critical to ensure that any problems are picked up in a timeous manner. In this regard, the following potential concerns should be taken into consideration:

• Destruction of habitat outside the construction servitude including 'No Go' areas;

• Destruction of conservation important/protected plants and trees.

• Erosion of water resource units (rivers/stream bed and banks);

• Signs of intense or excessive erosion (gullies, rills, scouring and head cuts) and/or sedimentation within, along the edge and/or immediately downstream of the construction zone;

• Erosion of disturbed soils, road batters and soil stockpiles by surface wash processes;

• Sedimentation of aquatic habitats downstream of work areas;

• Altering the hydrology and through flows to downstream aquatic habitat during construction;

• Pollution of water resource units (with a particular focus on hazardous substances such as fuels, oils and cement products);

• Poorly maintained and damaged erosion control measures (e.g. sandbags, silt fences and silt curtains).

These risks can be monitored visually on-site by the ECO (together with construction staff) with relative ease and should be reported on regularly during the construction process. Any concerns noted should be prioritised for immediate corrective action and implemented as soon as possible.

• Directly after construction (rehabilitation effectiveness):

This involves monitoring the effectiveness of rehabilitation activities. Monitoring recommendations for rehabilitated rivers/streams and riparian areas have been included in the 'Rehabilitation Plan for Wetlands and Watercourses' (Eco-Pulse, 2016), included separately as Appendix A of this document.

E. Operation phase monitoring requirements:

This involves annual monitoring of water resource units (rivers/streams) affected by the development in order to ensure that operational impacts are being effectively managed. This

can also be achieved through basic visual inspections by the ECO and support staff, documenting issues such as:

- Invasive Alien Plant infestation;
- Scouring and deposition associated with storm water runoff;
- Development of erosion 'headcuts';
- Blockage/siltation of culverts/pipes/side drains;
- Scouring around infrastructure at watercourse crossings; and
- Erosion or instability of road embankments.

Monitoring is required in order to ensure that water resources affected by the proposed development are maintained in their current ecological state (or improved) but incurring no net loss to ecosystem integrity and functionality as a result of construction. It is recommended that a Monitoring Programme be developed and implemented in accordance with the following guidelines.

F-2.2. Heritage Impact Assessment (HIA)

The following recommendations must be adhered to:

- No grave site may be altered, disturbed or destroyed.
- A buffer zone must be strictly maintained around each grave site. Due to the proximity of some grave sites to the road the buffer zone may change depending the specific circumstances of each site.
- Should it not be possible to adhere to these mitigation specifications then the developer may request a Phase 2 Heritage Impact Assessment by a 'grave relocation expert'. The Phase 2 study will assess the feasibility of a grave exhumation and translocation exercise. The consultant will also apply for a grave exhumation permit from the Amafa, the provincial heritage authority.

F-2.3. Palaeontological Impact Assessment (PIA)

Although several fossil and archaeological sites are known within the broader district, none were recorded during the ground survey and the proposed road upgrades will likely have zero impact on palaeontological resources. The thick sediment package making up the Quaternary deposits acts as a buffer to protect fossiliferous bedrock from potential damage caused by construction activities above.

Based on the assessment from the field survey, my recommendation is that the road upgrades can proceed. Whilst it is probable that fossils may lay buried somewhere in the vicinity of the proposed development (based on the SAHRA sensitivity map), the new roads will be built on existing dirt roads where the landscape is already disturbed as a result of the levelling out and overall construction process. The depth required for the foundations of the new roads is also insufficient to reach bedrock, thereby reducing the chances that sensitive strata will be encountered. However, infrastructure upgrades should proceed with caution and in a sensitive manner as heavy machinery may expose fossils not visible during the ground survey. If further excavation and disturbance of the surface should reveal palaeontological material, construction would need to halt immediately. The relevant heritage resources agency (Amafa or SAHRA) would need to be informed and a field palaeontologist would be required to visit the site to evaluate such fossil discoveries.

SECTION G: CONCLUSION

It is the opinion of the EAP that the proposed project should proceed based on the findings and recommendations of the specialist and engineering reports. It is the professional opinion of the EAP that all potential impacts that could potentially occur during the construction and operational phase of the proposed development have been identified and key impacts and their mitigation measures are provided in this report.

The proposed activity has been carefully planned to cater for the improved needs and necessities of the community while being mindful of imposing the least negative environmental impacts. Specialist studies (Freshwater Ecosystem/ Heritage/Palaeontological) have identified site specific impacts of the development and have put forward mitigations that need to be implemented to minimise impact significance during construction, as well as the operational phase of the proposed project.

Given that these scores reflect a borderline case, and with the addition of specific mitigation measures for each water resource unit, all risk ratings have the potential to be reduced to low levels overall. This suggests that the development could potentially be authorised in terms of the GA (General Authorisation) for Section 21 (c) and (i) water uses and must be lodged with the Department of Water and Sanitation.

APPENDICES

APPENDIX A - MAPS

A.1 – Aerial Map

A.2 – Locality Map

A.3 – Layout Map

A.4 – Sensitivity Map

APPENDIX B – SITE PHOTOGRAPHS

APPENDIX C – CIVIL DESIGN INFORMATION

C.1 – Design Report

C.2 – Construction Method Statement

C.3 – Storm Water Management Plan (SWMP)

C.4 – Civil Design Drawings

C.5 – Master Layout Plan

APPENDIX D – SPECIALIST STUDIES

D.1 – Wetland Impact Assessment

D.2 – Heritage Impact Assessment (HIA) / Palaeontological Impact Assessment (PIA)

APPENDIX E – PUBLIC PARTICIPATION

E.1 – Newspaper Advertisement

E.2 – Proof of Site Notices

E.3 – Ward Councillor Notification

E.4 – Community Meeting

E.5 – AMAFA Interim Comment

E.5 – AMAFA Final Comment

APPENDIX F – ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

APPENDIX G – OTHER INFORMATION

G.1 – EAP Declaration Form

G.2 – Specialist Declaration Form

G.3 – Project Team Resumes

G.4 – EDTEA Pre-application meeting