



**DRAFT BASIC ASSESSMENT FOR THE
PROPOSED REHABILITATION AND
REPAIR OF THE BRIDGE ALONG ROAD
D1321, MIDVAAL LOCAL MUNICIPALITY,
GAUTENG PROVINCE**

GDARD REFERENCE NO.: NEW APPLICATION

DATE: JANUARY 2022

COMPILED BY:

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Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.**
4. **A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.**
5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.
6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
8. An incomplete report may lead to an application for environmental authorisation being refused.
9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**
10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.
11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.
12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the of the Environmental Affairs Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the of the Environmental Affairs Branch
Ground floor Diamond Building
11 Diagonal Street, Johannesburg

Administrative Unit telephone number: (011) 240 3377
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:						
File Reference Number:						
Application Number:						
Date Received:						

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

N/A – This is a Draft Basic Assessment Report

Is a closure plan applicable for this application and has it been included in this report?

NO

if not, state reasons for not including the closure plan.

Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time. In addition, the current environmental baseline conditions may change overtime; it is therefore not possible to predict the potential environmental impacts. In addition, it is unlikely that decommissioning will be contemplated due to the nature of the development. However, closure and decommissioning would require a separate EIA process. If decommissioning is considered in future, the developer/ license holder will undertake the required actions by applying for decommissioning.

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity?

YES

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person?

YES

If no, state reasons for not attaching the list.

[REDACTED]

Have State Departments including the competent authority commented?

N/A

If no, why?

This Report is still in a draft stage and is being released to the public and state departments for review and comments.

I. PROJECT DETAILS

Report Title	:	Basic Assessment Report
Report Status	:	Draft
Review Period	:	12 January 2022 – 11 February 2022
Project Title	:	The Proposed Rehabilitation and Repair of the Bridge along Road D1321, Midvaal Local Municipality, Gauteng Province
Applicant	:	Gauteng Department of Roads and Transport
Environmental Consultant	:	Envirolution Consulting (Pty) Ltd
GDARD Reference No.:	:	New Application

II. DOCUMENT CONTROL

PREPARED BY:



Sameera Ismail

(MA Environmental Management)

REVIEWED BY:



Karthigesan Govender

(Pr.Sci.Nat. No: 400049/12)

III. DECLARATION

Envirolution Consulting (Pty) Ltd was contracted by Nyeleti Consulting (Pty) Ltd on behalf of the Gauteng Department of Roads and Transport as the independent environmental consultant to undertake the Environmental Basic Assessment process for the proposed project. Envirolution Consulting (Pty) Ltd is not a subsidiary of, or affiliated to Nyeleti Consulting and the Gauteng Department of Roads and Transport. Furthermore, Envirolution Consulting does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

IV. APPLICANT DETAILS

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Applicant representative:	Zukiswa Dlamini
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V. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)'s DETAILS

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Contact person:	Sameera Ismail		
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EAP Qualifications	BSc. Honours Botany		
EAP Registrations/ Associations	Registered with the South African Council for Natural Scientific Professions (No: 400049/12) and the Environmental Assessment Practitioners Association of South Africa (No: 2019/317)		

Details of the EAP's expertise to carry out Basic Assessment procedures

The EAPs from Envirolution Consulting who are responsible for this project are (refer to **Appendix I** for CVs):

Karthigesan Govender – The principle Environmental Assessment Practitioner (EAP) for this project is a registered Professional Natural Scientist and holds an Honours Degree in Botany. He has over 20 years of

experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIAs for several diverse projects across the country.

Sameera Ismail – The principle author of this Basic Assessment Report, holds a MA Environmental Management degree from the University of Johannesburg. She has 5 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; the identification of environmental management solutions and mitigation/risk minimising measures; and Water Use License processes. Sameera is currently a Project Manager and Environmental Consultant at Envirovolution Consulting (Pty) Ltd.

VI. SPECIALIST'S DETAILS

Name of Specialist	Title of specialist report/s as attached in Appendix G	Date issued
Limosella Consulting	Wetland/Riparian Delineation and Functional Assessment	August 2021
	General Wetland Rehabilitation and Monitoring Plan	August 2021
J van Schalkwyk	Heritage Assessment	August 2021

ABBREVIATIONS

BAR	Basic Assessment Report
DBAR	Draft Basic Assessment Report
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
EIA	Environmental Impact Assessment
FBAR	Final Basic Assessment Report
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
HIA	Heritage Impact Assessment
I&AP's	Interested and Affected Parties
IDP	Integrated Development Plan
MLM	Midvaal Local Municipality
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No. 36 of 1998)
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SMP	Stormwater Management Plan
WULA	Water Use License Application

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Appendix B: Photographs

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Appendix D: Route Position Information – **N/A**

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Appendix F: SAHRA and WULA Information

Appendix G: Specialist Reports

Appendix H: EMPr

Appendix I: Other Information

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

1.1 Project Title

The Proposed Rehabilitation and Repair of the Bridge along Road D1321, Midvaal Local Municipality, Gauteng Province.

1.2 Background

As a result of flooding caused by heavy rainfall, many of Gauteng's bridges, culverts and associated infrastructure have been severely damaged. The Gauteng Department of Roads and Transport (GDRT) have identified this bridge along Road D1321 amongst the infrastructure affected after functional deficiencies were noted as the structure stands presently. The structure is in a poor condition and the extent of the damage noticed is significant to warrant rehabilitation and repair.

This bridge is situated at chainage km 2.0, along route D1321 in Vereeniging. The road is classified as R4 (Rural collector road) according to the Gauteng RAMS Geo-spatial Decision Support System. The bridge provides a crossing over the Suikerbosrand River.

This bridge is a 4-span bridge with a cast in-situ simply supported concrete deck, the deck being either solid or voided construction. The abutments and piers are of cast in-situ concrete. The bridge has a combination of steel square hollow tubing and guardrails as parapets. The overall bridge length is 27.7m and width 5.2m. Superstructure stormwater drainage is accommodated by scuppers on both sides of the bridge deck. The affected area was found to be 3399m² as depicted in Figure 1 below.



Figure 1: Area of proposed scope of works

The findings from the visual assessment of the bridge indicate that the structure is in a fair condition. The current roadway is narrow and the guardrails are incapable of withstanding an impact load. This is due to the use of guardrails instead of rigid parapets, as well as the width of the roadway i.e. 5.48m - drivers will have difficulty in determining whether the roadway is suitable for one lane or 2 lanes. Western side of bridge is inaccessible due to fencing around Eligwa Estate, making it difficult to assess bridge condition.

The structural deficiencies that were identified are as follows:

- The roadway width between the kerbs is 4m which makes it difficult for drivers to determine whether the bridge is a single lane or 2 lanes.
- Moderate debris build-up/accumulate on the upstream side of the structure is present.
- The current parapets are inadequate to withstand an impact load of a vehicle.
- The current expansion joints are leaking, which is evident from the staining on the piers and abutments. The expansion joints have also been surfaced over and are causing rutting in the surfacing above the deck.
- There is a spall on the underside of the deck on span S4 as well as minor spalls on each span.
- There are diagonal cracks in all the wing walls.

The rehabilitation and repair includes fixing the deficiencies in the existing structure as well as removal of debris and siltation. The purpose of the rehabilitation and repair is thus to improve the current structure to allow for a

safe crossing for pedestrians, motorists, and cyclists over the river.

1.3 Hydraulic Assessment

Table 1 below provides a summary of the initial hydrological assessment undertaken for this structure.

Table 1: Summary of Evaluation

Hydrology Method	Rational Alternative 2			
Catchment size (km ²)	0.272			
MAP (mm)	665			
Length of Longest Water Course (km)	1.05			
River	Tributary to Blesbokspruit River			
Return Period	10	20	50	100
Peak Flow (m ³ /s)	3	4	5	7
Road Class	Class 4			
Indicator Flood (1:20) m ³ /s	4			
Return Period (Years)	10 (Drainage manual Figure 8.2)		25 (Gautrans Design Manual)	
Capacity (m ³ /s)	11			
Design Flow m ³ /s	3		4	
Pass or Fail	Pass		Pass	
Structure Overtops? (Yes/No)	No			

	Fail
	Pass

1.4 Proposed Project Description

The following rehabilitation and upgrade measures are proposed for the structure:

- Clear bush, debris, siltation and vegetation from structure and channel
- New guardrail (single and double)
- Rock backfill
- Clean concrete surface – clean staining on abutments, wingwalls, piers and deck due to leaking expansion joints above
- Apply protective coating – paint abutments, wingwalls, piers and deck
- Seal cracks
- Concrete must be reinforced
- Resurface or patch

- Repair sidewalk surface
- New traffic barrier (Concrete F-Shape/NJ)
- New endblocks
- Rock backfill
- New asphalt plug joint
- Repair spall
- Access-using scaffold
- Traffic accommodation

1.5 Locality of study site

The bridge is situated along route D1321 crossing over the Suikerbosrand River in Vereeniging within the Midvaal Local Municipality of the Gauteng Province. The bridge is located at geographic co-ordinates 26°40'20.87"S, 28°01'15.96"E. Refer to Figure 2 below for the locality map.



Figure 2: Locality Map

Select the appropriate box

The application is for an upgrade of an existing development

The application is for a new development

Other, specify

Does the activity also require any authorisation other than NEMA EIA authorisation?

	YES ✓
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If yes, describe the legislation and the Competent Authority administering such legislation

Water Use License Application as per the National Water Act (Act No. 36 of 1998) from the Department of Water and Sanitation.

If yes, have you applied for the authorisation(s)?

YES	
-----	--

If yes, have you received approval(s)? (attach in appropriate appendix)

	NO
--	----

A Water Use License Application is currently being uploaded onto the DWS eWULAAS portal. Refer to **Appendix F** for proof thereof. Impacts on the watercourse have been assessed through the Basic Assessment process (via **Appendix G1** – Aquatic Biodiversity Assessment). The following reports/ studies as outlined below will be required to be uploaded with the Water Use License Application:

- Basic Assessment Report;
- Aquatic Biodiversity Assessment;
- Risk Assessment; and
- General Wetland Rehabilitation and Monitoring Plan.

The nature and characteristic of the proposed project may not commence without an environmental authorisation from the competent authority, Gauteng Department of Agriculture and Rural Development (GDARD). It is for this reason that a Basic Assessment Process is being conducted and to ensure that:

- The potential environmental impacts associated with the proposed project are taken into consideration;
- Public Participation is conducted i.e. to afford any Interested and/ or Affected Parties (I&APs) sufficient opportunity to provide comments; and
- Sufficient information is provided to the competent authority for an informed record of decision.

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

2.1 Applicable Legislation, Policies and/or Guidelines

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Table 2: Applicable Legislation, Policies and/ or Guidelines

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
National Environmental Management Act (Act No. 107 of 1998)	<p>NEMA requires, inter alia, that:</p> <ul style="list-style-type: none"> ○ Development must be socially, environmentally, and economically sustainable. ○ Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied. ○ A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions. <p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p>	<p>National Department of Forestry, Fisheries and Environment (DFFE)</p> <p>Gauteng Department of Agriculture and Rural Development (GDARD)</p>	<p>The Basic Assessment is undertaken in accordance with the requirements of Government Notice R982 of December 2014, as required in terms of the National Environmental Management Act, 2008 (Act No. 107 of 1998).</p>
National Environmental Management Act (Act No. 107 of 1998)	<p>A project proponent is required to consider a project holistically and to consider the cumulative effect of potential impacts.</p> <p>In terms of the Duty of Care provision in S28(1) the project proponent</p>	<p>National Department of Forestry, Fisheries and Environment (DFFE)</p>	<p>While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the proposed project has</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with a project is avoided, stopped or minimised.	Gauteng Department of Agriculture and Rural Development (GDARD)	found application in the EIA Phase. The implementation of mitigation measures is included as part of the Project EMPr and will continue to apply throughout the life cycle of the project.
National Water Act (Act No. 36 of 1998)	<p>Section 21 water uses as per the NWA includes:</p> <p>21(a): Taking water from a water resource; 21(b): Storing water; 21(c): Impeding or diverting the flow of water in a watercourse; 21(d): Engaging in a stream flow reduction activity; 21(e): Engaging in a controlled activity; 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit; 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource; 21(h): Disposing in any manner of water which contains waste from, or which has been heated in any industrial or power generation process; 21(i): Altering the bed, banks, course or characteristics of a watercourse; 21(j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and 21(k): Using water for recreational purposes.</p> <p>For wetland areas, development within a 500m buffer triggers the act. For rivers, development within a 100m buffer triggers the act. Any activity that triggers any of the above water uses will require a Water Use License.</p> <p>Given the sensitivity associated with a project, DWS will determine</p>	Department of Human Settlements and Water and Sanitation (DHSWS)	The proposed development requires a Water Use License as Section 21 c and i of the NWA are triggered as a result of the bridge crossing over a river. A Water Use License Application is currently being uploaded onto the DWS eWULAAS portal.

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	whether the project will follow a General Authorisation process or a Water Use License Application process.		
National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004)	This Act provides management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.	National Department of Forestry, Fisheries and Environment (DFFE)	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project in proper management of the sensitive area (wetland) identified on site.
National Environmental Management: Waste Act (Act No. 59 of 2008)	The NEMA: WA came into effect on the on 1 st July 2009. Section 20 of the Environment Conservation Act 73 of 1989, under which waste management was previously governed, was repealed. In general, the act seeks to ensure that people are aware of the impact of waste on their health wellbeing and the environment, and in the process giving effect to Section 24 of the constitution, in ensuring an environment that is not harmful to health and wellbeing.	National Department of Forestry, Fisheries and Environment (DFFE) National Department of Forestry, Fisheries and Environment (DFFE) – lead authority for regulating hazardous waste. Provincial Environmental Department – for regulating general waste	No waste license activities are applicable to this project. The developer will however be required to store and manage waste in accordance with the requirements of this Act and associated Standards.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas". The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. Dust Control Regulation Control Regulations, R. No. 827 of 1 November 2013.	National Department of Forestry, Fisheries and Environment (DFFE)	While no permitting or licensing requirements arise from this legislation for the site, this Act will find application during the construction phase of the project. The implementation of dust mitigation measures are included as part of the project EMPr and will continue to apply throughout the life cycle of the project. Dust control regulations promulgated in

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
			November 2013 may require the implementation of a dust management plan.
National Heritage Resource Act, 1999 (Act No. 25 of 1999)	<p>Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including the construction of a road, exceeding 300m in length.</p> <p>In accordance with the NHRA, an independent heritage consultant is to conduct a cultural heritage assessment to determine any impact on any sites, features or objects of cultural heritage significance. If none are identified, any archaeological sites or graves to be exposed during construction work must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.</p> <p>If a permit is required as per section 34 of the NHRA, no works are to commence before the permit is obtained.</p>	<p>South African Heritage Resources Association (SAHRA)</p> <p>The Provincial Heritage Resources Authority Gauteng (PHRAG)</p>	Should any heritage sites be unearthed during excavations, a permit would be required to be obtained from SAHRA.
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)	Legislation that allows the public access to information about activities that influence their well-being and to make contributions to decision making.	National Department of Forestry, Fisheries and Environment (DFFE)	No permitting is required. The act finds applicability during the public participation process phase of the Basic Assessment process.
Occupational Health and Safety (Act No. 85 of 1993)	The Occupational Health and Safety Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.	Department of Labour	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Health and safety precautions measures must be put in place for the construction crew and the general public. E.g. Protection of workers on site through provision of Personal Protective Equipment's; Training and other health and safety amenities.

2.2 Listed Activities

In terms of Sections 24(2) and 24D of the National Environmental Management Act (Act No. 107 of 1998), as amended, and as read with Listing Notice 1 and Listing Notice 3 (Government Notices R. 327 and R. 324, in Government Gazette 40772 of 07 April 2017), the development will trigger a Basic Assessment process as per the following activities:

Table 3: Listed Activities

Indicate the number of the relevant Government Notice:	Activity No (s) (relevant notice): e.g. Listing notices 1, 2 or 3	Describe each listed activity as per the wording in the listing notices:
GN 983 of 08 Dec 2014, as amended (327 of 07 April 2017)	Listing Notice 1	<p>Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells grit, pebbles or rock of more than 10 cubic metres from a watercourse.</p> <p><i>The proposed project will result in infilling or removal of more than 10m³ or more of material into/from a watercourse during the rehabilitation and repairs to the bridge along Road D1321 and associated infrastructure.</i></p>
GNR 985 of 08 Dec 2014, as amended (324 of 07 April 2017)	Listing Notice 3	<p>Activity 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan</p> <p>c. Gauteng</p> <p>ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans.</p> <p><i>There is vegetation coverage along the proposed works areas (and as a result of the wetland area). The clearance of vegetation of approximately 300 square metres may occur within the wetland and buffer area. The site is located within an Important Area.</i></p>
GNR 985 of 08 Dec 2014, as amended (324 of 07 April 2017)	Listing Notice 3	<p>Activity 14: The development of:–</p> <p>(xii) infrastructure or structures with a physical footprint of 10 square meters or more –</p> <p>where such development occurs -</p> <p>a) within a watercourse;</p> <p>b) In Gauteng:</p> <p>iv. sites identified as Critical Biodiversity Areas (CBAs) and</p>

		<p>Ecological Support Areas (ESAs) Gauteng Conservation Plan or in bioregional plans.</p> <p><i>The physical combined footprint of the proposed works is over ± 10m² within a wetland area, an area identified as sensitive area and an Important Area by the Gauteng Conservation Plan.</i></p> <p><i>The development will occur within a wetland area which is regarded as a sensitive area protected by the National Water Act (Act No. 36 of 1998).</i></p>
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3 ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not include the no go option into the alternative table below.**

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

The following fundamental design goals have been considered:

- Safety
- Durability, serviceability and sustainability
- Economy
- Constructability
- Aesthetics

Provide a description of the alternatives considered

Table 4: Alternatives

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of “other”)	Description
1.	Drainage Alternatives	<p>Alternative 1 – Repairs to existing bridge (Preferred)</p> <p>The proposed rehabilitation and upgrade activities include:</p> <ul style="list-style-type: none"> • The waterway to be cleared of all, debris • Cast in-situ parapets to be constructed on either side of the deck with accompanying end blocks and guardrails on the approaches to the bridge • Expansion joints to be replaced. • Repair diagonal cracks in all the wing walls • Widen bridge to 2 lanes <p>Benefits include:</p> <ul style="list-style-type: none"> • This alternative would have minimal disturbance to the environment during construction. • Least expensive alternative for the rehabilitation project. <p>Drawbacks include:</p> <ul style="list-style-type: none"> • Concrete defects are likely to recur with time as a result of the nature of the structure construction.

		<p>Alternative 2 – New Bridge-Fully Integral Bridge</p> <p>The proposed activities include:</p> <ul style="list-style-type: none"> • Demolish existing bridge. • The proposed superstructure is a solid slab deck with F-shape parapets • The substructure comprises of abutments and 2 piers founded on solid rock by means of spread footings. <p>Benefits include:</p> <ul style="list-style-type: none"> • An integral bridge would require minimal maintenance through its lifespan. • Fewer piers will result in a reduced water constriction and subsequently reduce debris build up. <p>Drawbacks include:</p> <ul style="list-style-type: none"> • Increase in construction cost from Alternative 1. • Traffic accommodation measures have to be implemented during construction. • More disturbances to the environment during construction. <hr/> <p>Alternative 3 – New Bridge: Single Span Portal Bridge</p> <p>The proposed activities include:</p> <ul style="list-style-type: none"> • Demolish existing structure. • The proposed superstructure comprises of a continuous deck that spans the full length of the bridge
--	--	---

		<ul style="list-style-type: none"> • The abutments establish the connection between the bridge superstructure and the embankments. <p>Benefits include:</p> <ul style="list-style-type: none"> • No piers will result in a reduced water constriction and subsequently reduce debris build up. <p>Drawbacks include:</p> <ul style="list-style-type: none"> • Increase in construction cost from Alternatives 1. • Traffic accommodation measures have to be implemented during construction. • More disturbances to the environment during construction.
--	--	--

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.



4 PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc.), impermeable surfaces and landscaped areas:

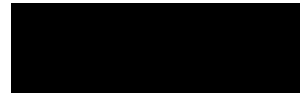
Proposed activity (Total environmental (landscaping, parking, etc.) and the operation footprint including storage area)

Size of the activity:

+/- 3399m²

Alternatives:

Alternative 1 (if any)



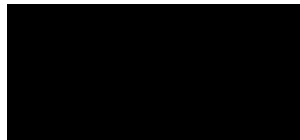
Alternative 2 (if any)

Ha/ m²

or, for linear activities:

Length of the activity:

Proposed activity Alternative 1



Alternative 2

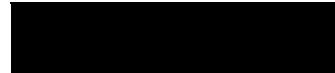
Alternative 3

m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

Size of the site/servitude:

Proposed activity



Alternative

Ha/m²

Please note that the proposed works are to be undertaken along the road reserve.

5 SITE ACCESS

Does ready access to the site exist, or is access directly from an existing road?

YES

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Maximum use of existing roads shall be made.

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated Number of times

(only complete when applicable)

6 LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
 - A4 size for activities with development footprint of 10sqm to 5 hectares;
 - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
 - A2 size for activities with development footprint of >20 hectares to 50 hectares);
 - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
 - A0 = 1: 500
 - A1 = 1: 1000
 - A2 = 1: 2000
 - A3 = 1: 4000
 - A4 = 1: 8000 ($\pm 10\ 000$)
- shape files` of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
 - Rivers and wetlands;
 - the 1:100 and 1:50 year flood line;
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

The Locality Map, C-Plan Map, Hydrology Map and Wetland Delineation Map for the proposed development are attached within **Appendix A**.

7 SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

Site photographs are attached within **Appendix B**.

8 FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

The structural drawing is included within **Appendix C**.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

- 1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route times

Instructions for completion of Section B for location/route alternatives

- 1) For each location/route alternative identified the entire Section B needs to be completed
- 2) Each alternative location/route needs to be clearly indicated at the top of the next page
- 3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives times (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route (complete only when appropriate for above)

Section B – Location/route Alternative No. (complete only when appropriate for above)

Please note that the alternatives proposed have the same receiving environment and will therefore be assessed together. It is for this reason that this section will not be duplicated.

1. PROPERTY DESCRIPTION

Property description:

(Including Physical Address and Farm name, portion etc.)

The proposed rehabilitation and repair of the bridge are to take place along Road D1321, on Portion 0 of Farm Uitvlugt 434 IR within the Midvaal Local Municipality, Gauteng Province.

2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Proposed Activity (central coordinates):	Latitude (S):	Longitude (E):
	26°40'20.87"S	28°01'15.96"E
Alternative:		

In the case of linear activities:

Alternative 1 (preferred):

Starting point of the activity
Middle point of the activity
End point of the activity

Latitude (S):	Longitude (E):

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix. Please find attached in

Addendum of route alternatives attached [REDACTED]

The 21 digit Surveyor General code of each cadastral land parcel

Proposal	T	0	I	R	0	9	8	4	0	0	0	0	0	4	5	8	0	0	0	0
----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	-------------	--------------	-------------	------------------

4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain	Undulating plain/low hills	River front
-----------	---------	--------------------------	--------	-------	----------------------------	-------------

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

Shallow water table (less than 1.5m deep)	YES	
Dolomite, sinkhole or doline areas		NO
Seasonally wet soils (often close to water bodies)	YES	
Unstable rocky slopes or steep slopes with loose soil	YES	
Dispersive soils (soils that dissolve in water)		NO
Soils with high clay content (clay fraction more than 40%)		NO
Any other unstable soil or geological feature		NO
An area sensitive to erosion	YES	

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s) [REDACTED] NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S): **Longitude (E):**

[REDACTED]

c) are any caves located within a 300m radius of the site(s) [REDACTED] NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S): **Longitude (E):**

[REDACTED]

d) are any sinkholes located within a 300m radius of the site(s) [REDACTED] NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S): **Longitude (E):**

[REDACTED]

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

Topography

The area falls within a gentle to moderate undulating landscape on the Highveld Plateau.

Climate

The area falls within a summer-rainfall region with the Mean Annual Precipitation (MAP) of 662 mm and has a cool-temperate climate with thermic continentality.

Hydrology

As per the Screening Report attached as **Appendix I3**, Aquatic Biodiversity holds a very high sensitivity as the proposed works are to take place within the wetlands and estuaries demarcation. This is depicted in Figure 3 below.

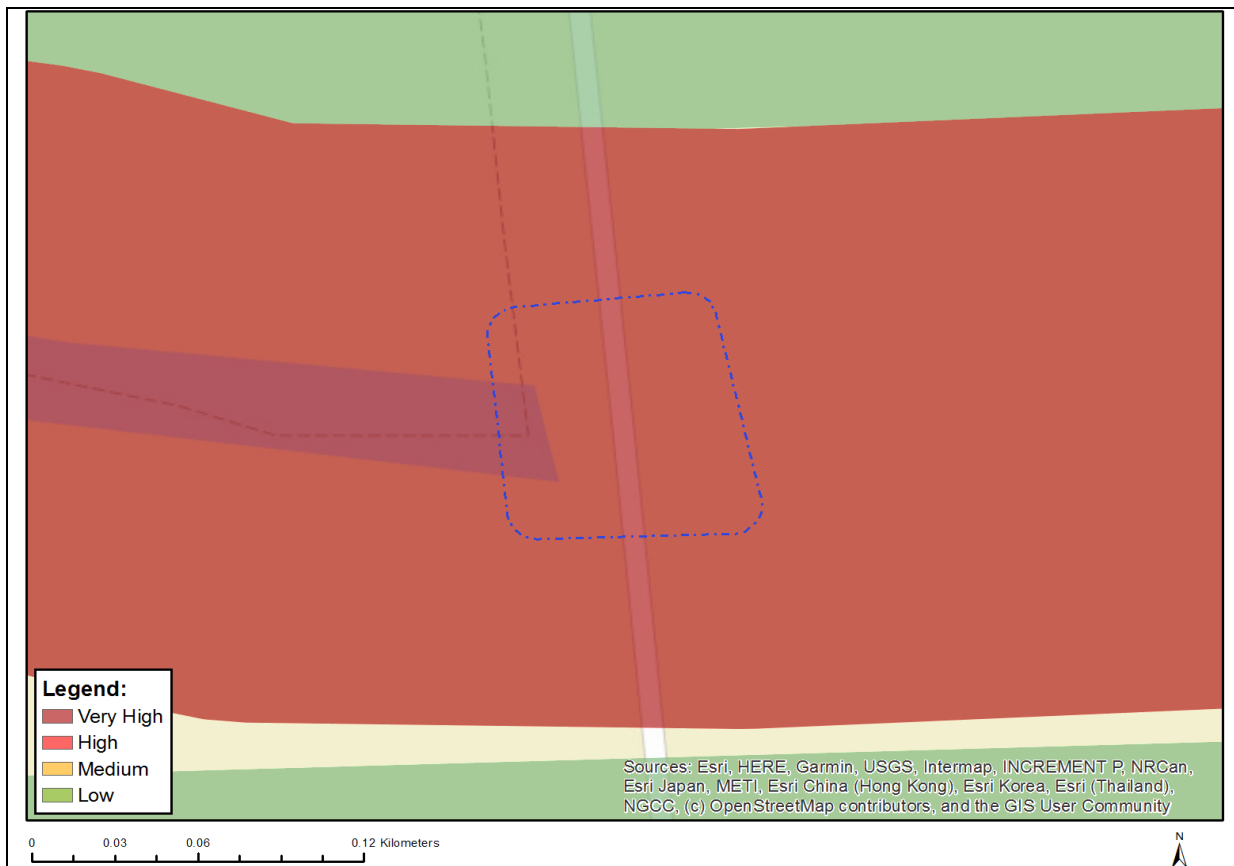
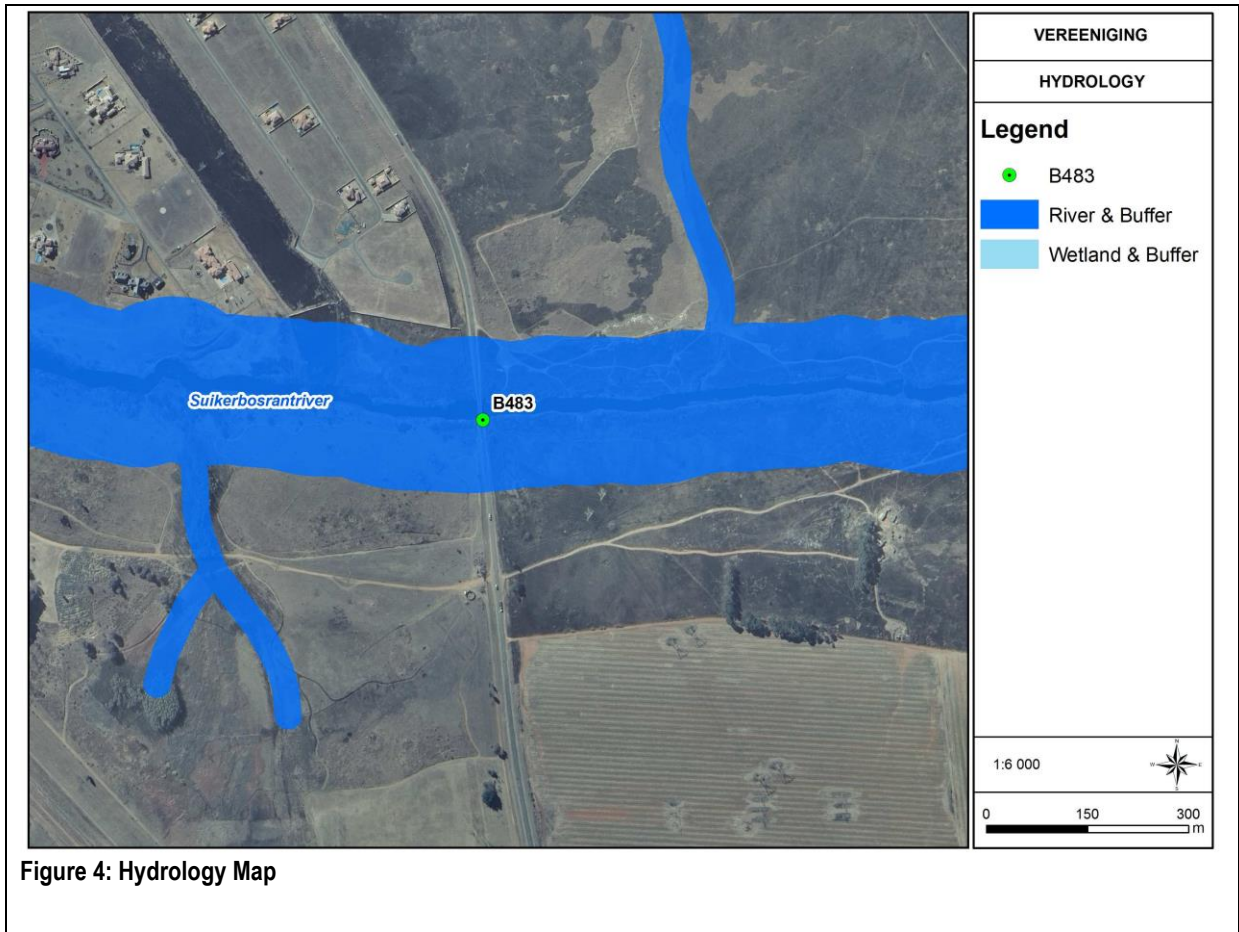


Figure 3: Aquatic Sensitivity Map

The site is situated in Quaternary Catchment C21G which falls in the 5th Water Management Area (WMA); Vaal Major WMA. In this WMA, the major rivers include the Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts, Molopo and Vaal rivers. In terms of the Aquatic Ecoregions of South Africa, the proposed site falls within the Highveld Ecoregion.

Surface water spatial layers such as the National Freshwater Ecosystems Priority Areas (NFEPA) Wetland Types for South Africa and Gauteng Department of Agriculture and Rural Development (GDARD) were consulted for the presence of wetlands and rivers. Accordingly, the Suikerbosrant River is indicated as a floodplain river. The bridge earmarked for upgrade lies across the Suikerbosrant River which drains directly into the Vaal River approximately 4km west of the bridge. Refer to Figure 4 below for Hydrology Map. The riparian map indicates the bridge location in relation to the 15m, 41m, and 500m buffers. Refer to Figure 5 below for Wetland Delineation Map.



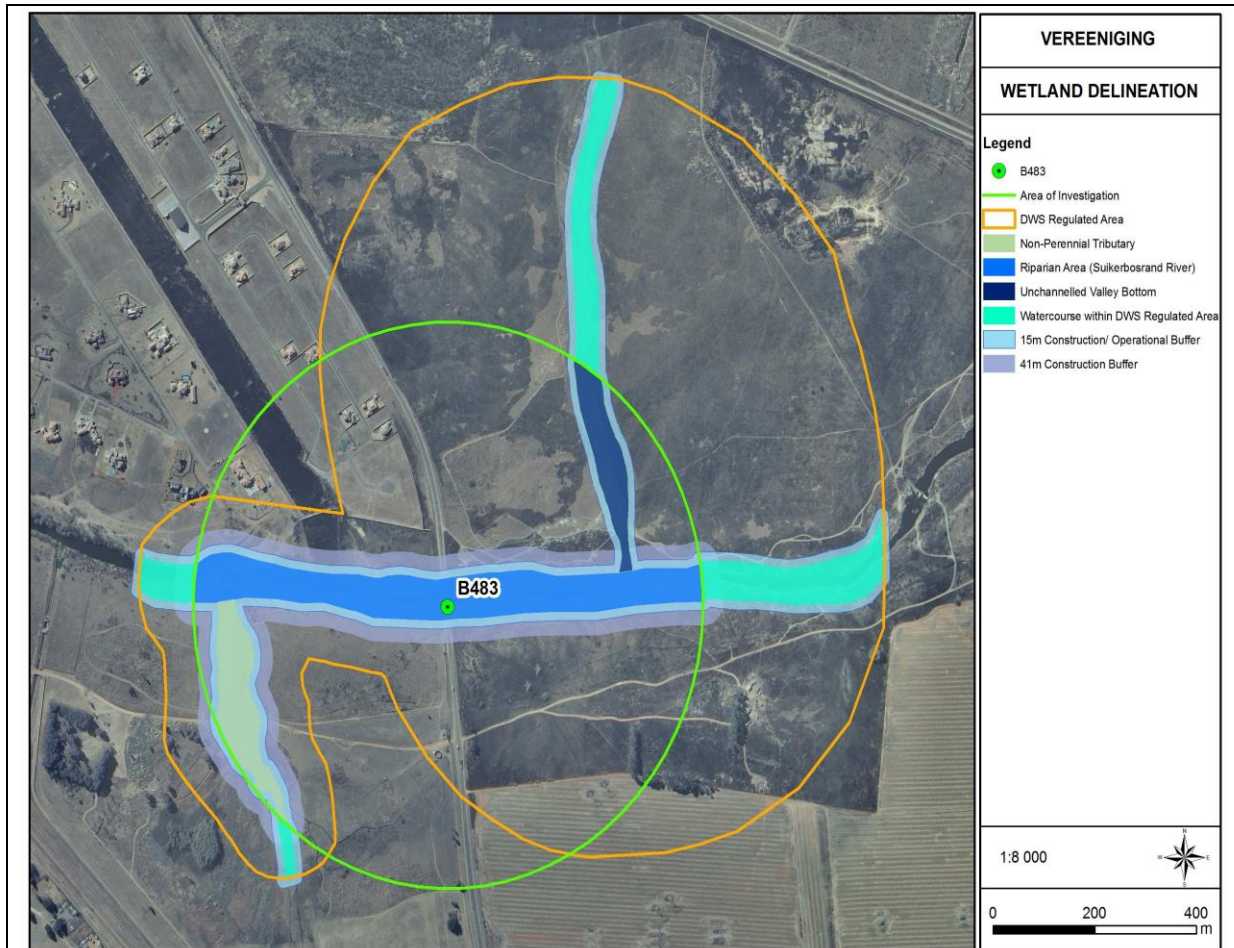


Figure 5: Wetland Delineation Map

The section of the Suikerbosrant River potentially impacted by the proposed bridge upgrade is classified as a perennial river. Within the area of investigation two additional watercourses were identified. They include an unchannelled valley bottom east (upstream) of the bridge and a small non-perennial to the west (downstream) of the bridge. These are unlikely to be affected by the proposed upgrades. It is important to note that this river flows directly into the nearby Vaal River which is an important strategic river in South Africa and therefore should be protected against potential pollution. Littering and other forms of pollution were visible throughout the study area.

The affected river was identified as a perennial river.

Watercourse Function and Integrity

- Riparian Vegetation Response Assessment Index (VEGRAI): 70.2%, C – Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.
- Ecosystem Services (ES): Moderate for Cultivated foods, water for human use and toxicant assimilation.
- Ecological Importance and Sensitivity (EIS): Low. Watercourses that fall in this category not ecologically

important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water in major rivers

- *In situ* water quality drivers: The temperature of the sample sites was low- within range for the seasonality of the site visit. The pH was circumneutral. The total dissolved salts (TDS) and electrical conductivity are elevated; this can be attributed to the increased nutrient releases from the feedlot found upstream of the site. The possible alteration of the nutrient regime was supported in the observation of filamentous blue green algae in the sample sites.
- Instream habitat (IHAS): 82.15% for the upper sample site; 85.95% for the lower sample site. This indicates the habitat that is “Highly suitable for supporting a diverse aquatic macroinvertebrate community”.
- Aquatic macroinvertebrate assemblages: The SASS 5 Ecological Category was determined to B classification. The classification suggests that the system is mostly natural condition. This assessment is in line with the site observations (IHAS).
- The upper sample area had a SASS score of 114 and with 25 species. The average score per taxon (ASPT) of the site was 4.6.
- The lower sample area had a SASS score of 92 and with 21 species. The average score per taxon (ASPT) of the site was 4.4.
- This is acceptable ASPT scores for the Suikerbosrant perennial system with habitat diversity as indicated by the IHAS scores.
- The Recommended Ecological Category (REC) is C – Maintain.

Geology and Soils

The geology of the area falls within the Madzaringwe Formation, Karoo Supergroup. The soils of the area are Ba29 soils.

Refer to **Appendix G1 – Aquatic Biodiversity Assessment** for full report.

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?

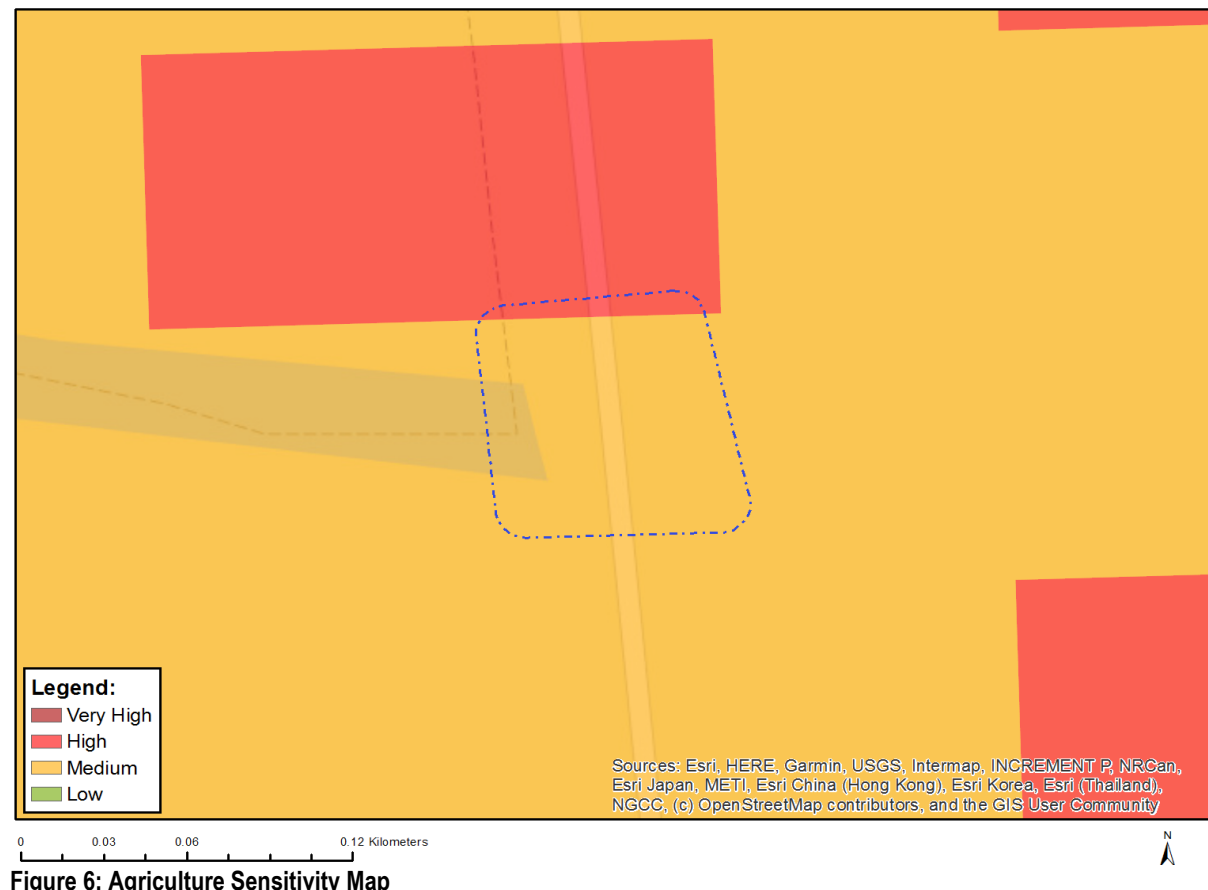
NO

Please note: The Department may request specialist input/studies in respect of the above.

Agriculture

According to the Screening Report, with regards to Agriculture in the development area, the sensitivity is considered High as a small portion of the area is within Land capability;09. Moderate-High/10. Moderate-High.

Majority of the area is however Medium as it falls within Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate. This is depicted in Figure 6 below. In terms of land cover, the site is classified as a road reserve. Thus, the site has a very low risk to agriculture potential.



7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld – good condition % = 15%	Natural veld with scattered aliens % = 5%	Natural veld with heavy alien infestation % =	Veld dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % =	Building or other structure % = 80%	Bare soil % =

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Regional Vegetation

According to the Screening Report, with regards to Plant Species in the development area, the sensitivity is considered Medium as the following species are present in the study area: *Delosperma macellum*, Sensitive species 1252, and Sensitive species 691 (the sensitive species' names have been withheld by SANBI as the species' may be prone to illegal harvesting and must be protected). This is depicted in Figure 7 below.

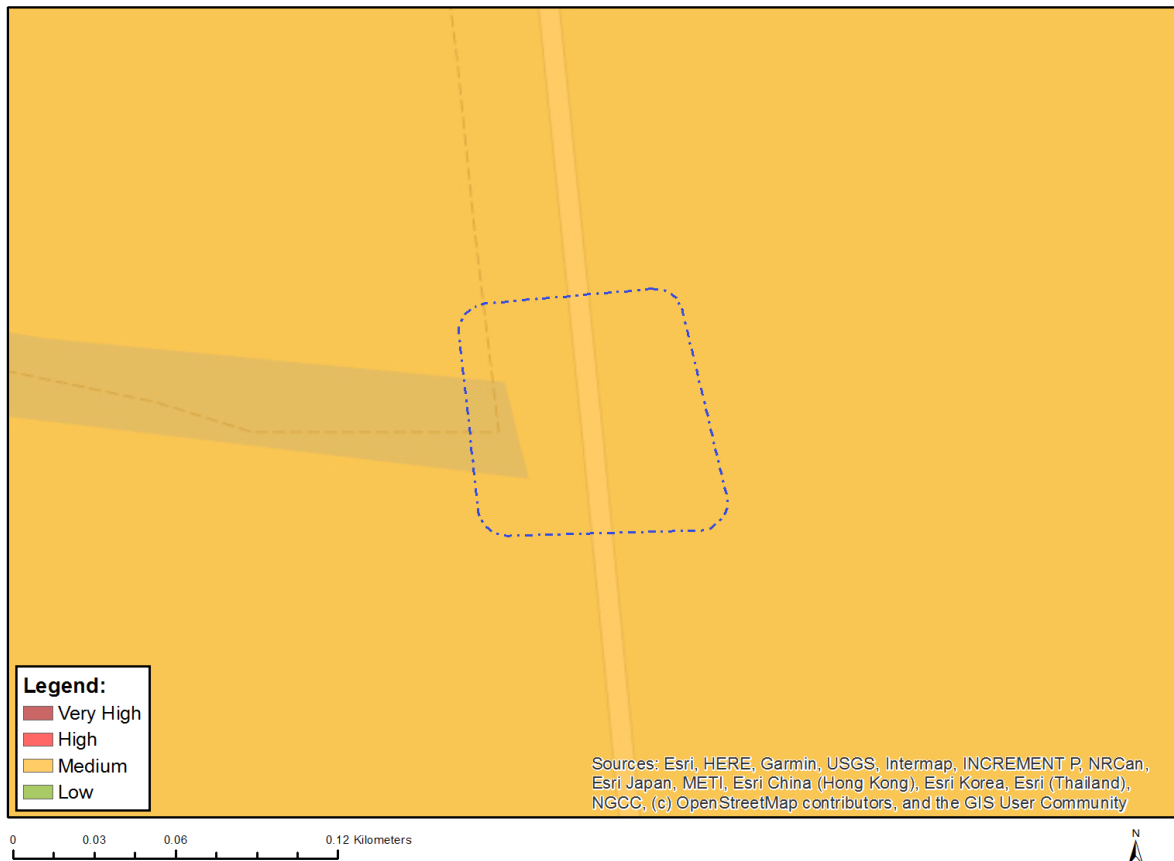
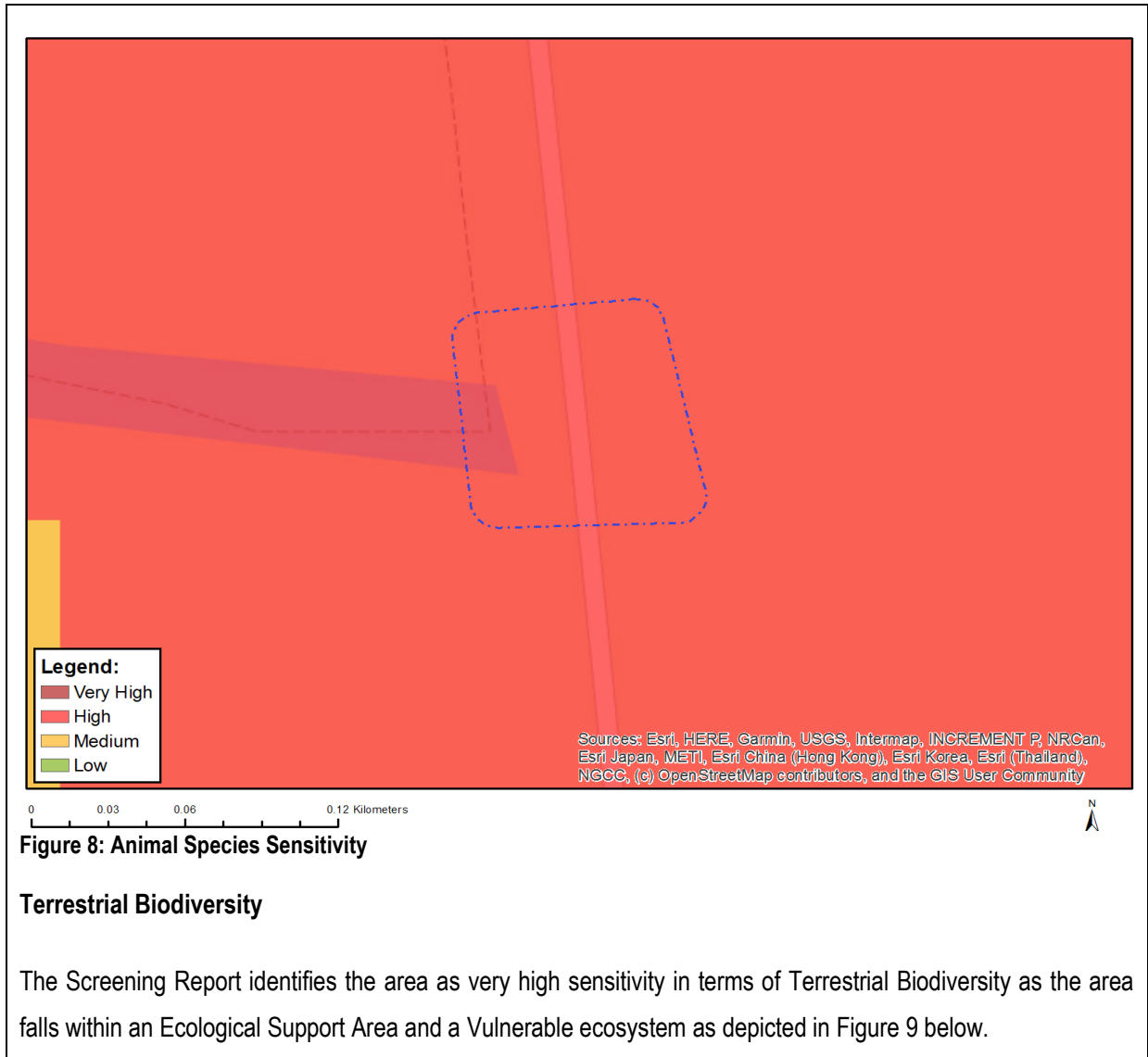


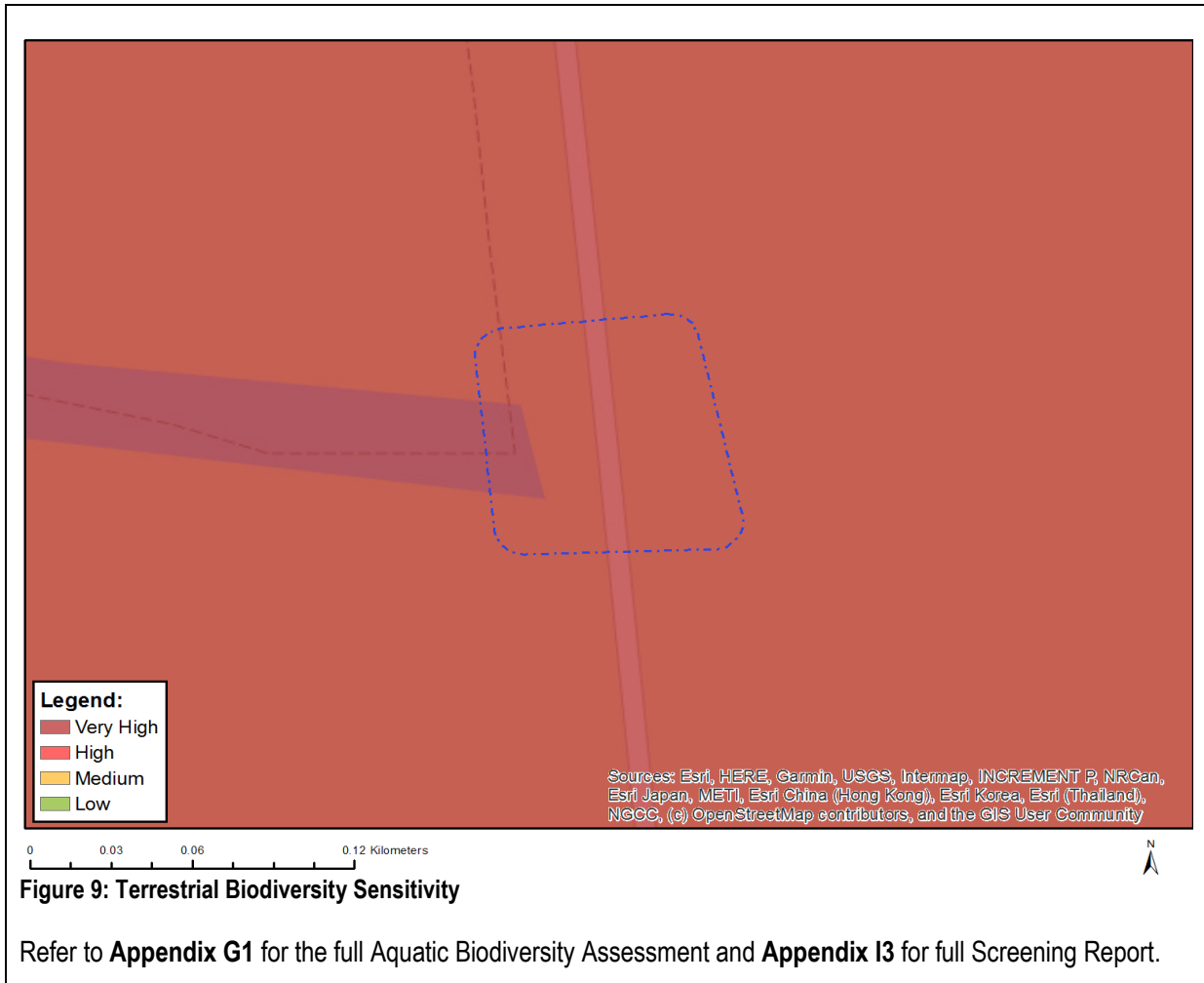
Figure 7: Plant Species Sensitivity Map

The broad vegetation unit of the area is Gm8 – Soweto Highveld Grassland and falls within the Endangered conservation status.

Fauna

According to the Screening Report, Animal Species Sensitivity on the proposed site is considered high based on the *Aves-Circus ranivorus* species. Medium sensitivity species include *Insecta-Lepidochrysops procera*, *Insecta-Orachrysops mijburghi* and *Mammalia-Hydriclis maculicollis*. Refer to Figure 8 below.





Are there any rare or endangered flora or fauna species (including red list species) present on the site

	NO
--	----

If YES, specify and explain:

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

	NO
--	----

If YES, specify and explain:

Are there any special or sensitive habitats or other natural features present on the site?

YES	
-----	--

If YES, specify and explain:

Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) classified areas within the province on the basis of its contribution to reach the conservation targets within the province. Critical Biodiversity Areas (CBAs) contain irreplaceable, important and protected areas (terms used in C-Plan 2) and are areas needed to reach the conservation targets of the Province. In addition, 'Ecological Support Areas' (ESAs), mainly around riparian areas and other

movement corridors were also classified to ensure sustainability in the long term. Landscape features associated with ESAs is essential for the maintenance and generation of biodiversity in sensitive areas and requires sensitive management where incorporated into C-Plan 3.

The study site is located on an area classified as an Ecological Support Area as depicted in Figure 10 below.

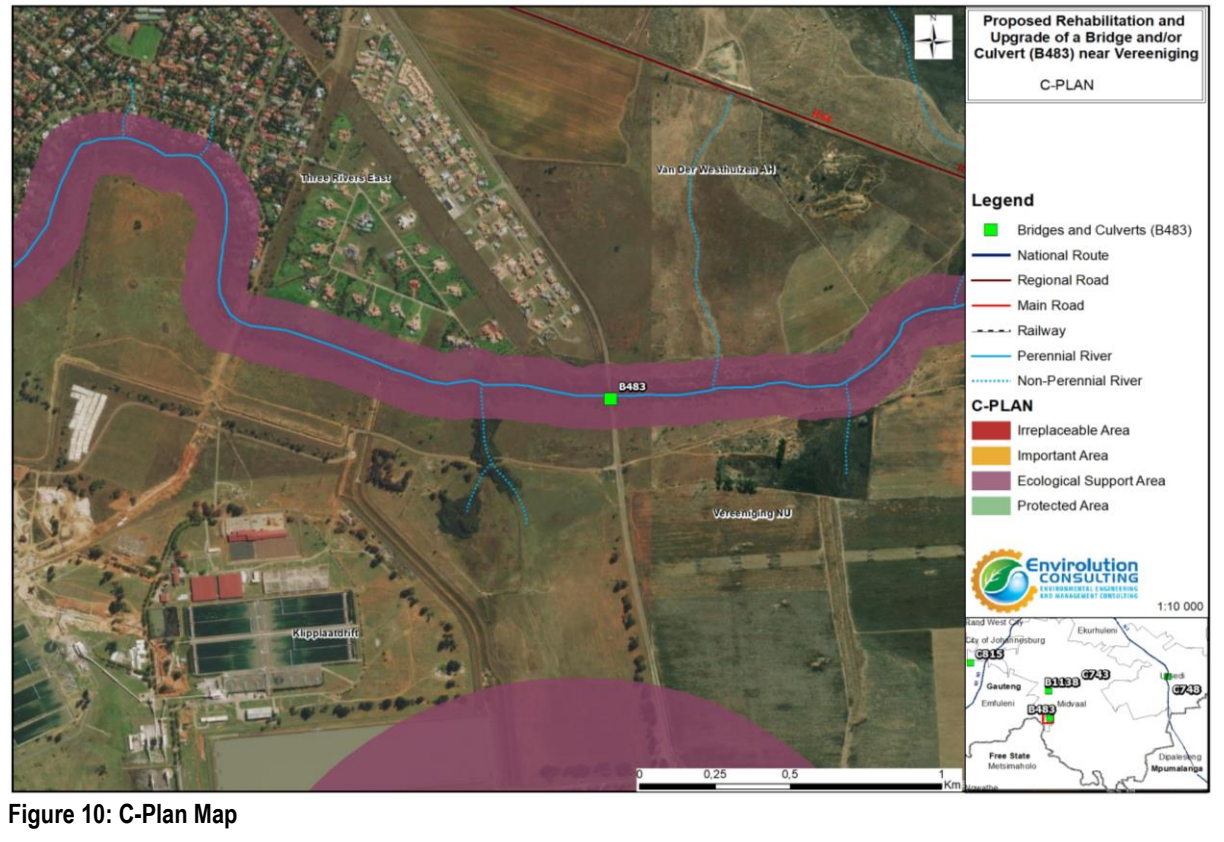


Figure 10: C-Plan Map

Was a specialist consulted to assist with completing this section
 If yes complete specialist details

YES

1) Wetland Specialist

Name of the specialist:
 Qualification(s) of the specialist:

Antoinette Bootsma
 B. Sc (Botany & Zoology) University of South Africa (2001), B. Sc (Hons) Botany University of Pretoria (2005), MSc Ecology, University of South Africa (2017), Short course in wetland delineation, legislation and rehabilitation, University of Pretoria (2007) and Short course in wetland soils, Terrasoil Science (2009).

Postal address:
 Postal code:
 Telephone:
 E-mail:

P.O. Box 32733, Waverley, Pretoria
 0135
 012 543 9982
 antoinette@limosella.co.za
 Cell: 083 4545 454
 Fax: [REDACTED]

Are any further specialist studies recommended by the specialist?

NO

If YES, specify:

If YES, is such a report(s) attached?

If YES list the specialist reports attached below

Signature of specialist:



Date:

August 2021

Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

2) Heritage Specialist

Name of the specialist:

J van Schalkwyk

Qualification(s) of the specialist:

J A van Schalkwyk, D Litt et Phil, heritage consultant, has been working in the field of heritage management for more than 30 years. Based at the National Museum of Cultural History, Pretoria, he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Eastern Cape, Northern Cape, Botswana, Zimbabwe, Malawi, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 60 papers, many in scientifically accredited journals.

Postal address:

62 Coetzer Avenue, Monument Park, 0181

Postal code:

2194

Telephone:

[Redacted]

Cell: 076 790 6777

E-mail:

jvshalkwyk@mweb.co.za

Fax:

[Redacted]

Are any further specialist studies recommended by the specialist?

NO

If YES,

specify:

[Redacted]

If YES, is such a report(s) attached?

[Redacted]

If YES list the specialist reports attached below

Signature of specialist:



Date:

August 2021

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial ^{AN}	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport ^N	23. Train station or shunting yard ^N	24. Railway line ^N	25. Major road (4 lanes or more) ^N
26. Sewage treatment plant ^A	27. Landfill or waste treatment site ^A	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam ^A	34. Small Holdings	
Other land uses (describe):				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks

NORTH						
	1, 8	1	1	1	1	
	1	1	1	1	1	
WEST	2	2		2	2	EAST
	1	1	1	1	1	
	1	1	1	1	1	
SOUTH						

Note: More than one (1) Land-use may be indicated in a block

Please note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an “A” and with an “N” respectively.

Have specialist reports been attached
If yes indicate the type of reports below

YES	
-----	--

Appendix G1 – Aquatic Biodiversity Assessment
Appendix G2 – Heritage Assessment

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

The site falls within the Midvaal Local Municipality which is an administrative area within the Sedibeng District Municipality of Gauteng in South Africa. The municipality's name references its geographical location halfway between Johannesburg and East Rand and the Vaal and Vereeniging areas.

According to the 2011 census, the Midvaal area had a population of 95 301 which increased to 111 612 in 2016. The majority of the population (68.8%) is between the ages of 15-64 years, 23.1% is under 15 years and only 8.1% is above 65 years old. About 39.6% have attained a matric education, 14.1% higher education and 4% no schooling.

The unemployment rate in Midvaal is 18.8% with the youth unemployment rate at 25.4%. The majority of households earn between R6 000 – R30 000 per month. In comparison with the other local municipalities within the Sedibeng District Municipality, Midvaal has the highest Human Development Index (HDI) and thus a better balanced society. Several new businesses have invested in the Midvaal region during the last few years, creating employment opportunities for the local community.

Economic Profile

The Midvaal Local Municipality is one of three local municipalities within the Sedibeng District Municipality, which constitutes the southern parts of Gauteng Province, the economic hub of South Africa. Together with the Emfuleni Local Municipality, Midvaal represents the major centre of economic activity in this part of the province with economic activity being predominantly industrial, however also including agricultural, mining, tourism and commercial business activities. The Midvaal Local Municipality's Gross Domestic Product (GDP) indicates a constant increase from 2001 to 2009. The major employment sector is services, followed by manufacturing, whilst the following sectors contribute to the GDP of the municipality:

- Mining (0.4%)
- Agriculture (2.6%)
- Electricity (5.7%)
- Construction (5.7%)
- Manufacturing (25.1%)
- Services sector (60.4%).

Level of Education

According to Census 2011, the level of education among adults in the Midvaal Local Municipality are as follows; 3.6% have completed primary schooling, 34.4% have some secondary education, 32.3% have completed matric, and 15.3% have some form of higher education. Very few people have no schooling. This contributes to a well-

balanced and sustainable community.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?

If YES, explain:

	NO
--	----

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

As per the Screening Report, the Archaeological and Cultural Heritage Sensitivity on the proposed development area is considered low as depicted in Figure 11 below.

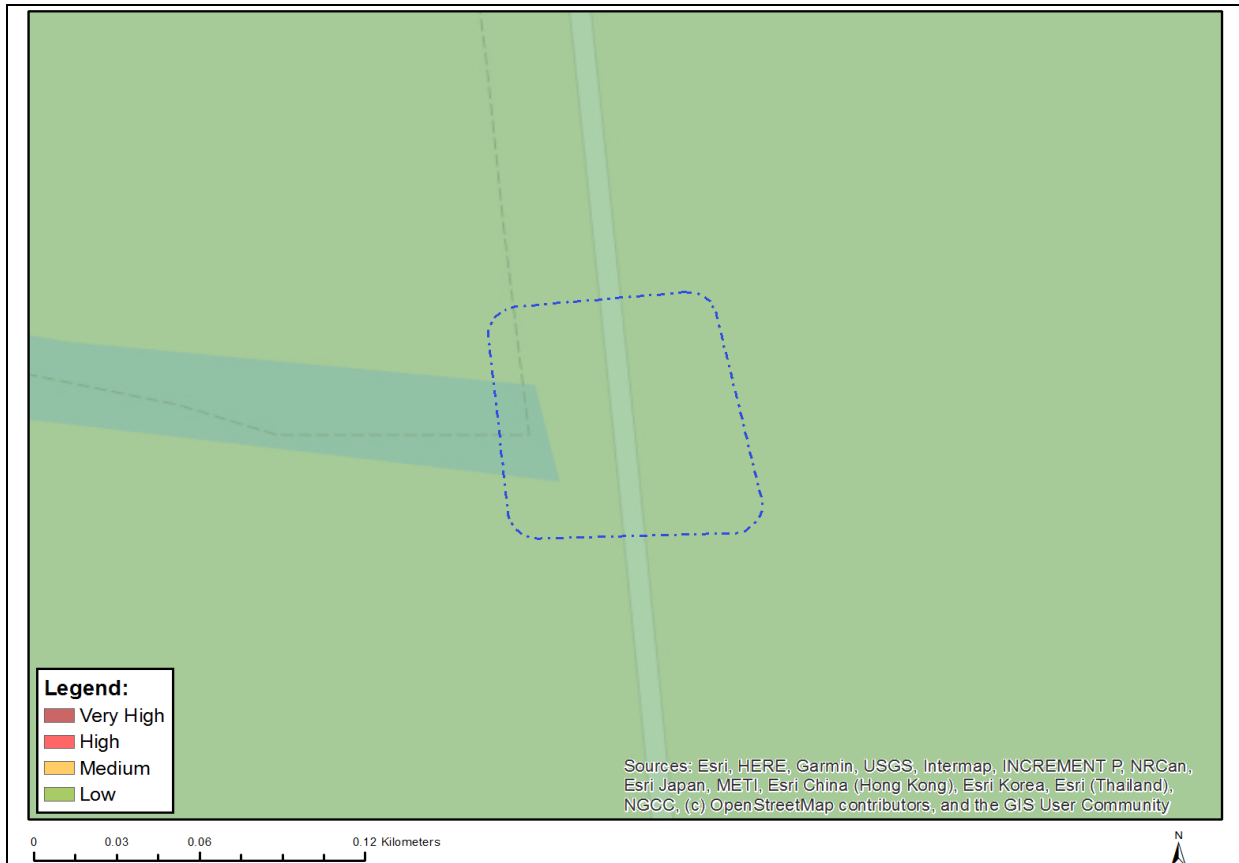


Figure 11: Archaeological and Cultural Heritage Sensitivity

As per the HIA, based on the integrity of the structure, the material used in its construction, and aerial photographs and information obtained from maps, it is possible that this structure is older than 60 years. It is unknown if the existing bridge structure replaced and older one – no such remains could be seen in the location of the current bridge. It does not show any interesting or unique features in its construction, nor was any unique materials used for building the culvert. No important event or person could be related with the bridge. It is possibly one of the last remaining single lane, stop-and-go bridges in Gauteng Province.

Accordingly, this bridge has been identified as Generally protected B: Medium significance. The implication of this is that the structure should be recorded before its destruction/rehabilitation. After recording, a permit for its destruction must be obtained from SAHRA/PHRAG.

The probability of cultural heritage sites, features and objects occurring in the study area is low. This is depicted in Figure 12 below.

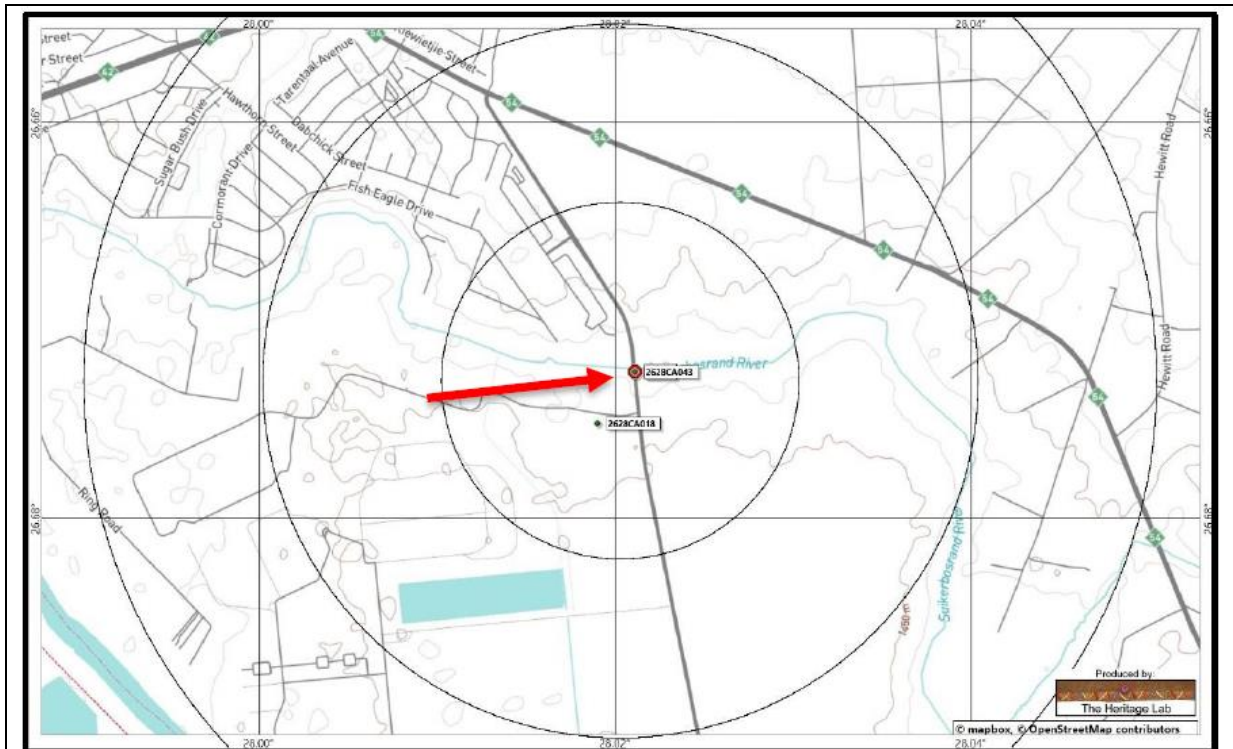
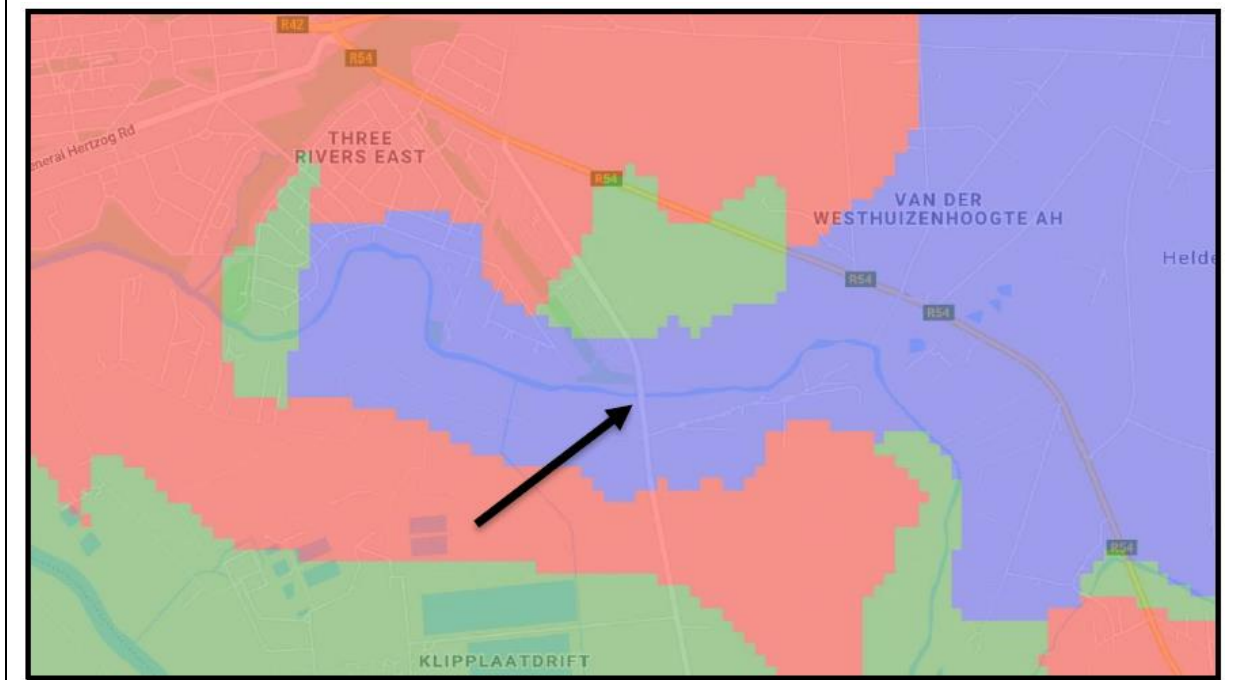


Figure 12: Location of known heritage sites and features in relation to the project area (heritage sites = coded green dots; bridge position = red arrow)

The Palaeontological Sensitivity Map (Figure 13 below) indicates that project area has a low sensitivity of fossil remains to be found and therefore a palaeontological desktop assessment was not required.



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 13: The Palaeontological sensitivity of the study area

The Screening Report also indicated a low palaeontology sensitivity as depicted in Figure 14 below.

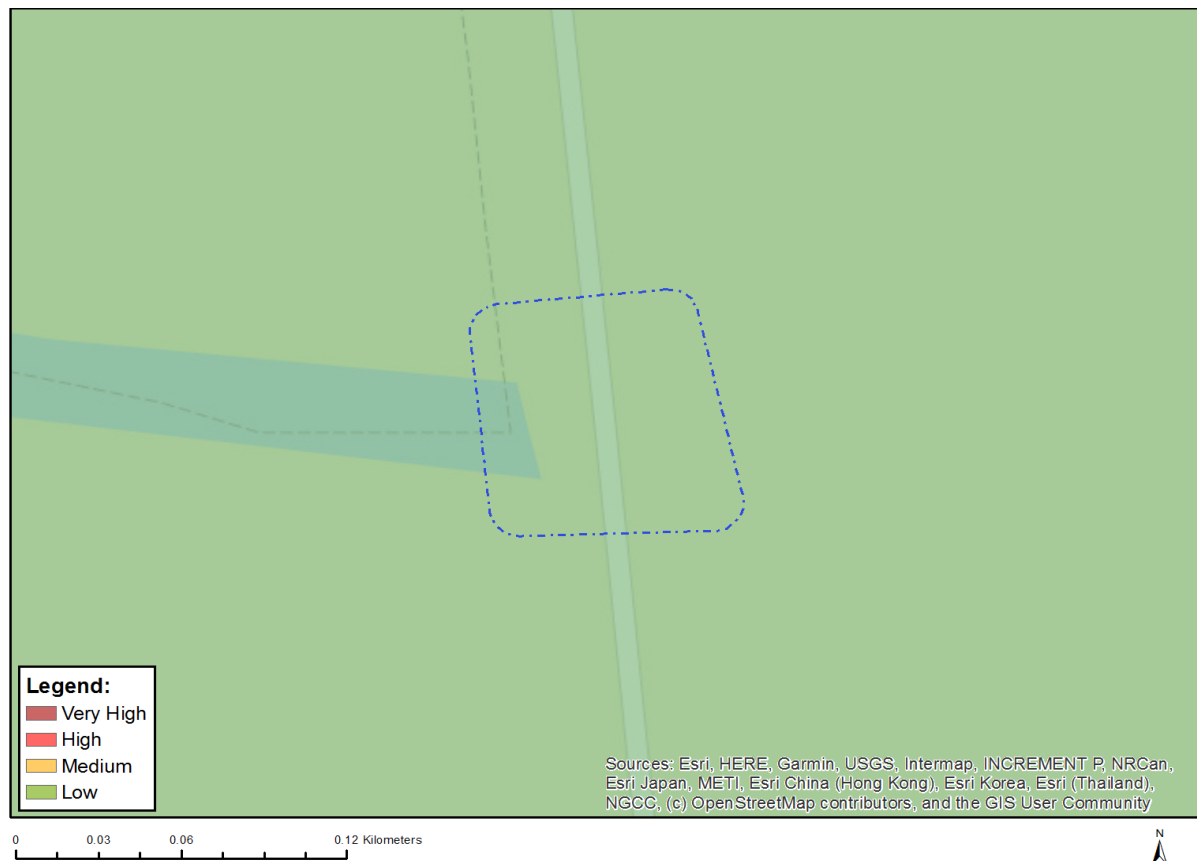


Figure 14: Palaeontology Sensitivity Map

As no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development. From a heritage point of view, it is recommended that the proposed development be allowed to continue on acceptance of the condition proposed below:

Should archaeological sites or graves be exposed in other areas during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

Refer to **Appendix G2** for the comprehensive Heritage Impact Assessment and **Appendix I3** for the Screening Report.

Will any building or structure older than 60 years be affected in any way? Potentially

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES

If yes, please attached the comments from SAHRA in the appropriate Appendix

The report is in the draft stage and has been made available to SAHRA for input. Their comments will be included in the final report to be submitted to GDARD.

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

1. The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?

YES

If yes, has any comments been received from the local authority?

NO

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

[REDACTED]

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The report is at a draft stage and is being submitted to the local authority for the 30 days legislated commenting period. Comments are anticipated during the 30-day review period.

3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

[REDACTED]

If "NO" briefly explain why no comments have been received

The report is at a draft stage and is being released for the 30 days legislated public review period. Comments are also anticipated during the 30-day review period.

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

Throughout the BA process, public participation receives high priority. Public participation is one of the most important elements of the development process; therefore, Interested and Affected Parties (I&APs) were identified as part of the Public Participation Process, including occupiers of the property, owners and occupiers of land adjacent to the site, municipal officials and relevant State Departments. All respondents were then registered on the project database. This database was supplemented by I&APs that contacted our Public Participation consultant during the initial notification period to be included on the database. The database will be used throughout the process to inform all I&APs of the project and is attached within **Appendix E9**.

In order to canvass the issues and concerns of the broader public and to ensure that all I&APs are afforded the opportunity to comment on the proposed development, the proposed project was announced as follows initially:

- Site notices (size A2) advertising the proposed development and displaying the contact details of the EAP were prepared and displayed on site. The site notices served the purpose of informing potential I&APs of the project and therefore afforded them the opportunity to comment. Refer to **Appendix E1** for Site Notice wording. Proof will be included in the Final BAR.
- Distribution of the notification letter with a Registration and Comment Sheet, and the locality map to state departments and other potential stakeholders through emails. Refer to **Appendix E2** for the notification letters. Proof of distribution will be included in the Final BAR.
- Hand-delivered the notification letter with Registration and Comment Sheet to the adjacent landowners in close proximity of the boundary of the property. Proof of distribution will be included in the Final BAR.
- Published an advertisement in the local newspaper (The Star – to run on Tuesday, 22 June 2021). Refer to **Appendix E3** for advertisement wording. Proof of distribution will be included in the Final BAR.
- Communication with local authorities and stakeholders.

The Draft BAR is currently out for a 30 day public review period and is available at the Meyerton Library along Loch Street, Meyerton, 1960, from 12 January 2022 until 11 February 2022. During this period, meetings will be scheduled. All correspondence during this period will be included in the Final BAR.

5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice/ Site Notice wording Attached as **Appendix E1**

Appendix 2 – Written notices issued as required in terms of the regulations/ Notification Letter wording Attached as **Appendix E2**

Appendix 3 – Proof of newspaper advertisements/ Advertisement wording Attached as **Appendix E3**

Appendix 4 – Communications to and from interested and affected parties – **N/A**

Appendix 5 – Minutes of any public and/or stakeholder meetings – **N/A at this stage**

Appendix 6 – Comments and Responses Report – **N/A at this stage**

Appendix 7 – Comments from I&APs on Basic Assessment (BA) Report – **N/A at this stage**

Appendix 8 – Comments from I&APs on amendments to the BA Report – **N/A**

Appendix 9 – Copy of the register of I&APs Attached as **Appendix E9**

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
- 4) Each alternative needs to be clearly indicated in the box below
- 5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives [redacted] times (complete only when appropriate)

Section D Alternative No. [redacted] (complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase? If yes, what estimated quantity will be produced per month?

YES	[redacted]
Could not be determined at this stage	

How will the construction solid waste be disposed of (describe)?

Construction rubble/ solid waste will be temporarily stored on site in designated waste skips and then removed by an appropriate waste contractor appointed by the main construction contractor to an approved landfill site. This will be managed through the EMPr – **Appendix H1**.

Where will the construction solid waste be disposed of (describe)?

General waste removed from site will be disposed of at a suitably licensed disposal facility. The nearest licensed landfill site shall be utilised. Safe disposal certificates must be obtained and kept on site for the duration of the construction phase.

Will the activity produce solid waste during its operational phase? If yes, what estimated quantity will be produced per month?

[redacted]	NO
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How will the solid waste be disposed of (describe)?

As the proposed development falls under the Midvaal Local Municipality, the council will collect the waste on a regular basis and dispose of at a registered landfill.

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

[redacted]	NO
------------	----

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

As above.

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation? NO
 If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility? NO
 If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

During Construction, wastes must be separated at source and disposed at relevant suitably licensed facilities. Waste should be separated into recyclable and non-recyclable materials and distributed for recycling where applicable. During the construction phase, construction waste rubble should be used as fill material and as foundation for the proposed upgrade processes where possible. The re-use of construction waste materials will minimize the amount of waste that will need to be disposed of at registered municipal waste facilities.

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? NO
 If yes, what estimated quantity will be produced per month?
 If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?

Will the activity produce any effluent that will be treated and/or disposed of on-site? NO
 If yes, what estimated quantity will be produced per month?

If yes describe the nature of the effluent and how it will be disposed.

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility? NO
 If yes, provide the particulars of the facility:

Facility name:
 Contact person:
 Postal address:
 Postal code:
 Telephone: Cell:
 E-mail: Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system? NO
 If yes, what estimated quantity will be produced per month? Unknown at this stage

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity (ies)? NO

Will the activity produce any effluent that will be treated and/or disposed of on site? NO

If yes describe how it will be treated and disposed off.

Chemical toilets are going to be used and the sewage waste will be collected by the Waste service provider for treatment at a treatment facility.

Emissions into the atmosphere

Will the activity release emissions into the atmosphere? YES

If yes, is it controlled by any legislation of any sphere of government? [REDACTED]

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

The activity itself will not contribute directly to emissions released into the atmosphere except possible short-term dust emissions during the construction phase. Emissions generated will be in the form of dust, carbon dioxide and other vehicle emissions generated by diesel powered machinery and trucks during the construction process i.e. tip trucks, TLB's, excavators and dust from the movement of the construction vehicles. These emissions will be composed primarily of CO₂ and will be of a low concentration.

2. WATER USE

Indicate the source(s) of water that will be used for the activity

Municipal	Directly from water board	groundwater	river, stream, dam or lake	other	the activity process itself will not use water
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If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: [REDACTED]

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix

Does the activity require a water use permit from the Department of Water Affairs? YES

If yes, list the permits required

The proposed stormwater upgrade and development also requires a Water Use License from the Department of Water and Sanitation in terms of National Water Act (Act No. 36 of 1998) for the following specific water uses:

- Section 21(c): Impeding or diverting the flow of water in a watercourse; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

If yes, have you applied for the water use permit(s)? YES

If yes, have you received approval(s)? (attached in appropriate appendix) NO

A Water Use License Application is currently being uploaded onto the DWS eWULAAS portal. Refer to **Appendix F** for proof thereof. The DBAR has also been made available to the Department of Water and Sanitation for comment during the DBAR review period.

3. POWER SUPPLY

Please indicate the source of power supply eg. Municipality / Eskom / Renewable energy source

The development will not require power supply during its operation phase. However generators will be used as a source of power if needed during the construction phase.

If power supply is not available, where will power be sourced from?

As above.

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

No particular considerations of energy saving/ conservation were deemed applicable in this project. The scope of work will be structured in a way that, where possible, the use of labour intensive methods will be employed. Not only will it serve the local community but it also saves the use of Pneumatic Equipment that requires a lot of energy input.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The proposed development is not an energy-intensive development that will require energy/electricity input for its continued operations and will therefore not consume energy during its operation phase.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4) (b) (i)).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

Please note that the following has been received during the initial period.

Issue/ Comment/ Concern	Response
	The report is at a draft stage and is being released for the 30 days legislated public review period. Comments are anticipated during the 30-day review period.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included).

(A full response must be provided in the Comments and Response Report that must be attached to this report):

The report is at a draft stage and is being released for the 30 days legislated public review period. Comments are anticipated during the 30-day review period. Comments that will be received during the DBAR review period will be included in the Final BAR that will be submitted to the authorising authority (GDARD).

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

The following methodology and criteria was used in assessing impacts related to the proposed development.

- The **Nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- The **Extent**, wherein it is indicated whether:
 - 1 is limited to the immediate area or site of development
 - 2 is the local area
 - 3 is regional
 - 4 is national
 - 5 is international
- The **Duration**, wherein it is indicated whether:
 - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - Medium-term (5–15 years) – assigned a score of 3;
 - Long term (> 15 years) - assigned a score of 4; or;
 - Permanent - assigned a score of 5.

- The **Magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - 0 is small and will have no effect on the environment;
 - 2 is minor and will not result in an impact on processes;
 - 4 is low and will cause a slight impact on processes;
 - 6 is moderate and will result in processes continuing but in a modified way;
 - 8 is high (processes are altered to the extent that they temporarily cease); and
 - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **Probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - Assigned a score of 3 is probable (distinct possibility);
 - Assigned a score of 4 is highly probable (most likely); and
 - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **Significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
 - The status, which is described as **positive, negative** or **neutral**.
 - The degree to which the impact can be reversed.
 - The degree to which the impact may cause irreplaceable loss of resources.
 - The degree to which the impact can be mitigated.

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

S= (E+D+M) P; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- **< 30 points: Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **31-60 points: Medium** (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **> 60 points: High** (i.e. where the impact must have an influence on the decision process to develop in the area).

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the **construction phase** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Table 5: Construction Impacts

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																		
<p>Nature of Impact: <u>Impacts to hydrological function at a landscape level</u></p> <p>Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes) as well as the extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flow and hydroperiod.</p> <p>Source of Impact: The compaction of soil, the removal of vegetation, surface water redirection including temporary diversion during construction.</p> <p>Alternative 1</p> <table border="1" data-bbox="192 1142 813 1382"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>30 (Low)</td> <td>14 (Low)</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Possible (2)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	30 (Low)	14 (Low)	<ul style="list-style-type: none"> • Designs should take into account soil properties, slopes and runoff energy with the aim of having a neutral effect on the regional hydrograph and prevent scouring, erosion or sedimentation. • Use of SANRAL road standards in terms of drainage and stormwater where practical and possible within project agreements. • A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. • Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMP. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account. • Ensure that the activity does not result in downstream erosion or sedimentation. 	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>
Description	Without Mitigation	With Mitigation																		
Probability	Probable (3)	Possible (2)																		
Duration	Short term (2)	Temporary (1)																		
Extent	Local (2)	Local (2)																		
Magnitude	Moderate (6)	Low (4)																		
Significance	30 (Low)	14 (Low)																		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Status (positive or negative)</i>	Negative	Negative		
Alternatives 2 and 3				
Description	Without Mitigation	With Mitigation		
Probability	Definite (5)	Probable (3)		
Duration	Medium term (3)	Short term (2)		
Extent	Local (2)	Local (2)		
Magnitude	Moderate (6)	Low (4)		
Significance	55 (Medium)	24 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
<p>Nature of Impact: <u>Changes in sediment regime</u></p> <p>Changes in sediment regimes of the aquatic ecosystem and its sub-catchment by, for example, sand movement, meandering river mouth/estuary, changing flooding or sedimentation patterns.</p> <p>Source of Impact: Construction and maintenance activities will result in earthworks and soil disturbance as well as the disturbance of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase in the turbidity of the water.</p> <p>Possible sources of the impacts include:</p> <ul style="list-style-type: none"> • Earthwork activities during construction; • Clearing of surface vegetation will expose the soils, which 			<ul style="list-style-type: none"> • Use of SANRAL road standards in terms of drainage and stormwater where practical and possible within project agreements. • Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses. • Construction in and around watercourses must be restricted to the dryer winter months where possible. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area. • Where sedimentation has been observed, effective rehabilitation with a focus on the long term control of alien invasive plants should be done. • Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. • Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction. These plans must be implemented immediately upon completion of construction. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<p>in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil;</p> <ul style="list-style-type: none"> • Disturbance of soil surface; • Disturbance of slopes through creation of roads and tracks adjacent to the watercourse; • Erosion. (e.g. gully formation, bank collapse). <p>Alternative 1</p> <table border="1" data-bbox="192 683 813 999"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Regional (3)</td> </tr> <tr> <td>Magnitude</td> <td>Medium (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>33 (Medium)</td> <td>16 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 1058 813 1374"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Regional (3)</td> </tr> <tr> <td>Magnitude</td> <td>High (8)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>56 (Medium)</td> <td>27 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Possible (2)	Duration	Short term (2)	Temporary (1)	Extent	Regional (3)	Regional (3)	Magnitude	Medium (6)	Low (4)	Significance	33 (Medium)	16 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Medium term (3)	Short term (2)	Extent	Regional (3)	Regional (3)	Magnitude	High (8)	Low (4)	Significance	56 (Medium)	27 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> • Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. • During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Runoff from the construction area must be managed to avoid erosion and pollution problems. • Monitoring should be done to ensure that sediment pollution is timeously addressed. 	
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<p>Nature of impact: <u>Introduction and spread of alien vegetation</u></p> <p>Source of Impact: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.</p> <p>Alternative 1</p> <table border="1" data-bbox="190 679 813 995"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Possible (2)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (3)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (2)</td> </tr> <tr> <td>Significance</td> <td>20 (Low)</td> <td>10 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="190 1054 813 1369"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>39 (Medium)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Possible (2)	Possible (2)	Duration	Short term (3)	Temporary (1)	Extent	Regional (3)	Local (2)	Magnitude	Low (4)	Low (2)	Significance	20 (Low)	10 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Probable (3)	Duration	Long term (4)	Short term (2)	Extent	Regional (3)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	39 (Medium)	24 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> • Undertake an Alien Plant Control Plan which specifies actions and measurable targets. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards. • Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan. • Rehabilitate or revegetate disturbed areas. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Loss and disturbance of riparian habitat</u></p> <p>Loss and disturbance of watercourse habitat and fringe vegetation including impact on fixed and dynamic ecological processes and impact on key ecosystem regulating and supporting services.</p> <p>Source of impact: Loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.</p> <p>Alternative 1</p> <table border="1" data-bbox="190 703 813 1023"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Medium (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>30 (Low)</td> <td>16 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="190 1082 813 1391"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>High (8)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>56 (Medium)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Possible (2)	Duration	Short term (2)	Temporary (2)	Extent	Local (2)	Local (2)	Magnitude	Medium (6)	Low (4)	Significance	30 (Low)	16 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Long term (4)	Short term (2)	Extent	Local (2)	Local (2)	Magnitude	High (8)	Low (4)	Significance	56 (Medium)	24 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Where construction occurs in the demarcated watercourse and buffer, extra precautions should be implemented to so as to minimise watercourse loss. Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or associated buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. Where sedimentation has been observed, effective rehabilitation with a focus on the long-term control of alien invasive plants should be done. Ensure that movement corridors enable fauna to migrate through the system. Monitoring should target the two minor culverts with outlets in the riparian zone to ensure that no habitat degradation results from these structures during the operational phase. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Changes in water quality due to input of foreign materials.</u></p> <p>Source: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/ivers and a reduction in watercourse function.</p> <p>Alternative 1</p> <table border="1" data-bbox="192 635 813 954"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Temporary (1)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (2)</td> </tr> <tr> <td>Significance</td> <td>21 (Low)</td> <td>10 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 1015 813 1329"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>50 (Medium)</td> <td>21 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Possible (2)	Duration	Temporary (1)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Low (4)	Low (2)	Significance	21 (Low)	10 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Probable (3)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	50 (Medium)	21 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. Provision of adequate sanitation facilities located outside of the watercourse area or its associated buffer zone. The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. Maintenance of construction vehicles/equipment should not take place within the watercourse. Measures should be put in place to prevent spills or water contaminated by waste material by for example constructing sumps or drains which can contain any spills in order for contaminated water to be isolated from the watercourse and removed from the site for appropriate disposal. Any spills should be cleared by effective methods to ensure no release occurs into the watercourse. A detailed rehabilitation plan should be drawn up with the input from a water quality, soil contamination assessment and ecologist should any spills occur. Independent water quality analyses should be undertaken annually, or as specified by an aquatic specialist, to demonstrate and audit compliance of effective pollution control measures. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Loss of aquatic biota</u></p>	<ul style="list-style-type: none"> Ensure that no additional vegetation is removed. 	<p>Expected to be limited provided</p>																																										

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<p>Loss of instream habitat, deposition of wind-blown sand, loss of fringing vegetation and erosion. Loss of non-marginal and marginal vegetation in combination with nutrient regime alteration. Increase in invasive species due to disturbance. Change in water quality. Changes in flow. Increase in sediment regime with emphasis on increased sediment releases from the site.</p> <p>Source: Loss and disturbance of biota due to direct development in the watercourse as well as changes in habitat including water quality, the water column, increased sediment, increased alien and habitat fragmentation.</p> <p>Alternative 1</p> <table border="1" data-bbox="190 675 813 994"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>30 (Low)</td> <td>14 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="190 1054 813 1369"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (5)</td> </tr> <tr> <td>Significance</td> <td>44 (Medium)</td> <td>30 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Possible (2)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	30 (Low)	14 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Medium term (3)	Medium term (3)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Moderate (5)	Significance	44 (Medium)	30 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> • Avoid unnecessary aquatic ecosystem crossing - limit work within the stream, river or wetland. The use of single access points for crossings. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • Mark all areas which do not form part of the proposed development within wetlands and riparian areas as no-go areas. • Weed control in aquatic ecosystem and buffer zone. • Management of sediment regime during construction. • All management procedures listed above for the change in water quality. 	<p>that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Loss and disturbance of heritage sites due to the development.</u></p> <p>Alternative 1</p> <table border="1" data-bbox="190 424 813 746"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Very improbable (1)</td> <td>Very improbable (1)</td> </tr> <tr> <td>Duration</td> <td>Permanent (4)</td> <td>Permanent (4)</td> </tr> <tr> <td>Extent</td> <td>Site (1)</td> <td>Site (1)</td> </tr> <tr> <td>Magnitude</td> <td>Minor (2)</td> <td>Minor (2)</td> </tr> <tr> <td>Significance</td> <td>7 (Low)</td> <td>7 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="190 807 813 1118"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Improbable (2)</td> <td>Very improbable (1)</td> </tr> <tr> <td>Duration</td> <td>Permanent (4)</td> <td>Permanent (4)</td> </tr> <tr> <td>Extent</td> <td>Site (1)</td> <td>Site (1)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Minor (2)</td> </tr> <tr> <td>Significance</td> <td>18 (Low)</td> <td>7 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Very improbable (1)	Very improbable (1)	Duration	Permanent (4)	Permanent (4)	Extent	Site (1)	Site (1)	Magnitude	Minor (2)	Minor (2)	Significance	7 (Low)	7 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Improbable (2)	Very improbable (1)	Duration	Permanent (4)	Permanent (4)	Extent	Site (1)	Site (1)	Magnitude	Low (4)	Minor (2)	Significance	18 (Low)	7 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Because of the possibility that this structure is older than 60 years, the structure should be recorded before any destruction/rehabilitation. After recording, a permit for its destruction (if necessary) must be obtained from SAHRA/PHRAG. Should graves, fossils or any archaeological artefacts be identified during construction, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a heritage practitioner or local museum so that an investigation and evaluation of the finds can be made. 	<p>Low risk anticipated provided that the mitigation measures are implemented correctly.</p>
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Probability	Very improbable (1)	Very improbable (1)																																										
Duration	Permanent (4)	Permanent (4)																																										
Extent	Site (1)	Site (1)																																										
Magnitude	Minor (2)	Minor (2)																																										
Significance	7 (Low)	7 (Low)																																										
Status (positive or negative)	Negative	Negative																																										
Description	Without Mitigation	With Mitigation																																										
Probability	Improbable (2)	Very improbable (1)																																										
Duration	Permanent (4)	Permanent (4)																																										
Extent	Site (1)	Site (1)																																										
Magnitude	Low (4)	Minor (2)																																										
Significance	18 (Low)	7 (Low)																																										
Status (positive or negative)	Negative	Negative																																										
<p>Nature of the Impact: <u>Loss and disturbance of palaeontology features due to the development.</u></p> <p>Alternative 1</p> <table border="1" data-bbox="190 1249 813 1366"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Very improbable (1)</td> <td>Very improbable (1)</td> </tr> <tr> <td>Duration</td> <td>Permanent (4)</td> <td>Permanent (4)</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Very improbable (1)	Very improbable (1)	Duration	Permanent (4)	Permanent (4)	<ul style="list-style-type: none"> Should any palaeontology features be identified during construction, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a specialist so that an investigation and evaluation of the finds can be made. Chance find protocol must be in place. 	<p>Low risk anticipated provided that the mitigation measures are implemented correctly.</p>																																	
Description	Without Mitigation	With Mitigation																																										
Probability	Very improbable (1)	Very improbable (1)																																										
Duration	Permanent (4)	Permanent (4)																																										

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
Extent	Site (1)	Site (1)		
Magnitude	Minor (2)	Minor (2)		
Significance	7 (Low)	7 (Low)		
Status (positive or negative)	Negative	Negative		
Alternatives 2 and 3				
Description	Without Mitigation	With Mitigation	<ul style="list-style-type: none"> • Construction vehicles should only park in designated areas. • Waste to be kept only at specific sites on site and to be removed weekly. • Do not locate the construction camp or laydown yards within 1km from any residential area or tourist attraction, unless it can be completely screened from sensitive viewpoints. Preferably, construction camps should be in a dedicated construction camp in the industrial area, in an area that is already disturbed. • Avoid the construction of additional access roads by keeping to existing roads where possible. • Avoid removal of any large trees or shrubs that may open views to the construction site and compromise the natural screening capacity of the study area. • Clearly demarcate the construction site to limit the area of disturbance. 	The site will not be visually appealing during the construction phase.
Probability	Improbable (2)	Very improbable (1)		
Duration	Permanent (4)	Permanent (4)		
Extent	Site (1)	Site (1)		
Magnitude	Low (4)	Minor (2)		
Significance	18 (Low)	7 (Low)		
Status (positive or negative)	Negative	Negative		
<p>Nature of Impact: <u>Visual</u></p> <p>Surface disturbances and the presence of a construction team are uncharacteristic events in the study area and may cause unsightly views as a result of the activity.</p> <p>Introduction of construction equipment, ground staff, construction vehicles and equipment that is unfamiliar in the baseline environment.</p> <p>Source of Impact:</p> <ul style="list-style-type: none"> • Construction vehicles. • Construction material. • Barricading and fencing. • Rubble on site. 				

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<ul style="list-style-type: none"> Construction crew. <p>Alternative 1</p> <table border="1" data-bbox="192 379 813 683"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td style="background-color: yellow;">40 (Medium)</td> <td style="background-color: green;">27 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 743 813 1050"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>High (8)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td style="background-color: red;">70 (High)</td> <td style="background-color: yellow;">44 (Medium)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Moderate (6)	Significance	40 (Medium)	27 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Highly Probable (4)	Duration	Long term (4)	Medium term (3)	Extent	Local (2)	Local (2)	Magnitude	High (8)	Moderate (6)	Significance	70 (High)	44 (Medium)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Keep dust levels down by regularly wetting dirt roads and exposed soil areas. Remove rubble and other waste that is generated by the construction process as soon as possible and dispose at an appropriate dump site. Keep the construction camp neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of sight from sensitive viewpoints. Enhance screening of the construction camps by erecting a temporary fence with a 3m high shade cloth to limit the intrusive nature of such a site. 	
Description	Without Mitigation	With Mitigation																																										
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Significance	70 (High)	44 (Medium)																																										
Status (positive or negative)	Negative	Negative																																										
<p>Nature of Impact: <u>Dust Generation</u></p> <p>Construction machinery and heavy vehicles which are likely to make use of the existing gravel roads to transport equipment and material to the construction site, are likely to generate dust which is likely to be perceptible by adjacent residents. Trucks may potentially distribute dust along internal access roads as well as into the watercourse given the nature of the activities.</p>	<ul style="list-style-type: none"> Vegetation clearance should be kept to a minimum (only where necessary). Wet all unprotected cleared areas and stockpiles with water to suppress dust pollution during dry and windy periods. Warning barricading should be placed around open trenches and should be suitable for high winds. Speed limits should be enforced to ensure that the generation of dust by construction vehicles are limited. Dust suppression at least twice a day; morning and before the end of 	<p>Medium risk (as the amount of dust emitted into the air will be of high volumes); unless mitigation measures are implemented.</p>																																										

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<p>Source of Impact:</p> <ul style="list-style-type: none"> Clearing of vegetation. Construction vehicles. <p>Alternative 1</p> <table border="1" data-bbox="192 480 813 786"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td>40 (Medium)</td> <td>27 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 847 813 1150"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>High (8)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td>70 (High)</td> <td>44 (Medium)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Moderate (6)	Significance	40 (Medium)	27 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Highly Probable (4)	Duration	Long term (4)	Medium term (3)	Extent	Local (2)	Local (2)	Magnitude	High (8)	Moderate (6)	Significance	70 (High)	44 (Medium)	Status (positive or negative)	Negative	Negative	<p>the working day.</p> <ul style="list-style-type: none"> A continuous dust monitoring process needs to be undertaken during construction. All vehicles transporting friable materials such a sand, rubble etc must be covered by a tarpaulin or wet down. Construction work to be undertaken during weekdays as far as practical. 	
Description	Without Mitigation	With Mitigation																																										
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Status (positive or negative)	Negative	Negative																																										
<p>Nature of Impact: <u>Crime, safety and security</u></p> <p>Source of Impact:</p> <ul style="list-style-type: none"> Lack of security. Easy access. Construction area not enclosed. Poorly trained personnel using equipment and vehicles. 	<ul style="list-style-type: none"> Ensure that the construction vehicles as well as equipment are under the control of competent personnel and are in proper working order. Ensure that the contact details of the police or security company and ambulance services are available on site. Limit access to the construction camp to construction workers through access control. 	<p>If not mitigated, medium risk to personnel as well as the construction site if safety measures are not put in place before construction commences.</p>																																										

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																					
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Description	Without Mitigation	With Mitigation																							
Probability	Possible (2)	Unlikely (1)																							
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Description	Without Mitigation	With Mitigation																							
Probability	Highly Probable (4)	Probable (3)																							
Duration	Medium term (3)	Short term (2)																							
Extent	Local (2)	Local (2)																							
Magnitude	High (8)	Moderate (6)																							
Significance	52 (Medium)	30 (Low)																							
Status (positive or negative)	Negative	Negative																							
Nature of Impact: <u>Noise</u> Source of Impact: <ul style="list-style-type: none"> Construction vehicles. Equipment and machinery. Alternative 1 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Highly Probable (4)	Duration	Short term (2)	Temporary (1)	Extent	Local (2)	Local (2)	<ul style="list-style-type: none"> Construction and the use of construction machinery should be limited between 06h00 and 18h00 on weekdays only. Institute noise control measures throughout the construction phase for all applicable activities, including the construction times. Ensure that noise licensers are installed on the construction vehicles and machineries to reduce the noise level. Inform residents of nearby residential areas of planned noisy activities outside the timeframes stated above. No construction should occur during weekends, unless the adjacent residents have been notified in writing at least three days in advance. Construction activities must abide by the national noise laws and the 	High risk as construction vehicles and equipment causes noise pollution.									
Description	Without Mitigation	With Mitigation																							
Probability	Definite (5)	Highly Probable (4)																							
Duration	Short term (2)	Temporary (1)																							
Extent	Local (2)	Local (2)																							

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Magnitude</i>	Moderate (6)	Low (4)	municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment.	
<i>Significance</i>	50 (Medium)	28 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
Alternatives 2 and 3				
<i>Description</i>	Without Mitigation	With Mitigation		
<i>Probability</i>	Definite (5)	Definite (5)		
<i>Duration</i>	Medium term (3)	Short term (2)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	High (8)	Moderate (6)		
<i>Significance</i>	65 (High)	50 (Medium)		
<i>Status (positive or negative)</i>	Negative	Negative		
Nature of impact: <u>Traffic and accessibility</u>				
Alternative 1				
<i>Description</i>	Without Mitigation	With Mitigation	<ul style="list-style-type: none"> Public traffic and general access over the structure will be compromised to a large extent with Alternatives 2 and 3. This is also anticipated for a long period of time. Traffic accommodation for construction activities affecting the travelled way as well as the sidewalks of the travelled way. If one lane is expected to be closed, "Stop and Go" will be used for traffic accommodation. In the case of complete road closure, traffic diversion must be accommodated for. 	High risk
<i>Probability</i>	Probable (3)	Possible (2)		
<i>Duration</i>	Short term (2)	Temporary (1)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Low (4)	Low (4)		
<i>Significance</i>	24 (Low)	14 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
Alternatives 2 and 3				
<i>Description</i>	Without Mitigation	With Mitigation		
<i>Probability</i>	Definite (5)	Definite (5)		
<i>Duration</i>	Long term (4)	Medium term (3)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<i>Extent</i>	Local (2)	Local (2)																																												
<i>Magnitude</i>	High (8)	High (8)																																												
<i>Significance</i>	70 (High)	65 (High)																																												
<i>Status (positive or negative)</i>	Negative	Negative																																												
Nature of impact: <u>Costs</u> Alternative 1 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Definite (5)</td> <td>Definite (5)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short term (2)</td> <td>Temporary (1)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td><i>Significance</i></td> <td>50 (Medium)</td> <td>35 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> Alternatives 2 and 3 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Definite (5)</td> <td>Definite (5)</td> </tr> <tr> <td><i>Duration</i></td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>High (8)</td> <td>Moderate (6)</td> </tr> <tr> <td><i>Significance</i></td> <td>65 (High)</td> <td>50 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	<i>Probability</i>	Definite (5)	Definite (5)	<i>Duration</i>	Short term (2)	Temporary (1)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	Moderate (6)	Low (4)	<i>Significance</i>	50 (Medium)	35 (Medium)	<i>Status (positive or negative)</i>	Negative	Negative	Description	Without Mitigation	With Mitigation	<i>Probability</i>	Definite (5)	Definite (5)	<i>Duration</i>	Medium term (3)	Short term (2)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	High (8)	Moderate (6)	<i>Significance</i>	65 (High)	50 (Medium)	<i>Status (positive or negative)</i>	Negative	Negative	<ul style="list-style-type: none"> Use of labour and material that is reasonably priced and locally sourced. 	High risk
Description	Without Mitigation	With Mitigation																																												
<i>Probability</i>	Definite (5)	Definite (5)																																												
<i>Duration</i>	Short term (2)	Temporary (1)																																												
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<i>Significance</i>	65 (High)	50 (Medium)																																												
<i>Status (positive or negative)</i>	Negative	Negative																																												
Nature of impact: <u>Socioeconomic</u> Source of Impact: <ul style="list-style-type: none"> Job creation for local skilled labour, general labour and 			<ul style="list-style-type: none"> General and skilled locals must be considered for employment during construction (contractor and construction crew). Local suppliers must be considered for the purchase of construction material. 	Medium																																										

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
suppliers.				
Alternative 1				
Description	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Temporary (1)	Short term (2)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Low (4)	Moderate (6)		
<i>Significance</i>	21 (Medium)	40 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		
Alternatives 2 and 3				
Description	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Short term (2)	Medium term (3)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Moderate (6)	High (8)		
<i>Significance</i>	30 (Low)	52 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the **operational phase** for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Table 6: Operation Impacts

POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<p>Nature of Impact: <u>Impacts to hydrological function at a landscape level</u></p> <p>Alternative 1</p> <table border="1" data-bbox="192 644 813 951"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Definite (5)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>60 (Medium)</td> <td>36 (Medium)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 1010 813 1318"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>40 (Medium)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>	Description	Without Mitigation	With Mitigation	Probability	Definite (5)	Highly Probable (4)	Duration	Long term (4)	Medium term (3)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	60 (Medium)	36 (Medium)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Medium term (3)	Short term (2)	Extent	Regional (3)	Local (2)	Magnitude	Low (4)	Low (4)	Significance	40 (Medium)	24 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMPr. High energy stormwater input into the watercourses should be prevented at all cost. Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be taken into account. Ensure that the activity does not result in downstream erosion or sedimentation. 	<p>Impacts to the flow characteristics of this watercourse are likely to be permanent unless rehabilitated.</p>
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Status (positive or negative)	Negative	Negative																																										
<p>Nature of Impact: <u>Changes in sediment regime</u></p>	<ul style="list-style-type: none"> Monitoring should target the culverts and with outlets in the riparian 	<p>Expected to be limited provided that the mitigation measures are</p>																																										

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
Alternative 1			zone to ensure that no habitat degradation results from these structures during the operational phase. <ul style="list-style-type: none"> Monitoring should target the culverts and with outlets in the riparian zone to ensure that no habitat degradation results from these structures during the operational phase. 	implemented correctly and effective rehabilitation of the site is undertaken where necessary.
Description	Without Mitigation	With Mitigation		
Probability	Highly Probable (4)	Probable (3)		
Duration	Medium term (3)	Short term (2)		
Extent	Regional (3)	Regional (3)		
Magnitude	High (8)	Low (4)		
Significance	56 (Medium)	27 (Low)		
Status (positive or negative)	Negative	Negative		
Alternatives 2 and 3				
Description	Without Mitigation	With Mitigation		
Probability	Possible (2)	Possible (2)		
Duration	Long term (4)	Medium term (3)		
Extent	Regional (3)	Local (2)		
Magnitude	Low (4)	Low (4)		
Significance	22 (Low)	18 (Low)		
Status (positive or negative)	Negative	Negative		
Nature of impact: Introduction and spread of alien vegetation			<ul style="list-style-type: none"> Weed control in buffer zone. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish. Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas. Operational activities should not impact on rehabilitated or naturally vegetated areas. 	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.
Alternative 1				
Description	Without Mitigation	With Mitigation		
Probability	Probable (3)	Probable (3)		
Duration	Long term (4)	Short term (2)		
Extent	Regional (3)	Local (2)		
Magnitude	Moderate (6)	Low (4)		
Significance	39 (Medium)	24 (Low)		
Status (positive or negative)	Negative	Negative		

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Nature of the Impact: <u>Loss and disturbance of riparian habitat</u> Alternative 1 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Long term (4)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>High (8)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>56 (Medium)</td> <td>32 (Medium)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> Alternatives 2 and 3 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Short term (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>27 (Low)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>			Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Highly Probable (4)	Duration	Long term (4)	Short term (2)	Extent	Local (2)	Local (2)	Magnitude	High (8)	Low (4)	Significance	56 (Medium)	32 (Medium)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Probable (3)	Duration	Medium term (3)	Short term (2)	Extent	Local (2)	Local (2)	Magnitude	Low (4)	Low (4)	Significance	27 (Low)	24 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> Monitoring should target the two minor culverts with outlets in the riparian zone to ensure that no habitat degradation results from these structures during the operational phase. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish Operational activities should not impact on rehabilitated or naturally vegetated areas. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Changes in water quality due to input of foreign materials</u></p> <p>Alternative 1</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (2)</td> </tr> <tr> <td>Extent</td> <td>Regional (3)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>48 (Medium)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (3)</td> <td>Probable (3)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Low (4)</td> <td>Low (4)</td> </tr> <tr> <td>Significance</td> <td>27 (Low)</td> <td>24 (Low)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>				Description	Without Mitigation	With Mitigation	Probability	Highly Probable (4)	Probable (3)	Duration	Medium term (3)	Medium term (2)	Extent	Regional (3)	Local (2)	Magnitude	Moderate (6)	Low (4)	Significance	48 (Medium)	24 (Low)	Status (positive or negative)	Negative	Negative	Description	Without Mitigation	With Mitigation	Probability	Probable (3)	Probable (3)	Duration	Medium term (3)	Medium term (2)	Extent	Local (2)	Local (2)	Magnitude	Low (4)	Low (4)	Significance	27 (Low)	24 (Low)	Status (positive or negative)	Negative	Negative	<ul style="list-style-type: none"> • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects. • Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. • Treatment of pollution identified should be prioritized accordingly. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>
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<p>Nature of the Impact: <u>Loss of aquatic biota</u></p> <p>Alternative 1</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Probable (4)</td> <td>Possible (2)</td> </tr> <tr> <td>Duration</td> <td>Medium term (2)</td> <td>Medium term (2)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> </tbody> </table>				Description	Without Mitigation	With Mitigation	Probability	Probable (4)	Possible (2)	Duration	Medium term (2)	Medium term (2)	Extent	Local (2)	Local (2)	<ul style="list-style-type: none"> • Weed control in aquatic ecosystem and buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. 	<p>Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.</p>																														
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POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Magnitude</i>	Moderate (6)	Moderate (5)		
<i>Significance</i>	48 (Medium)	30 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
Alternatives 2 and 3			<ul style="list-style-type: none"> Should graves, fossils or any archaeological artefacts be identified during maintenance, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a heritage practitioner or local museum so that an investigation and evaluation of the finds can be made. 	Low risk anticipated provided that the mitigation measures are implemented correctly.
Description	Without Mitigation	With Mitigation		
<i>Probability</i>	Possible (2)	Possible (2)		
<i>Duration</i>	Medium term (2)	Short term (2)		
<i>Extent</i>	Regional (2)	Local (2)		
<i>Magnitude</i>	Moderate (2)	Moderate (2)		
<i>Significance</i>	12 (Low)	12 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
Nature of the Impact: <u>Loss and disturbance of heritage sites</u> due to the development			<ul style="list-style-type: none"> Should any palaeontology features be identified during maintenance, work on the area where the artefacts were found, must cease immediately and it should immediately be reported to a specialist so 	Low risk anticipated provided that the mitigation measures are implemented correctly.
All Alternatives				
Description	Without Mitigation	With Mitigation		
<i>Probability</i>	Very improbable (1)	Very improbable (1)		
<i>Duration</i>	Permanent (4)	Permanent (4)		
<i>Extent</i>	Site (1)	Site (1)		
<i>Magnitude</i>	Minor (2)	Minor (2)		
<i>Significance</i>	7 (Low)	7 (Low)		
<i>Status (positive or negative)</i>	Negative	Negative		
Nature of the Impact: <u>Loss and disturbance of palaeontology features</u> due to the development				

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
Description	Without Mitigation	With Mitigation	that an investigation and evaluation of the finds can be made. <ul style="list-style-type: none"> • Chance find protocol must be in place. 	
Probability	Very improbable (1)	Very improbable (1)		
Duration	Permanent (4)	Permanent (4)		
Extent	Site (1)	Site (1)		
Magnitude	Minor (2)	Minor (2)		
Significance	7 (Low)	7 (Low)		
Status (positive or negative)	Negative	Negative		
Nature of Impact: <u>Dust Generation</u>			<ul style="list-style-type: none"> • Dust suppression and wet spraying should be implemented during maintenance works. • Limit maintenance hours to daytime and weekdays. • Speed limits should be enforced to ensure that the generation of dust by construction vehicles during maintenance are limited. 	Medium risk (as the amount of dust emitted into the air will be of high volumes); unless mitigation measures are implemented.
Alternative 1				
Description	Without Enhancement	With Enhancement		
Probability	Probable (3)	Highly Probable (4)		
Duration	Medium term (3)	Long term (4)		
Extent	Local (2)	Local (2)		
Magnitude	Moderate (6)	High (8)		
Significance	33 (Medium)	56 (Medium)		
Status (positive or negative)	Positive	Positive		
Alternatives 2 and 3				
Description	Without Enhancement	With Enhancement		
Probability	Probable (3)	Highly Probable (4)		
Duration	Short term (2)	Medium term (3)		
Extent	Local (2)	Local (2)		
Magnitude	Moderate (6)	Moderate (6)		
Significance	30 (Low)	44 (Medium)		

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<i>Status (positive or negative)</i>	Positive	Positive																																												
<p>Nature of Impact: <u>Noise</u></p> <p>Alternative 1</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Medium term (3)</td> <td>Long term (4)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td><i>Significance</i></td> <td>33 (Medium)</td> <td>56 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Short term (2)</td> <td>Medium term (3)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td><i>Significance</i></td> <td>30 (Low)</td> <td>44 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table>			Description	Without Enhancement	With Enhancement	<i>Probability</i>	Probable (3)	Highly Probable (4)	<i>Duration</i>	Medium term (3)	Long term (4)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	Moderate (6)	High (8)	<i>Significance</i>	33 (Medium)	56 (Medium)	<i>Status (positive or negative)</i>	Positive	Positive	Description	Without Enhancement	With Enhancement	<i>Probability</i>	Probable (3)	Highly Probable (4)	<i>Duration</i>	Short term (2)	Medium term (3)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	Moderate (6)	Moderate (6)	<i>Significance</i>	30 (Low)	44 (Medium)	<i>Status (positive or negative)</i>	Positive	Positive	<ul style="list-style-type: none"> • Inform residents of planned maintenance works. • Maintenance and the use of construction machinery should be limited between 06h00 and 18h00 on weekdays only. • Institute noise control measures throughout maintenance periods. • Maintenance activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. • Speed limits must be adhered to. 	High risk as construction vehicles and equipment causes noise pollution.
Description	Without Enhancement	With Enhancement																																												
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<i>Status (positive or negative)</i>	Positive	Positive																																												
<p>Nature of Impact: <u>Changes in sediment entering and exiting the system.</u></p> <p>Bank stabilization will in turn prevent further sediment input.</p>			<ul style="list-style-type: none"> • Monitoring should be done to ensure that sediment pollution is timeously dressed. 	Expected to be limited provided that the mitigation measures are implemented correctly and effective rehabilitation of the site is undertaken where necessary.																																										

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Alternative 1													
Description	Without Enhancement	With Enhancement											
Probability	Possible (2)	Highly Probable (4)											
Duration	Medium term (3)	Medium term (3)											
Extent	Site (1)	Site (1)											
Magnitude	Moderate (6)	Moderate (6)											
Significance	20 (Low)	40 (Medium)											
Status (positive or negative)	Negative	Positive											
Alternatives 2 and 3													
Description	Without Enhancement	With Enhancement											
Probability	Probable (3)	Highly Probable (4)											
Duration	Medium term (3)	Long term (4)											
Extent	Site (1)	Site (1)											
Magnitude	Moderate (6)	High (8)											
Significance	24 (Low)	52 (Medium)											
Status (positive or negative)	Negative	Positive											
<p>Nature of the Impact: <u>Erosion protection</u></p> <p>The proposed activities include erosion protection measures. This will result in bank stabilization.</p> <p>Alternative 1</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Possible (2)</td> <td>Highly Probable (4)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> </tbody> </table>			Description	Without Enhancement	With Enhancement	Probability	Possible (2)	Highly Probable (4)	Duration	Medium term (3)	Medium term (3)	<ul style="list-style-type: none"> Erosion protection measures. Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access. After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction and 	Medium
Description	Without Enhancement	With Enhancement											
Probability	Possible (2)	Highly Probable (4)											
Duration	Medium term (3)	Medium term (3)											

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
<i>Extent</i>	Site (1)	Site (1)	maintenance. <ul style="list-style-type: none"> • Monitor rehabilitation and ensure that alien invasive species are removed and dealt with in accordance to the Environmental Management Programme. • Maintenance workers or operational activities may not trample natural vegetation and work should be restricted to previously disturbed footprint. In addition, mitigation measures as set out for the construction phase should be adhered to. 	
<i>Magnitude</i>	Moderate (6)	Moderate (6)		
<i>Significance</i>	20 (Low)	40 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		
Alternatives 2 and 3			<ul style="list-style-type: none"> • Regular clearing of debris from watercourse. • Maintenance of bridge/ road. 	The site will not be visually appealing during the construction phase.
<i>Description</i>	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Medium term (3)	Long term (4)		
<i>Extent</i>	Site (1)	Site (1)		
<i>Magnitude</i>	Moderate (6)	High (8)		
<i>Significance</i>	24 (Low)	52 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		
Nature of Impact: <u>Visual</u>			<ul style="list-style-type: none"> • Regular clearing of debris from watercourse. • Maintenance of bridge/ road. 	The site will not be visually appealing during the construction phase.
Alternative 1				
<i>Description</i>	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Medium term (3)	Long term (4)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Moderate (6)	High (8)		
<i>Significance</i>	33 (Medium)	56 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		
Alternatives 2 and 3				

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
Description	Without Enhancement	With Enhancement																																												
Probability	Highly Probable (4)	Definite (5)																																												
Duration	Medium term (3)	Long term (4)																																												
Extent	Local (2)	Local (2)																																												
Magnitude	Moderate (6)	High (8)																																												
Significance	44 (Medium)	70 (High)																																												
Status (positive or negative)	Positive	Positive																																												
Nature of impact: <u>Traffic and access</u> Alternative 1 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Definite (5)</td> </tr> <tr> <td>Duration</td> <td>Short term (2)</td> <td>Medium term (3)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>Moderate (6)</td> </tr> <tr> <td>Significance</td> <td>40 (Medium)</td> <td>55 (Medium)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table> Alternatives 2 and 3 <table border="1"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td>Probability</td> <td>Highly Probable (4)</td> <td>Definite (5)</td> </tr> <tr> <td>Duration</td> <td>Medium term (3)</td> <td>Long term (4)</td> </tr> <tr> <td>Extent</td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td>Magnitude</td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td>Significance</td> <td>44 (Medium)</td> <td>70 (High)</td> </tr> <tr> <td>Status (positive or negative)</td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table>			Description	Without Enhancement	With Enhancement	Probability	Highly Probable (4)	Definite (5)	Duration	Short term (2)	Medium term (3)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	Moderate (6)	Significance	40 (Medium)	55 (Medium)	Status (positive or negative)	Positive	Positive	Description	Without Enhancement	With Enhancement	Probability	Highly Probable (4)	Definite (5)	Duration	Medium term (3)	Long term (4)	Extent	Local (2)	Local (2)	Magnitude	Moderate (6)	High (8)	Significance	44 (Medium)	70 (High)	Status (positive or negative)	Positive	Positive	<ul style="list-style-type: none"> • Maintenance of bridge. • Regular clearing of debris to prevent clogging and overtop flooding. 	Medium
Description	Without Enhancement	With Enhancement																																												
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POTENTIAL IMPACTS	PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED																																										
<p>Nature of Impact: <u>Safety</u></p> <p>Bridge will be safer to cross for vehicles, pedestrians and cyclists.</p> <p>Alternative 1</p> <table border="1" data-bbox="192 464 813 799"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Medium term (3)</td> <td>Medium term (3)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td><i>Significance</i></td> <td>33 (Medium)</td> <td>52 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table> <p>Alternatives 2 and 3</p> <table border="1" data-bbox="192 863 813 1193"> <thead> <tr> <th>Description</th> <th>Without Enhancement</th> <th>With Enhancement</th> </tr> </thead> <tbody> <tr> <td><i>Probability</i></td> <td>Probable (3)</td> <td>Highly Probable (4)</td> </tr> <tr> <td><i>Duration</i></td> <td>Medium term (3)</td> <td>Long term (4)</td> </tr> <tr> <td><i>Extent</i></td> <td>Local (2)</td> <td>Local (2)</td> </tr> <tr> <td><i>Magnitude</i></td> <td>Moderate (6)</td> <td>High (8)</td> </tr> <tr> <td><i>Significance</i></td> <td>33 (Medium)</td> <td>56 (Medium)</td> </tr> <tr> <td><i>Status (positive or negative)</i></td> <td>Positive</td> <td>Positive</td> </tr> </tbody> </table>	Description	Without Enhancement	With Enhancement	<i>Probability</i>	Probable (3)	Highly Probable (4)	<i>Duration</i>	Medium term (3)	Medium term (3)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	Moderate (6)	High (8)	<i>Significance</i>	33 (Medium)	52 (Medium)	<i>Status (positive or negative)</i>	Positive	Positive	Description	Without Enhancement	With Enhancement	<i>Probability</i>	Probable (3)	Highly Probable (4)	<i>Duration</i>	Medium term (3)	Long term (4)	<i>Extent</i>	Local (2)	Local (2)	<i>Magnitude</i>	Moderate (6)	High (8)	<i>Significance</i>	33 (Medium)	56 (Medium)	<i>Status (positive or negative)</i>	Positive	Positive	<ul style="list-style-type: none"> • Maintenance of the bridge. • Maintenance must comply with safety regulations. • Regular clearing of debris from watercourse to prevent clogging and overtop flooding. 	<p>Medium</p>
Description	Without Enhancement	With Enhancement																																										
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<i>Significance</i>	33 (Medium)	56 (Medium)																																										
<i>Status (positive or negative)</i>	Positive	Positive																																										
<p>Nature of impact: <u>Socioeconomic</u></p> <p>Source of Impact:</p> <ul style="list-style-type: none"> • Safer crossing over bridge. • Overall upliftment of the area. 	<ul style="list-style-type: none"> • Maintenance of the bridge. • Maintenance must comply with safety regulations. • Regular clearing of debris from watercourse to prevent clogging and overtop flooding. 	<p>Medium</p>																																										

POTENTIAL IMPACTS			PROPOSED MITIGATION	RISK OF THE IMPACT MITIGATION NOT BEING IMPLEMENTED
Alternative 1				
Description	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Medium term (3)	Medium term (3)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Low (4)	Moderate (6)		
<i>Significance</i>	27 (Low)	44 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		
Alternatives 2 and 3				
Description	Without Enhancement	With Enhancement		
<i>Probability</i>	Probable (3)	Highly Probable (4)		
<i>Duration</i>	Medium term (3)	Medium term (3)		
<i>Extent</i>	Local (2)	Local (2)		
<i>Magnitude</i>	Moderate (6)	High (8)		
<i>Significance</i>	33 (Medium)	52 (Medium)		
<i>Status (positive or negative)</i>	Positive	Positive		

NO GO

No go Alternative (compulsory). This is the alternative of not rehabilitating and repairing the bridge along Road 1321. This alternative will result in limited construction impacts already occurring in the study area. However, should the infrastructure not be rehabilitated as proposed, the structural deficiencies identified, flooding, and banks will continue to collapse which will pose a heavy threat to the environment, the surroundings as well as the community especially in terms of a safe road. This is an undesirable alternative for the project as it will pose negative impacts on the environmental, social and economic perspective and is not considered desirable. The negative impacts of the no go alternative are considered to outweigh the positive impacts of this alternative. **The no go alternative is therefore not preferred.**

Table 7: Potential impacts should the Development not be Approved ("No-Go" Alternative)

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Impacts to hydrological function at a landscape level – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Changes in sediment regime – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Introduction and spread of alien vegetation – No-go would mean study site status quo is maintained.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Loss and disturbance of watercourse habitat and fringe vegetation – No-go would mean study site status quo is maintained.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Changes in water quality due to input of foreign materials – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Loss of aquatic biota – No-go would mean study site status quo is maintained.	P – Low	There are no mitigation measures	P – Low	Low risk
Loss and disturbance of heritage sites – No-go would imply no heritage sites or artefacts will be disturbed.	P – Low	There are no mitigation measures	P – Low	Low risk

Loss and disturbance of palaeontology sites – No-go would imply no palaeontology sites or artefacts will be disturbed.	P – Low	There are no mitigation measures	P – Low	Low risk
Dust generation – No-go would mean study site status quo is maintained.	P – High	There are no mitigation measures	P – High	Low risk
Crime, safety and security: during construction – No-go would imply that the area remains as is.	P – High	There are no mitigation measures	P – High	Low risk
Noise – No-go would imply no construction noise.	P – High	There are no mitigation measures	P – High	Low risk
Traffic and accessibility – No-go would imply no traffic congestion during construction.	P – High	There are no mitigation measures	P – High	Low risk
Cost – No-go would imply no construction costs.	P – High	There are no mitigation measures	P – High	Low risk
Socioeconomic impacts anticipated during the construction period – No-go would mean no local job opportunities for general and skilled labourers as well as no opportunities for local retailers.	N – High	The rehabilitation of the bridge will provide job opportunities for locals and for local retailers.	N – High	High risk
Socioeconomic impacts anticipated during the operational period – No-go would mean that overall community upliftment will not occur.	N – High	The rehabilitation of the bridge will allow for a safe crossing over the river and Interchange overall.	N – High	High risk
Traffic and accessibility – No-go would imply that residents continue using the interchange in its current unsafe state.	N – High	Not rehabilitating and repairing the bridge will imply that it remains in its current condition – as a result of current faults in the infrastructure. Flooding is likely to still occur and erosion will continue as well.	N – High	High risk
Visual: during construction – No-go would imply that the study site will remain as is.	P – Medium	There are no mitigation measures	P – Medium	Low risk
Visual: during operation – No-go would imply the study site will remain as is.	N – Low	There are no mitigation measures	N – Low	High risk
Changes in sediment entering and exiting the system: during operation – No-go would mean study site status quo is maintained.	N – High	If the rehabilitation and repair of the bridge does not occur, debris would not be cleared from the watercourse and additional pollution will accumulate and cause clogging. This increases the risk of	N – High	High risk

		flooding.		
Erosion protection: during operation – No-go would mean study site status quo is maintained and erosion along the river banks is not addressed.	N – High	If erosion protection measures are not implemented, bank stabilization will fail to occur. Erosion and subsequent sedimentation will continue.	N – High	High risk
Safety: during operation – No-go would imply that the interchange remains the same.	N – High	Rehabilitating and repairing of the bridge will provide a safer crossing over the watercourse for vehicles, pedestrians and cyclists and the overall Interchange will be safer to use.	N – High	High risk

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

- Appendix G1 – Aquatic Biodiversity Assessment
- Appendix G2 – Heritage Assessment

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

No gaps in knowledge have been identified at this stage.

The following assumptions are made:

- The information on which the report is based (i.e. project information) is correct.
- The construction, operation and management of this proposed development will be in line with the recommendations in this report, which will be enforced by the implementation of a detailed Environmental Management Programme. Much of the long-term success lies in the effective implementation of the measures prescribed in the EMPr.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), +significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposed

Potential impacts:	Significance rating of impacts(positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Decommissioning and closure phase has not been considered as part of this application as the end use of the site and required decommissioning activities are not known at this time. It is therefore not possible to predict the potential environmental impacts. In addition, it is unlikely that decommissioning will be contemplated due to the nature of the development. If decommissioning phase is considered in future, the developer will undertake the required actions as prescribed by the legislation at the time and comply with all relevant requirements administered by any relevant authority and competent authority at that time.				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.



Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

Specialist studies for decommissioning and closure phase will be undertaken at the time when decommissioning

is contemplated by the developer.

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Cumulative impacts can result from actions which may not be significant on their own but which are significant when added to the impact of other similar actions. The anticipated cumulative impacts of this development (for all alternatives) includes the following:

- **Impacts on the Wetland**

Impacts associated with rehabilitation could increase the significance of this impact already present as a result of other activities in the area such as dumping; erosion and pollution input and infilling are amongst the most significant impact.

- **Cumulative Impacts on traffic congestion**

Public traffic and general access over the structure will be restricted due to the proposed works.

- **Cumulative visual impacts**

A rehabilitated and upgraded bridge will be aesthetically appealing and thus enhance the visual impact within the local area.

- **Increased socio-economic upliftment as a result of the proposed development**

Rehabilitation and repair of the bridge will result in direct jobs being created during the construction phase. The bridge will be safer for motorists, pedestrians and cyclists to cross.

Responsible environmental management will be required during the entire project life cycle. These management measures should be guided by the Environmental Management Programme (EMPr), attached as **Appendix H1**.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impacts that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal (preferred alternative)

The proposed activities assessed within this Basic Assessment Report are required to provide essential

information associated with the proposed rehabilitation and upgrade that may impact on the environment. In summary, the Basic Assessment has assessed potential impacts and identified appropriate management and mitigation measures. No environmental fatal flaws and no significant negative impacts have been identified to be associated with the proposed activities. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively mitigated to have a low significance impact rating provided the recommended mitigation and management measures are implemented.

Environmental cost that can be expected to arise as a result of the project proceeding for all alternatives include:

Disturbance of the wetland

- Riparian areas may be disrupted.

Benefits of the project include the following:

- The proposed development will negate the problem of flooding in the area.
- The proposed development will negate the severe problem of erosion in the area.
- The issue of unstable stream banks will be resolved.
- The health of the ecosystem (wetland on site) will improve and water will flow freely.
- Safer interchange for the community.
- The proposed development will result in important economic benefits at the local and regional scale through job creation, procurement of materials for construction and provision of services and other associated downstream economic development at local and regional scale. These will extend beyond the site and would be experienced at local and regional scale.

The benefits of the project are expected to outweigh the costs.

A number of mitigation and monitoring measures have been identified which would allow for the minimisation and management of potential environmental impacts associated with the proposed development, which have been incorporated into the EMPr (**Appendix H1**) for the project, which will be further developed during the detailed planning and construction phase of the project.

It is the opinion of Envirolution Consulting (Pty) Ltd that the proposed project will not have a significant environmental impact and is therefore preferred as it is considered to be sustainable from an environmental perspective.

No-go (compulsory)

This is the alternative of not rehabilitating and repairing the bridge along Road D1321. This alternative will result in limited impacts already occurring in the study area. However, should the infrastructure not be rehabilitated and

repaired as proposed, the social benefits (the department's objectives) associated with the proposed activities will not be addressed. This is an undesirable alternative for the project as it will not only pose negative impacts on the social perspective, but on the economic perspective as well. The no go option is therefore not preferred.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

Table 8: Impact Summary table

Construction Phase				
Nature of Impact	Alternative 1		Alternatives 2 and 3	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Impacts to hydrological function at a landscape level	Low	Low	Medium	Low
Changes in sediment regime	Medium	Low	Medium	Low
Introduction and spread of alien vegetation	Low	Low	Medium	Low
Loss and disturbance of riparian habitat	Low	Low	Medium	Low
Changes in water quality due to input of foreign materials	Low	Low	Medium	Low
Loss of aquatic biota	Low	Low	Medium	Low
Heritage impacts	Low	Low	Low	Low
Palaeontology impacts	Low	Low	Low	Low
Visual impact	Medium	Low	High	Medium
Dust	Medium	Low	High	Medium
Crime, safety and security	Low	Low	Medium	Low
Noise	Medium	Low	High	Medium
Traffic and accessibility	Low	Low	High	High

Costs	Medium	Medium	High	Medium
Operational Phase				
Nature of Impact	Alternative 1		Alternatives 2 and 3	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Impacts to hydrological function at a landscape level	Medium	Medium	Medium	Low
Changes in sediment regime	Medium	Low	Low	Low
Introduction and spread of alien vegetation	Medium	Low	Medium	Low
Loss and disturbance of riparian habitat	Medium	Medium	Low	Low
Changes in water quality due to input of foreign materials	Medium	Low	Low	Low
Loss of aquatic biota	Medium	Low	Low	Low
Heritage impacts	Low	Low	Low	Low
Palaeontology impacts	Low	Low	Low	Low
Dust	Medium	Medium	Low	Medium
Noise	Medium	Medium	Low	Medium
Positive Impacts				
Nature of Impact	Alternative 1		Alternatives 2 and 3	

	Without Enhancement	With Enhancement	Without Enhancement	With Enhancement
Socio-economic Impacts: during construction	Medium	Medium	Low	Medium
Socio-economic Impacts: during operation	Low	Medium	Medium	Medium
Changes in sediment entering and exiting the system: during operation	Medium	Medium	Low	Medium
Erosion protection: during operation	Medium	Medium	Low	Medium
Visual: during operation	Medium	Medium	Medium	High
Traffic and Access: during operation	Medium	Medium	Medium	High
Safety: during operation	Medium	Medium	Medium	Medium

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

Arc GIS was used as a spatial development tool to determine the presence of:

- Rivers and wetlands (and associated buffers);
- CBA Areas (ecological support areas and protected areas);
- Ridges;
- Geology and Soils; and
- Land Use cover

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

YES

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

A number of mitigation and monitoring measures have been identified which would allow for the minimisation and management of potential environmental impacts associated with the proposed rehabilitation and upgrade. These have been incorporated into the EMPr (**Appendix H1**).

This Report has identified and assessed the potential impacts on the environment associated with the proposed rehabilitation and repair of the bridge along Road D1321. It is therefore proposed that authorisation is granted.

The project will result in some unavoidable environmental impacts during construction but this is not a fatal flaw. The nature of the project has been planned in such a way that there are minimal negative environmental impacts. None of these adverse impacts are considered unacceptably significant and all can be managed to acceptable levels through the effective implementation of the recommended mitigation measures. In addition, the project will provide benefits to the local community in terms of service provision and safety.

Envirolution is in favour of **Alternative 1 – Repairs to existing bridge (Preferred)** in relation to Alternatives 2 and 3. Despite Alternatives 2 and 3 requiring less maintenance over time as a result of completely new structures, the deficiencies identified in the current structure are not enough to warrant complete new structures at this point. Alternative 1 is thus a cost effective alternative which has far less (minimal) environmental impacts

in relation to Alternatives 2 and 3. Alternative 1 may not be as long lasting as Alternatives 2 and 3 and will probably require more maintenance than Alternatives 2 and 3 over time. Alternative 1 will have a lower impact on the traffic and accessibility over the structure whereas Alternatives 2 and 3 would warrant the need for the bridge to be closed for the duration of the construction which would be a longer construction period as required for Alternatives 1 maintenance and repair works. All three alternatives would ultimately provide a safer bridge for motorists, pedestrians and cyclists to cross.

Based on the assumption Envirolution believes through effective implementation of the stipulated mitigation measures, the adverse impacts can be reduced. With the proposed mitigation measures, GDARD will agree that the project's benefits outweigh the potential negative impacts.

General Recommendations

Envirolution Consulting (Pty) Ltd recommends that **Alternative 1** be considered for approval subject to the following general recommendations:

1. Implementing the EMPr to guide construction and operational activities to provide a framework for the on-going assessment of environmental performance.
2. Water Use License: The relevant authorisations and water use licenses must be obtained from the Department of Water and Sanitation prior to the commencement of construction activities.
3. No development other than the authorized activities will be allowed within a watercourse or 30m buffer of the watercourse measured from the edge of the watercourse.
4. An independent ECO must be appointed/ designated to ensure that regular inspections are performed during the construction phase and to ensure the implementation of mitigation measures. Furthermore, an ECO must monitor compliance with all the conditions of the EMPr and the environmental authorization once issued.
5. There is continued consultation with relevant stakeholders through an appointed community liaison officer during construction.
6. Reports on the status of construction and legal compliance are submitted to GDARD at stipulated intervals.
7. Clearance of the area should be as minimal as possible and construction activities be confined to areas where construction will take place (development footprint) to prevent negative impacts onto the surrounding environment.
8. Avoid, as far as reasonably possible, disturbing the wetlands. Similarly, restore wetlands that will remain intact if they have been affected by construction activity – this project constitutes rehabilitation and upgrade activities within a watercourse.
9. Adequate measures must be put in place to prevent polluted runoff water from entering the, wetland and soil, thus preventing surface and groundwater pollution.

10. Servicing/maintenance/washing of vehicles must not be carried on the construction site and only emergency repairs can be done on site.
11. In the event of a major incident (e.g. fire causing damage to property and environment, major spill or leak of contaminants), the relevant authorities should be notified as per the notification of emergencies/incidents, as per the requirements of NEMA.
12. Construction noise on site must not exceed 85 decibels (DB) as stipulated in the Occupation Health and Safety Act.
13. All relevant legislation and requirements of other government departments (National, Provincial), in particular of Section 28 (duty of care) of NEMA, must be complied with.
14. Compliance with all legal requirements in relation to environmental management and conditions of the authorisation issued by GDARD.
15. Maximise the employment of local people and the procurement of local resources during the construction and maintenance phases to ensure maximum benefit to the provincial/local economy.
16. Implement the recommendations made in the specialist studies and EMPr.
17. Implement the planned stilling basin and erosion control measures downstream of the bridge so as to satisfy the ROD requirements from GDARD of the downstream watercourse
18. The EMPr should form part of the contractor's tender documentation.

On completion of the project, the site must be rehabilitated, all litter and construction debris must be removed from the site immediately. All waste must be disposed of at a registered or permitted waste disposal site for the type of waste produced.

From the impact assessment, it is evident that prior to mitigation, impacts associated with the proposed rehabilitation and repair are generally moderate. Thus, based on the specialist recommendations, it is the opinion that the project be considered favourably and environmental authorisation granted for the proposed activities, provided the essential and recommended mitigation measures as defined in this report, the EMPr, and the Environmental Authorisation are strictly adhered to.

9. THE NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

The current state of the bridge is poor and unsafe. The proposed rehabilitation and upgrade to the bridge will allow for a safer crossing over the bridge for motorist, pedestrians and cyclists and allow for the overall upliftment of the community. The project will also create jobs which will provide relief to the problem of unemployment.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED (*CONSIDER WHEN THE ACITIVTY IS EXPECTED TO BE CONCLUDED*)

Duration and Validity: The environmental authorisation is required for a period of 10 years from the date of issue. Should a longer period be required, the applicant/ EAP will be required to provide a detailed motivation on what the period of validity should be.

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers “Yes” to Point 7 above then an EMPr is to be attached to this report as an Appendix

EMPr attached

YES

SECTION F: APPENDICES

The following appendices must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

Appendix A: Site plan(s)

- A1: Locality Map
- A2: C-Plan Map
- A3: Hydrology Map
- A4: Wetland Delineation Map

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route Position Information – N/A

Appendix E: Public participation information

- E1: Site Notice Wording
- E2: Notification Letters Wording
 - E2 (i): IAP Notification Letter
 - E2 (ii): Organ of State Notification Letter
- E3: Advertisement Wording
- E4: Correspondence – **N/A**
- E5: Meeting Minutes – **N/A at this stage**
- E6: Comments and Response Report – **N/A at this stage**
- E7: Comments from I&APs on Basic Assessment (BA) Report – **N/A at this stage**
- E8: Comments from I&APs on amendments to the BA Report – **N/A**
- E9: IAP Database

Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist Reports

- G1: Aquatic Biodiversity Assessment
- G2: Heritage Assessment

Appendix H: EMPr

- H1: Environmental Management Programme
- H2: General Wetland Rehabilitation and Monitoring Plan

Appendix I: Other information

- I1: EAP Declaration and Expertise
- I2: Specialist Declaration and Expertise
- I3: DFFE Screening Report

CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.