

DRAFT BASIC ASSESSMENT REPORT

PROPOSED UPGRADE AND WIDENING OF THE P483 ROAD, NEWCASTLE, AMAJUBA DISTRICT MUNICIPALITY, KWAZULU-NATAL

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



Name of the Applicant: KZN-DOT

Submitted on behalf of: Anderson Vogt Consulting

DOCUMENT INFORMATION

Title	Proposed upgrade and widening of the P483 road, Newcastle, Amajuba District Municipality, KwaZulu-Natal
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Client	KZN Department of Transport
Issue Date	

REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT

This Draft Basic Assessment Report is available for commenting for a period of **30 days** (excluding Public Holidays) from **25 February 2016** until **01 April 2016**. A copy of the report is available at the Newcastle Municipal Library and upon request from Afzelia Environmental Consultants (Pty) Ltd.

Please send your comments and queries before **01 April 2016** to:

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EXECUTIVE SUMMARY

PROJECT BACKGROUND AND LOCATION

Afzelia Environmental Consultants (Pty) Ltd was appointed by Anderson Vogt Consulting on behalf of the KwaZulu-Natal Department of Transport (KZN DoT) to conduct an environmental assessment in the form of a Basic Assessment Report for the proposed upgrade of the P483 provincial road, which is the major access road to and from Newcastle to Madadeni, Osizweni and Utrecht.

KZNDOT is planning on widening P483 by an extra two lanes to relieve the current traffic build-up pressure on this road; due primarily to increased population growth of Madadeni and Osizweni

The GPS co-ordinates of the area of construction are approximately:

Start: 27° 23' 57.92" S; 30° 56' 09.11" E

End: 27° 46' 10.02" S; 30° 1' 11.24" E

The first phase of this project entails the upgrading and widening of P483, currently a single carriageway road to a double undivided carriageway hi-way from Km 0+000 and km 7+000. This will significantly improve access between the Newcastle CBD and the residential areas of Madadeni and Osizweni.

The proposed upgrading and widening of P483 and associated infrastructure is in line with the objectives of the Amajuba District Municipality Strategic Development Plan (SDP) and is pivotal for future growth.

The scope of activities planned for this project include, *inter alia*;

- Widening of Road over Rail Bridge at km 0+600;
- Widening of iNgagane River Bridge at km 6+800;
- Upgrading of culverts; and
- Widening of 4 major intersections, i.e. N11 intersection at km0+000
Karbochem intersection at km 0+900
Airport/waste site intersection at km2+000
Albert Wessels intersection at km5+200

As part of construction, the following activities are likely to cause environmental damage:

- Clearing of vegetation to establish the project footprint;
- Earth layer works and ground compaction;
- Installation of associated stormwater infrastructure;
- Establishment of casting yard for in situ concrete casting;
- Stockpiling of construction material;
- Equipment laying down;
- Storage of hazardous chemicals and substances; and
- Extension and lengthening of culverts

LEGISLATIVE AND REGULATORY REQUIREMENTS

As the above environmental activities are likely to cause environmental degradation, a Basic Assessment process must be undertaken in accordance with the 2014 EIA regulations promulgated through the provisions of the National Environmental Management Act 107 of 1998 (Act 107 of 1998).

The following activities, under Listing Notice 1, have been identified:

- Activity 12 – The development of bridges and bulk stormwater outlet structures exceeding 100 square metres in size within 32 metres of a watercourse.
- Activity 19 - The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from (i) a watercourse.
- Activity 48 – The expansion of bridges and bulk stormwater outlet structures by 100 square metres or more in size.
- Activity 56 – The widening of a road by more than 6 metres, where (i) the existing road reserve is wider than 13.5 metres.

In addition to obtaining environmental authorisation from the Department of Economic Development, Tourism and Environmental Affairs, a Water Use Licence must be approved in terms of Section 21 of the National Water Act (Act No. 36 of 1998); as amended by the Department of Water and Sanitation.

Public Participation is currently underway and comments from this draft BAR will be incorporated into the final report.

Activity Motivation has been discussed in accordance with the Guidelines on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 – GN 891 issued in October 2014 in GG 38108.

MOTIVATION

The direct need for the upgrading of P483 is primarily due to the need to alleviate traffic congestion in both directions from Newcastle to Madadeni, Osizweni and Utrecht. As the population of these areas increases, traffic flow is increasing at a considerable rate, leading to safety hazards, primarily in the form of taxi lay-byes. The project will help alleviate this problem and accommodate for the current and future needs of commuters.

Social benefits associated with the upgrading and widening of P483 include:

- Employment opportunities;
- Improved safety of motorists and pedestrians;
- Reduction in road inconveniences and delays;
- Improve traffic efficiency; and
- Temporary economic upliftment

Environmental benefits associated with the upgrading and widening of P483 include:

- Improved stormwater infrastructure resulting in improved ecological functioning of the wetland systems and the iNgagane River;
- Decreased soil erosion;
- Decreased sedimentation of the iNgagane River; and

- Decreased alien invasive plant cover as a result of the implementation of an alien invasive plant control plan, as outlined in the Environmental Management Programme

In accordance with the 2014 EIA regulations, activity motivation was undertaken to assess Need and Desirability in terms of the guidelines. The proposed development is aligned with the Newcastle Spatial Development Framework and the Amajuba District Integrated Development Plan 2014/2015.

ALTERNATIVES

As this project is the widening of an existing road on a disturbed footprint, no site alternatives have been assessed.

SPECIALIST STUDIES

Section B of this report highlights the findings of the specialist reports. A traffic impact assessment, wetland delineation and functional assessment, heritage impact assessment and geotechnical assessment were conducted for the project.

Traffic Impact Assessment

According to the traffic impact assessment, average weekday traffic and average daily traffic counts in the years 2018/2019 is estimated at approximately 13 300 and 12 650 respectively. As per KZN DOT traffic standards, these volumes meet the minimum criteria for the current road to be upgraded to a 4 lane dual carriageway.

Wetland Delineation and Functional Assessment

The wetland assessment identified the presence of five wetland units within 500m of the existing P483 road, i.e. three (3) hillslope seeps, a floodplain and a channelled valley bottom. The wetlands were all categorised as largely modified (PES Category D) with the exception of one hillslope seep associated with the floodplain that was categorised as moderately modified (PES Category C). The floodplain system and associated hillslope seep were determined to have a medium Ecological Sensitivity and Importance EIS. The EIS of the remaining hillslope seeps and channelled valley bottom was recorded as low due to the largely modified characteristics of these wetland units.

Social Impact Assessment

The findings of the social assessment indicated that the proposed upgrading of P483 will support the future economic development of Madadeni and Osizweni. The road upgrade will improve road safety for motorists and pedestrians and improve access to the area. The project will also create employment and business opportunities during the construction phase. The no-go option would hinder the future economic development of Newcastle and the surrounding areas. The no-go option would also result in the deterioration of the current road surface and increased safety risks to motorists and commuters.

Heritage Impact Assessment

The construction of the existing road has resulted in damage to any possible previous sites of heritage significance. As such, no sites of heritage potential were identified.

Geotechnical assessment

The geotechnical investigation identified that P483 is underlain by sedimentary rock of the Vryheid Formation of the Ecca Group and the Karroo Supergroup. Shale, sandstone and siltstone are the most common rock types.

IMPACT ASSESSMENT AND EAP'S RECOMMENDATIONS

At this stage of the project, there is limited design information available, limiting the assessment outcomes/impacts of the project. It has been proposed that concrete structures will be cast in situ. However, as the practise of in situ casting has far higher environmental impacts compared to precast concrete structures, it is not supported by the EAP. Should in situ concrete casting take place, the casting yard must **not** be located within 100m of the iNgagane River and the temporary boundary of any wetland units. The location for the casting yard must be approved by the Independent Environmental Control Officer before establishment of the yard and before any activities can commence. Waste water from the casting yard must be "trapped" and disposed of at a Hazardous Landfill site.

The engineering and construction protocols for the widening of the iNgagane River bridge are not available at this time; therefore, the exact process of widening the bridge cannot be assessed as it is not known if additional abutments/piers will be needed.

Of particular concern is the impact of the road widening through the hillslope seep associated with the floodplain, as this wetland unit has a high functional status which will be directly affected by both construction and operation of the road.

In addition, the extension of the general road servitude from 30m to 40m in this wetland is not supported as this will allow for a large area of the natural environment to be negatively impacted.

Construction activities must be strictly controlled such that the work servitude must only be to the north of the existing P483 and must be limited to 8m in width. Further mitigation measures that must be fully implemented and adhered to have been stipulated in the Draft Environmental Management Programme, attached as Appendix.

MONITORING

An Independent Environmental Control Officer (IECO) with suitable experience must be appointed for the duration of the construction phase. Due to the size and complexity of the project, an independent Environmental Site Officer (ESO) with suitable experience should also be appointed and be present on the site at all times to oversee construction activities and ensure compliance with the Environmental Management Programme (EMPr), conditions as stipulated to in the Environmental Authorisation (if granted) and the Water Use licence.

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ACRONYMS AND ABBREVIATIONS

EDTEA	Department of Economic Development, Tourism and Environmental Affairs (KZN)
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ESO	Environmental Site Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
HGM	Hydrogeomorphic Unit
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
WULA	Water Use License Application
KZN	KwaZulu-Natal
NEMA	National Environmental Management Act (107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act (No 36 of 1998)
PES	Present Ecological State
PPP	Public Participation Process
SABS	South African Bureau of Standards
SANS	South African National Standards
SDF	Spatial Development Framework
SMP	Stormwater Management Plan
SUDS	Sustainable Urban Drainage Systems

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER,
SPECIALISTS AND PROPONENT

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

Table 1: Contact details of the EAP'S Organisation

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Table 2: Names and details of expertise of the EAP involved in the preparation of the report

Names of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (years)
Miss Astika Bhugeloo	MSc Environmental Science	IAIAsa	1
Ms Adrienne Edgson (Reviewer)	SAQA: Environmental Law; Environmental Impact Assessment Procedures; Environmental Risk Assessment; Estuarine Management; Waste Laws and management; Wetland Rehabilitation	IAIAsa, IAP2, ELA	18

NAMES AND EXPERTISE OF SPECIALISTS

Table 3: Names and details of expertise of each specialist that has contributed to the report

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/ s as attached in Appendix I
Rowena Harrison	MSc Soil Science	Wetland assessments	Wetland delineation and functional assessment
Frederick Volbrecht	Masters in Engineering	Geotechnical assessments	Geotechnical Assessment
Stephan Gaigher	BA Hons Archaeology (UP)	Heritage Impact Assessments	Heritage Impact Assessment
E.J. Anderson	BSc Engineering (Civil)	Civil Engineering, Traffic Impact Assessments	Traffic Impact Assessment

CONTACT DETAIL OF PROPONENT

Table 4: Contact details of Proponent and Project Manager

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1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 Background

Afzelia Environmental Consultants (Pty) Ltd was appointed by Anderson Vogt Consulting on behalf of the KwaZulu Natal Department of Transport (KZN D.o.T) to conduct an environmental assessment in the form of a Basic Assessment Report for the proposed upgrade of the P483 provincial road. The P483 provincial road forms the major access road to and from Newcastle to Madadeni, Osizweni and Utrecht.

Since the original road was built the population at Madadeni and Osizweni has increased significantly along with the traffic volumes, especially during the rush hour period. KZNDOT is considering the option of widening the road by an extra two lanes to relieve the current traffic build-up pressure. The project entails the upgrading and widening of P483, currently a single carriageway road to a double undivided carriageway hi-way from Km 0+000 and km 7+000.

Included in the scope of work are:

- Upgrading of culverts and storm water infrastructure;
- Construction of pedestrian sidewalks;
- Widening of Road over Rail Bridge at km 0+600;
- Widening of Ingangane River Bridge at km 6+800; and
- Widening of 4 major intersections, i.e. N11 intersection at km 0+000;
Karbochem intersection at km 0+900;
Airport/waste site intersection at km2+000; and
Albert Wessels intersection at km5+200

The proposed site is found within the Quarter Degree Grid Squares (QDGS) 2729DD and 2730CC, situated in Newcastle.

Approximate geographical co-ordinates for the proposed project are:

	S	E
Start of road	27° 23' 57.92"	30° 56' 09.11"
End of road	27° 46' 10.02"	30° 1' 11.24"

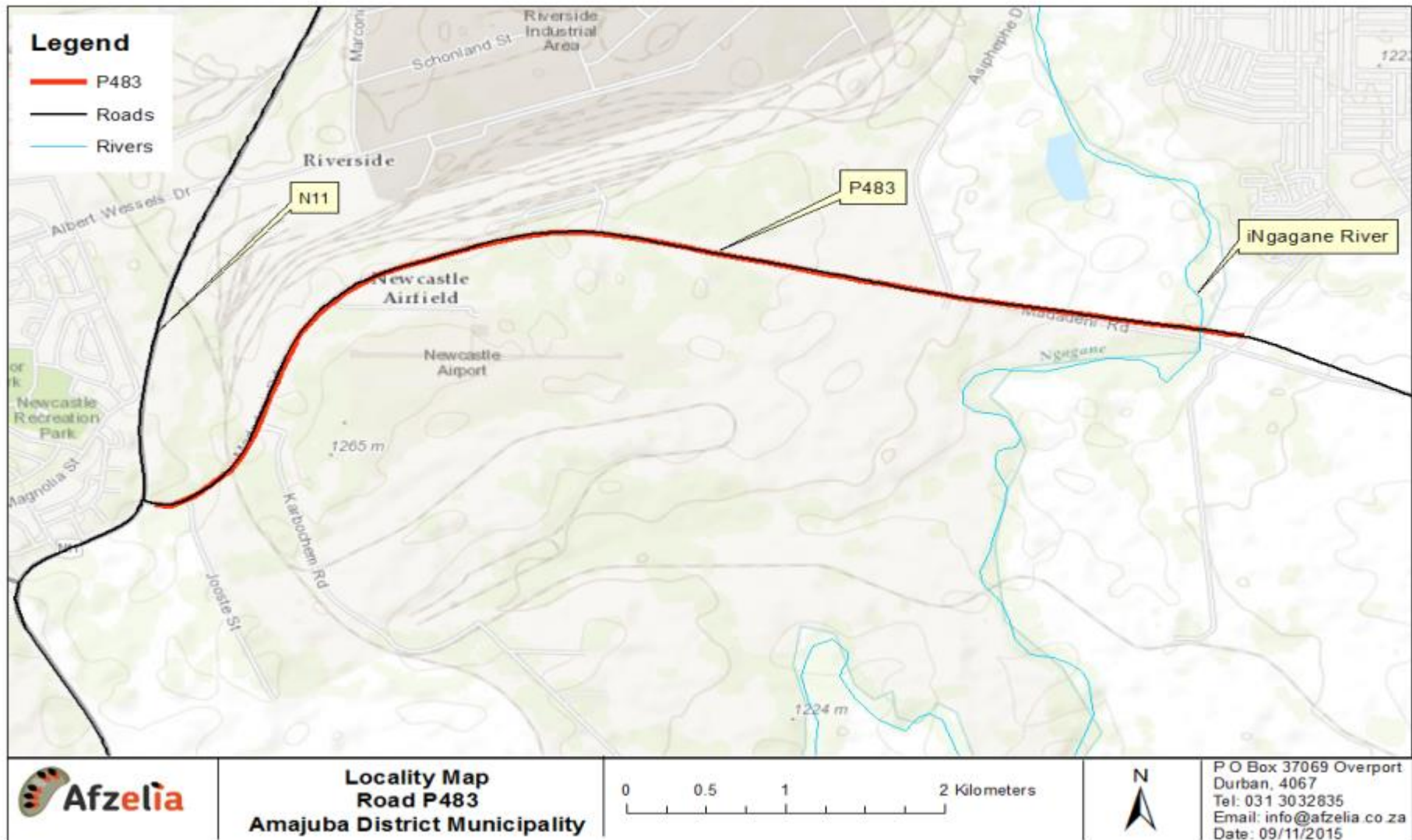


Figure 1: Locality map of P483

1.2 Alternatives

As this project is the widening of an existing road on a disturbed footprint, no site alternatives have been assessed.

“No Go” Alternative (status quo)

The “no go” alternative means that the *status quo* is maintained and road P483 is not upgraded and improved. There will continue to be a lack of inadequate mobility and accessibility. Temporary employment for the surrounding community and skills development will not take place. This will continue to hinder the economic growth of the area.

The wetland systems and iNgagane River are currently being impacted upon by urban development surrounding the existing road. The increase in hardened surfaces has changed the hydrological flow of the wetlands, leading to soil erosion, changes in species composition and a subsequent decrease in basal cover. This is due largely to ineffective stormwater management along P483. If stormwater management of P483 is not improved, ecological degradation of the iNgagane River and wetland systems will continue to worsen.

2. ENVIRONMENTAL LEGAL REQUIREMENTS FOR THE PROPOSED PROJECT

2.1 NEMA EIA Regulations 2014

In accordance with Environmental Impact Assessment (EIA) Regulations and its Listing Notice, promulgated in November 2014, the table below shows all the activities that trigger a Basic Assessment process:

Table 5: Listed Activities in terms of EIA Regulations 2014

Government Notice Number	Activity number	Description of each listed activity
No. R. 983 of December 2014 (Listing Notice 1)	12	The development of - (iii) bridges exceeding 100 square metres in size; (vi) bulk stormwater outlet structures exceeding 100 square metres in size where such development occurs (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.
	19	The infilling or depositing of any material of cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from - (i) a watercourse.
	48	The expansion of - (iv) bridges where the bridge is expanded by 100 square metres or more in size; (vi) bulk stormwater outlet structures where the bulk storm water outlet structure is expanded by 100 square metres or more in size.
	56	The widening of a road by more than 6 metres - (i) where the existing reserve is wider than 13.5 metres.

2.2 National Water Act (Act 36 of 1998)

The proposed project requires a water use authorisation in terms of Section 21 (c) and (i), in accordance with the provisions of the National Water Act 1998 (Act No. 36 of 1998); as amended.

Table 6: Listed Activity in terms of the National Water Act 1998 (Act No. 36 of 1998)

Activity Number	Water Use	Explanation / definitions
Section 21 (c) of NWA, 1998	Impeding or diverting the flow of water in a watercourse.	<ul style="list-style-type: none">• Impeding flow means the temporary or permanent obstruction or hindrance to the flow of water into watercourse by structures built either fully or partially in or across a watercourse.• Diverting flow means a temporary or permanent structure causing the flow of water to be rerouted in a watercourse for any purpose.
Section 21 (i) of NWA, 1998	Altering the bed and banks of a watercourse or characteristics of a watercourse.	<ul style="list-style-type: none">• Altering the bed and banks means any change affecting the resource quality of the watercourse (the area within the riparian habitat or 1:100 year floodline, whichever is the greatest).

2.3 Applicable Legislation, Policies and/or Guidelines

Table 7: Applicable legislations, policies and/ or guidelines

Title of legislation, policy or guideline:	Administering authority:	Date:
National Environmental Management Act, as Amended (Act 107 of 1998)	Delegated to provincial authority; Department of Economic Development, Tourism and Environmental Affairs (EDTEA)	1998
Environmental Impact Assessment Regulations, Published under GNR 982,983,984 and 985 (4 December 2014), as amended	Delegated to provincial authority; Department of Economic Development, Tourism and Environmental Affairs (EDTEA)	2014
South Africa's Constitution (Act 108 of 1996), specifically the Bill of Rights (Chapter 2, Section 24)	The State	1996
National Water Act (Act 36 of 1998)	Department of Water and Sanitation	1998
Hazardous Substances Act (Act 15 of 1973)	Department of Health (DoH)	1973
National Environmental Management: Waste Act (Act 59 of 2008)	National Department of Environmental Affairs	2008
National Environmental Management: Biodiversity Act, (Act 10 of 2004)	Ezemvelo KwaZulu-Natal Wildlife (EKZNW)	2004
Conservation of Agricultural Resources Act (Act 43 of 1983)	Department of Agriculture, Forestry and Fisheries (DAFF)	1983
KwaZulu-Natal Planning and Development Act (Act 6 of 2008)	Emadlangeni and Newcastle Local Municipalities & Department of Cooperative Governance and Traditional Affairs (COGTA)	2008
Spatial Planning and Land Use Management Act (Act 16 of 2014)	National Office of the Department of Rural Development & Land Reform	2014
Minimum requirements for handling, classification and disposal of hazardous waste (DWAF, second edition, 1998) based on the Environment Conservation Act 73 of 1989.	Department of Water and Sanitation (DWS)	1998
KwaZulu-Natal Provincial Roads Act (Act No. 4 of 2001)	Department of KZN Transport	2001
National Road Traffic Act (No. 93 of 1996)	KwaZulu-Natal Department of Roads and Transport	1996
Amajuba District Municipality IDP 2015/ 2016	Amajuba District Municipality	2015/16
South African Water Quality Guidelines. Volume 8	Department of Water and Sanitation	1996

2.4 General Impacts with Legislative Requirements

Waste, Effluent, Emission and Noise Generation

Solid waste management

Solid waste will be generated during the construction phase. Solid waste generated onsite must be disposed of at a registered and operational landfill site. The Newcastle Municipal Landfill is the closest landfill site and it is advised that all non-hazardous waste be transported and disposed of at this landfill facility. Any hazardous waste must be disposed of via a registered waste disposal company such as Enviroserv or Wastetech.

Liquid effluent and waste

Sewage must be disposed of into the municipal sewage system, discharging at the nearest Waste Water Treatment Works (WWTWS). Liquid waste resulting from construction activity must be stored in isotankers and disposed of via a registered waste disposal company, such as Enviroserv or WasteTech.

Atmospheric emissions

During construction of P483, dust and vehicular emissions will be produced. This must be mitigated by adhering to recommendations made in the EMP, which include the following:

- Loads of loose material (such as sand etc.) must be covered and/or dampened during transportation;
- Vehicles travelling on the construction site must adhere to speed limits to avoid generating excessive dust;
- The construction site must be dampened with a water bowser as necessary to minimise dust; and
- Fires are not permitted on site.
- Mechanical road sweeping is not permitted.

Generation of noise

Construction vehicles and other construction related activities will generate noise during the construction phase of the project. Noise levels during the day are anticipated to be less than 70dBA as required by SANS 10103 and therefore a licence will not be required. As P483 is a main road with heavy traffic flows during peak hours, construction may occur during night and weekend hours. If noise levels exceed 60dBA during night hours, a licence will be required as per SANS 10103.

Energy efficiency

The movement of construction vehicles must be monitored and restricted to a minimum to reduce fuel usage and carbon footprint impacts.

Alternate sources of electricity such as generators shall be used to power electric tools. Should there be a need for cooking food, LPG stoves must be used.

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

3. DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Climate

P483 is situated in the Newcastle area of KwaZulu-Natal. The climate is characterised by a summer rainfall pattern with some rain in winter. The majority of the summer precipitation is in the form of thunderstorms. The area receives the lowest rainfall in June (0mm) and the highest rainfall in January (125mm). The mean annual temperature is

approximately 16.5°C with approximately 15 frost days per year (Mucina and Rutherford 2006, Scott-Shaw and Escott, 2011).

3.2 Vegetation

The study site is situated within the KwaZulu-Natal Hinterland Thornveld vegetation type; characterised by undulating plains of open thornveld, situated on upper margins of river valleys. This vegetation type is considered vulnerable with no statutorily conserved areas. More than 20% of the vegetation type has been transformed as a result of cultivation and urban sprawl (Mucina and Rutherford, 2006).

3.3 Geology

According to the geotechnical investigation, P483 is underlain by sedimentary rock of the Vryheid Formation of the Ecca Group and the Karroo Supergroup. Shale, sandstone and siltstone are the most common rock types. Coal seams occur in some places along the route.

Dolerite sills and dyke intrusions are common. Alluvial deposits of sands, silts and clays overlie sedimentary deposits and igneous intrusions along stream lines. These alluvial deposits are geologically recent deposits and are most likely derived from the iNgagane River.

3.4 Catchment characteristics

The proposed project falls within the quaternary catchments V31K and V31J which is part of the Buffalo Sub Water Management Area and the Thukela Water Management Area. The project crosses the iNgagane River which is considered a Class D, Largely Modified river (Driver *et al.*, 2011).

3.5 Land uses and existing impacts

The V31K and V31J quaternary catchments are categorised as urbanised catchments and are generally associated with transformation (Ilunga and Singh, 2011; 2015). These quaternary catchments are catchments of the Buffalo River and are considered to have good water quality (Ilunga and Singh, 2011; 2015).

Land uses within the catchments are generally associated with transformation and the Newcastle area is considered an industrial hub.

3.6 NFEPA wetlands

The NFEPA project aims to produce maps which provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. Examination of the NFEPA GIS database identified a floodplain wetland system, a channelled valley bottom wetland and 2 wetland flats within the 500m assessment buffer of P483.

3.7 Wetlands

According to the wetland assessment report, five hydrogeomorphic (HGM) units were identified within 500m of P483. The hillslope seep situated adjacent to the floodplain was classified as moderately modified. The floodplain, channelled valley bottom and remaining hillslope seeps were classified as largely modified. These systems will all be impacted upon by the road widening.

As the wetlands will be directly impacted upon by the road upgrade, a water use license must be applied for before the project commences, as per the requirements in terms of Section 21 of the National Water Act 1998 (Act No. 36 of 1998).

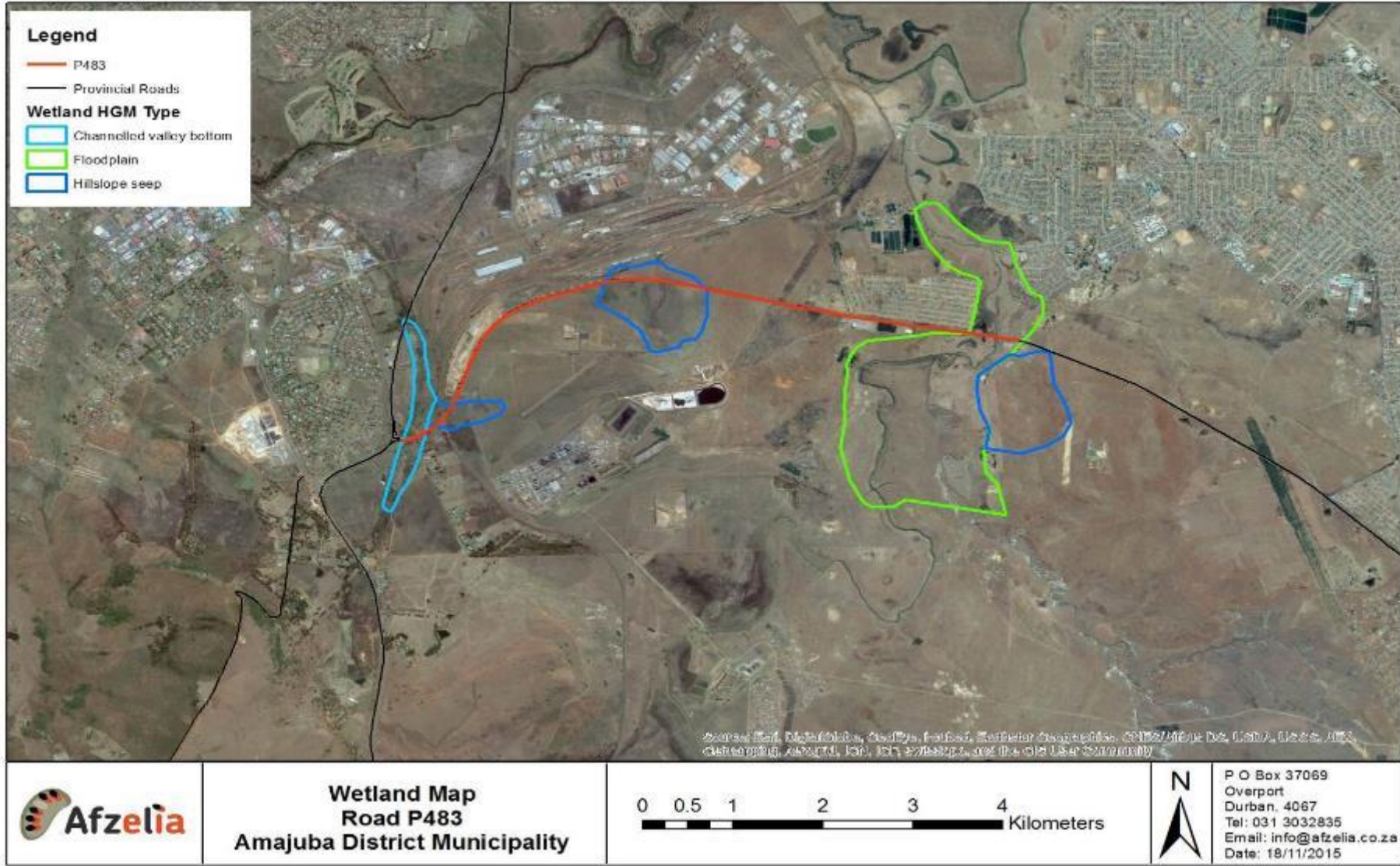


Figure 2: Wetland units identified within 500m of P483

3.8 Services and Infrastructure

The Kwamathukuza residential area is situated approximately 30m away from the current P483 road. It is anticipated that during future phases of the road widening, certain parts of the community (those closest to the road reserve) will have to be displaced in order to accommodate the road widening. As displacement of people bears a huge psychological impact, a social impact assessment will need to be undertaken and compensation brokered prior to the widening of the road at this point commences, which is anticipated to be March 2018.





Photograph 1: a) View of Kwamathukuza to P483; b) and c) Overview of Kwamathukuza residential dwellings

The first intersection to be upgraded leads from the N11 to P483 (km0+00). The second intersection to be upgraded, along P483, leads to the Karbochem chemical manufacturing plant (km0+900). The intersection at km1+900 leads to the Newcastle Airport. The final intersection to be upgraded is the Albert Wessels intersection at km5+200.

There are various other services and businesses situated along the route (**Photograph 2**). These include:

- Caltex Service Station;
- Cashbuild (Building supplies retailer);
- Dry cleaning services: and
- Building blocks supply store



Photograph 2: a) Caltex Service Station situated along P483; b) Cashbuild store and Dry cleaning services situated along P483; c) Building blocks supply store situated along P483



Figure 3: Position of services and infrastructure located along P483

4. ACTIVITY MOTIVATION

4.1 NEED AND DESIRABILITY OF THE ACTIVITY

The Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 – GN 891 issued in October 2014 in GG 38108 has been used to inform and provide structure for the Need and Desirability Report of a project.

The concept of “need and desirability” relates to, amongst others, the nature, scale and location of the development being proposed, as well as the wise use of land. Need and desirability are inter-related and the two should be considered in an integrated and holistic manner.

The following policies, statues and documents were examined:

1. The National Environmental Management Act Principals.
2. National Spatial Development Perspective (NSDP) (2003 and updated in 2006);
3. Spatial Planning and Land Use Management Act Principles
4. The New Growth Path (2010);
5. The National Development Plan 2030;
6. The Integrated Development Plan (IDP) for the Amajuba District Municipality;
7. The Spatial Development Framework; and
8. The Environmental Management Framework & Strategic Environmental Framework

Need:

The direct need for the upgrading of P483 is primarily due to the need to alleviate traffic congestion in both directions from Newcastle to Madadeni, Osizweni and Utrecht. As the population of these areas increases, traffic flow is increasing at a considerable rate. There is also a need for pedestrian sidewalks to improve pedestrian safety. Newcastle is considered an economic and industrial hub; improved access to and from Newcastle is therefore important to help facilitate economic growth of the area.

The spatial and temporal need for the project is justified as it can be regarded as a societal priority in the local area. The proposed upgrading and widening of P483 and associated infrastructure is in line with the objectives of the Amajuba District Municipality Strategic Development Plan (SDP) and is therefore pivotal for future growth.

Desirability:

During 2011, the Newcastle Local Municipality completed a Spatial Development Framework (SDF) for its area of jurisdiction. The SDF identified and quantified selected focus areas as focus areas of future priority development. One of these focus areas was identified as the ‘Main Road 483 Corridor’ which intends to connect and strengthen the link between the Newcastle CBD and the residential areas of Madadeni and Osizweni.

At a social level facet, the proposed development will have long term positive benefits, as it will improve the safety of pedestrians as there will be a paved walkway on either side of the road; improve the safety of motorists, reduce inconveniences and delays and improve traffic efficiency. It is unlikely that the proposed development will significantly change the visual character of the area or affect the “sense of place”, as the road currently has high traffic volumes and there are various industries and services situated along the route, including the Newcastle Airport, Newcastle Train Station, Karbochem chemical manufacturing plant and a Caltex service station.

Additional benefits will include temporary employment opportunities being created for the local community. This will provide temporary economic upliftment to the local communities by possibly helping to create a boost in local business during the construction phase. Skill development opportunities could also be achieved and the acquisition of such skills by inexperienced labourers could be used to secure and retain employment in other projects once construction of P483 is complete. Skills development and employment opportunities fall under the 'Municipal objectives and strategies' under the Amajuba District IDP 2014/2015.

From the above-mentioned development plans, it is expected that the project is provided for in the infrastructure planning of the Amajuba District Municipality as well as the Newcastle Local Municipality.

4.2 NEMA requirements in terms of development criteria:

In order to take into consideration, the objectives of the Integrated Environmental Management (IEM) as set in Section 23 of NEMA, this basic assessment report along with the inputs from the specialists has identified, predicted and evaluated the potential impacts of the project on the environment.

In accordance with Section 2 of NEMA the following principles of environmental management have been complied with:

1. Adopting a risk-averse and cautious approach. See specialists' reports. **Appendix I**
2. Anticipating and preventing or minimising negative impacts. See EMPr. **Appendix H**
3. Pursuing integrated environmental management. **Appendix D**
4. Involving stakeholders in the environmental authorisation process. **Appendix D**
5. Considering the social, economic and environmental impacts of activities. **Section D** of this report
6. Placing people and their needs at the forefront of concern and serve their needs equitably. **Appendix D**
7. Ensuring that development is sustainable, minimises disturbance of ecosystems and landscape, pollution and waste, and achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources.
8. Duty of Care of the Environment, and
9. Polluters Pay Principle. See EMPr. **Appendix H**

Mitigation measures have been incorporated into the EMPr to help ensure protection of the natural environment; re-dress present degradation. **See Appendix H.**

5. SITE/AREA DESCRIPTION

Specialists were consulted during the completion of this section; the full reports are attached in Appendix I

5.1 Geotechnical Assessment

The following is extracted from the Geotechnical Assessment conducted for the study site during September 2015.

Specialist:	Frederick Volbrecht for Ground Africa Consulting Engineers
Contact person:	Frederick Volbrecht
Qualification:	Masters in Engineering (University of Sydney)
Professional affiliation(s) (if any)	<i>Engineering Council of South Africa, South African Institution of Civil Engineering</i>

The general geology of P483 is summarised below:

P483 is underlain by sedimentary rock of the Vryheid Formation of the Ecca Group and the Karoo Supergroup. Shale, sandstone and siltstone are the most common rock types. Coal seams occur in some places along the route.

Dolerite sills and dyke intrusions are common. Alluvial deposits of sands, silts and clays overlie sedimentary deposits and igneous intrusions along stream lines. These alluvial deposits are geologically recent deposits and are most likely derived from the iNgagane River.

Site specific recommendations:

Bridges:

Road over Rail Bridge:

- It is recommended that the new portions of widened bridge be established on piled foundations that are securely socketed into the competent underlying sandstone (between approximately 8.0m and 12.0m below present ground level).
- Rock sockets for individual piles must extend through this minimum depth to reach competent founding rock.
- Bored, temporarily cased cast-in-situ piles will be a suitable pile type for this location. Pile augers must have the drilling capability to intersect the hardpan ferricrete horizon and reach the underlying sandstone horizons.

Road over River Bridge:

- The new portions of widened bridge must be established on piled foundations that are securely socketed into the underlying rock.
- Rock sockets for individual piles must extend through the top of rock level to firmly secure individual foundations in fresh, unweathered rock.
- Bored, temporarily cased cast-in-situ piles will be a suitable pile type for this location. Some boulders may be present in the overlying alluvial layers; therefore, suitably sized pile equipment must be specified.

Culverts:

- Culvert 1 must be established on steel reinforced concrete foundations keyed to at least 200mm into high strength sandstone rock. Foundations must be securely seated into fresh unweathered sandstone. Foundations with a rectangular plan area of approximately 6.0m x 1.0m, securely keyed into the very high strength sandstone are anticipated to have allowable bearing capacities of approximately 800kPa to 1000kPa. Culvert C1 does not directly impact any wetland units (Figures 4 and 5).
- Culvert C2 must be built on hardpan ferricrete. Breaking away the ferricrete horizon to place the new extensions on the underlying residual clays is not recommended. It is recommended that the culvert be founded on steel reinforced concrete foundations placed directly on the hardpan ferricrete layer. Culvert C2 lies directly within a hillslope seep (HGM unit 3) (Figures 4 and 5).
- Culvert C3 lies within a floodplain (HGM unit 2); no geotechnical recommendations were provided for this culvert (Figures 4 and 5).



Figure 4: Position of culverts along P483

Centreline:

The erosive potential of the natural surface colluvial and alluvial sands must be taken into consideration during the excavation process.

5.2 Heritage Impact Assessment

The following is extracted from the Phase 1 Heritage Impact Assessment conducted for the study site during September 2015.

Specialist:

Stephan Gaigher for G&A Heritage

Contact person:

Stephan Gaigher

Qualification:
Professional affiliation(s) (if any)

BA Hons Archaeology (UP)

ASAPA (Site Director status)

The findings of the heritage impact assessment report are summarised below:

The construction of the existing road has resulted in damage to any possible previous sites of heritage significance. As such, no sites of heritage potential were identified.

Site specific recommendations:

The following recommendations must be adhered to should any sub-surface remains of heritage sites be identified:

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
- All construction in the immediate vicinity (50m radius of the site) should cease.
- The Heritage Practitioner should be informed as soon as possible.
- In the event of obvious human remains the South African Police Services (SAPS) must be notified.
- Mitigation measures (such as refilling etc.) must not be attempted.
- The area in a 50m radius of the find must be cordoned off with hazard tape.
- Public access must be limited.
- The area must be placed under guard.
- No media statements must be released until such time as the heritage practitioner has had sufficient time to analyse the finds.

5.3 Wetland Assessment:

The following is extracted from the Level 2 Wetland Delineation and Assessment Report conducted for the study site during November 2015.

Specialist:

Rowena Harrison for Afzelia Environmental Consultants

Contact person:

Rowena Harrison

Qualification:

MSc Soil Science (UKZN)

Professional affiliation(s) (if any)

SACNASP, IAIAAsa

The findings of the wetland report are summarised below:

A field investigation of the area identified the presence of five wetland units within 500m of the existing P483 road. The wetlands were classified into separate hydrogeomorphic (HGM) units, comprising of three hillslope seeps, a floodplain and a channelled valley bottom. These wetland units will be crossed and directly impacted upon during the proposed P483 road upgrade (Figure 5).

The wetlands were all categorised as largely modified (PES Category D) with the exception of one hillslope seep that was categorised as moderately modified (PES Category C). The wetlands were considered modified due primarily to existing urban, residential and commercial activities surrounding the site. These modifications have led to changes in plant species compositions, a decrease in basal cover and soil erosion in all wetland systems.

The floodplain system (HGM 1) and associated hillslope seep (HGM 2) were assessed to have a medium Ecological Sensitivity and Importance (EIS), as these wetland units have higher species diversity and basal cover, therefore helping to maintain biodiversity. The EIS of the remaining hillslope seeps (HGM 3 and HGM 4) and channelled valley bottom (HGM 5) was recorded as low due to the largely modified characteristics of these wetland units.

From a wetland perspective, the following impacts are likely to occur:

- i. Soil erosion and sedimentation;
- ii. Loss of hydric soils
- iii. Removal of hydrophytic vegetation;
- iv. Consequential soil erosion and sedimentation;
- v. Pollution of wetland systems

Site specific recommendations:

- Construction activities surrounding the hillslope seep associated with the floodplain must be strictly controlled such that the work servitude must only be to the north of the existing P483 and must be limited to 8m in width. In addition to this the extension of the general servitude from 30m to 40m in this wetland is not supported.
- In order to counter existing soil erosion care must be taken at the design stage that the correct placement of water directing techniques within the road reconstruction servitude are planned and specified in a manner that will best mitigate the effects of stormwater runoff.
- The use of sustainable urban drainage systems (SUDS) must be incorporated into the design of the road and associated drainage systems and include:
 - The use of swales (a shallow vegetated channel to convey road runoff);
 - The use of filter strips, which are maintained grassed areas of land that are used to manage shallow overland stormwater runoff through several filtration processes in a similar manner to buffer strips;
 - It is important to maintain any SUDS feature that is installed along the road route. Un-maintained SUDS features may eventually fail operationally as a result of sediment build up and the effect this has on vegetation growth. If properly designed and regularly maintained, vegetated swales and other SUDS can last indefinitely and are far more cost effective than the maintenance of hardened or semi-hardened structures;
 - The use of SUDS features can also be used to remediate these wetland systems through allowing for erosion control, attenuation of water and therefore the 're-wetting' of these systems which will promote vegetation growth in areas where basal cover is lacking; and
 - **Furthermore, consideration must be given to evaluating the gradual channel shift alignments in the floodplain system over time when designing the bridge structure over the iNgagane River.**
- No stockpiling of any materials may take place adjacent to any of the wetlands, or the iNgagane River. 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.
- Do not allow surface water or storm water to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place.

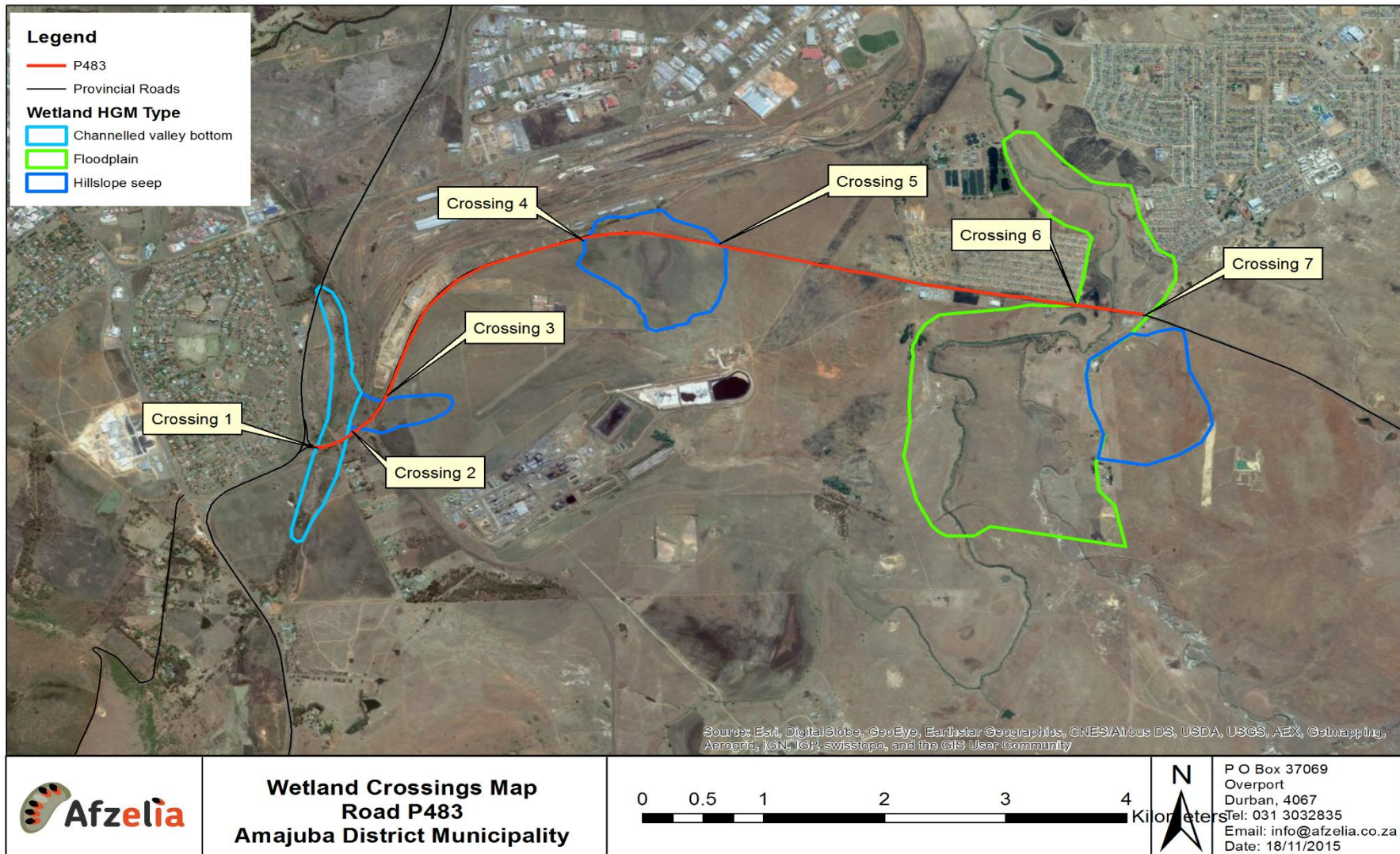


Figure 5: Position of wetland crossings along P483

- **No scupper pipes may be placed onto any watercourse crossings.**
- Vegetation clearing must not be undertaken more than 5 days in advance of the work front. Vegetation clearing within 50m of any wetland and within the wetland areas as well as the iNgagane River must only be undertaken when construction activity is actually underway at these places point and such areas 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.
- Disturbed sites must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated. Undertaking progressive rehabilitation is critical within environmentally sensitive sites, such as wetlands and river systems.
- Use vehicular digging of the banks of the iNgagane River and the channel associated with the channelled valley bottom wetland only in areas where this is deemed absolutely necessary for the bridge construction. Working during the winter months will reduce soil erosion potential in disturbed areas.
- Increases in the turbidity of the iNgagane River must be monitored and controlled when the bridge is constructed in this area. Ways to control turbid water include passing it through sediment traps or sediment curtains.
- Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.
- Where the road will be upgraded adjacent to the wetlands install sediment barriers along the edge of the construction servitude to contain sediment and spoil within the construction area. This is particularly so whilst working near the channelled valley bottom and floodplain systems.
- Erosion protection measures must be installed at all pipe culverts or stormwater drainage pipes' outlets located along the route. This is in addition to velocity control measures.
- Protect as much indigenous vegetation as possible.
- Rehabilitate disturbed wetland vegetation as soon as construction in this area has ended. A wetland rehabilitation plan compiled by a suitable qualified/experienced specialist must be compiled.
- It is strongly recommended that wetland and riverine vegetation is carefully harvested prior to construction activities commencing so that sufficient and appropriate vegetation will be available for the rehabilitation of the wetlands and riverine system. It must be noted that the commercial availability of wetland plants is extremely limited. Plants that are harvested must be kept on site in a condition conducive to their continued existence. Hydrophytic plants must be kept damp in rivers/streams that will be crossed, using for example a coffer dam.
- 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 as described above to protect the bare soil before the planted vegetation has become established.
 - All waste generated during construction is to be disposed of as per the Environmental Management Programme and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to or in the iNgagane River, channels or wetlands is permitted.
 - Proper management and disposal of construction waste must occur during the lifespan of the project, including during maintenance of the road.

- No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the wetlands.
- Portable toilets, the construction camp and any depot for any substance which causes or is likely to cause pollution must be placed outside of the 1:100-year flood line from streams or 30m away from the temporary boundary of the wetland whichever is the greatest.
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using correct 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.
- The design and use of SUDS which includes, but is not limited to, swales, filter strips and infiltration trenches that capture runoff, filter out the pollutants and allow for the diffuse release of water into the receiving environment is paramount to limiting the long term effects of an increase in hardened surfaces adjacent to the wetland areas situated along P483.
- An alien invasive management programme must be incorporated into the Environmental Management Programme, particularly for the eradication of the *Lantana camera*, *Rubus cuneifolius* (American bramble), and *Solanum mauritianum* (Bugweed) and *Eucalyptus spp* (Gum Tree).
- Ongoing alien plant control must be undertaken along the road route and particularly in the disturbed wetland and riparian areas. 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.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control for a minimum of five years after construction is complete.

5.4 Traffic Impact Assessment:

The following is extracted from the Traffic Impact Assessment Report conducted for the study site dated September 2015.

Specialist:	E.J. Anderson for Anderson Vogt Consulting
Contact person:	E.J. Anderson
Qualification:	BSc Engineering (Civil)
Professional affiliation(s) (if any)	<i>Engineering Council of South Africa (PrEng)</i>

The findings of the traffic impact assessment report are summarised below:

The report recommends that the existing P483 must be upgraded from a single carriageway to an undivided 4 lane dual carriageway. According to the traffic impact assessment, average weekday traffic and average daily traffic counts in the years 2018/2019 is estimated at approximately 13 300 and 12 650 respectively. As per KZN DOT traffic standards, these volumes meet the minimum criteria for the current road to be upgraded to a 4 lane dual carriageway.

5.5 Social Impact Assessment:

The following is extracted from the Social Impact Assessment conducted for the study site during May 2016.

Specialist:	Tony Barbour for Afzelia Environmental Consultants
Contact person:	Tony Barbour
Qualification:	MSc Environmental Science (UCT)
Professional affiliation(s) (if any)	None

The findings of the social impact assessment report are summarised below:

The findings of the social impact assessment report indicate that the proposed upgrade of P483 is supported by the Newcastle Local Municipality Integrated Development Plan and Strategic Development Framework. These documents identify P483 as a Mixed-use Activity Corridor that is a key access point to Madadeni and Osizweni. This link needs to be strengthened to allow for improved accessibility to and from Newcastle which will in turn support the future economic development of Madadeni and Osizweni. The upgrading of the P483 will improve road safety for motorists and pedestrians. The project will also create employment and business opportunities during the construction phase.

The no-go option would hinder the future economic growth of Newcastle, Madadeni and Osizweni. Safety aspects and accessibility issues will not be addressed. The significance of the no-go option is rated as High Negative. The no-go option is not supported.

Site specific recommendations:

- The intersection for the Newcastle Airport should be moved to the opposite side at the current entrance to the Newcastle Railway Station;
- Taxi stops along the P483 should be identified and incorporated into the design. The design should provide cover for commuters. Taxi stops should be provided with lighting and adequate seating for elderly commuters;
- Street lights should be installed as part of the design, particularly between km 5.2 (intersection with Wessel Road) and km 7 (Madadeni turn-off);
- Pedestrian walk-ways / cycle paths should be established, specifically on the northern side of the P483, particularly between km 5.2 (intersection with Wessel Road) and km 7 (Madadeni turn-off);
- The design should ensure that the pedestrian walk way on the bridge over the Ingangane River is sufficiently wide to accommodate the volume of pedestrians that use the bridge to cross the river;
- A landscaping plan should be implemented to as part of the road upgrade.

5.6. Assumptions and Gaps in Knowledge

The following assumptions and gaps in knowledge were noted by the specialists:

5.6.1 Geotechnical Investigation

- The report does not provide actual geotechnical designs specifying foundation sizes, depths and load capabilities with regard to bridges.
- The report does not provide actual geotechnical designs specifying foundation sizes, pavement layer specifications and slope embankment geometries with regard to the road.

5.6.2 Heritage Assessment

- Field investigations were performed on foot and by vehicle where access was readily available.
- Sites were evaluated by means of description of the cultural landscape, direct observations and analysis of written sources and available databases.
- It was assumed that the site layout as provided by GBS Environmental Consultants is accurate.
- It was assumed that the public participation process performed as part of the Environmental Impact Reporting phase was sufficiently encompassing not to be repeated in the Heritage Assessment phase.

5.6.3 Wetland Assessment

- The findings, results, observations, conclusions and recommendations are based on the author's best scientific and professional knowledge as well as available information regarding the perceived impacts on the wetlands.
- A hand held Garmin 60 GPS used to delineate the wetland and riparian channels had an accuracy of 3-6m;
- The results of the wetlands' functional, health and ecological sensitivity assessments are based on a three-day site investigation from the 2nd to the 4th of November 2015. Site visits should ideally be conducted over differing seasons in order to better understand the hydrological and geomorphologic processes governing the wetlands' systems as well as the use of the wetlands by both the surrounding community and faunal species.
- Vegetation could not be used as a wetland indicator due to large scale disturbance to the species composition along the road route as well as the lack of growth of vegetation as a result of the drought conditions experienced in the area. The delineations of wetland systems relied heavily on soil indicators.
- Final road designs were not available at the time of writing the report. Impacts and mitigation measures given in the report are therefore based on generic impacts that roads have on wetland and watercourse systems and are not based on the specific designs for this project.

5.6.4 Social Impact Assessment

- It is assumed that the need for the proposed road upgrade has been informed by the required traffic and technical information.

5.6.5 Traffic Impact Assessment

- A 2.5% growth rate in traffic per annum was assumed.

6. PROPOSED SCOPE OF WORKS

The table below has been tabulated to comparatively assess and contrast the standard activities that are to be undertaken in establishing the proposed infrastructure. The information has been extracted from the appointed engineers, Anderson Vogt Consulting, scope of works.

Activity	Materials to be used	Construction	Cost	Possible Environmental Impacts
Widening of iNgagane River Bridge	<ul style="list-style-type: none"> • Bitumen • Associated structures such as wing walls, energy dissipaters and gabions • Use of pile auger 	2 x 27.3m spans	R52 000 000	<ul style="list-style-type: none"> • Alteration of river flows during the construction phase leading to a decrease/increase in flow velocity. • Pollution of the river by foreign materials associated with construction and resultant alteration in dissolved oxygen concentrations, negatively affecting the aquatic ecosystem. • Sedimentation of the river. • Sedimentation and erosion of the wetland systems. • Pollution of the wetland systems. • The underwater sound pressure caused by the pile augers may be detrimental to aquatic life. • Groundwater may be contaminated during pile driving as surface contaminants can be pushed down. This can include construction material such as concrete.
Upgrading and widening of three major culverts	<ul style="list-style-type: none"> • Bitumen • Use of pile auger 	<ul style="list-style-type: none"> • Culvert no. 1: 2 barrels both 3.2m wide x 3.2m high 	R19 500 000	<ul style="list-style-type: none"> • Construction activities will disturb soil, making soil susceptible to erosion. • Sedimentation of wetlands is likely to occur.

Activity	Materials to be used	Construction	Cost	Possible Environmental Impacts
		<ul style="list-style-type: none"> • Culvert no. 2: 2 barrels 1.7m wide x 1.7m high • Culvert no. 3: 3 barrels 3.8m wide x 3.8m high 		<ul style="list-style-type: none"> • Removal of hydric soils and consequent degradation of the wetland systems.
Widening of P483 road into a 4 lane dual carriageway	<ul style="list-style-type: none"> • Gravel selected layers. (2 layers of 150mm each) (G5) • A stabilised sub base layer (150mm) (C4) • A crushed stone (G1) base coarse layer (150mm) • 40mm premix surfacing (Bitumen) 	<ul style="list-style-type: none"> • 2x 3,7m lanes in each direction • 0,6m painted median • 2 x 2,0m surfaced shoulders • 1,8m sidewalks (in the Madadeni and Ozisweni residential areas) and the two (2) bridge approaches • 40m road reserve (This is not acceptable in environmentally sensitive areas, 	R92 700 000	<ul style="list-style-type: none"> • Erosion is likely to occur due to the erosive potential of the colluvial and alluvial sands present. • Sedimentation of wetlands. • Removal of hydrophilic vegetation and subsequent degradation of wetland areas.

Activity	Materials to be used	Construction	Cost	Possible Environmental Impacts
		such as wetland and river crossings).		
Widening of Road over Rail Bridge	<ul style="list-style-type: none"> • Concrete • Associated structures such as wing walls, energy dissipaters and gabions 	<ul style="list-style-type: none"> • 2 x 13.0m spans • 2 x 8.0m jack spans 	R45 000 000	<ul style="list-style-type: none"> • Groundwater may be contaminated during pile driving as surface contaminants can be pushed down. This can include construction material such as concrete. • Soil erosion and sedimentation of wetlands. • Removal of hydrophilic vegetation and subsequent degradation of wetland areas.
No go alternative	Status quo	N/A	<ul style="list-style-type: none"> • <i>Increase in traffic flows</i> • <i>Time delays for commuters</i> • <i>Safety hazards</i> • Hinder accessibility to and from Newcastle and therefore economic growth 	<ul style="list-style-type: none"> • The functional integrity of the wetland units and the iNgagane River will continue to deteriorate due to inadequate storm water management. • The wetland units will ultimately be lost as development and land use encroach further into the wetlands.

Please see **Appendix A** for the preliminary design drawing.

The following must be considered in terms of stormwater management infrastructure:

Stormwater management features must be incorporated in the final design drawings before the construction phase can commence. **Since a detailed stormwater management plan has not been provided by the Engineers, the EAP, in terms of best practise principles, requires that the following be incorporated:**

- The Engineer will comply with the requirements of the KZNDOT standard details of roads and bridges, this will also be in line with the SANS codes for civil construction.
- Sustainable Urban Drainage Systems principles must be incorporated into the stormwater design (SUDS)¹.
- Culverts must be augmented by constructing grass-lined U-shaped-earth-side-drains adjoined to trimmed edges. Permanent road side swales must be created in places where runoff from the roads is not collected; this will allow stormwater to be biologically cleansed prior to seeping into natural drainage patterns within the receiving environment. Planting of indigenous sedges such as *Schoenoplectus corymbosus*, *Cyperus albostratus*, *Cyperus laevigatus* and *Cyperus sphaerospermus* is recommended. (As per SUDS principles).
- Stormwater drains **must never** discharge directly into any watercourse (iNgagane River) or wetland, but into retention ponds that will allow for stormwater to be released into the river at a slower rate. Retention ponds must be 30 m away from all river banks. Mitre drains/ off-shoots must have enough capacity to lead water out of the side drains and avoid side drain blockages associated with sedimentation.
- All side drainage (chutes and mitre drains) must dissipate water at an angle not greater than 30%.

Section E of this report (Impact Assessment) further addresses the above-mentioned aspects and the impact on the receiving environment.

¹ SUDS are a sequence of water management practices designed to drain surface water in a manner that will provide a more sustainable approach than the conventional practice of routing run-off through pipes or canals to watercourses.

7. PUBLIC CONSULTATION PROCESS

In accordance with the National Environmental Management Act (NEMA) (Act 107 of 1998) as amended, Public Participation is conducted as part of stakeholder involvement. The main aims of conducting public participation is *inter alia*;


- To give Interested and Affected Parties (I&Aps) transparent and concise information regarding the proposed causeway and road re-alignment;
- To give governmental departments critical relevant information that will allow authorities to making informed decisions for a specific project; and
- To allowing for commenting by all I&APs.





The following is an outline of the public consultation process undertaken to date as part of this Basic Assessment process;



- Background Information Documents were circulated to all stakeholders on the 6th of October 2015; comments and responses are attached as Appendix D;
- In accordance with the stipulations of the 2014 EIA regulations, and the National Water Act 36 of 1998 (Act 36 of 1998), site notices in English and IsiZulu were erected at various points along the P483 route. This was done on the 2nd of November 2015; and
- Flyers were distributed to local community members within the vicinity of the proposed development on the 2nd of November 2015.

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

7.1 Issues raised by the interested and affected parties (I&APs)

Method of response -  = Letter/Fax  = E-mail  = Public meeting

NO.	ISSUE	NAME	METHOD & DATE	COMMENT	RESPONSE
1	General comments during the application process	Jeffrey Maivha Department of Agriculture, Forestry & Fisheries	 26/10/2015	<ul style="list-style-type: none"> The department has no objection to the proposed developments. There are no national forests or protected trees in terms of the National Forest Act (No. 84 of 1998). 	<ul style="list-style-type: none"> Thank you for your response. Afzelia acknowledges your comment.
2	Registration as an I&AP	Mr L.P. Hadebe Local resident	 09/11/2015	<ul style="list-style-type: none"> Provided personal details to register as an I&AP. 	<ul style="list-style-type: none"> Have added Mr. Hadebe to the I&AP register and will keep him informed throughout the Environmental Authorisation process.
3	General comments during the application process	Mr T. Hadebe Servitude Manager	 20/11/2015	<ul style="list-style-type: none"> Transnet has no objection in principle to the proposed upgrade and widening of P483, subject to compliance with Transnet's standard crossing conditions and requirements (which have been provided). 	<ul style="list-style-type: none"> Conditions required by TRANSNET have been forwarded on to the engineers for consideration. These conditions have been included in the Environmental Management Programme.
4	Registration as an I&AP	C.J. Hunlun LANXESS CISA (PTY) LTD	 23/11/2015	<ul style="list-style-type: none"> Provided personal details to register as an I&AP. 	<ul style="list-style-type: none"> Have added LANXESS CISA to the I&AP register and will keep the company informed throughout the Environmental Authorisation process.

NO.	ISSUE	NAME	METHOD & DATE	COMMENT	RESPONSE
5	General comments during the application process	Mr. R. Moore ESKOM	 23/11/2015	<ul style="list-style-type: none"> • The Ingangane/Volksrust 188kV sub transmission power line will be affected. • However, ESKOM has no objection to the proposed road upgraded, provided that servitude conditions put in place by ESKOM are met. 	<ul style="list-style-type: none"> • Conditions required by ESKOM have been forwarded on to the engineers for consideration. These conditions have been included in the Environmental Management Programme.
6	General comments during the application process	Michele Schmid Department of Transport	 09/02/2016	<ul style="list-style-type: none"> • The Minister, as the Controlling Authority, as defined in the KwaZulu-Natal Roads Act No. 4 of 2001, has in terms of section 21 of the Act, no objections to the proposal. • The road shall be upgraded and constructed in consultation with and to the satisfaction of the Newcastle Municipality and this Department's cost centre manager in accordance with the approved design. 	<ul style="list-style-type: none"> • Comments and conditions have been forwarded on to the engineers for consideration.

Comments from this draft BAR are to be incorporated in the final BAR.

8. IMPACT ASSESSMENT

Significance scoring assesses and predicts the significance of environmental impacts through evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact. The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required². Each of the above impact factors have been used to assess each potential impact using ranking scales.

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

Rating of Impacts

Below is the Impact significance scoring (rating) used for each potential impact;

Significance scoring

Probability	Duration
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	Magnitude
1 - limited to the site	2 – minor
2 - limited to the local area	4 – low
3 - limited to the region	6 – moderate
4 - national	8 – high
5 - international	10 – very high

Significance Points = (Magnitude + Duration + Extent) x Probability. The maximum value is 100 Significance Points.

Potential Environmental Impacts are rated as high, moderate or low significance as per the following:

<30 significance points = Low environmental significance

31-59 significance points = Moderate environmental significance

>60 significance points = High environmental significance

² Impact scores given “with mitigation” are based on the assumption that the mitigation measures recommended in this assessment are implemented correctly and rehabilitation of the site is undertaken. Failure to implement mitigation measures during and after construction will keep the impact at an unacceptably high level.

The impacts that are tabulated are based on generic construction methods derived from the available preliminary drawings. Baseline conditions derived from the site by the wetland and geotechnical specialists have been used to determine the vulnerability of the study site. Impact scores given “with mitigation” are based on the assumption that the mitigation measures recommended in this assessment are implemented correctly and at all times and rehabilitation of the site is fully and correctly undertaken. Failure to implement mitigation measures during construction and rehabilitation after construction will keep the impacts at an unacceptably high level.

8.1. IMPACTS THAT MAY ARISE FROM THE CONSTRUCTION PHASE

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
• Temporary disturbance for pedestrians and vehicle traffic	5	3	2	10	75 (High)	5	3	2	8	65 (High)

Proposed Mitigation measures:

- Vehicle operators must adhere to designated routes outlined by the project managers.
- Construction activities must be restricted to designated hours.
- Surrounding Stakeholders and Interested and Affected Parties must be informed of disturbances well in advance of the proposed construction activities.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitu de	Rating
• Damage to public infrastructure and services due to negligent civil works	3	3	1	6	30 (Low)	3	3	1	4	24 (Very low)

Proposed Mitigation measures:

- The Contractor must identify and demarcate all existing public infrastructure that may be affected before the project commences.
- Demarcation of construction footprints must be undertaken so that the construction footprint is not extended.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
<ul style="list-style-type: none"> Reduced air quality due to: <ul style="list-style-type: none"> Increased dust generation Increased vehicular emissions 	5	3	2	6	55 (Moderately high)	5	3	1	4	40 (Moderate)

Proposed Mitigation measures:

- Dust suppression must be carried out using water carts
- Heavy vehicles must not exceed a speed limit of 40 km/hr.
- No burning may be done onsite; LP gas must be used should there be a requirement to cook.
- Camp construction areas / Access road / work face –that have been stripped of vegetation must be effectively dampened to avoid excessive dust.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
<ul style="list-style-type: none"> Temporary waste generation 	5	3	2	6	55 (Moderately high)	5	3	2	4	45 (Moderate)

Proposed Mitigation measures:

- Solid waste and refuse generated onsite must be disposed at a permitted landfill site. Weigh bills for such disposal must be kept on site for record purposes.
- Housekeeping must be done on a daily basis and adequate bins and / or skips must be provided at the work face and camp site. The bins must be covered to prevent wind-blown rubbish and scavenging by people and animals.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
<ul style="list-style-type: none"> Increased noise generation 	5	3	2	8	65 (High)	5	3	2	6	55 (Moderate)

Proposed Mitigation measures:

- Silencers must be fitted on all construction vehicles.
- Operational hours should be limited to between 07h 00 and 17h 00 to avoid sleep / rest disruption and general disturbance of adjacent land users.
- Notify adjacent land owners and ECO of after-hours construction work and of any other activity that could cause nuisance.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
<ul style="list-style-type: none"> River and ground water pollution due to in situ concrete casting and the use of pile augers 	5	5	2	10	85 (Very high)	5	4	2	8	70 (Very high)

Proposed Mitigation measures:

- In situ concrete casting is not supported in general and may only be undertaken in a casting yard. Pre-cast casting must be used as an alternative wherever possible.
- Casting yards must not be located within 100m of the iNgagane River and the temporary boundary of any wetland units.
- The location of the casting yard must be approved by the Independent Environmental Control Officer before establishment of the yard and before any activities can commence.
- Activities within the casting yard must be monitored by the Independent Environmental Site Officer at all times.
- **Waste water from the casting yard must not be discharged into the wetlands or the iNgagane River under any circumstances.**
- Waste water must be disposed of via a registered waste disposal company, such as Environserv or Wastetech.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Creation of skills development and temporary employment (positive impact ³)						5	3	2	8	65 (High)

Proposed Mitigation measures:

- Number of people employed
- Various groups of people employed (women, youth, disabled) leading to increased empowerment, gender equality, employment for younger households
- Skills development for all employees leading to increased chances of future employment and a more productive workforce

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Improved access to and from Newcastle and surrounding areas (positive impact)						5	5	2	8	75 (Very high)

Proposed Mitigation measures:

- As P483 is a main route to and from Madadeni, Osizweni and Utrecht, upgrading the road will help improve accessibility to and from Newcastle by way of improved routes.

³ Through the effective implementation of the mitigation measures, a positive impact can be achieved.

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Improved transport systems (positive impact)						5	5	2	8	75 (Very high)

Proposed Mitigation measures:

- The upgrading and widening of P483 will help reduce traffic congestion, decreasing delays and increasing road safety.
- Pedestrian safety will improve drastically through the construction of pavements.

8.2. IMPACTS AFFECTING WETLANDS

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Soil erosion and sedimentation	5	3	2	8	65 (High)	2	1	8	6	40 (Mode rate)

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Reduction in hydrophilic vegetation	5	3	2	8	65 (High)	2	1	8	6	40 (Moderate)

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Pollution of water resources and soil	5	2	3	8	65 (High)	5	2	2	6	50 (Moderately high)

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Proliferation of alien invasive species	5	5	3	6	70 (High)	5	5	2	4	55 (Moderately high)

Proposed Mitigation measures:

Mitigation Options

Please refer to **Section 5.3: Wetland Assessment** and the attached ***Wetland delineation and functional assessment report*** under **Appendix?** for a comprehensive list of recommendations regarding impacts to wetland areas.

8.3. OPERATIONAL IMPACTS

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
Degradation of wetland areas	5	5	1	8	70 (Very high)	5	5	1	6	60 (High)

Proposed Mitigation measures:

- Regular inspections and maintenance of storm water infrastructure must take place over the lifespan of the P483.
- Indigenous vegetation must be monitored to ensure that there is a minimum **indigenous vegetation cover of 85% at all times**. In areas flagged as requiring further intervention, a suitable replanting / re-vegetation programme must be implemented. This must comprise a mix of rapidly germinating indigenous wetland/riparian species, shrubs and trees naturally occurring in the affected habitat and adapted to stabilising areas.
- The Alien Plant Control Programme implemented during the construction phase must be ongoing throughout the operational phase of the project. The programme must be undertaken at least 4 times a year during the first 5 years and thereafter twice yearly for the lifespan of the project.

8.4 CUMULATIVE IMPACTS

Impact	Without mitigation					With mitigation				
	Probability	Duration	Extent	Magnitude	Rating	Probability	Duration	Extent	Magnitude	Rating
First flush effect ⁴	5	5	2	10	85 (Very high)	5	5	2	8	75 (High)

Proposed Mitigation measures:

Mitigation Options

- Sustainable Urban Drainage Systems (SUDS) will help minimise first flush effects.
- Erosion and sedimentation must be addressed at all times during the construction and operational phase.

8.5 IMPACTS THAT WILL ARISE DUE TO THE “NO GO” ALTERNATIVE

The functional integrity of the wetland units and the iNgagane River will continue to deteriorate due to inadequate storm water management. The wetland units will ultimately be lost as development and land use encroaches further into the wetlands.

From a social aspect, there will be an increase in traffic flows resulting in increased time delays for commuters. Pedestrian safety is also compromised as there are currently no pavements or pedestrian walkways on P483. Short term employment opportunities and skills development during the construction phase will not be realised. In the long term, the economic development of Newcastle, Madadeni and Osizweni will not be realised.

⁴ First flush is the initial surface runoff following a rainfall event, particularly runoff from impervious surfaces. Pollutants accumulate on hard surfaces during preceding dry periods. Polluted water is discharged directly into streams and rivers via inadequate storm water infrastructure. This is considered a significant form of diffuse pollution, contaminating receiving waters with considerable heavy metal loads. Efficient and effective storm water management techniques supplemented by soft engineering techniques help minimise the problem.

9. ENVIRONMENTAL IMPACT STATEMENT AND EAP'S RECOMMENDATIONS

At this stage of the project, there is limited design information available, limiting the assessment outcomes/impacts of the project.

It has been proposed that concrete structures will be cast in situ. However, as the practise of in situ casting has far higher environmental impacts compared to precast concrete structures, in situ casting is not supported by the EAP. Should in situ concrete casting take place, the casting yard must not be located within 100m of the iNgagane River and the temporary boundary of any wetland units. The location for the casting yard must be approved by the Independent Environmental Control Officer before establishment of the yard and before any activities can commence. Waste water from the casting yard must be disposed of via a registered waste disposal company such as Enviroserv or Wastetech.

The engineering and construction protocols for the widening of the iNgagane River bridge are not available at this time; therefore, the exact process of widening the bridge cannot be assessed as it is not known if additional abutments/piers will be needed.

Of particular concern is the impact of the road widening through the hillslope seep associated with the floodplain, as this wetland unit has a higher functional status which will be directly affected by both construction and operation of the road.

In addition, the extension of the general road servitude from 30m to 40m in this wetland is not supported as this will allow for a large area of the natural environment to be negatively impacted.

Construction activities must be strictly controlled such that the work servitude must only be to the north of the existing P483 and must be limited to 8m in width.

In order to ensure that negative impacts are effectively remediated, a 20% financial provision must be allocated in the budget for rehabilitation.

9.1 PROPOSED MONITORING AND AUDITING

A suitably qualified Independent Environmental Compliance Officer (ECO) must be appointed for the entire duration of the project. This must be done before the commencement of any authorised activity. The appointed ECO will have the responsibility of ensuring that mitigation/ rehabilitation measures and recommendations are implemented.

Considering the large scale of the project as well as the complexities associated with the wetland and river crossings and the establishment of a casting yard, it is recommended that a full time, suitably qualified and experienced independent Environmental Site Officer (ESO) is appointed.

Should an ESO be present on site full time, the ECO is to be on site on a weekly basis for the first three months, when setting up is underway and at times of high activity or activity taking place in any environmentally sensitive areas e.g. initial breaking ground, working in the river, etc. Thereafter, when activities have settled into acceptable levels of operation, site visits must occur twice a month – once for auditing and once for monitoring. Site visits must be two weeks apart.

In order to ensure effective rehabilitation, especially in sensitive areas such as wetlands and river crossings, annual visits for a five (5) year period must be carried out by an independent environmental consultant during the

operational phase of the road, to ensure that any negative environmental impacts arising from the proposed P483 road upgrade are avoided or minimised and positive environmental impacts are enhanced.

Recommended mitigation and rehabilitation measures provided in the EMPr must be implemented fully and correctly at all times to ensure that any negative impacts to the environment will be minimal.