EMALAHLENI – VULINDLELA BRIDGE – BASIC ASSESSMENT

BASIC ASSESSMENT REPORT FOR THE PROPOSED VULINDLELA BRIDGE REPAIRS, IN OGIES, MPUMALANGA PROVINCE

VERSION: 1

MDT Ref: EVB 2019/01

Part A

Volume 1 of 5

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Report Structure

Please note that the outline below acts as a guide on the sequence of the report:

Part A

i. Basic Assessment Report with associated stakeholder engagement outcomes (Volume 1 of 5)

Part B

ii. Environmental Management Programme Report (Volume 2 of 5)
iii. Specialist Study:
    - Aquatic Resource Assessment Study (Volume 3 of 5)
    - Heritage Impact Study and Paleontological Impact Study (Volume 5 of 5
iv. Norms and Standards Studies conducted as post-mitigation intervention
    - Waste Classification Study (Volume 4 of 5)

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DISCLAIMER

This Basic Assessment Report has been prepared by Myezo Environmental Management Services (Pty) Ltd (Myezo) and MDT Environmental (Pty) Ltd with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating all contractual agreements and taking account of the resources devoted to it by agreement with the client.

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SASOL – VULINDLELA BRIDGE – BASIC ASSESSMENT REPORT
EMALAHLENI – VULINDLELA BRIDGE - BASIC ASSESSMENT REPORT

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DOCUMENT CONTROL AND REVISION LIST

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Abbreviations

BAR:	Basic Assessment Report
CBD:	Central Business District
CDF:	Conservation Development Framework
CPA:	Catchment Protected Areas
CVB	Channelled Valley Bottom
DARDLEA:	Mpumalanga Department of Rural Development, Land and Environmental Affairs
DEDET:	Mpumalanga Department of Economic Development, Environment and Tourism
DW&S	Department of Water and Sanitation
EAP:	Environmental Assessment Practitioner
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plan
EIS	Ecological Importance and Sensitivity
ELM:	Emalahleni Local Municipality
EMP:	Environmental Management Plan
EMPr:	Environmental Management Programme report
GN:	Government Notice
Myezo:	Myezo Environmental Management Services (Pty) (Ltd)
NEMA:	National Environmental Management Act (Act No. 107 of 1998)
NEMWA:	National Environmental Management Waste Act (Act No. 59 of 2008)
NEMBA:	National Environmental Management Biodiversity Act (Act No. 10 of 2004)
NEMPAA:	National Environmental Management Protected Areas Act (Act No. 57 of 2003)
NGO:	Non-Governmental Organization
NWA:	National Water Act (NWA) (Act No. 36 of 1998)
PES	Present Ecological State
PNA:	Priority Natural Areas
PTY:	Private Company
REC	Recommended Ecological Classification
SANBI:	South African National Biodiversity Institute
SAHRA:	South African Heritage Resources Agency
SANS:	South African National Standards
SDF:	Spatial Development Framework
SoER:	State of Environmental Report
TCBA:	Terrestrial Critical Biodiversity Area
VPA:	Viewshed Protected Area
WUL:	Water Use Licence

ACKNOWLEDGEMENTS

This report has been compiled with the insights and input from the project team members outlined below:

Project Proponent – Emalahleni Local Municipality

- Eric Sithole
- Amanda Mauku

Project Funders – Sasol Mining (Pty) Ltd

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- Aziza De Stadler
- Beauty Zwane
- Bheki Mndawe
- Willem Van Den Heever
- Michael DeKock
- Nobom Hlatshwayo
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- Kuda Juru
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- Babalwa Fatyi
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- Lynn Madziwanzira
- Prisca Thobejane

Project Specialists

- Aquatic Resources Assessment
  - Ryan Nawn and De Wet Botha
- Heritage Impact Assessment and Palaeontological Impact Assessment
  - Roy Muroyi and Heidi Fourie

Norms and Standards Studies conducted as post-mitigation intervention

- Waste Classification Study
  - Prasheen Singh and Gert le Roux

REPORT STRUCTURE

Part A

i. Basic Assessment Report (Volume 1 of 5) – which include the project introduction with a detailed legislative framework, environmental setting, public involvement which has been undertaken and identified impacts.

Part B

ii. Environmental Management Programme (Volume 2 of 5) – which provides the mitigation measures for the identified impacts and aspects pertaining to implementation support structures and tools.

iii. Specialist Study:

- Aquatic Resource Assessment Study (Volume 3 of 5); and
- Heritage Impact Study and Paleontological Impact Study (Volume 5 of 5

v. Norms and Standards Studies conducted as post-mitigation intervention

- Waste Classification Study (Volume 4 of 5)

EXECUTIVE SUMMARY

Emalahleni Local Municipality (ELM) is planning to conduct rehabilitation and maintenance, as well as desilting activities, upstream and downstream of the Vulindlela Bridges, which are situated at Phola Township, Ogies, within the Emalahleni Local Municipality, Mpumalanga Province. The planned works are a result of increasing and uncontrolled vegetation growth, siltation caused by erosion, which has led to a reduction in river capacity, as well as altered water flow patterns in the overall watercourse. Consequently, during rainy seasons the river floods, hindering smooth traffic and pedestrian movement.

The activities will be undertaken at two bridge crossings, as located at 26°0’18.03”S, 29°2’18.13”E and S25°59’55.17”S, 29°1’56.67”E. The site falls within three wards, namely: Ward 28, 30 and 31.

The project is undertaken as part of the Local Economic Development (LED) contribution provided by Sasol Mining (Pty) Ltd (Sasol Mining) and is part of the projects committed to in their social and labour plan. The project beneficiaries, and as such project applicants, are ELM. Siyandiza Consulting Engineers (Pty) Ltd were appointed to undertake designs for the bridge rehabilitation works. In addition, to comply with the National Environmental Management Act (NEMA) (Act No. 107 of 1998) and its regulations, as amended, Sasol has also appointed MDT Environmental (Pty) Ltd, as the Environmental Assessment Practitioners (EAPs), to conduct environmental studies and apply for environmental authorisation for any listed activities that might be triggered through the execution of this project. The environmental studies determined the potential significant environmental impacts, that will emanate from the proposed project. In addition, the study also recommends mitigation or management measures for these significant impacts.

The activities to be undertaken under this application include:

- Activity 12 listed under NEMA GNR R327 (Listing No. 1) dated 04 December 2014 as amended;
- Activity 19 listed under NEMA GNR R327 (Listing No. 1) dated 04 December 2014 as amended; and
- Activity 12 listed under NEMA GNR R325 (Listing No. 3) dated 04 December 2014 as amended.

The triggered activities are based on the general activities to be undertaken and as such the proposed activities include cleaning river along both bridge crossings; sediment clearance and structural upgrades.

The biophysical and social data was collected and analysed to understand the environmental setting of the project area, after which this data was analysed to assess the potential impacts. There was also stakeholder engagement which was conducted following the regulatory stipulations provided under Regulation 41 of NEMA. Accordingly, stakeholder input and comment on the project were sourced in the form of meetings, site notices, adverts and one-on-one engagements. The significant issues raised were investigated further to ascertain the impacts.

The Specialists Studies which were commissioned to be conducted included: Aquatic Resource Assessment as well as Heritage Impact Assessment and Palaeontology Impact Assessment Study. The outcomes of these studies indicated the following:

1. The field investigations concluded that two (2) natural wetland systems (three wetland units) could be affected by the proposed activities. The systems drain into Saalboom Spruit. The wetlands recorded were assessed where the wetlands attained a low overall Present Ecological State (PES), a low Ecological Importance and Sensitivity (EIS) score and the Recommended Ecological Category (REC) fall into Category C for the overall wetland system. The rehabilitation of the wetland/s is vital to recover the required ecological function.
2. Based on the findings of the Heritage Impact Assessment and Palaeontology Impact Assessment study, there are no archaeological and palaeontological sites were recorded; no burial grounds and graves were noted within project site and no public monuments and memorials in the study area. Due to the lack of heritage resources, the impact of the proposed project is considered low and the Environmental Management Programme report (EMPr) already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance find, the protocol will be to immediately cease all construction activities, construct a 30m no-go-barrier, and SAHRA will be contacted immediately for further investigation.

Furthermore, pertaining to Norms and Standards Studies, conducted as post-mitigation intervention, their outcomes are outlined below.

1. The silt at the two bridges was been sampled, analysed and based on results the silt has been classified and further determined to be Type 3 Waste (Class C Liner) as outlined in the National Norms and Standards for Disposal of Waste to Landfill (published under Government Notice R636 in Government Gazette 36784 of 23 August 2013). Municipal waste disposal facilities would comply with the disposal of Type 3 Waste; thus this waste may be disposed at any licenced disposal facilities.
2. The classification showed that there are no physical and aquatic hazards associated with the sediment, however, the sediment does have a carcinogenic hazard as well as a specific target organ toxicity hazard with quartz as the main driver for health hazard at a concentration of 93.2%. Additionally, the sediment contains microbial contaminants (Faecal Coliforms and E. coli). E. coli infection which may cause health problems such as diarrhoea, high blood pressure, kidney problems, heart disease and even haemolytic uremic syndrome. These results may pose a health hazard during construction measures; thus mitigation measures were developed. The Emalahleni waste site is not equipped to receive the type of waste the sediment classification has given to these sediments (Type C waste). Therefore, an alternative waste disposal site will be sought and the nearest site is in Midrand, Gauteng Province. The

sediments will be stockpiled and allowed to dry-out prior to any transportation to control any impacts.

It is of the opinion of the EAP that any potential impacts associated with the proposed development may be mitigated through thorough planning and implementation. The proposed mitigation measures to attain the commitments of the applicant are detailed in the Environmental Management Programme report (EMPr) – Volume 2 of 4. It is important to indicate that this project is based on improving the state of the site and associated ecosystem organisms. The project need is aimed at addressing issues associated with vegetation build-up, sedimentation build-up and structural maintenance; which in summary encompass improving the state of the site. Given the proposed activities, the outcomes of the EIA and the identified impacts from the project activities would be manageable if the proposed mitigation measures are implemented; as such the EAP would motivate in favour of the proposed development.

1 INTRODUCTION

1.1 Background

Emalahleni Local Municipality is planning to conduct urgent bridge repair and maintenance work at two bridge crossings, as well as desilting activities, upstream and downstream of the two Vulindlela Bridges, which are situated at Phola Township, Ogies, within the Emalahleni Local Municipality, Mpumalanga. The activities will be undertaken at two bridge crossings. The two bridge crossings are located at 26°0'18.03"S, 29°2'18.13"E and S25°59'55.17"S, 29°1'56.67"E in the Phola Township, as indicated in Figure 1.1-1. The site falls within three wards, namely: Ward 28; 30; and 31.

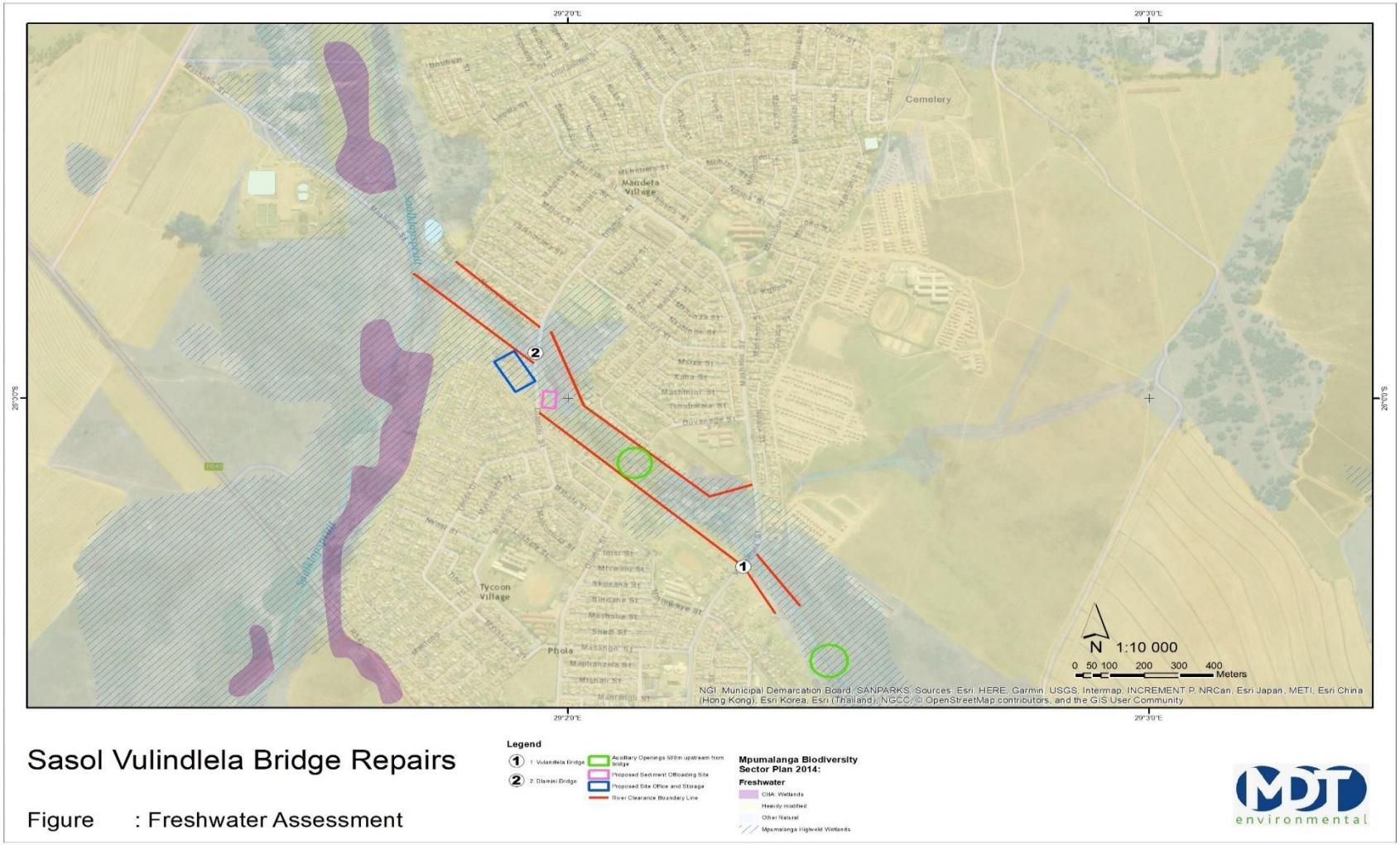

Figure 1.1-1: Local Setting and Environmental Feature

1.2 Objectives of the Environmental Study for the Proposed Activities

This report is compiled as a Basic Assessment Report (BAR) which is required as a supporting information document for the application for environmental authorisation which is required for the proposed activities mentioned above. Section 1.3 and Section 5 of this report provide details of the legislative framework and the triggered activities for this development which then require that this BAR is compiled. The objective of the basic assessment process is to ensure that the environmental aspects surrounding the proposed developmental activities are understood so that mitigation measures developed for potential negative impacts that could be experienced due to the Proposed Vulindlela Bridge Maintenance and Rehabilitation activities. The process also seeks, through a stakeholder consultative process, to achieve aspects outlined below.

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and y alternatives;
- Describe the need and desirability of the proposed development and any associated alternatives;
- Undertake an impact and risk assessment process, inclusive of cumulative impacts which focus on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity.
- Assess the risk of the impact, to determine:
  - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to,
  - The degree to which these impacts can either be reversed; may cause irreplaceable loss of resources; and can be managed, avoided or mitigated,
  - The process seeks to rank the site sensitivities and possible impacts the activity and technology alternatives might impose on the site location.
  - This is done to:
    - ✓ Identify and motivate a preferred site, activity and technology alternative,
    - ✓ Identify suitable measures to manage, avoid or mitigate identified impacts, and
    - ✓ Identify residual risks that need to be managed and monitored.

- Compile an Environmental Management Programme (EMPr) to ensure all the potential impacts are mitigated, audited and monitored to protect the environment and human health.

 **Current bridge infrastructure – highly sedimented and constricted walkway path (26^{0}00'16.3"S; 29^{0}02'19.4"E)**	 **Households close to the floodplain. Waste disposal skip container and illegal dumping observed. (26^{0}00'15.9"S; 29^{0}02'22.5"E)**	 **Riparian vegetation predominant in the project area. (26^{0}00'15.9"S; 29^{0}02'22.5"E)**	 **Surrounding Households in (26^{0}00'16.3"S; 29^{0}02'19.4"E)**
 **Livestock Grazing . (25°59'33.1"S 29°01'29.1"E)**	 **Soil erosion. (26^{0}00'16.3"S; 29^{0}02'19.4"E)**	 **Illegal waste disposal along the access road. (26^{0}00'16.3"S; 29^{0}02'19.4"E)**	 **Substation. (26°00'16.2"S 29°02'23.0"E)**

Pictorial View 1: Project Site and Surrounding

1.3 Approach

1.3.1 Basic Assessment Report Requirements and Report Structure

The nature and all related developmental impacts for the proposed project are detailed in this draft Basic Assessment Report (BAR). This report has been compiled in accordance with the requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment Regulations (EIA) December 2014, as amended in 2017. Subsequent to the appointment of the independent Environmental Assessment Practitioner (EAP), a literature research and information collection process were undertaken to understand the Status Quo of the site. The data collection and consolidation process included site inspections and engagement of specialists, as well as consultation with the regulatory authorities.

This BAR adheres to the requirements contained in Appendix 1 of GNR 982, as noted in Table 1.3-1, which provides the BAR structure. The supporting documents that are mentioned from each of the report sections follow that specific section number. The specific appendices stipulated in the regulations are referenced as Appendix A, B, etc.

Table 1.3-1: Content of a BA Report (2014 EIA Regulations)

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BA Report
Appendix 1, Section 3 (a)	Details of – 1. The EAP who prepared the report; and the expertise of the EAP; and (i) The expertise of the EAP, including a curriculum vitae.	Section 2 & Appendix G2
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 3
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3.1.7 and Appendix A
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 4
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation,	Section 5

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BA Report
	policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including- (i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by Interested and Affected Parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and; (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 7 & 8 Section 9 and Appendix H Section 9.2.3.4 Section 10 Section 10.11 Section 10.12 Section 10.13 Section 10.13 Section 10.15 Section 10.15
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 11 Section 11.1 Section 11.2

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BA Report
	(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, (i) Impacts; (ii) The including- Cumulative nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; (vii) The degree to which the impact and risk can be avoided, managed or mitigated.	Section 10 and Section 12
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 10 and Section 13
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 14 Section 14
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 14 and Appendix F
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 16
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 17
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 18
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 19
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to:- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties;	Section 19

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BA Report
	(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Section 20
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	Section 21
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	Section 22

1.3.1 Environmental Management Programme (EMPr)

An Environmental Management Programme (EMPr) has been compiled according to Appendix 4 of the GNR 982 of the EIA Regulations (2014) for the construction, operational and decommissioning phases of the project. The EMPr is attached as Appendix F.

2 FULL DETAILS OF THE EAP

2.1 Environmental Assessment Practitioner (EAP)

Babalwa Fatyi, the Environmental Assessment Practitioner (EAP), who is the founder of Myezo, is a Registered Professional Natural Scientist (400123/01). She is also registered with the Institute of Environmental Management and Assessment, Lincoln, UK (0025153). She has consulting experience, having worked for an engineering consulting company, after which she also worked for a mining company, responsible for overseeing the company's compliance with its environmental obligations.

She has academic qualifications to back-up her experience, having obtained a Master of Science (*cum laude*) and receiving the 'SA Association for Advancement of Science Award' for an outstanding MSc Degree in the Faculty of Science. Babalwa has undertaken several environmental management and public consultation projects in terms of the NEMA, as well as environmental authorisations, in terms of the Mineral and Petroleum Resources Development Act (No 28 of 2002) (MPRDA).

Her work experience has allowed her an insight with respect to sector specific environmental requirements ranging from authorisations, implementation and monitoring. She is thus still active in promoting environmental stewardship, through utilisation of a series of integrated environmental management tools, for attainment of long lasting and meaningful economic prosperity.

She has compiled a significant number of Environmental Management Plans (EMPs) and programmes and Basic Assessment Reports (BARs), within the various sectors and industries. A comprehensive illustration of her qualifications is included in the CV and profile attached as Appendix G2. A profile of Myezo Environmental Management Services is included as Appendix G3.

Table 2.1-1: EAP Description and Contact Information

Environmental Assessment Practitioner (EAP):	Myezo Environmental Management Services (Pty) Ltd.	
Contact person:	Babalwa Fatyi	
Profession:	Managing Director and EAP	
Physical address:	107 Haymeadow Road Boardwalk, Lakeview Suites G8	
Postal address:	Postnet Suite B165, Private Bag X18 Lynnwood Ridge	
Telephone:	(012) 998 7642	
Fax:	(012) 998 7641	
Cell:	082 772 2418	
E-mail:	babalwa@myezo.co.za	
EAP Qualifications	Master of Science (*cum laude*): Ecology	
EAP Registrations/Associations	The South African Council for Natural Scientific Professions (SACNASP)	Institute of Environmental Management and Assessment (IEMA), Lincoln, UK
Registration Number	400123/01	(0025153)

3 THE LOCATION OF THE ACTIVITY

3.1 Project Location

3.1.1 Site Identification

Property description:	The property consists of Erf 1057 and Erf 1058 in Phola within eMalahleni Local Municipality in Mpumalanga.

(Farm name, portion, number and registration division or Erf number etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

Current land-use zoning:	Erf 1058 falls within a water course.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Property size (m^2) of all proposed sites:	The two properties, Erf 1057 and 1058 mainly consists of an open area that is dissected by a tributary of the Saalboom Spruitfalls. The Municipality has earmarked the site as a Park and the properties are zoned as open space.
Development footprint size (m^2):	The development footprint size for Erf 1057 is 77 330 m^2 and the development footprint size for Erf 1058 is 207 613 m^2. Thus, the total development footprint size is 284 943 m^2.

Project map:	A Project Map must be attached to this document. The map must accurately provide an indication of the project site position as well as the positions of the alternative sites, if any, and • Road names or numbers of all major roads as well as the roads that provide access to the site(s); • A north arrow; • Any sensitive geographic features (e.g. watercourses). *A project map, Photographic Map, Site Layout Plan, Mpumalanga Biodiversity Sector Plan (MBSP) and Terrestrial Critical Biodiversity Area (TCBA) Map are attached as Appendix 3.1-1 to 3.1-4.*

<table>
<tr><td>Site co-ordinates:</td><td>Indicate the position of the activity using the latitude and longitude of the centre point of the preferred site alternative. The co-ordinates must be in degrees, minutes and seconds using the Hartebeesthoek94 WGS84 co-ordinate system.
<table>
<tr><th>Number of corner</th><th colspan="3">Latitude (S):</th><th colspan="3">Longitude (E):</th></tr>
<tr><td>1</td><td>26°</td><td>00’</td><td>18.03”</td><td>29°</td><td>02'</td><td>18.13"</td></tr>
<tr><td>2</td><td>25°</td><td>59'</td><td>55.17"</td><td>29°</td><td>01'</td><td>56.67"</td></tr>
</table></td></tr>
</table>

SG 21 Digit Code(s):	The Surveyor-General 21-digit codes for the site are listed under Appendix 3.1-1

4 DETAILED DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

4.1 Project Title

The project title is: Vul

EMALAHLENI – VULINDLELA BRIDGE – BASIC ASSESSMENT

Basic Assessment Report for the proposed Vulindlela Bridge Maintenance and Rehabilitation Activities, in Ogies, Mpumalanga Province.

4.2 Project Description

The proposed Vulindlela Bridge works involve the rehabilitation of two bridge crossings as indicated in Figure 1.1-1. The water course has been affected by increasing and uncontrolled vegetation growth, as well as siltation caused by erosion, which has led to a reduction in river capacity, as well as altered water flow patterns. Consequently, during rainy seasons the river floods, hindering smooth traffic and pedestrian movement.

The status of the current bridge infrastructure is shown in Pictorial View 1.

The project is undertaken as part of the Local Economic Development contribution provided by Sasol Mining (Pty) Ltd (Sasol Mining) and forming part of the projects commitment to in their social and

labour plan. The project beneficiaries, and as such project applicants, are Emalahleni Local Municipality. The project entails rehabilitating two bridge crossings as indicated in Figure 1.1-1.

Siyandiza Consulting Engineers (Pty) Ltd, were appointed to undertake designs for the bridge rehabilitation works. In addition, to comply with NEMA, as amended, and its regulations, Sasol has also appointed MDT Environmental (Pty) Ltd, as Environmental Assessment Practitioners (EAPs), to conduct environmental studies and apply for environmental authorisation for any listed activities that might be triggered through the execution of this project. The environmental studies will determine the potential significant environmental impacts that will emanate from the proposed project. In addition, the study will also recommend mitigation or management measures for these significant impacts.

The development will trigger listed activities in terms of NEMA; and that is the reason why an environmental authorisation application is being undertaken. The details of listed activities are provided under Section 5.

The main objective of the study is to maintain the Vulindlela Bridge and various inherent objectives will be realised as part of this project.

Within that context, the key objectives of the project, for which the environmental authorisation is being conducted for, is outlined below.

- To establish mechanisms that will minimize sedimentation and debris accumulation at the bridge openings;
- To rehabilitate and clean both bridges in order to improve safety status;
- To improve storm water control measures;
- To undertake dredging methods that are well investigated to reduce impact on the ecosystem;
- Achieve functional structures, which can be maintained in association with the asset management system for the Local Municipality.

4.3 Project Scope

The project activities that will be undertaken to realise the above objectives are outlined as follows:

- Clearing and cleaning the area upstream and downstream of the bridge,
- Fix any damages to the bridge that need repairs and maintenance,
- Install handrails on the walkways along the bridge,

- Upgrade or maintain walkways and road furniture along the bridge,
- Clear the waste surrounding the wetland area,
- Install soil erosion structures.

4.4 Energy Efficiency

All energy requirements for the site will be provided for by the municipality. In the case where high voltage is required, appropriate electricity sources would need to be provided by the municipality. In the event that there are power outages or Eskom load shedding, the site will use a back-up generator. The use of alternative power source such as solar power will be considered. Furthermore, work will be conducted only during the day to ensure safety with regards to residents (working class and scholars) returning to their various accommodations after sunset and to ensure optimum use of the energy sources with the less disturbed time at hand.

4.5 Socio-economic Value of the Activity

The project is envisaged to provide temporal and permanent jobs for the local community. The job creation and employment opportunity will boost the socio-economic status of the community and lead to increased quality of life. Local economic development through engagement of local SMMEs will also have a positive impact to the community.

This labour engagement plan highlights the intended type and number of labourers that will be recruited onto the project. The details of this engagement plan will change as the project progresses, depending on the scope of work being carried out at a given time.

The proposal is to carry out local recruitment through a labour desk in the area that will establish the skill personnel in the area.

Type of Labour	Males	Females	Youth
Skilled			
Concrete Foreman	2	1	0
Bricklayers	2	2	1
Steel Fixers	4	1	2
Painters	3	1	2
Carpenter	1	1	1
Semi-Skilled			
Welders	2	2	2

Type of Labour	Males	Females	Youth
Assistant Bricklayers	2	2	4
Assistant Carpenter	2	2	4
General Labour			
General Workers	15	10	12

4.5.1 Capital Value of Proposed Activity

The estimated capital value for the project is R 6 000 000, with 20% estimated as a contribution towards the temporal and permanent jobs to be created.

4.6 Waste Efficient, Emissions, Energy and Noise Management

4.6.1 Solid Waste Management

Solid waste will be generated during all phase of the project. Construction rubble and litter will be generated during the construction and decommissioning phases of the project and more litter will be generated during the operational phase. Waste Management Plan procedures will be implemented and adhered to. Solid waste management infrastructure such as litter bins and recyclable material colour-coded and labelled bins will be provided within the site. Regular maintenance and cleaning will be ensured to eliminate odours that will attract ants, flies, rats, birds and other animals on the site.

Generated waste will be handled, transported and disposed off at a designated landfill site. The Service Level Agreement with the Municipality for use of the landfill site as Appendix I.

4.6.2 Liquid Effluent

No liquid effluent will be discharged from the site, except drainage water from removal of sediments. The temporary ablution facilities to be provided during site establishment and construction will be managed and maintained regularly and properly used by the site workers. Spillages or leaks will be checked daily and reported immediately to reduce the potential of soil, surface water and ground water pollution. These temporary facilities will be located outside the 1:100-year flood line of the stream.

4.6.3 Emissions into the Atmosphere

The only emissions envisaged at the site are from dust resulting from vehicular movement on the site during the offloading of construction material at stockpiling areas during construction. Other emission sources will be exhaust fumes from plant. These sources will be mitigated through ensuring that all plant is in a sound working order through regular maintenance.

4.6.4 Water Use

The river clean-up and rehabilitation is intended to ensure the full functioning of the river ecosystem. This feeds back into the intended project scope. It is understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for the function of the river system will further engage other parties and this project has already established the key stakeholder, waste water treatment works.

Water use for all site operations will be sourced from the municipality. Water for human consumption and use will also be sourced from the municipality. A construction utilities acclaim will be opened with the Municipality and this will act as a confirmation of the utilities that the Municipality will provide Appendix I.

4.7 Temporal and Permanent Jobs

The labour force is categorise in Section 4.5.

4.8 Competence to Operate Site

4.8.1 Municipal Overall Site Management

The Emalahleni Local Municipality (ELM) will ensure that all personnel on the site undergo specific water course rehabilitation training. Technical skills will be acquired through on-site training in general health and safety, and procedures will be prescribed for the day-to-day running of the site.

The site will be the responsibility of the appointed Manager within the ELM and his details are as follows:

Name	Position	Role	Qualifications
• Mr Eric Sithole	• Manager: Road and Infrastructure	• Planning and manage bridge crossing maintenance activities and monitoring requirements to ensure compliance with the	• National Diploma (S4) • Civil Eng. – 1998: Tshwane University of Technology • BTech in Civil Eng. – 2014: Tshwane University of Technology • Transportation

		conditions of authorisation	

4.8.2 Technical Competence and Site Management

The proposed development will be designed by a professional engineering team: Siyandiza Consulting Engineers (Pty) Ltd. The site will be operated by the asset management unit of the ELM, with the responsibility of ensuring that the infrastructure does not deteriorate. Emalahleni Local Municipality (ELM) will designate an Environmental Officer (EO) to ensure compliance with set licence conditions.

4.9 Listed and Specific Activities Triggered

The activities to be undertaken under this planned application which are triggered under NEMA Regulations include Listed Activities provided in Table 4.9-1 and therefore, basic assessment procedures will be followed.

Table 4.9-1: Triggered Listed Activities

Act	Number and Date of Relevant Notice (Regulations)	Activity	As Described in the Legislation	Implications for Site or Motivation or Reason for Interpretation
National Environmental Management Act, 1998 (Act 107 of 1998)	GNR 327 (GNR983) as amended in April 2017 (Listing Notice 1)	12	The development of - (iii) Bridges exceeding 100 square metres in size; The development of - (ii) Infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs -	• The development of the bridge exceeds 100 square metres in size. • Activity number (ii) is triggered due to the fact that the development of infrastructure (bridge) require the clearance of the river and other areas surrounding the watercourse for the purposes of site establishment and the physical development footprint might exceed 100 square metres.
National Environmental Management Act, 1998 (Act 107 of 1998)	GNR 327 (GNR983) as amended in April 2017 (Listing Notice 1)	19	• The infilling or depositing of any material of more than [5] 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than [5] 10 cubic metres from [–(i)] a watercourse;	• The development will involve infilling of materials, dredging, excavation and removal of soil and sand from a watercourse. • This activity 19 is not excluded since rehabilitation exercise is

Act	Number and Date of Relevant Notice (Regulations)	Activity	As Described in the Legislation	Implications for Site or Motivation or Reason for Interpretation
			• But excluding where such infilling, depositing, dredging, excavation, removal or moving - 2. (b) Is for maintenance purposes undertaken in accordance with a maintenance management plan.	not an activity that is solely for maintenance purposes.
National Environmental Management Act,1998 (Act 107 of 1998)	GNR 324 (GN R985) as amended in April 2017 (Listing Notice 3)	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. (f.) Mpumalanga (i.) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans.	The proposed development will involve the clearance of land and the clearance might involve clearance of indigenous vegetation for an area exceeding 300 square metres. However, this activity can only be triggered if (f) (i) and (ii) are applicable that is if the areas fall within a critically endangered or endangered ecosystem as identified by the National spatial Biodiversity Assessment 2004 or in bioregional plans. (f) (i) and (ii) are applicable because wetlands are considered as endangered ecosystems in terms of NEMBA.

Act	Number and Date of Relevant Notice (Regulations)	Activity	As Described in the Legislation	Implications for Site or Motivation or Reason for Interpretation
Other activities not specific to NEMA				
National Water Act, 1998 (Act 36 of 1998)	-	Section 21 (c)	Impeding or diverting the flow of water in a watercourse.	The proposed development will involve the rehabilitation of the watercourse by cleaning and clearing the vegetation and sediment build-up, as such the proposed activities trigger Section (c) of the National Water Act, 1998 (Act 36 of 1998).
National Water Act, (Act 36 of 1998)	-	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse.	The proposed development seeks to improve the characteristics and/or state of the watercourse by conducting system maintenance and repairs, as such the proposed activities trigger Section (i) of the National Water Act, 1998 (Act 36 of 1998).

4.10 Description of the Activities to be Undertaken Including Associated Structures and Infrastructures

The scope of the project activities is included in Section 4.3 and the description of the activities is outlined below.

4.10.1 General Activities

- There will be identification and implementation of emergency measures, which will handle any debris accumulation during the construction phase.
- Community engagement through environmental awareness programs.
- Dredging and clearing of both bridges approach areas using frontend loaders and tipper trucks.
- Erosion bags installations at defined points along the stream, (highlighted on layout drawing).
- Rubble placement and compaction for construction vehicles movement.

The construction sites will be located on previously disturbed areas as all the areas identified are within a built-up environment. These areas will make provision for closed civil systems such as water tanks and conservancy tanks for sewerage containment. All waste products will be removed from the construction sites to an approved and licensed disposal site. Rehabilitation of the construction sites will be to the same level as to prior establishment. The construction site camp will be located above the 1:20 year flood line with hazard free accessibility from the main roads for delivery and access to the construction areas. Access to the respective construction sites would be possible via pre-existing roads. All additives to be used are to be non-poisonous and environmentally friendly. Batching of concrete for all purposes is to be done at the construction site camps in a regulated environmentally friendly way. No batching will be allowed to happen inside river servitude area of the 1:20 year flood line. All construction equipment and material will also to be stored at the site camps and above the 1:20 year flood line where required. All material will be imported, thus no quarries or borrow areas will be established in the vicinity.

The identified areas are vulnerable and the risk of failure increases with every passing rainy season.

4.10.2 Cleaning of the Riverbed

- Removal of material from the riverbed shall be end-hauled to safe, stable and licenced disposal sites.

- Environmental considerations pertaining to riparian ecosystem will be considered and a wetland and aquatic studies were undertaken.
- Excavation of excess material in the channel will be done to the original base level of the streambed, not below it, to avoid head cuts and / or water stagnation.
- Culvert cleaning may be done using horizontal drilling or jetting.

4.10.3 Structural Health Monitoring of the Bridge

Assessment of the bridge structures will take into account the corrosion of the culvert reinforcement, cracks, abrasion extents and differential settlements if any are observed. The purpose of this exercise is to determine if there are any structural safety concerns that may require rehabilitation of the bridges themselves or their replacement (Note this is not the scope of this project, at this stage, repair work has been commissioned and the designs are looking at various feasible alternatives to achieve repair and leave stable, safe and operational structures)

4.10.4 Storm Water Management and Erosion Control

- To minimize donga formation due to erosion and promote stabilization storm water control measures will be implemented
- Road kerbs and channel combination, with down-chutes will be used to drain the surface water from the road walkway enlargement will be done

4.10.5 Walkways and Road Furniture

- Due to high pedestrian movements, there are considerations for the refurbishment and construction of dedicated walkways on both sides of the bridges. The walkways are to have handrails on the outer edge and a barrier on the inner road edge to protect the pedestrians from vehicular traffic.

4.10.6 Proposed Site Office and Storage Areas:

The envisage infrastructure on site will entail

- Site Office;
- Storage area;
- Containers;
- Parking area for plant;

- Fuelling point;
- 3 m high boundary fence with access;
- Gate facing main road;
- Security boom;
- Sediment offloading site;
- Collection to take to spoiling or designated waste sites.

4.11 Site Layout

The site layout or locality plan (is indicated in Figure 1.1-1) comprises of the project plan and other sections of the development. The engineering site layout illustrated in Appendix A2.

Site Demarcation and boundaries have taken into account the social activities in the area and appropriate access points for the two sites to be worked on. Due to the nature of the work which is along the stream, a designated site for storage and operations management purposes has been defined. Work being done along the stream will be barricaded using barricade wires. Existing services have not been affected as per our site layout plan. Any other services identified will be brought to the attention of the Engineer and attended to.

4.11.1 Site Access

The site for the proposed development is located south of N4 and approximately 2.5 km north of the N12. The site access from Pretoria is via the N4, through to the R545 off-ramp, which will then get into the Phola Township. Alternatively, the site can be access from Johannesburg via the N12, and onto the R545. Description of the policy and legislative context within which the development is proposed (Figure 4.11-1)

Figure 4.11-1: Illustration of the Proposed Site from Pretoria

5 LEGISLATIVE REQUIREMENTS SPECIFIC TO THE DEVELOPMENT

Table 4.9-1 provides an indication of triggered listed activities.

5.1 Applicable Legislation and 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.

The applicable legislation to this application is outlined below in Table 5.1-1.

Table 5.1-1: Applicable Legislation and Guidelines

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
• Constitution of the Republic of South Africa 1996 (Act No.108 of 1996, Section 24)	• National & Provincial • Department of Justice and Constitutional Development	• No licence requirement, but general respect for the environment and people's rights to a healthy and clean environment during construction and operation of the site.
• National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended in 2010). (NEMA)	• National & Provincial • Department of Environmental Affairs	• The act provides for environmental management in the country and the site on which the bridge is to be rehabilitated. • The rehabilitation development should be managed co-operatively in terms of decision-making regarding the materials used and full functioning of the site suitable for human and environmental benefit.
• Department of Environmental Affairs National Environmental Management Act, 1998 (Act No. 107 of 1998)	• National • Department of Environmental Affairs	• Provides for environmental authorisation requirement for listed activities and for this project listed activities are provided in Table 4.9-1.

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
2014 Listing Notices 3, 04 December 2014		
• Environmental Impact Assessment Regulations have been promulgated in terms of Section 21 of the Environment Conservation Act, No 1989 (Act No. 73 of 1989)		
• National Water Act, 1998 (Act No. 36 of 1998) • NWA	• National & Provincial • Department of Water and Sanitation	• Provides for all aspects relating to pollution of surface water. To take all reasonable measures to prevent any pollution of a water resource from occurring, continuing or recurring. Provides provisions for the protection, use, development, management, conservation and control of South African's water resources. General respect for non-pollutant water and surrounding environment of the site are to be maintained, as it is used by people and neighbouring habitats of fauna and flora.
• National Environmental Management: Waste Act.2008	• National • Department of Environmental Affairs	• To reform the law regulating waste management in order to protect health and environment by providing reasonable measures for the prevention of pollution,

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
(Act No. 59 of 2008) • NEMWA		ecological degradation and for securing ecologically sustainable development. To be observed by ensuring that the sediment waste is classified and the general waste disposal is adequately handled.
• National Environmental Management: Waste Act, 2008 (Act No.59 of 2008) • List of Waste Management Activities: Govt Notice No. 921 of 29 Nov 2013 as amended by Government Notice No. R332 of 2 May 2014 and as also amended by Govt. Notice No. R633 of 24 July 2015.	• National & Provincial • Department of Environmental Affairs	• Protection of the surrounding environment through efficient waste management by ensuring proper waste collection, transportation, storage, disposal and treatment by the Appointed contractor. Should the sediment waste be classified or hazardous a licence will be required for its disposal.
• National Environmental Management Laws Amendment Act, (Act No.107 of 1998).	• National	• Environmental protection and mitigation against negative impacts the development or rehabilitation might present

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
• Atmospheric Pollution Prevention Act 1965 (Act No. 45 of 1965)	• Department of Environmental Affairs • Chief Air Pollution Control Officer (CAPCO) in the Directorate of Air Pollution within DEAT and local authority inspectors.	• Controls all forms of air pollution. Illegal waste disposal from surrounding households, pollution from vehicle use and operation of nearby substation to be monitored.
• National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004); National Dust Control Regulations, 2013.	• National • Department of Environmental Affairs • Chief Air Pollution Control Officer (CAPCO) in the Directorate of Air Pollution within DEAT and local authority inspectors.	• Declaration of dust control areas. Steps to prevent atmospheric pollution by dust. • Prevention of high sedimentation in walkways, soil erosion and livestock grazing.
• National Environmental Management: Air Quality Amendment Act, 2014 (Act No. 20 of 2014).	• National • Department of Environmental Affairs • Chief Air Pollution Control Officer (CAPCO) in the Directorate	

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
	of Air Pollution within DEAT and local authority inspectors.	
• Health Act, 1997 (Act No. 63 of 1977)	• National • Department of Health	• Control of health aspects of waste disposal and water treatment Regulates, rubbish, sewage. Especially, illegal waste disposal, dumping, floodplain surroundings and considering riparian ecosystems.
• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). (NEMBA)	• National • Department of Environmental Affairs	• The provisions of the Act and Regulations have been used in the compilation of mitigation measures in Section h (viii) and (i) (ix). Biodiversity management through proper rehabilitation measures. This includes the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity institute. • Care to be given to riparian vegetation in the project area as well as grazing livestock.
• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (Alien and Invasive	• National • Department of Environmental Affairs	• The mitigation measures section considers alien invasive species management. • Riparian vegetation and flood prone areas surrounding the site were identified, hence the need for management of alien invasive species.

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
Species Regulations, 2014).		
• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). • (Regulation 8 of the Alien and Invasive Species Regulations, 2014).	• National • Department of Environmental Affairs	• Invasive species are now deemed to be a legal liability of the property owner and it is up to the landowner to ensure that all invasive species are safely removed from their land in accordance with the regulations and permitting requirements.
• National Heritage Resources Act (Act No. 25 of 1999) (NHRA)	• National • South African Heritage Resources Agency (SAHARA)	• Controls for the protection of natural and cultural heritage resources. No archaeological remains were seen or noticed during the site visits. Should there be any identification of the archaeological artefacts during construction or operation/ South African Heritage Resources Agency will be notified
• Conservation of Agricultural Resources Act, 1983 (Act No.43 of 1983) • In March 2001, Regulations 15 and 16, were promulgated in	• National • Department of Environmental Affairs	• Conservation of Agricultural Resources Act 43 of 1983: Section 5 of the Act prohibits spreading of weeds. • Controls the utilisation and protection of wetlands, soil conservation, control and prevention of veld fires, control of weeds and invasive plants. • Regulations stipulate that weeds and invader plants should be eradicated or

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
terms of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).		controlled in areas where they are not used for recreational or economic purposes.
• Environment Conservation Act, 1989 (Act 73 of 1989)	• National	• Provides control for the effective protection and utilisation of the environment, littering, waste disposal, noise and various other activities, which may have a detrimental effect on the environment.
• Regulations • Environmental Impact Assessment Regulations have been promulgated in terms of Section 21 of the Environment Conservation Act, 1989 (Act, No 73 of 1989)	• National • Department of Environmental Affairs	• The regulation provides for the following objectives: • To regulate the procedure and criteria contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.
• Guidelines: 27 September 2005: Guidelines for clearing invasive alien plants Guidelines for	• Provisional	• Provides guidance on how to clear invasive alien plants • NEMBA Sections 75 and 76 are very specific in terms of who must develop these Invasive Species Monitoring, Control and Eradication Plans, what the plans must

Title of Legislation, Policy or Guideline:	Administering Authority:	Applicability to the Site:
clearing of invasive in terms of section 75 and 75 of national Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and as required by Section 76 of this Act		include and how they should be implemented.
• CoJ Metro Municipal By-Laws: Act, 2000 (Act No. 30 of 2000)	• Provisional	• Provides for the protection of the environment.
• ELM - Public open spaces By-laws In terms of Section 13(a) of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)	• Provisional	• Provide an effective legal and administrative framework to ensure that the way in which the Council controls, manages and develops public open spaces is environmentally sustainable. and is in the long-term interests of the whole community of Johannesburg, including future generations and which clearly defines the rights and obligations of the public in relation to public open spaces.

6 MOTIVATION FOR THE NEED AND DESIRABILITY FOR THE PROPOSED DEVELOPMENT

There are a number of risks posed by the current state of the bridge and most of these risks emanate from flooding that frequently occurs during the rainy season. Below is a summary of the major risks

that are posed by the current state of the bridge and this indicate the importance of repairing this bridge as this will act as a mitigation measure in avoiding such risks.

- During the rainy season, the two access points become submerged resulting in flooding in the area. The neighbouring households that are on the flood line are at a higher risk to be affected by the floods. The flooding will potentially result in damage to property including injury and loss of life to the community members.
- The crossing carriageway for both vehicles and pedestrians have damaged guardrails which are not safe for operational use.
- From a structural safety point of view, investigations have been carried out in relation to corrosion of the culvert reinforcement, existence of cracks, abrasion extents and differential settlements if any are observed. The correct load capacity of the bridges and culvert oscillations during the dredging process including the vehicular movement across the bridges present a risk of vibrational activity which will have to be closely monitored.
- Dilapidated guardrails pose a safety risk to functional bridge operation.
- Floodwaters can concentrate garbage, debris, and toxic pollutants that cause secondary effects of health hazards.
- Flooding pose a safety risk to the community considering that children staying in the nearby areas might risk crossing while the bridge is submerged resulting in them being washed away.
- Frequent flooding also affects the bridge itself and this is a safety concern as there will be defects of the bridge in the long term.
- The environmental aspects of concern which are a result of the observed potential impact such a flooding are:
- Clogging as a result of siltation and vegetation encroachment
- Cumulative sedimentation and debris discharge at a level almost flash with the underside of the bridge decks.
- Habitat destruction
- Currently there is no roadside furniture on the approach

The overall benefits of the proposed activity include the following:

Social Benefits:

When it comes to social benefits, generally one of the first on the list of benefits is reduction in traffic congestion. However, in this instance what has raised the biggest concern is the neighbouring households that are on the flood line, thus placing them at high risk of experiencing potential damage to property, concentrate garbage, debris and toxic pollutants. Therefore, a rehabilitated bridge will eliminate these risks and health hazards for the community. Furthermore, outside of the rainy season, the rehabilitation of the bridge will ensure excellent fire and seismic resistance which are characteristics of concrete structures such as this and further ensures the public wellbeing. As, far as traffic is concerned, cars will be able to cross freely with no threat posed by a weakened bridge filled with cracks and worn out guardrails.

Environmental benefits:

The environmental benefits will include flood and fire resistance/reduction. Hence, there will be no more siltation and vegetation encroachment which is causing clogging. A decrease in cumulative sedimentation and debris discharge. Also, combat of habitat destruction. Furthermore, the use of concrete makes it possible to facilitate accelerated construction, thereby, reducing greenhouse gas emissions caused by traffic delays and construction equipment operation.

Economic benefits:

The bridge rehabilitation process support the local economy, due to wages paid to construction workers and repair personnel. Rehabilitation of bridges require regular cleaning and maintenance. Bridge workers then give this money back to the local community by paying their debts and purchasing local goods and services. The economic benefits issues go beyond simple cash flow. The bridge project connects communities, allowing them to interact for work or play. This capacity is especially important for areas where one town has an abundance of raw materials and another has a labour force in need of work. In this way, both people and communities can support one another. In an environment of limited resources, it is essential that the municipality make maximum use of the resources at its disposal by using them in an efficient and effective manner. Efficiency in operations and investment will increase poor people’s access. Access to the markets and economic hub areas is necessitated by these bridge crossings and they stable nature will be beneficial.

The bridge is also an asset of the Municipality and its maintenance contributes to the improving the asset value and keeping it in the asset register for longer.

7 MOTIVATION FOR THE PREFERRED AREAS, PRESERVATION MEASURES AND EROSION STRUCTURES

7.1 Site Alternative

There are no site alternatives because the rehabilitation and maintenance works have to be undertaken at the two (2) bridge crossings to address the matters discussed under need and desirability in Section 6.

7.2 Design Alternatives

The alternatives that were considered pertain to the design of the erosion control structures.

Gabions structures were considered but when assessed against the erosion structures below, they were the least preferred option.

Three typical designs were considered as erosion protection structures and would be implemented based on space constraints and practicality.

There are three proposed and preferred typical erosion protection structures considered, namely;

(a) Typical protection structure 1 (Riprap & Vegetated Berm): Wide floodplains: Berm with 1:2.5 side slope on both sides, Riprap protection on one side face to river, riprap toe below 1:20 year flood erosion level

(b) Typical protection structure 2 (Riprap & Vertical Wall): Limited space and deep alluvial material: Concrete wall with 1:2.5 bank slope and Riprap protection on one side, riprap toe below 1:50 year flood erosion level

(c) Typical protection structure 3 (Vertical Wall): Limited space and shallow bedrock: Concrete wall without side slope, toe below 1:50 year flood erosion level or to bedrock.

The activities that will be undertaken as part of these planned alternatives for erosion protection measures are provided in Table 7.2-1. These erosion structures will be installed at various points along the river bank, where

Table 7.2-1: Proposed Erosion Protection Structures

(a) Typical protection structure 1 (Riprap and vegetated berm)	(b) Typical protection structure 2 (Riprap & vertical wall)	(d) Concrete stilling basin (site 2)
1. Site Clearance and establishment. 2. All necessary traffic accommodation and construction warning signage will be erected as necessary. 3. River diversion and dewatering where required. (To be avoided) 4. Surveying and setting out. 5. Removal of failed gabion structures and other debris down to the founding rock embankment 6. Importing and placement of appropriate fill material. 7. Preparation and compaction of the river bank. 8. Riprap installation: a. Ensure correct gradient. b. Provide specified fabric. c. Fabric should be thoroughly stapled to the ground. d. Provide the specified type and size of riprap. e. A rock bucket should be used during the installation of the riprap. f. Place riprap according to engineering specifications and guidelines provided during detailed design. 9. Berm: a. Provide enough material to construct berm to required height. b. Place and compact material according to engineering specifications and guidelines provided during detailed design. c. Ensure that the berm ties in with the riprap to form one structure. 10. Landscaping, shaping of ground, planting of vegetation where required and consideration of green engineering around all structures. 11. Rehabilitation and site de-establishment and Maintenance of the rehabilitated areas	Same as (a) with the exception that a vertical wall is provided **(c) Typical protection structure 3 (Vertical wall)** Same as (a) and (b) with the exception that there is no riprap installation activities	1. Site Clearance and establishment. 2. All necessary traffic accommodation and construction warning signage will be erected as necessary. 3. River diversion and dewatering where required. 4. Surveying and setting out. 5. All existing failed gabion structures and other debris will be removed down to the founding rock embankment with the use of an excavator where possible or by hand. 6. Importing and placement of appropriate fill material. 7. Preparation and stabilisation of the river banks. 8. Concrete stilling basin: a. Excavation into river bank up to bedrock. b. Prepare base with proper compaction of the soil and to the correct level. c. Erect formwork and steel fixing. d. Tie into existing upstream culverts and downstream canal. e. Cast concrete. f. Curing. g. Stripping of shutters. h. Backfill and compact where necessary. 9. Landscaping, shaping of ground, planting of vegetation where required and consideration of green engineering around all structures. 10. Rehabilitation and site de-establishment including the removal of all debris and waste products off the site to an approved and licensed disposal site. 11. Maintenance of the rehabilitated areas

8 A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVE WITHIN THE SITE

The preliminary design, took into account the use of various erosion control mechanisms and maintained the restoration process which is maintaining the same river pattern as how it is defined onsite.

After investigations and 2D modelling of various flood events routed through the compiled model of the river course way, fifteen areas were identified that were erosion prone and where severe flooding could occur during, specifically a 1 in 20 - year flood event. Conceptual erosion protection measures were then designed for these locations and the model re-run to ensure the preservation and protection of the identified areas and to ensure the surrounding properties are not negatively affected during a 1 in 20-year storm event.

The detailed design further considers the use of the river clearance process but narrows down to the erosion control mechanisms stipulated above.

The gabion system was eliminated for security reasons as past experience shows that the gabion fences are stolen when sites are left to operate. It should be noted that the cost of developing these erosion control mechanisms is the same as the bulk of the work involves removal of sediments in the stream.

9 PUBLIC PARTICIPATION PROCESS

9.1 Background

Public participation is a process that is designed to enable all interested and affected parties (I&APs) to voice their opinions and concerns that enable the practitioner to evaluate all aspects of the proposed development, with the objective of improving the project by maximising its benefits while minimising the adverse effects. The I&APs include all interested stakeholders, technical specialists, and the various relevant government departments to work together to produce better decisions. The projected milestones for the PPP are provided in Table 9.2-1 below.

The objective of the public participation process is to:

- Confirm the key stakeholders to include in the process, municipal departments, businesses, NGOs and the communities within the ELM;
- Compilation and maintenance of the stakeholder database for the duration of the project as well as the background information document;

- Introduce the project to the stakeholders to obtain their inputs in the proposed mitigation measures;
- Communicate with the stakeholders at all key applicable project stages; and
- Take into consideration all inputs and comments made during engagement sessions for input into the reports to be generated.

9.2 Details of Public Participation Process Undertaken in Terms of Regulation 41 of the Regulations, Including Copies of the Supporting Documents and Input.

9.2.1 Introduction of Public Participation Process

Vulindlela Bridge works involve the rehabilitation of two bridge crossings as indicated in Figure 2.1-1, 2.1-2 and 2.1-3 in BAR. The water course has been affected by increasing and uncontrolled vegetation growth, as well as siltation caused by erosion, which has led to a reduction in river capacity, as well as altered water flow patterns. Consequently, during rainy seasons the river floods, hindering smooth traffic and pedestrian movement.

The project was undertaken as part of the Local Economic Development (LED) contribution provided by Sasol Mining (Pty) Ltd (Sasol Mining) and was part of the projects committed to in their social and labour plan. The project beneficiaries, and as such project applicants, are Emalahleni Local Municipality (ELM). The project entails rehabilitating two bridge crossings.

Siyandiza Consulting Engineers (Pty) Ltd were appointed to undertake designs for the bridge rehabilitation works. In addition, to comply with the National Environmental Management Act, 1998 (act No 107 of 1998) (NEMA), as amended, and its regulations, Sasol has also appointed MDT Environmental (Pty) Ltd, as Environmental Assessment Practitioners (EAPs), to conduct environmental studies and apply for environmental authorisation for any listed activities that might be triggered through the execution of this project. The environmental studies determined the potential significant environmental impacts, that would emanate from the proposed project. In addition, the study also recommended mitigation or management measures for these significant impacts.

The development triggers listed activities in terms of NEMA and that was the reason why an environmental authorisation application was being undertaken. The details of listed activities are provided under Section 5 of the BAR.

9.2.2 Stakeholder Engagement Approach

The approach that was to ensure that stakeholder concerns were captured is indicated in Table 9.2.-1

Table 9.2-1: Detailing Stakeholder Engagement Plan

Activity/ Tasks (What will be done)	Objectives (Why)	Execution Plan (How)	Deliverables
1. Stakeholder profiling, data collection and identification of relevant stakeholders and Interested and Affected parties (IAPs).	• To ensure that all the relevant stakeholders and Interested and Affected Parties (IAPs) are identified in accordance with the National Environmental Management Act, of 1998 (Act No 107 of 1998) (NEMA), EIA Regulations, 2014; • To understand the socio-economic and geographic environment and key role players within these sectors; • To undertake identification of relevant stakeholders and IAPs. The stakeholder profiling was done to identify all the relevant stakeholders upfront, from various stakeholder sectors including national, provincial and local authorities; civil society sectors and industries. These include the following: ➢ Water authorities (the then Department of Water and Sanitation (DWS) and now known as Department of Water, Sanitation and Human Settlements (DWS&HS)), ➢ Environmental Affairs (Department of Environmental Affairs, Mpumalanga Department of Agriculture and Rural Development, Land and Environmental Affairs (DARDLEA)), ➢ Mpumalanga Tourism and Parks Agency (MTPA), ➢ South African Heritage Resources Agency (SAHRA), ➢ Working for Wetlands, ➢ Parastatal organisations, ➢ Farmers Association, ➢ Business Association, ➢ Police Department, ➢ Water User Association, ➢ City Power, ➢ Roads and Transport Department,	• The key stakeholders were notified about the Environmental Studies /Environmental Impact Assessment to be conducted. The following approach was employed: ➢ Understanding of scope of work from the applicant; ➢ Identification of project locality and neighbouring activities and; ➢ Understanding of the site; ➢ Literature review of existing documents and reports including the Municipal Integrated Development Plan (IDP), Spatial Development Frameworks, Mpumalanga Growth Development Strategy, Local Economic Development Plans, Municipal by-laws, and Provincial ordinances; ➢ Literature review of specialists /experts reports that have contributed to the understanding of this water management unit ➢ Analysis and review of legislation; ➢ Utilised local setting maps to identify stakeholders such as: ✓ Occupiers of land adjacent to the study area that might be affected or impacted upon by the project execution ✓ Current and planned land uses and similar projects that are planned for the study area • National, Provincial and local authorities were sourced from previous experience and knowledge of the government departments who administer laws relating to matters affecting the environmental aspects relevant to the study area. The application for environmental authorisation included the following: Department of Water and Sanitation (DWS), Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).	• I&AP Register; see Appendix 9.2-1. • Project locality map see Figure 2.1-1, 2.1-2 and 2.1-3 in BAR. • Background Information Document (BID), *see Appendix 9.2-2*. A comprehensive and technical background information document was compiled and distributed electronically with the notification emails on 28 March 2019 to the respective key stakeholders. The leaflet was further be sent as part of the public participation process (PPP).

Activity/ Tasks (What will be done)	Objectives (Why)	Execution Plan (How)	Deliverables
	➢ Civil society sectors e.g. Non-Governmental Organisations (NGO) and Community Based Organisations (CBO), and ➢ Industries.		
1.1 Data verification and preliminary consultation	• To validate the preliminary collected data and check credibility to ensure that the relevant Stakeholders and IAPs are contacted, and the correct contact details are recorded. • To validate the legislative requirements and administration.	• Validation of collated information was done through literature review of existing documents and reports such as the Municipal IDP and Spatial Development Framework • Analysis of data collected from meetings with stakeholders such as Ward Councillors. Emalahleni Local Municipality, pre-application meeting with DARDLEA, DWS various data verification meetings with the various experts from the project team; Sasol Mining (Pty) Ltd (Sasol), Emalahleni Local Municipality and Siyandiza Consulting Engineers (Pty) Ltd.	• Updated I&AP Register, see Appendix 9.2-1. • Agenda, see Appendix 9.2-3. ➢ ELM Agenda, see Appendix 9.2.3-1. ➢ Ward Councillor Agenda, *see Appendix 9.2.3-2.* ➢ DWS Agenda, see Appendix 9.2.3-3. ➢ DARDLEA Agenda, see Appendix 9.2.3-4. • Preliminary engagement discussions/minutes, see Appendix 9.2-4. ➢ Emalahleni Local Municipality Meeting Outcomes, *see Appendix 9.2.4-1.* ➢ Ward Councillor Meeting Outcomes, *see Appendix 9.2.4-2* ➢ DWS Meeting Outcomes, *see Appendix 9.2.4.3.* ➢ DARDLEA Meeting Outcomes, *see Appendix 9.2.4.4.*

Activity/ Tasks (What will be done)	Objectives (Why)	Execution Plan (How)	Deliverables
2. Notification of stakeholders and IAPs. 2.1. Compilation of Background Information Document (BID). 2.2. Development of adverts site notices and notification letter. 2.3. Distribution of BID and notifying stakeholders about adverts output date and sourcing and organising meetings.	• To ensure that I&APs are informed about the project; • Give stakeholders and I&APs an opportunity to liaise any concerns, or suggest solutions they might have in relation to the proposed project; • To ensure stakeholders are notified and broader geographic representation of stakeholders was reached; • To distribute the technical BID and leaflet; • To ensure that I&APs receive a notification email; and • Hold focus group meetings and a public meeting.	• Confirmation of the local newspaper • Check with newspaper for their geographic distribution boundaries; • Send advert to newspaper • Send notification and information sharing documents to key stakeholders • Engaged the Ward Councillors.	• BID, see Appendix 9.2-2. • Meeting minutes, see Appendix 9.2-4. • Notification letter, *see Appendix 9.2-6.* On 28 March 2019, notification letters were sent to the key stakeholders to introduce the proposed development and invite the respective I&AP's database. • Copy of the published advert, *see Appendix 9.2-7.* • Posted site notice, *see Appendix 9.2-8.* • Updated I&AP Register, *see Appendix 9.2-1.*
3. Stakeholder engagement • The information to be collected during stakeholder profiling will be used to determine the best engagement strategies. The literacy levels and circumstances that could hinder effective participation was noted during these stages.	The main objectives of the stakeholder engagement were as follows: • To inform stakeholder authorities about the proposed project; • To clarify legislative and administrative requirements; • To gather issues and concerns regarding the project and ensure that they are addressed in the Basic Assessment Report; • To facilitate, review and inform input into the Basic Assessment Report; and • To conduct meetings and facilitate presentations of the project to the stakeholders and IAPs.	The strategy for stakeholder engagement was conducted as follows: • Engagement meetings were conducted to gather data from stake holders: • A meeting with Ward Councillor representative on 19 February 2019 • Constant engagement and progress reporting to Emalahleni Local Municipality. • A pre-consultation meeting was held with DWS&HS on 04 March 2019 • A pre-application meeting was held, with DARDLEA on 07 March 2019 • Project Initiation meeting with Sasol, ELM and Siyandiza Consulting Engineers. • SAHRA so that the organisation might verify the heritage status of the area, and the notification was loaded on the SAHRIS portal on Monday, 01 July 2019.	• Submitted written issues and concerns, *see Appendix 9.2-9.* • Notification letter and email, *see Appendix 9.2-6.* • Presentations held during meetings, *see Appendix 9.2-5.* • Agendas of meetings, *see Appendix 9.2-3.*

Activity/ Tasks (What will be done)	Objectives (Why)	Execution Plan (How)	Deliverables
4. Telephonic engagements to solicit data also done in isiZulu when necessary by the dedicated facilitator.	• To compile the minutes of the meetings; • To ensure incorporation of issues in the Basic Assessment Report; and • To facilitate compilation of Issues and Response Report.	• The meeting organisation entailed telephonic communication to organise meetings, sending emails and meeting requests to confirm the dates and confirmation of meetings and circulation of proposed agenda. • The identified Ward Councillors were preliminary notified about the project via telephone communication which was subsequently followed by an invitation and attendance to a site meeting conducted on 19 February. The ward telephonic contact and subsequent councillor were engaged with regarding the language of communication other than English and IsiZulu was suggested as the language of communication that can be used. • Site notices were translated to the main language, IsiZulu and erected at strategic points to be identified; Vulindlela Bridge 1, Vulindlela Bridge 2, Police Station, Library and Sukumani Primary School.	
5. Collation and consolidating of issues raised during the IAP engagement and Public Participation Process.	• To identify and record all the details relevant stakeholder details; • To receive and respond to issues raised by interested and affected parties; • Capture analysed data; and • To analyse data received from IAP engagement.	• Issues raised were collated and the communications and responses were captured in the issues and response report • The process followed during the public participation was recorded and recorded in the comments and response report. • Update IAP register with relevant IAPs.	• Issues and Response Report, *see Table 9.3-1.* • Complete I&AP register, *see Appendix 9.2-1.* • BAR Appendices with details and proof of the undertaken public participation process, kindly see all above-mentioned supporting documents referenced as Appendices.

9.2.2.1 Identification of I&AP's and Establishment of Database

The activities pertaining to the identification of the I&AP's and adjacent landowners/occupants are indicated in Table 9.2-2 below.

Table 9.2-2: Activities Undertaken

Site	I&AP Identification	Date	Challenges
Vulindlela Bridge, Bridge 1 and 2.	WinDeed Search	26 March 2019	• The limited property details, some of the residents did not have their stand numbers. However, the Geographical Information System (GIS) mapping using Cadastral overlay helped curb this. • Even though there is a historical political climate of unrest and the project was underway during the periods leading to the elections, the Ward Councillors were informed and consistently engaged. Together with them, a strategy of engagement for the the areas within their jurisdiction, was devised. This strategy entailed allocating a ward committee representative to be present at all intervention activities within the community. The ward committee representative was present during all specialist investigation site visits and also during the notification of adjacent landowners about the project.
	On site identification of I&AP (walking and driving door-to-door)	Planned	• Getting a hold of residents during the notification period. Most of the heads of families were at work but there were representatives to receive the notification and who indicated they

Site	I&AP Identification	Date	Challenges
			had delegated authority to oversee the household and comment on the matters and engage on the project related issues. Nevertheless, In such instances where the head of the families were reportedly not available, all I&AP's were urged to contact the project team for any information and/or clarity, using the information in the leaflets, which were left with the persons who were present at those particular households. The acknowledgment of receipt documents were then signed by those who received the information. • Lack of trust of the process due to the expressed previous experience with other developers on these processes. The IAPs were engaging but expressed these types of concerns and these were added in the issues register to ensure that mitigation measures for this project are provided to avoid creating or building on such mistrust. • Lack of understanding of the project scope by residents, whereby aspects outside this project scope were raised. The residents were capacitated and empowered to participate with understanding by ensuring that the project team representatives, who spoke their

Site	I&AP Identification	Date	Challenges
			languages were dispatched to the community to explain the project to adjacent landowners. However, others still saw this process as an opportunity to relay their needs to the municipality, even though they understood that these were not part of this EIA process such as requests for more roads. The issues that were outside of this EIA process, were also captured and are indicated as such in the issues report. • Different language dynamics. This factor was curbed by having two personnel/representatives on site who were equipped to engage with the different landowners in their preferred language.
	I&AP's Referrals	Planned	• Getting a hold of a variety of participants preliminarily registered I&AP's through emails and telephones. To ensure that all those stakeholders who were not advance on the email communications were still capacitated to participate, there were one-on -one engagements by visiting the adjacent landowners and also through direct engagement with the Ward Councillors who then provided a representative to support in the identification process by delegating a Ward Committee representative to provide information that was required and also support

Site	I&AP Identification	Date	Challenges
			during the site based identification and notification of stakeholders. • Risk of exclusion of some of the key stakeholders. This was controlled by the use of different tools either than deeds searches, social media sites research, internet searches of organisations and CBOs, maps, peer to peer referrals through use of response sheets, adverts, site notices. For example to identify the adjacent landowners site walk about to each households were done, through further support of the Ward Councillors and their delegated Committee representative.
	I&AP's Registration	Started	• Not reaching all the I&AP's as a result of further property subdivision according the municipal township development, which was still not finalised and was at the attorneys , however, updated GIS Cadastral maps were used to identify landowner and WinDeed was further used as support, where updated information for subdivisions was not yet loaded on the municipal systems. The municipal delegated project management team were actively involved trough review of data, in ensuring the landowners are confirmed.

9.2.3 Notification

The notification to all adjacent landowners was conducted on Tuesday, 04 June 2019. Where the site notices were placed at the respective strategic places; Vulindlela Bridge 1, Vulindlela Bridge 2, Police Station, Library as well as Sukumani Primary School. A record of the stakeholders handed the notification letter is provided as Appendix H.

9.2.4 Meetings

The details of the held meetings; focus group meetings and public meetings are provided in Table 9.2-3.

Table 9.2-3: Meeting Details

Meeting No.	Description	Date	Location
1	Focus Group Meeting: Ward Councillor	19 February 2019	Vulindlela Bridge
2	Focus Group Meeting: I&AP's	19 February 2019	Waste Water Treatment Works
3	Focus Group Meeting: Department of Water and Sanitation	04 March 2019	Department of Water and Sanitation - 474 Carl Street, Pretoria West
4	Focus Group Meeting: Department of Agriculture Rural Development Land and Environmental Affairs	07 March 2019	Corner Ryan and Rosmead, Klipfontein, Witbank

9.3 A summary of the Issues Raised by Interested and Affected Parties, and an Indication of the Manner in which the Issues were Incorporated, or the Reasons for not Including them.

The details of the raised issues, comments and concerns are detailed in Table 9.3-1, the input has been collated from the respective site visits, focus group meetings, reply slips and will further be incorporated from the draft BAR, the planned public meeting and additional focus group meetings.

Table 9.3-1: Issues and Comments Received

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
Socio-economic and Socio-political					
1.1	The community was seemingly sensitive with various socio-political issues present.	Mr Arthur Mashiane	The study was undertaken in such a manner that the community representatives are involved in the process. During the specialist study surveys, the ward councillor representative was present.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	See Section 4.3 of the BAR for the detailing project scope.
1.2	The approach taken for the project has been focused on working with community members, maximising transparency to avoid community isolation.	Mr Arthur Mashiane	The Ward councillors were briefed and kept updated on the project activities.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 4.5 of the BAR for the detailing socio-economic value for the proposed activity.
1.3	Job employment and related opportunities.	Mr Arthur Mashiane	The labour plan was being done by the consulting engineers and it was expected that there were opportunities for employment the locals during the construction phases of the project. Any planned employment will be done through the agreed process with the ward councillors.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 4.5 of the BAR for the detailing socio-economic value for the proposed activity.
1.4	The socio-economic issues pertaining to job creation, fear of losing land/property and lack of trust with industries needs to be addressed accordingly.	Mr Arthur Mashiane on behalf of I&AP's that had an encounter the project team on site; 19 February 2019.	The project was a socio-economic contribution project that was being undertaken as part of Sasol's social and labour plan and as such all the funding for his project were directly contributing to addressing socio-economic needs of the municipality as well. Since this project is part of the programmes that Sasol is doing as part of their social and labour plan, it is intended to be a give-back to the community project. The aspects pertaining to job creations during the execution of the project will be addressed through a systematic process that will be managed together with ward councillors to ensure that	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 4.5 of the BAR for the detailing socio-economic value for the proposed activity.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
			locals, where the skills allow, receive preference when it comes to employment. It is not intended that there will be any relocations since this project is being done to ensure that people receive a peace of mind and are not forced out of their homes due to flooding.		
1.5	Will there be a need for contractors during the construction phase of the proposed development?	Mr Arthur Mashiane	Local contractors would be sourced based on expertise, however if the needs are not met from the local candidates, then contractors will be outsourced accordingly.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 4.5 of the BAR for the detailing socio-economic value for the proposed activity.
Environmental					
2.1	The environmental issues of flooding and silt build up needs to be addressed.	Mr Arthur Mashiane on behalf of interested and affected parties (I&AP's) that had an encounter the project team on site; 19 February 2019.	The environmental impact assessment process has entailed specialist investigations such as the aquatic assessment study. The management measures from this study will be adopted as commitment which will be adhered during the construction process.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 6 and 13 of the BAR.
2.2	The need for a new bridge has been stressed to address the environmental and socio-economic issues associated with the current structures.	Mr Arthur Mashiane on behalf of interested and affected parties (I&AP's) that had an encounter the project team on site; 19 February 2019.	The reason why this study was being done was to address the issues of flooding due to the risk posed by the current state of the bridge crossings, which are heavily silted with damaged structures.	During a Focus Group Meeting/Site Visit held on 19 February 2019.	Section 6 and 13 of the BAR.
2.3	Would there be channelling?	Ms Dineo Tswai	There would be no channelling of water and that the project would be a maintenance and fault fixing exercise	During a Focus Group Meeting	See Section 4.3 of the BAR for the detailing project scope.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
				held on 07 March 2019.	
Legislative					
3.1	A general authorisation (GA) is not a prerequisite for a Basic Assessment (BA).	Mr Lindelani Mbulaheni	The comment has been noted and as such the two processes (GA and BAR) will be run in parallel to each other.	During a Focus Group Meeting held on 04 March 2019.	BAR and GA have been independently managed through the required means. See BAR for the environmental authorisation component and the GA has further been managed on the e-WUL portal.
3.2	To be in a better position, the project team should conduct a desktop study as there might be Heritage material of value. Once the study has been done, a letter or motivation from South African Heritage Resources Agency (SAHRA) and as such, the need for a full heritage study would be determined by the desktop study and SAHRA reference.	Ms Dineo Tswai	The comment was applied and the process that was suggested was applied. The desk stop studies were undertaken and SAHRA was notified about the project.	During a Focus Group Meeting held on 07 March 2019	See Table 5.1-1, Section 10.4-2 and 10.7.1 of the BAR. Additionally, note Appendix 9.2-1 and Appendix 9.2-10.
Post draft BAR					
4.1	Request to have a new crossing bridge built as there are various associated risks; injuries as a result of rainy seasons, access. The existing bridges are a risk for users and further motivates for the need of a bridge to be constructed in between the two existing bridges.	Ms Margareth Theldi	The expressed comment was outside the scope of the project, but the matter was recorded and the IP was informed that the focus of the current study is on rehabilitating the existing two bridges.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 6 of the BAR.
4.2	A bridge is requested in between the two existing bridges as people need to travel to the other two bridges which are further away and resort to installing temporal structures to cross; these structures are not	Mr Ngiwengile Apleni	The expressed comment was outside the scope of the project, but the matter was recorded. The IAP was informed that this particular environmental study was only focused on the planned rehabilitation of the two existing bridges	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 6 of the BAR.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
	reliable especially after rain. This was raised at a Ward Meeting and nothing has been done since.		to alleviate the impacts of flooding improve functionality of the bridges.		
4.3	Flooding is an issue and a functional system which seeks to manage the flooding is required.	Patricia Gololo	One of the key objectives of the Vulindlela Bridge Repairs was to address the flood/ing issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.4	Flooding is a huge issue, from the watercourse itself to the two existing bridges.	Mr Mandla Masembuka	One of the key objectives of the Vulindlela Bridge Repairs was to address the flood/ing issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.5	The flooding is of a high level and the drainage systems are not efficient, increasing the risk for the community members.	Mr Negota Balaganani	One of the key objectives of the Vulindlela Bridge Repairs was to address the flooding issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.6	Water as a result of flooding enters house, the water flows from upper escarpment, as it makes its way into the main river.	Ms Maria Mokoena	One of the key objectives of the Vulindlela Bridge Repairs was to address the flooding issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.7	The flooding that takes place affected and restricts children from going to school.	Ms Nomhle Mbokane	One of the key objectives of the Vulindlela Bridge Repairs was to address the flooding issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.8	Flooding is an issue.	Mr Percy Nyauza	One of the key objectives of the Vulindlela Bridge Repairs was to address the flooding issue.	During the notification to adjacent landowners, 04 Jun 2019	Section 6 and 13 of the BAR.
4.9	Flooding prevents walkaway to the other side.	Mpilo	One of the key objectives of the Vulindlela Bridge Repairs was to address the floodng issue.	During the notification to adjacent	Section 6 and 13 of the BAR.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
				landowners, 04 Jun 2019	
4.10	The sewage system is poor and needs to be attended to.	Mr Negota Balaganani	Amongst the things that the project aims to solve, as a result of the river clean-up, was the water contamination since he planned works which seek to clean and clear the river.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation is intended to ensure the full functioning of the river ecosystem. It is understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works Department – See Section 4 of the EMPr (Volume 2 of 5).
4.11	The sewage causes a terrible smell.	Mr Bafana Sibanyoni	Amongst the things that will be solved, as a result of the river clean-up was existing smells since the debris will be removed, thus facilitating free river flow and dilution.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation was intended to ensure the full functioning of the river ecosystem. It was understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
					the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works Department – See Section 4 of the EMPr (Volume 2 of 4).
4.12	When it rains, the water from the river comes closer to the houses. Additionally, mosquitoes are a problem after it has rained or flooded.	Mr Bafana Sibanyoni	The scope of the project is to repair the system to efficiently have water flow, by doing, this will minimise any impacts caused by the system as such excess water flow. The clean-up and clearance will further alleviate the issues pertaining to the pest.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 of the BAR for the detailing project scope.
4.13	There are sewage issues which exist, affecting the overall smell of the area.	Patricia Gololo	Amongst the things that the project aims to solve, as a result of the river clean-up is existing smells since the debris will be removed, thus facilitating free river flow and dilution.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation was intended to ensure the full functioning of the river ecosystem. It was understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
					Department – See Section 4 of the EMPr (Volume 2 of 5).
4.14	The stench in the area is bad.	Tumelo Billy Theledi	Amongst the things that the project aims to solve is a result of the river clean-up, is existing smells since the debris will be removed, thus facilitating free river flow and dilution.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation was intended to ensure the full functioning of the river ecosystem. It was understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works Department – See Section 4 of the EMPr (Volume 2 of 5).
4.15	Sewage is a problem and further flows toward the household.	Ms Maria Mokoena	Amongst the things that the project aims to solve as a result of the river clean-up, was the water contamination following the planned works which seek to clean and clear the river. The planned works seek to alleviate the excess water flow.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation was intended to ensure the full functioning of the river ecosystem. It was understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
					the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works Department – See Section 4 of the EMPr (Volume 2 of 5).
4.16	There is a great issue with the sewage which further causes water contamination.	Mr Thabiso Senteni	Amongst things that the project aims to solve, as a result of the river clean-up, was the water contamination following the planned works which seek to clean and clear the river.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 4.8.1 of the BAR. The river clean-up and rehabilitation was intended to ensure the full functioning of the river ecosystem. It was understood that ongoing river integrity depends on the collaboration of all respective stakeholders. The Municipality as the implementing authority for the function of the river system will further engage the other parties and this project has already established the key stakeholders; Waste Water Treatment Works Department – See Section 4 of the EMPr (Volume 2 of 5).
4.17	There are safety and security issues as a result of vegetation in and around the watercourse.	Mr Negota Balaganani	The current project objectives are to address this raised issue and one of the activities of the maintenance works includes vegetation clearance.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 6 of the BAR.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
4.18	The safety of the community children is at risk.	Mr Percy Nyauza	There is associated structural repair work, where the structure of the two existing bridges are being repaired to address the associated risks.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3 and 6 of the BAR.
4.19	The existing small businesses and emerging businesses have given rise to the impact on the watercourse, due to failure to be sensitive to requirements and rules when doing business that can cause an impact on the river.	Mr Negota Balaganani	The comment has been recorded and will further be incorporated into the BAR. In addition, the large presence of businesses in the Phola Location has been identified through the Site Analysis conducted by the Project Team. The appointed contractor and subcontractors or suppliers during the project implementation phases will be educated on the impacts of their activities on the environment as part of the measures that will be stipulated in the environmental management programme report.	During the notification to adjacent landowners, 04 Jun 2019	Section 4.5 of the BAR - Labour requirement, Table 10.7-1 and Table 10.7-2 addresses matters of protection of the integrity of the watercourse and avoiding water contamination. Additionally, Section 7.4 of the EMPr (Volume 2 of 4) for the planned environmental training.
4.20	The pollution along the river is a problem, as the waste is transported through the water towards some houses.	Mr Percy Nyauza	The maintenance of the system includes waste clearing and cleaning.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3, 4.10.1, Table 10.7-1 and Table 10.7-2 of the BAR.
4.21	The project would help us very much if the river could be cleaned, as the system is not hygienic, and it smells.	Mr Chris Ntombla	The maintenance of the system includes waste clearing and cleaning.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3, 4.10.1, Table 10.7-1 and Table 10.7-2 of the BAR.
4.22	Cold temperatures.	Tumelo Billy Theledi	This was not a factor which the project can change.	During the notification to adjacent landowners, 04 Jun 2019	See Section 10.5 of the BAR.
4.23	There are snakes in the riparian spotted once in a while.	Tumelo Billy Theledi	The maintenance works include clearing, this might potentially be a	During the notification to adjacent	See Section 4.3 of the BAR.

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
			control measure of the presence of snakes in the area.	landowners, 04 Jun 2019	The clean-up and rehabilitation seek to address the direct, indirect and cumulative impacts and/or risks within the river system.
4.24	If the water is cleaned, we as the community members will use it for the toilet and/or domestic use.	Tumelo Billy Theledi	The suggestion has been noted and appreciated. The clearance of vegetation and sediment clean-up forms part of the scope of the project.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.10.2 of the BAR.
4.25	A suggestion for the impact the system has had on the community would have to include that clearing needs to take place.	Mr Percy Nyauza	The suggestion has been noted and appreciated. The clearance of vegetation and sediment clean-up forms part of the scope of the project.	During the notification to adjacent landowners, 04 Jun 2019	See Section 4.3, 4.10.1, 4.10.2, Table 10.7-1 and Table 10.7-2 of the BAR.
4.26	A request to have a road built and have speed humps added for the safety of the children.	Ms Nomkhosi Simelani	The expressed request was outside the scope of the project, however, the matter was recorded and passed onto the rest of the project team. The safety aspects of this particular project are addressed and there will be efforts to ensure that the bridge crossings are talking to the road users through installation of safety signage so that the cars can be able to read the safety and pedestrians are also better protected when using the bridge crossings.	During the collection of the draft BAR; 16 July 2019.	See Section 4.3 of the BAR for the detailing project scope.
Authority Input					
5.1	The Applicant shall conduct a preliminary legal assessment to identify all the water use activities associated with the proposed project that will require authorisation by the Department of Water and Sanitation (DWS) and the applicant is hereby referred to Section 22(1) of the	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The legal screening assessment was done and the triggered activities specifically fall under NEMA and Section 21 of the National Water Act,	Email on 06 August 2019.	See Section 4.9 and 5.1 of the BAR and Section 2.1.5 of the EMPr (Volume 2 of 5).

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
	National Water Act, 1998 (Act 36 of 1998).		1998 (Act 36 of 1998) (NWA) activities. The triggered activities under the NWA were also noted and hence the application was done for Section 21 (c) and (i).		
5.2	Therefore any other water use related activities associated with this project that are not permissible as indicated on Section 22(1) of the National Water Act, 1998 (Act 36 of 1998) shall have to be authorised by the DWS prior to such water use activities taking place.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The raised comment has been noted and no activities outside the prescribed general authorisation shall be conducted.	Email on 06 August 2019.	See Section 4.9 and 5.1 of the BAR and Section 2.1.5 of the EMPr (Volume 2 of 5).
5.3	Water supply: It is indicated on page 16 of the basic assessment report that water use for bridge repairs and maintenance and for human consumption will be source from the Municipality. The applicant must also provide the Department with the quantity of water and a signed copy of service level agreement to demonstrate that provision will be made to render such service.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. Do note that an agreement was sourced from the Municipality for Water Usage and was further granted.	Email on 06 August 2019.	See Section 4.6.4 of the BAR.
5.4	Wetland and Streams: It is indicated on page 53 of the basic assessment report that two (2) natural wetland systems could be affected by the activities. The applicant should note that if wetlands, streams ad drainages are to be destructed, the applicant should ensure that mitigation measures are taken to mitigate impacts or alternatively, the applicant should provide another option which will not involve	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The detailing mitigation measure for any impacts on the watercourse systems has been analysed to ensure that all the relevant measures are applied to be in line with the prescribed general authorisation.	Email on 06 August 2019.	See Section 12 of the EMPr (Volume 2 of 4) and Section 8 of the Aquatic Resources Assessment (Volume 3 of 5).

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
	destruction of these watercourses. If the activity is within 500m radius of the watercourse, it is a water use in terms of Section 21 (c) and (i) of the National Water Act, 1998 (Act 36 of 1998).				
5.5	Flood-lines: The applicant must note that no activities should occur within (whichever is the greater), unless authorised.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The raised comment has been noted and no activities outside the prescribed general authorisation shall be conducted.	Email on 06 August 2019.	See Section 5, 12 of the EMPr (Volume 2 of 4) and Section 8 of the Aquatic Resources Assessment (Volume 3 of 5).
5.6	Pollution of groundwater and surface water: The applicant should note that pollution of water resources must be avoided by implementing proper water and waste management during the entire life of operation. The mitigation measures and the monitoring plan must be implemented in consultation with the Department.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. Detailing mitigation measures have been accounted for to ensure the avoidance of groundwater and surface water pollution.	Email on 06 August 2019.	See Section 5, 12 of the EMPr (Volume 2 of 4) and Section 8 of the Aquatic Resources Assessment (Volume 3 of 5).
5.7	Stormwater Management: Stormwater management plan must be implemented to prevent pollution on run-off. The applicant must ensure that stormwater is diverted away from all the working areas and the stormwater leaving the construction areas must not be contaminated by any substance, whether that substance is solid, liquid, vapour or any combination thereof. The soil must be stabilised in order to prevent	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. An Aquatic Resources Assessment and Waste Classification Study have been conducted to ensure compliance of the raised comment to apply the correct mitigation measures and contain any associated impacts.	Email on 06 August 2019.	See Section 5, 12 of the EMPr (Volume 2 of 4) and Section 8 of the Aquatic Resources Assessment (Volume 3 of 5).

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
	the resulting wash downs into any water resource and where possible rehabilitation of the disturbed areas must be done concurrently with the construction activity.				
5.8	Waste: It is indicated on the basic assessment report page 15 that solid waste will be generated during all phases of the project. The applicant shall ensure that any waste generated on site is handled, transported and disposed of at a designated landfill site. A signed copy of service level agreement shall be submitted to the DWS to demonstrate that provision will be made to render such service.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The consideration of waste disposal has been accounted for following the conducted Waste Classification Study and presented results. A signed level agreement will be provided to this identified aspect.	Email on 06 August 2019.	See Section 4.6.1, Table 10.7.1; subsection 5 (b) of the BAR and Waste Classification Study recommendations (Volume 4 of 5).
5.9	Storage of oil, diesel, hydraulic fluids and grease: It is recommended that the storage areas for these fluids be bunded with cement and in such a manner than any spillages can be contained and reclaimed without causing any pollution to the group and surface water resources.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The storage of all hazardous waste will be contained in a facility which will not have any direct impact on the environment.	Email on 06 August 2019.	Section 5, 8, 9.2, 9,3 and 15 of the EMPr (Volume 2 of 5).
5.10	Sanitation: The applicant shall ensure that no sanitary system is located within a horizontal distance of 100 meters from any watercourse unless authorised. Reasonable measures must be taken to prevent the potential pollution of ground and surface water resources.	Department of Water and Sanitation – Ndlhovu Tshilidzi	The comments provided will be incorporated into the Basic Assessment Report and the updated report will be shared accordingly. The raised comment has been noted and no activities outside the prescribed general authorisation shall be conducted.	Email on 06 August 2019.	See Section 15 of the EMPr (Volume 2 of 5).
5.11	The Applicant is referred to Section 19(1) of the National Water Act, 1998	Department of Water and	The comments provided will be incorporated into the Basic Assessment	Email on 06 August 2019.	See Section 5 of the EMPr (Volume 2 of 5).

No.	Issue/Comment	Raised by	Response	Received by	Section where addressed in the BAR
	(Act 36 of 1998), and to report any pollution incidents originating from the proposed project to the Regional Office of the Department of Water and Sanitation within 24 hours.	Sanitation – Ndlhovu Tshilidzi	Report and the updated report will be shared accordingly. The raised comment has been noted and no activities outside the prescribed general authorisation shall be conducted.		
6					

10 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES (THE ENVIRONMENTAL ATTRIBUTED DESCRIBED)

Environmental Settings

10.1 Hydrology

The study site is located in quaternary catchment B20G in the Olifants Water Management Area (WMA 2).

The Nkangala District Municipality Rural Development Plan (2017) illustrates that the District falls within the Inkomati and the Upper Olifants Water Management Areas (WMAs). The Inkomati WMA consists of the Komati West, Komati North, Crocodile and Sabie sub-WMAs, whilst the Olifants WMA consists of the Upper Olifants, Middle Olifants, Steelpoort and Lower Olifants sub-WMAs (Nkangala District Municipality Rural Development Plan, 2017).

The Olifants River acts as the main drainage system within the District, flowing in a northerly direction, bending gradually in an easterly direction to join the Limpopo River and further settles into the Indian Ocean. Approximately, 57% of the water in the Olifants WMA is utilised for irrigation purposes, simultaneously, the Olifants River drains the entire Steve Tshwete and Emalahleni mining regions and the areas north of Witbank and Middleburg form part of the Strategic Water Source Area (Nkangala District Municipality Rural Development Plan, 2017).

10.1.1 Wetland Delineation

During the desktop investigation, one (1) possible area where wetlands could occur was identified on or in close proximity to the study site that would be affected by the proposed development activities. The NFEPA wetlands were also consulted and one wetland area was identified on or in close proximity to the study site that could be affected by the proposed activities.

The field investigations were undertaken during February 2019 to assess and confirm the delineated Wetland zones present on the survey area. The field investigations concluded that two (2) natural wetland systems (three wetland units) could be affected by the activities. Same is draining into the Saalboom Spruit.

Terrain unit indicator helps identify those parts of the landscape where wetlands are most likely to occur. Wetlands occupy characteristic positions in the landscape and can occur on the following terrain units:

- Crest;

- Midslope;
- Footslope; and
- Valley bottom.

10.1.2 Wetland Classification

The hydrogeomorphic wetland units identified were also assessed in respect to its location in the landscape. The wetland units found:

- VBR_CVB1 was found on the valley floor draining towards the North-West into the Saalboom Spruit. This system passes under both bridges.
- VBR_HSS1 was found on the North-Eastern slope associated with VBR_CVB1 draining towards the West into VBR_CVB1 east of Bridge 1.
- VBR_HSS2 was found on the North-Eastern slope North-West of Bridge 1 draining towards the West into VBR_CVB1 and then into the Saalboom Spruit.

Table 10.1-1: Classification of the Terrain Unit

Identified Wetland	**Level 1: System**	**Level 2: Regional Setting**	**Level 3: Landscape Unit**	**Level 4: Hydrogeomorphic (HGM) Unit**	
	Connectivity to Open Ocean	**Ecoregion**	**Landscape Setting**	**HGM Type**	**Longitudinal Zonation / Landform**
				A	**B**
VBR_CVB1	INLAND	DWAF Level 1 Ecoregions	VALLEY FLOOR	Channelled valley-bottom wetland	Valley-bottom flat
VBR_HSS1	INLAND	DWAF Level 1 Ecoregions	SLOPE	Hillslope	
VBR_HSS2	INLAND	DWAF Level 1 Ecoregions	SLOPE	Hillslope	

10.2 Soil Form and Soil Wetness Indicator

Soil erodibility in hydrologically transformed environments contributes to the difficulties to precisely determining wetland boundaries. This investigation focussed on the delineation of the wetland features based on soil hydro-morphology and landscape hydrology as observed in the catchment and on the study site.

Soils were found to be of a low clay content in general. Mostly sandy soils were present especially in the top 250 mm. The wetland seasonal and permanent zones reflected clayey soils.

The soils in the region are mostly derived from the geology of the region namely, predominantly shale, sandstone conglomerate and dolerite intrusions which feature prominently in the area. The soils are generally shallow with a dark brown colour (Zithole Consulting 2010).

The regional land capability is mostly class IV soils with limitations. This is evident in the large number of grazing land as opposed to cultivated lands found in the region. This is due to the fact that the effective soil depth is too shallow or too wet to cultivate, and livestock is grazed instead.

10.3 Vegetation Type

The study area falls within the Grassland Biome (Biome 06), The Highveld Level -1 Ecoregion (Ecoregion 11) (Kleynhans *et al*., 2005).

Close to 9% of the Districts ecosystems are endangered, some critically so; 9% of land is already degraded, 35.8% of land has been transformed, primarily within the grassland biome; and 33% of the river types are critically endangered (Nkangala District Municipality Rural Development Plan, 2017). The state of the environmental is mainly due to poor environmental management in the respective mining areas within the District which leads to excessive levels of water and air pollution (Emalahleni Local Municipality Spatial Development Framework, 2015; Nkangala District Municipality Rural Development Plan, 2017).

The conservation status illustration is shown in Figure 10.3-1 and Figure 10.3-2.

Upon the assessment of the area, the various wetland vegetation components were assessed and recorded. Dominant species were characterised as either wetland species or terrestrial species. Hydrophytic vegetation species were observed. Predominantly grass, rushes and sedge species were recorded. This unit was predominantly utilised to delineate the wetland (Pictorial View 2).

Pictorial View 2: Wetland Vegetation

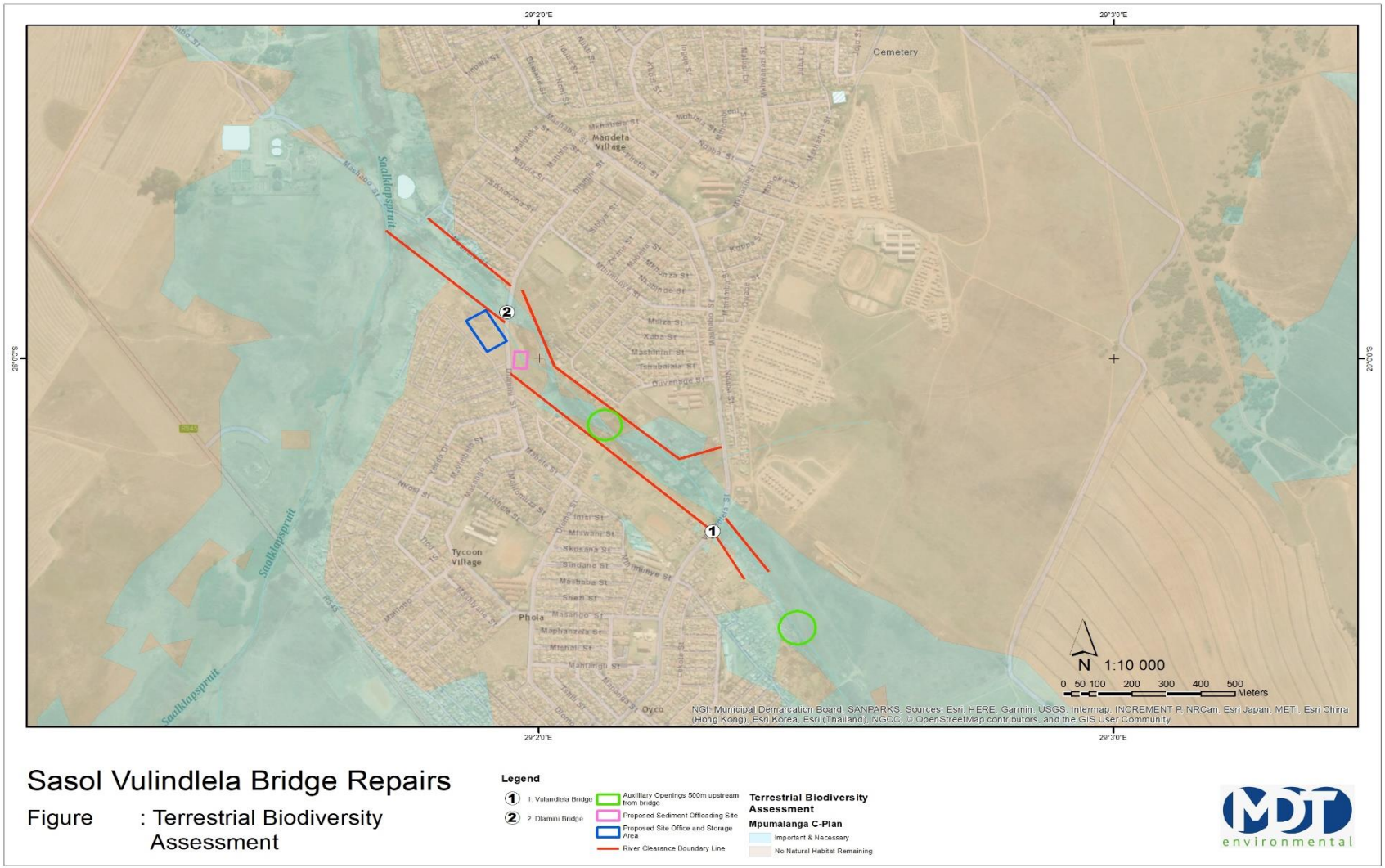

Figure 10.3-1: Conservation Status

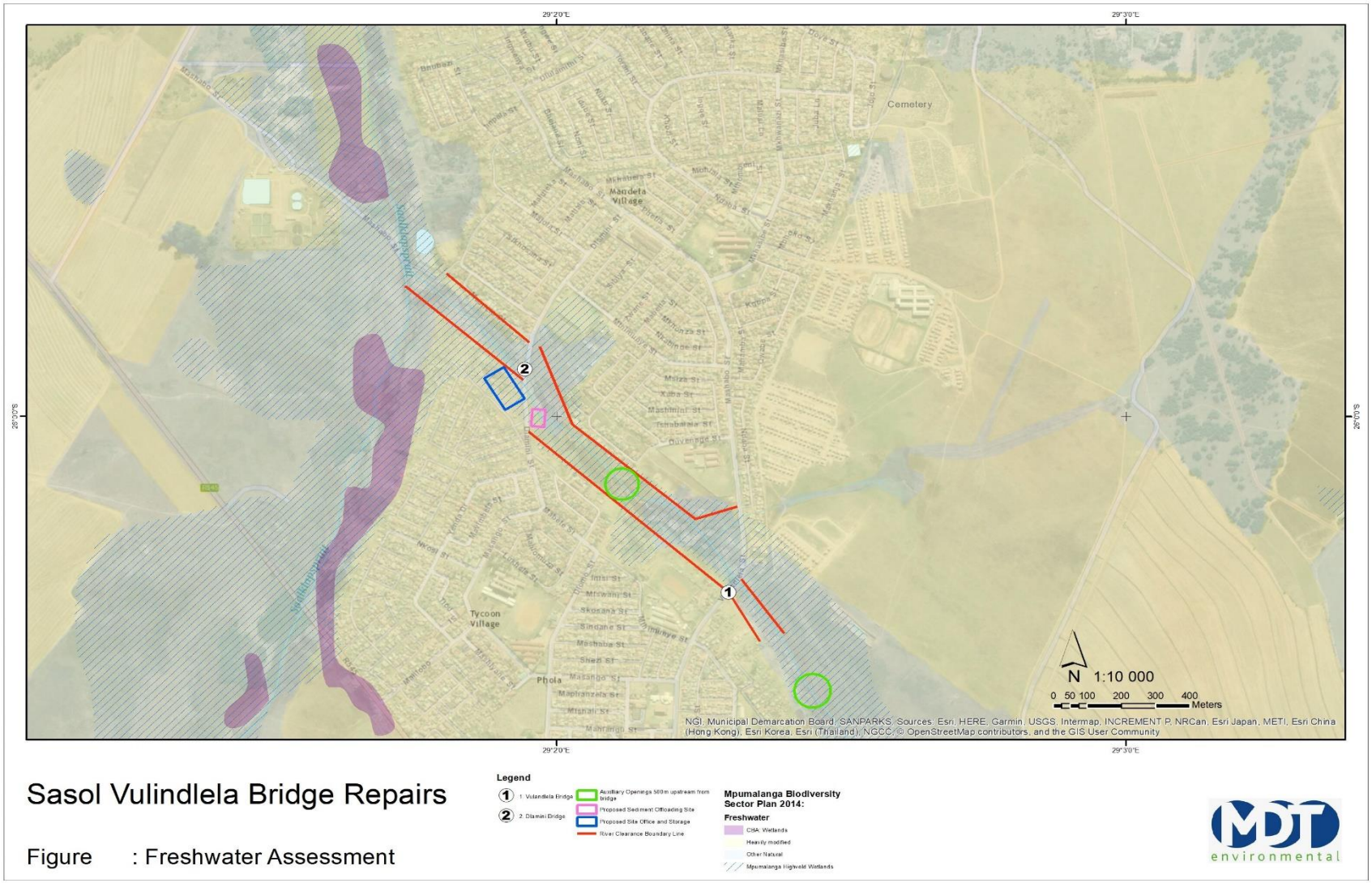

Figure 10.3-2: Freshwater Assessment

Wetland indicators species noted during the assessment are indicated in Table 10.3-1.

Table 10.3-1: Wetland Indicator Species noted During the Assessment

Riparian / Wetland Vegetation
Typha species
Paspalum species
Cyperus species
Juncus species
Andropogan species
Berkhaya radula

*Not all species are listed. Only most common ones

10.4 Socio-Economic Setting

The socio-economic overview of the Emalahleni Local Municipality has been compiled from the Emalahleni Local Municipality Integrated Development Plan (IDP) 2017- 2022, Emalahleni Spatial Development Framework (SDF) 2018, Nkangala District Municipality Integrated Development Plan (IDP) 2017-2022, Steve Tshwete Local Municipality Integrated Development Plan (IDP) 2017- 2022, Dr JS Moroka Local Municipality Integrated Development Plan (IDP) 2017- 2022, Thembisile Hani Local Municipality Integrated Development Plan (IDP) 2017- 2022, Victor Khanye Local Municipality Integrated Development Plan (IDP) 2017- 2022, Emakhazeni Local Municipality Integrated Development Plan (IDP) 2017- 2022. Documents from other surrounding Local Municipalities where used mainly for data comparison purposes since municipalities interact with each other. Also, data from Stats SA 2011 Census and Stats SA 2016 Community Survey Report and GIS maps for location, direction and distance purposes were consulted.

Nkangala District Municipality is the smallest, in land mass, of all the three District Municipalities in the Mpumalanga Province which also include Gert Sibande and Ehlanzeni. Nkangala District Municipality comprises of six local municipalities which are Emakhazeni, Steve Tshwete, Victor Khanye, Thembisile Hani, Dr JS Moroka and eMalahleni Local Municipality and Emalahleni Local Municipality (ELM) covers an area of approximately 2 677 km^2 constituting about 16% of the total 18 812km^2 of the Nkangala District Municipality. The local municipality is situated on the Western parts of the Nkangala District sitting on the Highveld region of Mpumalanga.

ELM shares a boarder with the Gauteng Province connected to the Province by N12 and N4 National transport corridors, (Spatial Development Framework, 2016). The hierarchy of roads consist of National (N4 and N12), Provincial (R555, R544, R545, R547, R104 and R580) and several local road networks. Also, the local municipality has an exceptional railway and road connection which include a

rail line that connects Gauteng and Maputo running parallel to the N4 as well as roads and rail connection to the South of the municipality connecting Emalahleni to Richards Bay and Maputo Harbour. There are also road and railway networks within ELM. Thus, it is evident that when it comes to transport connections, ELM provides significant logistical opportunities.

The Emalahleni Spatial Development Framework (2016) state that ELM comprises of 34 wards. The area around town, eMalahleni Town, formerly Witbank, is divided into small wards which are so close to each other and the reminder of the area comprise of larger wards. Vulindlela bridges are located within three wards which are ward 28, 30 and 31 all situated around the watercourse.

Of the residential areas and settlement within ELM, eMalahleni town is the largest considered one of the major urban concentrations in the Nkangala District Municipality, and other medium sized towns and settlements include Phola, Ogies, Ga Nala, Thubelihe and several mining settlements in the south-eastern parts of the municipal area including Balmoral, Coalville, Kendal, Kriel, Matla, Minnaar, Rietspruit, Van Dyks Drif, Duvha, Wilge, and several rural settlements. Emalahleni Spatial Development Framework (2016) divides ELM into functional sections namely Emalahleni West, Emalahleni East, Phola, Ogies, Thubelihle, Ga-Nala and Emalahleni Rural. ELM is considered as the most industrialised municipality in Nkangala probably due to the fact that the local municipality has the largest concentration of power stations in South Africa. Vulindlela Bridge repairs will take place in the Phola–Ogies area located about 35km south west of Emalahleni town.

Figures from a census conducted in 2011 shows that ELM had a total population of 395 466 and a community survey conducted in 2016 shows that the population was 455 228 indicating a 3.2% growth rate between 2011 and 2016 (Statistics, South Africa, 2016). The Emalahleni Local Municipality Integrated Development Plan 2017/2018-2021/2022 state that in 2016, ELM had the third largest population in the Province taking 31.5% of the total population in Nkangala and making it the most populated Local Municipality within the district. Table 10.5-1 summarises the population figures in comparison to other local municipalities found within Nkangala District Municipality.

Despite being the most populated local municipality in Nkangala District Municipality, ELM had a 3.2 percentage population increase, 2011 to 2016, placing the local municipality on the second highest in the District, behind Steve Tshwete, which had the highest increase of 4.4 %. Considering the current growth rate, it is projected that by 2030 ELM will have a total population of 707 530 and this is expected to put pressure on infrastructure development, service delivery and employment opportunities.

Table 10.4-1: Population Figures for Nkangala District Municipality and Local Municipalities that fall within the District Municipality Jurisdiction

Socio-economic Indicators	Nkangala District Municipality		Emalahleni Local Municipality		Steve Tshwete Local Municipality		Thembisile Hani Local Municipality		Victor Khanye Local Municipality		Emakhazeni Local Municipality		Dr JS Moroka Local Municipality	
	2011	2016	2011	2016	2011	2016	2011	2016	2011	2016	2011	2016	2011	2016
Total Population	1 307 948	1 445 624	395 466	455 228	229 831	278 749	310 458	333 331	75 452	84 151	47 216	48 149	249 705	246 016
Total Number of Households	404 000		150.420		86 713		75 634		24 276		14 633		62 162	
Average household size	3.5		3.0		3.2		4.1		-		-		4.0	
Annual population increase (%)			3.2		4.4		1.6		2.5		0.4		-0.3	

Source: Statistics South Africa: 2011 Population Census and 2016 Community Survey

High employment levels are an indication of a good economic environment in an area. The Emalahleni Integrated Development Plan 2017/2018-2021/2022 state that unemployment is still a challenge as is the case in many South African municipal areas. However, the local municipality has experienced a decrease in unemployment rates form 27.3% in 2011 to 23.2% in 2016 which is below the national unemployment rate of 26.6%. In Nkangala District Municipality, Emalahleni local municipality has the fourth highest unemployment rate with Dr JS Moroka Municipality having as high as 47.7% unemployment rate and Steve Tshwete with the least unemployment rate of 17.3%.

Table 10.4-2: Individual Income for Emalahleni Local Municipality

Income in Rands (R)	Percentage (%)	
	Male	Female
No income	42	58
1- 1 600	48.9	51.1
1 601 – 6 400	68	32
6 401 – 25 600	69.3	30.7
25 601 – 102 400	79.4	20.6
102 401 – 204 800	74.1	25.9
204 801 or more	74.9	25.1

Source: Modified from data supplied in Emalahleni local Municipality Integrated development Plan 2017/2018 – 2021/20.

Emalahleni Local Municipality (ELM) is facing a challenge of high unemployment rates among females and the youth which were at 29.8% and 36% in 2016 respectively. There is huge difference between males' and females' employment rates which were at 19.2% for males in 2016 against 29.8% previously mentioned for females. Thus, there is need for women empowerment by creating a conducive working environment for women as well as empowering them through skills transfer when the project will be undertaken as this might help to improve their chances of being employed in the long term.

High unemployment levels between men and women also affect the income characteristics of ELM. Table 10.8-2 shows the difference in income between males and females within ELM indicating skewed income percentage in favour of men with the percentage of women's income decreasing as the amount of income increases. Thus, this indicate that there is need for women employment and empowerment so as to improve their income base.

10.4.1 Phola Socio-economic Setting

The township, consists of:

a. Businesses
   - Engen garage
   - Retail stores

b. High density of small - medium businesses,
   - Hair salons
   - Tuckshops
   - Car washes

c. Social services;
    - Youth centre
    - Schools

d. Primary industries;
    - Mines
    - Farms

e. Banking services
    - Different ATM facilities

f. Waste management facilities;
    - Waste recycling centre
    - Landfill site

g. Power generation
    - Eskom Substation

Along the Vulindlela Street, many businesses are observed immediately after turning into the township. See Appendix 3 for the visual illustration of some of the service offerings. Within close proximity of the site, there is an Eskom Substation approximately 200 m east of the bridge. This substation serves to distribute electricity to local residents. There are powerlines, which run from the eastern to western side of the bridge. Siyathokoza Primary School is located approximately 300 m east of the bridge and this school was identified as a suitable venue for the meetings.

10.4.2 Heritage and Cultural

The District is associated with high levels of poverty, limited economic opportunities, poor access to primary services in rural parts and poor spatial planning. The land use activities within the area are in most cases conducted in an unsustainable manner with no proper plans in place to manage and guide development to further promote the livelihoods of the residents in the rural communities. As a result, these communities are left displaced, segregated, underdeveloped and impoverished; which further motivates for the socio-political issues which exist. The directly affected poor communities comprises of Tribal Authority Areas as a result of limited local economies, informal settlements which consist of high population densities and have a high reliant on the main centres for economic opportunities due to the lack of local economies and furthermore, farms and mining villages which is a result of the political instability, public documentation, access and high reliance on economic activities. The livelihood of the communities has forced residents to succumb to long distance commuting for

economic opportunities and access to services (Nkangala District Municipality Rural Development Plan, 2017).

The town of Emalahleni, previously named Witbank, was established in 1903 and was named after a ridge of white rock located near a present railway station. The municipality has a large collection of heritage resources, which is currently under threat as a result of the rapid development and a number of priority Cultural Heritage Sites were identified within the rural extents of the municipality, which is intended to receive attention in terms of the planned conservation planning (Nkangala District Municipality Rural Development Plan, 2017). Phola Township is a mining community with no key Heritage resources identified outside the graveyards within the Township. The identified graveyards are located over 5 km away from the Vulindlela Bridges, posing no threat to the sites of Heritage value.

For this specific project site, the HIA and PIA studies were conducted see Appendix D (Volume 5 of 5). The results of study are outlined below.

Archaeological and palaeontological resources

Section 35 (4) No person may, without a permit issued by the responsible heritage resources authority No archaeological and paleontological sites were recorded.

Cultural Landscapes, Intangible and Living Heritage.

Section 3 (3) of the National Heritage Resources Act, No. 25 of 1999 makes provisions of such places of spiritual significance to individuals

A place or object is to be considered part of the national estate if it has cultural significance or other special value because of—(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of a residential area. Visual impacts to scenic routes and sense of place are also considered to be low due to the previous developments in the area and the lack of significant sites.

Burial Grounds and Graves

Section 36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority

No burial grounds and graves were noted within the project site.

Public monuments and memorials

Section 37. Public monuments and memorials must, without the need to publish a notice to this effect, be protected in the same manner as places which are entered in a heritage register referred to in Section 30.

There are no public monuments and memorials in the study area

10.4.3 Land Use

The overall topography of the District is characterised as undulating landscape undulating landscapes, with the occurrence of revealed rocky outcrops along the Olifants and Wilge Rivers and the mountainous areas in the north-western part of the district. The rocky and mountainous outcrops stretch further in an east-west direction along the northern boundary of the district (Emalahleni Local Municipality Spatial Development Framework, 2015; Nkangala District Municipality Rural Development Plan, 2017).

10.5 Climate

The municipality is located on the Highveld plateau which is approximately 1 600 m above sea level and is characterised by an undulating landscape with slopes of less than 1:30 on average. This frequently causes drainage issues for development in the area, however, there are steeper slopes along the rivers in the area. Necessitates thorough stormwater management plans and efficient drainage systems, this further motivates for the proposed maintenance works on the Vulindlela Bridge (Emalahleni Local Municipality Spatial Development Framework, 2015).

The municipality has characterised by a typical Highveld climate, which consists of warm summers and cold winters. On average, the frost experienced is estimated to reach 30 days per year. The summer day-time temperatures are moderate, averaging on 24.5°C as a result of the height above sea level, whilst the winter day-time temperatures are low, averaging on 19.2°C (Figure 10.5-1). The average rainfall of the area ranges between 700 - 750 m per annum, with 65% of summer rainfall and most being in the form of thunderstorms (Emalahleni Local Municipality Spatial Development Framework, 2015; Nkangala District Municipality Rural Development Plan, 2017). The variation in annual temperature is around 11.2 °C for Ogies. (Climate-Data.org 2019. The temperatures are highest on average in January, at around 20.1 °C. June has the lowest average temperatures of the year reaching laws of 8.7°C.

Figure 10.5-1: Emalahleni Weather by Month / Weather Averages

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	20.1	19.6	18.3	15.3	11.9	8.7	8.7	11.4	14.9	17.6	18.6	19.6
Min. Temperature (°C)	13.6	13.2	11.5	7.8	3.4	-0.3	-0.4	2.1	6.2	10	11.8	13.1
Max. Temperature (°C)	26.6	26.1	25.2	22.9	20.4	17.8	17.8	20.7	23.7	25.3	25.4	26.2
Avg. Temperature (°F)	68.2	67.3	64.9	59.5	53.4	47.7	47.7	52.5	58.8	63.7	65.5	67.3
Min. Temperature (°F)	56.5	55.8	52.7	46.0	38.1	31.5	31.3	35.8	43.2	50.0	53.2	55.6
Max. Temperature (°F)	79.9	79.0	77.4	73.2	68.7	64.0	64.0	69.3	74.7	77.5	77.7	79.2
Precipitation / Rainfall (mm)	119	90	79	49	16	7	6	7	23	71	115	111

In winter, there is less rainfall than in summer. About 693 mm of precipitation falls annually (Climate Data.Org 2019).

The variation in the precipitation between the driest and wettest months is 113 mm -117 mm. During the year, the average temperatures vary by 11.4 °C. The wettest months being, November, December, January and February (Climate-Data,org 2019).

10.6 The Methodology Used in Determining and Ranking Impacts

An Impact Assessment Methodology for Assessing the Impact Significance of proposed activities is outlined below. The assessment of possible impacts during the project life cycle stages was done through the establishment of a standardised and internationally recognised methodology to assess

the significance of the potential environmental impacts of the proposed waste recovery and recycling activities. The significance of the impacts was determined through the following:

- For each impact, the SEVERITY (size or degree), DURATION (time scale) and EXTENT (spatial scale) are used to determine the CONSEQUENCE of the impact.
- The section below outlines the assessment methodologies utilised in the study.

SEVERITY		
How severe does the aspects impact on the resource quality (flow regime, water quality, geomorphology, biota, habitat)?		
Insignificant / non-harmful	1	
Small / potentially harmful	2	
Significant / slightly harmful	3	
Great / harmful	4	
Disastrous / extremely harmful or beneficial and/or wetland(s) involved	5	
Where or wetland(s) are involved it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.		
SPATIAL SCALE		
How big is the area that the aspect is impacting on?		
Area specific (at impact site)	1	
Whole site (entire surface right)	2	
Regional / neighbouring areas (downstream within quaternary catchment)	3	
National (impacting beyond secondary catchment or provinces)	4	
Global (impacting beyond SA boundary)	5	
DURATION		
How long does the aspect impact on the resource quality?		

One day to one month, PES, EIS and/or REC not impacted	1	
One month to one year, PES, EIS and/or REC impacted but no change in status	2	
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3	
Life of the activity, PES, EIS and/or REC permanently lowered	4	
More than life of the organisation/facility, PES and EIS scores, an E or F	5	
PES and EIS (sensitivity) must be considered.		
FREQUENCY OF THE ACTIVITY		
How often do you do the specific activity?		
Annually or less	1	
6-monthly	2	
Monthly	3	
Weekly	4	
Daily	5	
FREQUENCY OF THE INCIDENT/IMPACT		
How often does the activity impact on the resource quality?		
Almost never / almost impossible / >20%		1
Very seldom / highly unlikely / >40%		2
Infrequent / unlikely / seldom / >60%		3
Often / regularly / likely / possible / >80%		4
Daily / highly likely / definitely / >100%		5
Remote and difficult to observe		4
Covered		5
TABLE 8: RATING CLASSES		
RATING	**CLASS**	**MANAGEMENT DESCRIPTION**

1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
170 – 300	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.
A low risk class must be obtained for all activities to be considered for a GA		

CALCULATIONS

Consequence = Severity + Spatial Scale + Duration
Likelihood/Probability of occurrence = Frequency of Activity + Frequency of Incident
Significance\Risk = Consequence X Likelihood

INTERPRETATION OF THE STATUS OF THE IMPACT

IMPACT STATUS	CRITERIA
Positive	The impact benefits the environment
Negative	The impact results in a cost to the environment
Neutral	The impact has no effect on the environment

Once the significance of an impact has been determined, the CONFIDENCE in the assessment of the significance rating is ascertained using the rating systems outlined below.

DEFINITION OF CONFIDENCE RATINGS

CONFIDENCE RATINGS*	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact. Greater than 70% sure of impact prediction
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact. Between 35% and 70% sure of impact prediction.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact. Less than 35% sure of impact prediction.

* The level of confidence in the prediction is based on specialist knowledge of that particular field and the reliability of data used to make the prediction.

The degree to which the impact can be reversed is estimated using the rating system shown below.

DEFINITION OF REVERSIBILITY RATINGS

REVERSIBILITY RATINGS	CRITERIA
Irreversible	Where the impact is permanent.
Partially Reversible	Where the impact can be partially reversed.
Fully Reversible	Where the impact can be completely reversed.

The degree to which there will be a loss of resources, as shown below refers to the degree to which a resource is permanently affected by the activity, i.e. the degree to which a resource is irreplaceable.

DEFINITION OF LOSS OF RESOURCES

LOSS OF RESOURCES	CRITERIA

Low	Where the activity results in a loss of a particular resource but where the natural, cultural and social functions and processes are not affected.
Medium	Where the loss of a resource occurs, but natural, cultural and social functions and processes continue, albeit in a modified way.
High	Where the activity results in an irreplaceable loss of a resource.

Lastly, the degree to which the impact can be mitigated or enhanced is shown in Table 10.6-1.

Table 10.6-1: Degree to Which Impact can be Mitigated

DEGREE TO WHICH IMPACT CAN BE MITIGATED	CRITERIA
None	No change in impact after mitigation.
Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact.
Low	Where the significance rating drops by one level, after mitigation.
Medium	Where the significance rating drops by two to three levels, after mitigation.
High	Where the significance rating drops by more than three levels, after mitigation.

10.7 Positive and Negative Impacts that the Proposed Activity and Alternatives

The environmental impacts to be presented by the proposed project will be divided into the project cycle stages or phases. Each potential impact identified in Table 10.7-1, has been further classified into three categories: Direct, Indirect and Cumulative Impacts in Table 10.7-1 The severity/nature of the impact will indicate whether the impact presents a negative or positive outcome to the receiving environment.

10.7.1 Health and Safety Impacts

The potential environmental effects of river rehabilitation, (dredging) can come firstly as a result of the dredging process itself and secondly as a result of the disposal of the dredged material. Some of these health and environmental effects should be taken into consideration before, during and after the dredging process. The purpose of these considerations is to manage physiochemical changes in the component of the environment.

The impact associated with management of the sediments waste that will be excavated from the river bed has received consideration. The classification of the sediment material to be removed has been done and the results will be available before the dredging process has started. The disposal process

of this material will be considered based on the findings of the results. The sediment disposal area has been delineated as shown in Figure 1.1-1.

The classification results will indicate the waste disposal methodology. There are options to disposed of at a licenced land fil site or to avail it to the communities as extra building material.

10.7.2 Cumulative Impacts

The identified impacts and the proposed mitigation measures are summarized in Table10.7-2. Cumulative impacts are changes to the environment that are caused by an action in combination with other past, present and future human actions (DEAT,2004). There are however limitations in assessing the cumulative impacts such as inadequacy of available data on activities that have resulted in similar impacts or can cause similar impacts as those that have been identified to be potential impacts of this current development. The impact prediction methods that are used looked at known activities that are being undertaken in the project vicinity which could then cause a and the proposed mitigation and monitoring measures.

Table 10.7-1: Impacts and Mitigation Measures

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td colspan="7">PHASE: PRE-CONSTRUCTION (PLANNING AND DESIG) AND CONSTRUCTION</td></tr>
<tr>
<td>1. Receiving Environmental Authorisation Finalisation of drawings and
2. Construction plans Consolidation of safety files and other regulatory operational manuals</td>
<td>a. Project not approved or authorisation withdrawn</td>
<td>Direct</td>
<td>Submitted documents not meeting the approval criteria and properties applied on not clearly defined
No signed and submitted construction documents prior to the commencement of activities</td>
<td>Design and Planning</td>
<td>The impact of no environmental authorisation would mean the community would be negatively impacted by current flood impacts and the value of these assets, which are these bridge crossings would be lost.
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>5</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>2</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Low</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>High</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>14 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Low</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>● Ensure all Legislative and procedural requirements are met including specified timelines and protocols outlined within the BA Regulations before commencing with construction.
● Application for Environmental Authorisation has been submitted
● Communicate with relevant stakeholders on all project plans and progress.
● Ensure transparency with project scope and implementation.</td>
</tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td>3. Planning and design and site establishment

3.1 Planning and Design
3.1.1 Site Establishment
Demarcate areas & zones for construction phase
Site Infrastructure
➢ Set mobile office facility
➢ Install storage and ablution
➢ facilities
➢ Install waste disposal facilities (e.g. waste bins)
➢ Clearing of access points where necessary</td>
<td>Loss of vegetation
3.2.1-1 Site Assessment, Selection and Establishment
b. Site selection
c. Site Assessment
d. Site preparation – Clearing of vegetation
e. Stripping of topsoil
f. Levelling, grading and compaction
g. Excavation for perimeter fencing
h. Installation of fence around site
i. Material stockpiling
j. Construction of access roads and entrance</td>
<td>Direct.
Development of Drawings
• Site Layout plans
• Construction plans
• Consolidation of safety files and other regulatory operational manuals</td>
<td>Improper siting of site equipment</td>
<td>Site establishment</td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>4</td></tr>
<tr><td>Spatial scale and duration</td><td>1+2</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>High</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Low</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>35 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Low</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>

The impact on the will be low as the proposed site area is already transformed and cultivated. The soil has been trampled and there are informal household development encroaching the site area. Mitigation measures to be adhered to.
</td>
<td>• Careful consideration to reduce the footprint of the proposed activity not to increase impact to the environment.
• Poor design & planning could result in highly significant environmental impacts.
• Place infrastructure previously disturbed area and should be located at least 100m away from the watercourse.
• Natural vegetation maintained and re-generated through seedlings and transplanting</td>
</tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td>security gate and guardhouse
k. Servicing and maintenance of machinery and equipment</td><td></td><td></td><td></td><td></td><td>• Low noise machinery to be sourced.
• Notification of community representatives about site development plans.</td></tr>
<tr><td>4. Site Safety and Access:

4.1 Machinery and Equipment Delivery and stockpiling of construction material.
4.2 Safety and site management, environmental induction,
Source PPE safety equipment
4.3 Excavation for fence;
5.4 Install fencing and security gate;</td><td>(a) Damage to top soil;
(b) Siltation; Compaction of soil;
(c) Dust from offloading of construction of material;
(d) Theft of material & vandalization of site infrastructure</td><td>Direct /Cumulative</td><td>Site material safety personnel safety</td><td>Undertaking maintenance activities</td><td>The impact on the soil will be low as the proposed site area is already transformed and cultivated. The soil has been trampled and there are informal household development encroaching the site area. Mitigation measures to be adhered to.

<table><tr><td>Impact Status</td><td>Negative</td></tr><tr><td>Severity</td><td>3</td></tr><tr><td>Spatial scale and duration</td><td>1+2</td></tr><tr><td>Probability of occurrence</td><td>3</td></tr><tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr><tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr><tr><td>Cumulative impact prior to mitigation</td><td>18 (Low)</td></tr><tr><td>Significance rating prior to mitigation</td><td>Low</td></tr><tr><td>Cumulative impact after mitigation</td><td>Low</td></tr><tr><td>Significance rating after mitigation</td><td>Low</td></tr></table></td><td>• All areas for material stockpiling will be demarcated and kept secured at all times.
• Any suspicious movements around the site will be reported and investigated.
• Site safety protocols will be adhered to.
• Source PPE safety equipment
• Ensure adherence to speed limit of 30km/hr before</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>the entry to the site.
• Installation of speed humps to enforce speed limit to be considered.
• Safety monitors especially at the intersections will be placed to ensure safety of motorists and pedestrians.
• Educate staff about the impacts of off-road driving.</td></tr>
<tr><td>5. Recruitment of local site workers</td><td>(a) Improved economic and social status</td><td>Direct</td><td>Job creation</td><td>Design and Planning
Construction
Operational
Decommissioning and Rehabilitation</td><td>There will be creation of job opportunities during all the phases of the project. The impact will be positive and high for boosting the livelihood status of the households within the area and also local economic development for the local SMMEs.
<table><tr><td>Impact Status</td><td>Positive</td></tr><tr><td>Severity</td><td>3</td></tr><tr><td>Spatial scale and duration</td><td>1+2</td></tr><tr><td>Probability of occurrence</td><td>5</td></tr><tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr><tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Negligible</td></tr><tr><td>Cumulative impact prior to mitigation</td><td>High</td></tr><tr><td>Significance rating prior to mitigation</td><td>(30) Low</td></tr></table></td><td>• Local community personnel to be sourced/recruited for rehabilitation.
• Local site workers to undergo extensive safety and environmental induction training</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
					Cumulative impact after mitigation: Medium **Significance rating after mitigation**: Low	on environmental and wetland rehabilitation requirements including worker behaviour on site. • Ensure use of PPE at all times. • Odour management plan to be implemented. • Waste Management plan will be implemented. No waste will be stored for more than a day on site. • Noise Management plan will be implemented. Housekeeping rules to will be enforced. • Ensure that all illegal dumping sites on the vicinity of the site

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>and its surrounding areas are cleared before construction and rehabilitated to reduce further impacts.</td></tr>
<tr><td>6. Training of site workers: Skills development of employees in various skills such as finance, management, marketing, sales, stock etc.</td><td>(a) Improved skill levels
(b) Exposure to new vocational training and opportunities.</td><td>Direct</td><td>Human Skills Level & Empowerment</td><td>Planning & Design</td><td>The impact of the proposed project will entail the empowerment of local community workers due to the training programmes and skills development. The impact is rated high with a positive impact to the local community's empowerment and development. Engagement of local training SMMEs is encouraged as to increase local SMME development within the area.
<table>
<tr><td>Impact Status</td><td>Positive</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+5</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Low</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Negligible</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>45 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• Skill development in the local community will be promoted and encouraged.
• Provision of opportunities for exposure to other vocational areas will be encouraged.
• Empowerment of community through other educational programmes will be encouraged.
• Site specific awareness programmes will be encouraged and specific of</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						the sediment type and handling of the material will be addressed. • Provision of on-site accredited training will be encouraged.
	(c) General Social Impacts	Positive	Community as there will be improved risk factors related to safety risks, improved river flow patterns, improved health hazards.		Positive social impacts that will emanate from the project include: - • Both bridges pose safety concerns hence by rehabilitating the bridges, • There are health concerns such as water pollution emanating from sewage effluents and general waste being disposed into the watercourse. Once the bridges are repaired these health concerns will be addressed. • There are informal settlements taking place along the river, thus a change in river flowing patterns result in flooding and this will affect those in the informal the most due to the fact their structures might not withstand flooding. Hence, rehabilitating the bridges will reduce such risks. • The project will create jobs and this will result in an improved standard of living to the residents in the area and alleviation of poverty. • The bridge crossing will improve migration and increase in the demand of goods and services thus promoting growth of the available businesses and economic growth in the area.	• Adhere to engineers' construction methodology to ensure the rehabilitation is undertaken according to the design specification and construction standards.

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td><table>
<tr><td>Impact Status</td><td>Positive</td></tr>
<tr><td>Severity</td><td>5</td></tr>
<tr><td>Spatial scale and duration</td><td>1+5</td></tr>
<tr><td>Probability of occurrence</td><td>6</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>High</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Negligible</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>66 (Medium)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Low</td></tr>
<tr><td>Significance rating after mitigation</td><td>Medium</td></tr>
</table></td><td></td></tr>
<tr><td>7. Potential visual intrusion of construction/demolition on activities on the views of sensitive visual receptors</td><td>a. Visual impacts: Visual intrusion</td><td>Direct</td><td>Visibility of neighbouring communities and road users</td><td>Construction/Decommissioning and Rehabilitation</td><td>There is potential for visual intrusion due to the establishment of structures and infrastructure during construction and demolition during decommissioning, however this impact is considered low due to the existence of infrastructure on site therefore the site is not pristine area but has already been disturbed.<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>High</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>35 (ow)</td></tr>
</table></td><td>• Dust suppression methods will be implemented.
• Good housekeeping on site to avoid litter and minimise waste will be ensured.
• Litter and rubble will be timeously removed from the construction site and disposed at a</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
					Cumulative impact after mitigation Low **Significance rating after mitigation** Low	licenced waste disposal facility. • Additional mitigation measures could include: • Construct the boundary wall in a manner in keeping with the area. Solid fencing and vegetative screening can improve the visual appearance of the drop-off and can provide a buffer to noise and dust. • Plant trees to soften the effect of the wall and further screen the proposed structures (note: should there be sufficient Municipal/ project

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>budget for such planting).</td></tr>
<tr><td colspan="7">PHASE : OPERATIONAL ACTIVITIES
MAINTENANCE: CLEARANCE AND DESILTING RIVER BED</td></tr>
<tr><td>1. Removal of vegetation.</td><td>A Runoff from the cleared areas</td><td></td><td>Increase in turbidity of the surface water</td><td>Undertake maintenance activities - clearing and desilting river bed</td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>High</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>20 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• No additional or new access roads will be constructed
• Land clearing will be kept to the smallest possible footprint not larger than 300m^2 when working in Critical Biodiversity Areas
• The work area be clearly demarcated to prevent unauthorised entrance to areas outside the maintenance activity footprint</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td></td>
<td>Spillages of hydrocarbon materials from earth moving equipment</td>
<td></td>
<td>Deterioration of surface water quality</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Low</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>25 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
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Runoff due to land clearing will be managed
No additional access roads will be constructed
Land clearing will be kept to the smallest possible footprint, not larger than 300 m^2 when working in Critical Biodiversity Areas
Silt laden runoff from cleared areas will not be discharged directly into the Saalboom Spruit or any of its tributaries.
Soil erosion protection measures will be employed where necessary.

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</tr>
</table>

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<tr>
<td></td>
<td>Loss of riparian areas</td>
<td></td>
<td>Loss of riparian functioning</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Low</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>20 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
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No additional or new access roads will be constructed
Land clearing will be kept to the smallest possible footprint, not larger than 300 m^2 when working in Critical Biodiversity Areas
The work area be clearly demarcated to prevent unauthorised entrance to areas outside the maintenance activity footprint

</td>
</tr>
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<tr>
<td>2. Removal of topsoil</td>
<td>Increase in turbidity of the surface water</td>
<td></td>
<td>Runoff from the cleared areas</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>20 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
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<tr>
<td></td>
<td>Deterioration of surface water quality</td>
<td></td>
<td>Spillages of hydrocarbon materials from earth moving equipment</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>25 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
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<tr>
<td></td>
<td>Loss of riparian functioning</td>
<td></td>
<td>Loss of riparian areas</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>15</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
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No additional or new access roads will be constructed
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The work area be clearly demarcated to prevent unauthorised entrance to areas outside the maintenance activity footprint.

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<tr>
<td>3. Stockpiling of topsoil</td>
<td>Increase in turbidity of the surface water</td>
<td></td>
<td>Run-off from the topsoil stockpiles</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>20 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>

Place the topsoil with the rehabilitation of the area in mind, as close to the point of use as possible, but still outside the 1:100-year flood line or not closer than 100 m from the edge of the river bank.
Topsoil shall be placed in such a way as to minimise handling - no double handling
Stockpiles shall be shaped in such a way that it will not be higher than 2 m with slopes steeper than 45 degrees, be free draining and do not impound water

</td>
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</table>

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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>• Erosion control measures shall be implemented in all areas where concentrated storm water flow will occur</td></tr>
<tr><td></td><td>Deterioration of surface water quality</td><td></td><td>Spillages of hydrocarbon materials from earth moving equipment</td><td></td><td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>20 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td><td>• All earthmoving vehicles and equipment shall be on a preventative maintenance schedule to ensure that the equipment is in a good working order to prevent the leakages of oil and diesel
• An inspection programme shall be implemented to ensure that all the mechanical equipment is</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						inspected on a daily basis to ensure the optimal functioning of the equipment • No temporary or emergency vehicle maintenance areas will be established • Any oil and redundant parts will be removed for recycling oils and waste. • Refuelling of equipment shall occur in designated areas by trained people • Fuel will be dispensed in a fit for purpose bowser. This bowser will be removed from site at the end of each day.

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						• Spill kits shall be readily available to clean up spillages • Drivers and operators shall be trained to use spill kits and contain spillages to the smallest possible areas and the training records shall be made available on request • Contaminated soil shall be removed to a demarcated area e.g. soil hospital for rehabilitation and replaced where necessary once rehabilitated • No field maintenance of equipment shall be done • Drip trays shall be used when dispensing fuel or

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						oils from the earthmoving equipment outside any demarcated areas for any other reason • Drip trays shall be emptied into a dedicated container • The dedicated containers used to dispose the drip tray contents into, must be emptied into containers for removal by an approved contractor to be recycled • Waste manifests and safe disposal certificates must be filed as proof of safe disposal

<table>
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<tr>
<td>4. Dust suppression</td>
<td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td>
<td></td>
<td>Using contaminated water for dust suppression</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>2</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>16 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>

The Contractor is to take appropriate measures to minimise the generation of dust such as, the frequent spraying of roads during low rainfall periods or by using a chemical dust binding agent approved by the Engineer.
Dust must be controlled through the regular watering of active work areas.
A maximum speed of 20km/h must be enforced on site with the construction of speed bumps.
Fine materials (such as bedding material) must be

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</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						covered during transportation. • All trucks and vehicles removing spoil from the site must have their load areas covered by a tarpaulin to prevent rocks and spoil falling onto the road surfaces. • Disturbed areas no longer used for construction purposes shall be re-vegetated immediately when no longer required. • Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is

<table>
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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>about to take place.</td></tr>
<tr><td>5. Waste management</td><td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td><td></td><td>Disposal of construction rubble</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>18 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• No littering shall be allowed on and around the site
• Sufficient number of bins shall be provided for the disposal of waste
• Bins must be provided with lids in order to keep rain water out
• Waste shall be segregated into the different types (e.g. general and hazardous waste) to allow for reuse and recycling
• Waste shall be stored in demarcated areas according</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						to the type of waste • Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed • Runoff from any area demarcated for waste will be contained, treated and reused • Hazardous waste will be removed and managed by an approved service provider • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						at a registered facility • All waste management facilities will be maintained in good working order • Concrete shall only be mixed in a dedicated area, on impervious surfaces outside of the 1:50 year flood line and surplus concrete shall be dispose of responsibly at a registered general waste disposal site • Waste shall not be buried or burned on site

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<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td></td>
<td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td>
<td></td>
<td>Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc.</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>18</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>

General Waste will be disposed off at a designated waste site
No littering shall be allowed on and around the site
Sufficient number of bins shall be provided for the disposal of waste
Bins must be provided with lids in order to keep rain water out
Waste shall be segregated into the different types (e.g. general and hazardous waste) to allow for reuse and recycling
Waste shall be stored in demarcated areas according

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ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
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<tr>
<td>6. Providing sanitation during construction use of chemical toilets</td>
<td>Contamination of surface runoff</td>
<td></td>
<td>Lack of or poor sanitation</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>18 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
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<td>

Sufficient ablution facilities shall be provided to service the construction site
Ablution facilities shall not be placed within 100 m of the rivers or boreholes used for drinking water for human or animal consumption
Ablution facilities shall be serviced on a regular basis by an approved service provider to ensure, no spills or nauseous smells or vectors breading occurs

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<tr>
<td></td>
<td>Deterioration of water quality, increase in E. coli resulting in potential health effects</td>
<td></td>
<td>Poor housekeeping</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
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<tr><td>Significance rating prior to mitigation</td><td>18</td></tr>
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<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
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</td>
<td>

The area required for the contractors' camp/ laydown must be kept to the minimum
No construction camps shall be established
No washing of vehicles shall be allowed
Refuelling of vehicles will only be allowed in designated areas
All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is used for some time
Designated eating areas shall be provided for employees

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<tr><td></td><td>Deterioration of water quality, increase in E. coli resulting in potential health effects</td><td></td><td>Disposal of contents of chemical toilets</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>2</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>12 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>Contents of ablution facilities e.g. chemical toilets shall be disposed of to a licenced Waste Water Treatment Works (WWTW) and the necessary measures shall be taken to ensure that it will not impact on the operations of the WWTW</td></tr>
<tr><td></td><td></td><td></td><td>Maintenance – Operational Activities</td><td></td><td></td><td></td></tr>
<tr><td colspan="7">PHASE 3: OPERATIONAL ACTIVITIES
MAINTENANCE ACTIVITIES AT BRIDGE CROSSINGS, INCLUDING SILT, DEBRIS, AND TREE REMOVAL.</td></tr>
</table>

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<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td>1. Vegetation clearing to access river at bridges</td>
<td>Increase in turbidity of the surface water</td>
<td></td>
<td>Runoff from the cleared areas</td>
<td>Undertake maintenance activities at bridge crossings, including silt, debris and tree removal</td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Low</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>22 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
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Runoff due to land clearing will be managed
No additional access roads will be constructed
Land clearing will be kept to the smallest possible footprint not larger than 300 m^2, when working in a Critical Biodiversity Area.
Silt laden runoff from cleared areas will not be discharged directly into the Saalboom Spruit or any of its tributaries.
Soil erosion protection measures will be employed where necessary

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<tr><td rowspan="2"></td><td>Spillages of hydrocarbon materials from earth moving equipment</td><td></td><td>Deterioration of surface water quality</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>3+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>28 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>All vehicles will be inspected on a daily basis.
Drip trays will be used at all times.
Spill kits will be available onsite</td></tr>
<tr><td>Loss of riparian functioning</td><td></td><td>Loss of riparian areas</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>1+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>15 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>No additional or new access roads will be constructed
Land clearing will be kept to the smallest possible footprint not larger than 300m2 when working in a Critical Biodiversity Area
The work area be clearly demarcated to</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>prevent unauthorised entrance to areas outside the maintenance activity footprint</td></tr>
<tr><td>2. Silt excavation in riverbed at existing bridges</td><td>Deterioration of surface water quality</td><td></td><td>Spillages of hydrocarbon materials from earth moving equipment</td><td></td><td><table><tr><td>Impact Status</td><td>Negative</td></tr><tr><td>Severity</td><td>3</td></tr><tr><td>Spatial scale and duration</td><td>2+1</td></tr><tr><td>Probability of occurrence</td><td>3</td></tr><tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr><tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr><tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr><tr><td>Significance rating prior to mitigation</td><td>18 (Low)</td></tr><tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr><tr><td>Significance rating after mitigation</td><td>Low</td></tr></table></td><td>• All vehicles will be inspected on a daily basis.
• Drip trays will be used at all times.
• Spill kits will be available onsite.</td></tr>
<tr><td></td><td>Exposing river bed</td><td></td><td>Increase in turbidity of the surface water</td><td></td><td><table><tr><td>Impact Status</td><td>Negative</td></tr><tr><td>Severity</td><td>3</td></tr><tr><td>Spatial scale and duration</td><td>3+1</td></tr><tr><td>Probability of occurrence</td><td>3</td></tr><tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr><tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr><tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr><tr><td>Significance rating prior to mitigation</td><td>21 (Low)</td></tr><tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr><tr><td>Significance rating after mitigation</td><td>Low</td></tr></table></td><td>• Identified areas where erosion could occur must be appropriately protected by installing the necessary temporary and/or permanent drainage works as soon as</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						possible and by taking other appropriate measures to prevent water from being concentrated in the stream and from scouring slopes, banks or other areas. • Any erosion channels which develop during the construction period must be suitably backfilled, compacted and restored to a proper condition. • Where excavation takes place, the affected area should be properly stabilised and revegetated to minimise erosion risk.

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						• The original geometry, topography and geomorphology in both cross-sectional and longitudinal profile should be reinstated at above and below the bridge, except for the establishment of the silt trap. • All coffer dams, causeway and construction materials should be removed from the stream and riparian zone immediately after construction at the site is completed. • Disturbed areas of the riparian zone should be re-vegetated using either a specified seed

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>mix and / or appropriate indigenous trees where necessary and according to slope and risks in terms of bank erosion along the stream</td></tr>
<tr><td></td><td>Increased flow velocity</td><td></td><td>Impeding flow</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>5</td></tr>
<tr><td>Spatial scale and duration</td><td>3+1</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>32 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• Ensure that any coffer dams are constructed in such a manner that flow velocities does not cause erosion downstream of the activity.</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td></td>
<td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td>
<td></td>
<td>Stockpiling of excavated material</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>4</td></tr>
<tr><td>Spatial scale and duration</td><td>2+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>28 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>

All material removed shall only be stored temporarily, before removal to a licenced waste disposal facility.
All material removed shall only be stored temporarily, before removal to a licenced waste disposal facility.
Temporary storage of the material shall be outside the riparian area, in a dedicated and prepared area.
Any runoff from these stockpile areas will not be released into any river, stream or drainage line.

</td>
</tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td>3. Waste management</td>
<td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td>
<td>• The silt at the two bridges has been samples, analyzed and based on results the silt has been classified. The silt has been determined to be a Type 3 Waste.
• Therefore, based on the provisions for containment barriers contained in the National Norms and Standards for Disposal Waste to Landfill (published under Government Notice R636 in Government Gazette 36784 of 23 August</td>
<td>Temporary storage and disposal of excavated material</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>5</td></tr>
<tr><td>Spatial scale and duration</td><td>3+2</td></tr>
<tr><td>Probability of occurrence</td><td>5</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>50 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>• The sediment removed from the river bed has been analysed and classified according to the National Norms and Standards for Waste storage and disposal.
• Position sediment (excavated debris) as indicated on the approved layout plan.
• Any additional sediment storage area required by the contractor must be approved by the applicant. The following information is required for approval:
o The location, description of</td>
</tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
		2013), the specified barrier for Waste Type 3 Waste is a Class C Liner. Generally, all municipal waste disposal facilities would comply with this requirement. • The classification showed that there are no physical and aquatic hazards associated with the sediment. The sediment does have a carcinogenic hazard as well as specified target organ toxicity hazard. The main driver for the health hazards is the quartz at a				and access to proposed sites. o The quantity of material to be stored. o The type of material to be stored as sediment. o The proposed method of storing sediment. • Position sediment on the higher side of a disturbed area, and above a 1:20 year flood line wherever possible. • Ensure that all sediment is stored in such a way and in such a place that it will not cause the damming up of water, erosion gullies, or wash away itself.

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
		concentration of 93.2%. • The sediment contains microbial contaminants (Faecal Coliforms and E.coli). E. coli infection can lead to diarrhea, high blood pressure, kidney problems, heart disease and even haemolytic uremic syndrome. These results are important considerations during construction activities to ensure that the construction workers are protected from these hazards.				• Store sediment in low heaps, not exceeding 5m in height. • Do not store sediment in drainage lines. • No littering shall be allowed on and around the site • Sufficient number of bins shall be provided for the disposal of waste • Bins must be provided with lids in order to keep rain water out • Waste shall be segregated into the different types (e.g. general and hazardous waste) to allow for reuse and recycling • Waste shall be stored in demarcated areas according

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						to the type of waste • Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed • Runoff from any area demarcated for waste will be contained, treated and reused • Hazardous waste will be removed and managed by an approved service provider • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						at a registered facility • All waste management facilities will be maintained in good working order • Concrete shall only be mixed in a dedicated area, on impervious surfaces outside of the 1:50 year flood line and surplus concrete shall be dispose of responsibly at a registered general waste disposal site • Waste shall not be buried or burned on site

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr>
<td></td>
<td>Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc</td>
<td></td>
<td>Contamination of surface runoff resulting in the deterioration of water quality of the watercourse</td>
<td></td>
<td>
<table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>4</td></tr>
<tr><td>Spatial scale and duration</td><td>3+1</td></tr>
<tr><td>Probability of occurrence</td><td>4</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>32 (low</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table>
</td>
<td>

The sediment removed from the river bed has been analysed and classified according to the National Norms and Standards for Waste storage and disposal.
Position sediment (excavated debris) as indicated on the approved layout plan.
Any additional sediment storage area required by the contractor must be approved by the applicant. The following information is required for approval:
The location, description of and access to proposed sites.

</td>
</tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						• The quantity of material to be stored. • The type of material to be stored as sediment. • The proposed method of storing sediment. • Position sediment on the higher side of a disturbed area, and above a 1:20 year flood line wherever possible. • Ensure that all sediment is stored in such a way and in such a place that it will not cause the damming up of water, erosion gullies, or wash away itself. • Sediment will be dried up before being transported

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						to a designated landfill site • For health and safety, the area for temporal drying will have a warning signage of the nature of the material • As part of the environmental awareness sessions sediment handling will be addressed. • Store sediment in low heaps, not exceeding 5m in height. • Do not store sediment in drainage lines. • No littering shall be allowed on and around the site • Sufficient number of bins shall be provided for the disposal of waste

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						• Bins must be provided with lids in order to keep rainwater out • Waste shall be segregated into the different types (e.g. general and hazardous waste) to allow for reuse and recycling • Waste shall be stored in demarcated areas according to the type of waste • Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed • Runoff from any area demarcated for waste will be contained,

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						treated and reused • Hazardous waste will be removed and managed by an approved service provider • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste at a registered facility • All waste management facilities will be maintained in good working order • Concrete shall only be mixed in a dedicated area, on impervious surfaces outside of the 1:50 year flood line and surplus concrete

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>shall be dispose of responsibly at a registered general waste disposal site
• Waste shall not be buried or burned on site</td></tr>
<tr><td>4. Providing sanitation during construction use of chemical toilets</td><td>Contamination of surface runoff</td><td></td><td>Lack of or poor sanitation</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>4</td></tr>
<tr><td>Spatial scale and duration</td><td>3+2</td></tr>
<tr><td>Probability of occurrence</td><td>2</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Medium</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>18 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• Sufficient ablution facilities shall be provided to service the construction site
• Sufficient ablution facilities shall be provided to service the construction site
• Ablution facilities shall not be placed within 100 m of the rivers or boreholes used for drinking water for human or animal consumption</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>• Ablution facilities shall be serviced on a regular basis by an approved service provider to ensure, no spills or nauseous smells or vectors breading occurs</td></tr>
<tr><td></td><td>Deterioration of water quality, increase in E. coli resulting in potential health effects</td><td></td><td>Poor housekeeping</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>4</td></tr>
<tr><td>Spatial scale and duration</td><td>2+2</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>24 (Low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• Storage areas shall be established outside the 1:100-year flood lines
• No washing of vehicles shall be allowed
• Refuelling of vehicles will only be allowed in designated areas
• All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is</td></tr>
</table>

<table>
<tr><th>ACTIVITY</th><th>IMPACTS</th><th>TYPE OF IMPACT</th><th>ASPECTS</th><th>PHASE</th><th>SIGNIFICANCE RATING</th><th>MITIGATION MEASURES</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>used for some time
• Designated eating areas shall be provided for employees</td></tr>
<tr><td></td><td>Deterioration of water quality, increase in E. coli resulting in potential health effects</td><td></td><td>Disposal of contents of chemical toilets</td><td></td><td><table>
<tr><td>Impact Status</td><td>Negative</td></tr>
<tr><td>Severity</td><td>3</td></tr>
<tr><td>Spatial scale and duration</td><td>2+2</td></tr>
<tr><td>Probability of occurrence</td><td>3</td></tr>
<tr><td>Degree to which impact can be reversed</td><td>Medium</td></tr>
<tr><td>Degree to which impact may cause irreplaceable loss of resource</td><td>Low</td></tr>
<tr><td>Cumulative impact prior to mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating prior to mitigation</td><td>21 (low)</td></tr>
<tr><td>Cumulative impact after mitigation</td><td>Medium</td></tr>
<tr><td>Significance rating after mitigation</td><td>Low</td></tr>
</table></td><td>• Contents of ablution facilities e.g. chemical toilets shall be disposed of to a licenced Waste water Treatment Works (WWTW) and the necessary measures shall be taken to ensure that it will not impact on the operations of the WWTW</td></tr>
</table>

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
5. All construction activities • Removal of topsoil, vegetation and infrastructure establishment.	Impact on Heritage and Palaeontological Resources	Destruction and partial destruction as non-renewable heritage resources.	Vegetation clearance and topsoil removal	Construction	See Table A below for the detailed significance rating.	Archaeological and Heritage • Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered; ➢ Bone concentrations, either animal or human ➢ Ceramic fragments such as pottery shards either
6. Desilting activities	Impact on Heritage and Palaeontological Studies.	Destruction of Palaeontological and Heritage resource.	Desilting activities	Desilting	See Table B below for the detailed significance rating.	

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						historic or pre-contact ➢ Stone concentrations of any formal nature • The following recommendations are given, should any sub-surface remains of heritage sites be identified as indicated above: ➢ All operators of excavation equipment will be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered. ➢ All construction in the immediate vicinity (50m radius of the site will cease). ➢ The heritage practitioner will be informed as soon as possible. • Archaeological watching briefs at

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						regular intervals should will also be carried out to ensure that no possible archaeological resources are lost during the construction phase. Paleontological • If any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA will be notified. All development activities will be stopped, and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.

ACTIVITY	IMPACTS	TYPE OF IMPACT	ASPECTS	PHASE	SIGNIFICANCE RATING	MITIGATION MEASURES
						• A Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 will be signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

Table A: Assessment of Social Impacts during Construction Phase

Socio-economic impacts		Direction	Extent		Intensity		Duration		Consequence Rating	Probability	Significance
Town/General Public	Employment	+	Local	2	Medium	3	Medium	2	High	Definite	High
	Income	+	Local	2	Medium	3	Medium	2	High	Highly Probable	High
	Economic growth	+	Local	2	Medium	2	Medium	2	High	Highly Probable	High
Municipality	Rates	+	Local	2	High	3	Medium	2	High	Highly Probable	High
	Stress on water supply	-	Local	2	Medium	2	Medium	2	High	Definite	High
	Stress on electricity supply	-	Local	2	Medium	2	Medium	2	High	Definite	High

Urban Environment	Congestion and Traffic	-	Local	2	Low	1	Medium	2	Low	Highly Probable	Low
	Aesthetics of Site Location	-	Site	1	Low	1	Medium	2	Low	Highly Probable	Low

Table B: Assessment of Social Impacts during Operational Phase

Socio-economic impacts		Direction	Extent		Intensity	Duration		Consequence Rating	Probability	Significance	
Town/ General public	Employment	+	Local	2	Medium	Long	3	High	Highly Probable	High	
	Income	+	Local	2	High	Long	3	High	Highly Probable	High	
	Economic growth	+	Local	2	Medium	Long	3	High	Probable	High	
Municipality	Rates	+	Local	2	High	Long	3	High	Highly Probable	High	
	Operations	-	Local	2	Medium	Long	3	High	Probable	High	
	Stress on Water Supply	-	Local	2	High	Long	3	High	Definite	High	
	Stress on Electricity Supply	-	Local	2	Medium	Long	3	High	Definite	High	
Urban Environment	Road access	-	Local	2	Low	Long	3	6	Medium	Highly Probable	Medium
	Better road access	+	Local	2	Medium	Long	3	7	High	Probable	Medium
	Aesthetics of Site Location	+	Local	2	Low	Long	3	6	Medium	Highly Probable	Medium
Competing developments	Loss of income	-	Local	2	Medium	Medium	2	6	Medium	Highly Probable	Medium

10.8 Site Selection Matrix

The following parameters and environmental components are typically considered for the selection of the site for the proposed activity:

- Appropriate zoning
- Land ownership
- Topography
- Location
- Site Access
- Environmental status
- Proximity to the river
- Proximity to the KNP boundary fence
- Current land use
- Community Preference
- Technological
- Economical (capital and operating costs)
- Heritage

However, in this instance, there was no site selection done since the site was selected based on the need to address the risk posed by flooding which was being experienced at the sites.

10.9 A Concluding Statement Indicating the Preferred Alternatives, Including Preferred Location of the Activity

Typical protection structure 1 and 2 will be used. Appendix A1 indicated these typical erosion structures and the areas where they will be installed depending on the channel characteristics.

Proposed protection structure 3 will be used in scenarios whereby limited space due to close boundaries is considered and also shallow bedrocks. Shallow bedrock have been identified where river gradient reduces in stages. These sections are to be protected to prevent accumulation of fines

which will promote rise in the bed hence affection the flow pattern of the river. The concrete wall will be installed without a side slope. The toe will be below 1:20 year flood erosion level or to bedrock.

11 A FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS

11.1 Description of All Environmental Issues and Risks That Were Identified

A preliminary background research was done to obtain an overview of the project context from an environmental, legal, policy and administrative, as well as institutional context. The baseline environmental assessment studies of the receiving environment that are likely to be affected were conducted. Impacts were identified through use of collected data from the literature review of the municipality and its related documents such as the State of the Environment Report (SoER), IDP, SDF, communication with the municipality officials, consultation with the authorities from the Competent Authority offices, research of information from SANBI and Windeed and professional expertise. Once the impacts were identified, they were assessed for significance, using the criteria and methodology provided in Section 14. The first stage of impact assessment was identification of environmental activities, aspects and impacts. This was supported by the identification of receptors and resources, which allowed for an understanding of the impact pathway and an assessment of the sensitivity to change.

11.2 An Assessment of The Significance of Each Issues and Risk and an Indication of the Extent to Which the Issues and Risk Can be Avoided or Addressed by The Adoption of Mitigation Measures.

The significance of the impact was then assessed by rating each variable according to defined criteria. The purpose of the rating was to develop a clear understanding of influences and processes associated with each impact.

Impact management objectives were then determined from previous knowledge of the EAP whilst undertaking similar studies, input from project team, I&APs and stakeholders, existing documents and reports. The significance of the impact also determined the impact management objectives to be utilised e.g. whether the impact will require on-going monitoring or if mitigation measures could be implemented to reduce the impact within a specific period of time. Existing regulations, guidelines and standards with regards to the different activities/impacts to be undertaken were also utilized to determine impact management objectives.

Potential issues of concerns, gathered during engagement of stakeholders were assessed further by specialists, to identify the key aspects and the impacts resulting from those aspects. Stakeholders

were given an opportunity to raise any concerns they might have about the project as well as suggested solutions. In instances where it was clear that such an interactive and iterative process had been followed in the development of a preferred alternative, it was then appropriate to terminate the assessment of other alternatives, excluding the no-go alternative, that have been considered and assessed in such a process during the course of the assessment.

11.3 The Proposed Method of Assessing Duration Significance

The method of assessing the significance is provided under Section 10.6.

12 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The full description of the method used for the assessment of each identified potentially significant impact and risk has been discussed in detail in Section 11 above. The assessment of the significance rating is provided in Table 10.7.-2. There are no negative impacts with a significantly high rating. The negative impacts will be significantly improved when the river morphology is improved after the de-siltation and river cleaning activities. The project is intended to improve the river channel with the aim of improving its current state to a more functional state.

13 SUMMARY OF FINDINGS AND ENVIRONMENTAL IMPACTS AND IMPACT MANAGEMENT MEASURES

This Basic Assessment Process provides an indication of likely/potential environmental impacts based on subjective criteria, the public consultation process, and maps of the site and nature of the receiving environment. The construction impacts are directly interrelated with the project. It is therefore important that the applicant, ensure continual monitoring as a means to ensure environmental protection. It is also essential that the EMP and Operational Management Plan be updated in order to reflect actual impacts and the changing institutional and legal environment as appropriate.

This Environmental Impact Statement describes the project, the expected environmental conditions of the site, and assesses the likely effects of the proposed project on the environment. The Environmental Impact Statement also includes an assessment of likely cumulative effects of the project in combination with other past, present or reasonably foreseeable projects, as required. It describes the effects for normal conditions and as a result of accidents and malfunctions.

The development would reduce any potential risks associated with flooding within the area, seeing that it is flood prone as well. Amongst the benefits are, safer transportation routes for inhabitants as well as vehicles, assurance of possible invasive alien species clearance and reduced risk in potential sand sedimentation/erosion.

The proposed project would also add socio-economic benefits to the community through temporal job creation and support local economic development.

The identified potential environmental impacts and their mitigation measures are outlined in detail in Table 10.7-1 and Table 10.7-2 and also within the EMPr (attached as Appendix F). With the implementation of the mitigation measures suggested in the EMPr, the significance of impacts on site can be reduced to Low.

Concluded from the results presented in this document, the construction activities will impact on the wetland system but can be mitigated to satisfactory standards if all mitigatory actions are implemented with due care. It is key to preserve water quality and supply to the downstream aquatic resources. Hence the actioning of this remediation project.

The rehabilitation of the wetland is vital to recover the required ecological function. The wetland drivers must be enhanced as part of the rehabilitation of the affected areas. In respect of the bridge construction, it is important to ensure that the required erosion protection measures linked to the crossing sections be carefully designed and installed.

The project can be supported should all the mitigation measures be implemented and monitored against.

14 IMPACT MANAGEMENT MEASURE FROM SPECIALISTS REPORTS AND THE EMPR

14.1 Specialist Studies Reports

The aquatic resources assessment which entailed wetland delineation, diatom analysis as well as in situ water quality was undertaken.Table 14.1-1 provided the mitigation measures that were recommended for the identified impacts.

The Hydrogeomorphic wetland units were identified as indicated below.

- The Channelled Valley Bottom (VBR_CVB1) is located in the valley floor. The river drains toward the NW in Saalboom Spruit and it passes under the bridges.
- VBR_HSS1 is located in the North Eastern slope which is connected with the VBR_CVB1, and they both drain toward the West into VBR_CVB1, east of Bridge 1.
- VBR_HSS2 was found on the North Eastern slope NW of Bridge 1, and it drains toward the West into VBR_CVB1 and then into Saalboom Spruit.

14.1.1 Key Findings to the Wetland Assessment Report

The wetland system had a low overall PES (Present Ecological State). This indicates that the wetland had lost large proportions of its natural state and had been largely modified from previous activities. The largest modifications were caused by historical channelization upstream of the system as well as grazing and small-scale crop production. The construction of the Vulindlela bridges will therefore have minimal impact on the ecosystem processes.

The wetland attained a low Ecological Importance and Sensitivity (EIS) score. The biodiversity is low, with no red data list species. The system plays an intermediate role in monitoring, and in the quantity and quality of water flowing from major river streams. The system is moderately sensitive to flow and habitat modification and is considered of moderate ecological importance. The system drains into the Saalboom Spruit. The system is classified into Category C. The rehabilitation and maintenance of the system will mitigate the associated impacts and may potentially improve the sustainability of the system. The recommended ecological classification will be localized and at the transitional point leading into the re-establishment interface which begins at the base-level, extending to the outer edge and banks of the wetland system. The category classification will regress during the construction of the bridges, but regenerate over time as the resource quality characteristic associated with the project improves. Storm water management will be required particularly during the construction of the bridges.

All sites reflected poor conditions, with some level of pollution. Despite that, the original state of the water quality of the Channelled Valley Bottom passing through Bridge 1 and Bridge 2 and the associated upstream and downstream sampling points may be adequate to support ecosystems.

The construction activities will impact the wetland systems, however, these may be mitigated to a satisfactory state once the construction activity is complete. The preservation of the water quality and water supply is important for aquatic life downstream and should therefore be prioritized. The rehabilitation will recover ecological functioning. It is important to ensure that the required erosion protection measures are linked to the cross sections that are to be carefully designed and installed.

Table 14.1-1: Specialist Mitigation Measures

	IMPACTS			PROBABILITY	RANKING WITHOUT MITIGATION	IMPLEMENTATION OF MANAGEMENT MEASURES		RANKING WITH MITIGATION	DEGREE REVERSABILITY & LOSS OF RESOURCE	
	Type	Description	Nature	Probability (P)	Significance (A + B + C) X P	Mitigation and/or Management Measures	Mitigation Effectiveness	Significance	Loss of Resources	Reversibility
CONSTRUCTION PHASE										
Wetland	Direct	Water quality	Negative	*Definite*	*Medium*	Stock piling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration.	*Medium*	*Low-Medium*	*Substantial*	*Medium Degree*
	Indirect	Silt	Negative	*Highly Likely*	*Low-Medium*	Stock piling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration.	*Medium*	*Low*	*Partial*	*High Degree*
	Direct	Surface water run-off	Negative	*Highly Likely*	*Low-Medium*	Storm water management.	*Medium*	*Low*	*Partial*	*High Degree*
	Indirect	Contamination of water from hazardous substances	Negative	*Possible*	*Low*	Limited use of machinery in the wetland area. No servicing of vehicles and equipment on site.	*High*	*Low*	*Partial*	*High Degree*
	Direct	Disturbance of natural system	Negative	*Definite*	*Medium*	Stock piling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration.	*Medium*	*Low-Medium*	*Substantial*	*Medium Degree*
	Direct	Disturbance/pollution of sub-surface flow	Negative	*Highly Likely*	*Medium*	Stormwater management, dry season construction, coffer damming, filtration, sub-surface drains.	*High*	*Low-Medium*	*Partial*	*High Degree*
	Direct	Disturbance of aquatic ecological	Negative	*Highly Likely*	*Medium*	Stock piling outside the wetland area, stormwater management,	*High*	*Low-Medium*	*Partial*	*High Degree*

	IMPACTS			PROBABILITY	RANKING WITHOUT MITIGATION	IMPLEMENTATION OF MANAGEMENT MEASURES		RANKING WITH MITIGATION	DEGREE REVERSABILITY & LOSS OF RESOURCE	
	Type	Description	Nature	Probability (P)	Significance (A + B + C) X P	Mitigation and/or Management Measures	Mitigation Effectiveness	Significance	Loss of Resources	Reversibility
OPERATIONAL PHASE										
Wetland	Direct	Water quality	Positive	*Highly Likely*	*Medium*	Rehabilitation of construction impacted area, continuous monitoring.	*Medium*	*Medium*	*No Loss*	*Reversible*
	Indirect	Silt	Positive	*Definite*	*Medium*	Rehabilitation of construction impacted area, continuous monitoring and maintenance.	*Medium*	*Medium*	*No Loss*	*Reversible*
	Direct	Surface water run-off	Positive	*Highly Likely*	*Medium*	Rehabilitation of construction impacted area, continuous monitoring, storm water management.	*High*	*Medium*	*No Loss*	*Reversible*
	Indirect	Contamination of water from hazardous substances	Negative	*Possible*	*Low*	Rehabilitation of construction impacted area, continuous monitoring, storm water management.	*High*	*Low*	*Partial*	*High Degree*
	Direct	Disturbance of natural system	Negative	*Likely*	*Low*	Rehabilitation of construction impacted area, continuous monitoring.	*High*	*Low*	*Partial*	*High Degree*
	Direct	Disturbance/pollution of sub-surface flow	Negative	*Likely*	*Low*	Rehabilitation of construction impacted area, continuous monitoring and silt management.	*High*	*Low*	*Partial*	*High Degree*
	Direct	Disturbance of aquatic ecological systems	Negative	*Highly Likely*	*Low-Medium*	Rehabilitation of construction impacted area, continuous monitoring and silt management.	*High*	*Low*	*Partial*	*High Degree*

14.2 Waste Classification

Waste classification studies are underway. Siyandiza Consulting Engineers (Pty) Ltd was requested to classify the waste (three composite samples) that has to be disposed off, forthcoming from the desilting activities upstream and downstream of the Vulindlela Bridge crossings. The silt has to be analysed and classified to determine its end disposal/treatment. Section 4 of the waste classification regulation state that all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 (except if the waste is listed as general waste in Annexure 1 of the regulations).

Siyandiza Consulting Engineers (Pty) Ltd will analyse and classify three composite waste samples as requested in accordance with the Waste Classification and Management Regulation 36784, Articles 634 and 635, promulgated under the National Environmental Management: Waste Act, 2008 (NEMWA) to determine the disposal/landfill that is to be applied.

Siyandiza Consulting Engineers (Pty) Ltd will recommend the appropriate method of disposal and the type of facility to be used for the disposal of waste. This recommendation will be done in accordance with the National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN 635 of 23 August 2013).

15 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The full EMPr is attached as Appendix F.

16 ASPECTS WHICH WERE CONDITIONAL TO THE FINDING OF THE ASSESSMENT

17 A DESCRIPTION OF ANY ASSUMPTION, UNCERTAINTIES, GAPS IN KNOWLEDGE, WHICH RELATE TO THE ASSESSMENT AND MITIGATION MEASURES PROPOSED.

The Aquatic resources assessment study was limited to a snapshot view during one site assessment. The field investigation was undertaken on 19 February 2019 to assess and confirm the delineated Wetland zones present on the survey area. Weather conditions during the survey were favourable for recordings. The delineations were recorded by hand held GPS. It must be noted that, during the process of converting spatial data to final output drawings, several steps are followed that may affect the accuracy of areas delineated. Due care has been taken to preserve accuracy. Printing or other forms of reproduction may also distort the scale indicated in maps.

It is therefore suggested that the wetland areas identified in this report be pegged in the field in

collaboration with the surveyor for precise boundaries. A total assessment of all probable scenarios or circumstances that may exist on the study site was not undertaken. No assumptions should be made unless opinions are specifically indicated and provided.

Data presented in this document may not elucidate all possible conditions that may exist given the limited nature of the enquiry. It is unlikely that more surveys would alter the outcome of the aquatic study.

18 A REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED – RECOMMENDATION FROM EAP

It is the opinion of the EAP that any potential negative impacts associated with the proposed rehabilitation project can be mitigated through proper planning and execution in order to prevent any possible environmental damage. In fact, this project is based on the improvement of the site itself and surrounding areas which are inhabited by people, fauna and flora, and grazing animals. The extent to the quality of the sand sediments shall be sampled to ensure potential use of healthy sand by the locals. Further consideration of the 15 flood prone areas surrounding the site plays an integral role in the conduction of the development. In turn, this too plays a mitigating part in the combat/prevention of soil erosion. Therefore, the EAP highly recommend this project, not only for its socio-economic gains, but for the environmental protection too.

19 WHERE THE PROPOSED ACTIVITY DOES NOT INCLUDE OPERATIONAL ASPECTS, THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED, THE DATE ON WHICH THE ACTIVITY WILL BE CONCLUDED, AND THE POST CONSTRUCTION MONITORING REQUIREMENTS FINALISED

19.1 The Project

The project will include operational aspects and the Emalahleni Local Municipality will conduct regular maintenance according plan they will develop for this project. The project implementation schedule is included as Table 19.1-1. The construction period will be for six months.

Table 19.1-1: The Project Implementation

Insert A3 print out

20 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP AND APPLICANT

20.1 An Undertaking Under Oath or Affirmation by the EAP

Declaration

The Independent Environmental Assessment Practitioner

I, Babalwa Fatyi of Myezo Environmental Management Services declare under oath that I –

- Act as the independent environmental assessment practitioner in this application;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2006;
- Have and will not have no vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;
- Will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- Will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- Will keep a register of all interested and affected parties that participated in a public participation process; and
- Will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Myezo Environmental Management Services (Pty) Ltd

Name of company:

Date:

Signature of the Commissioner of Oaths:

Date:

Designation:

20.2 An Undertaking Under Oath or Affirmation by the Applicant

The Applicant

Signature of Applicant

Name of company:

City of Mbombela Local Municipality

Date:

Signature of the Commissioner of Oaths:

Date:

Designation:

Continuation

21 WHERE APPLICABLE, DETAILS OF ANY FINANCIAL PROVISION FOR THE REHABILITATION, CLOSURE, AND ONGOING POST DECOMMISSIONING MANAGEMENT OF NEGATIVE ENVIRONMENTAL IMPACTS

At this stage, the proposed activity is not operational and there is currently no financial provision provided for its rehabilitation as the facility still to be constructed (dependent on the outcome of the environmental authorisation) is envisaged to be operational for a long-term. Financial quantum for the construction of the phase and is covered under operational costs for the project.

22 ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY

N/A

23 ANY OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4)(A) AND (B) OF THE ACT

N/A

24 REFERENCES

Climate-Data.Org 2019, Climate Ogies, viewed 19 May 2019, <https://en.climate-data.org/africa/south-africa/mpumalanga/emalahleni-641/#temperature-graph>.

Climate-Data.Org 2019, Climate Emalahleni, viewed 19 May 2019, <https://en.climate-data.org/africa/south-africa/mpumalanga/emalahleni-641/#temperature-graph>.

Koch, F.G.L. & Schoeman, J.L.,1989. Climate data. In: Land types of the map 2530 Barberton. Mem. Agri. Nat. Res. S. Afr. No 13. Dept. Agric & Water Supply, Pretoria.

MacVicar, C.N., de Villiers, J.M., Loxton, R.F, Verster, E., Lambrechts, J.J.N., Merryweather, F.R., le Roux, J., Van Rooyen, T.H. & Harmse, H.J. Von M., 1977. Soil classification. A binomial system for South Africa. ARC-Institute for Soil, Climate & Water, Pretoria.

Schoeman, J.L., Turner, D.P. & Fitzpatrick, R.W., 1984.Land type map 2530 Barberton. Agricultural Research Council, Pretoria.

Vegetation Map of South Africa, Lesotho and Swaziland, Sanbi

Emalahleni Local Municipality Spatial Development Framework. 2015. Available from: https://emalahleni.gov.za/online2/index.php/documents/file/552-emalahleni-sdf-final-29-may-2015. Accessed on: 20 May 2019.

Nkangala District Municipality Rural Development Plan. 2017. Available from: www.ruraldevelopment.gov.za/.../nkangala_dm_rdp.pdf. Accessed on 16 May 2019.

DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

25 APPENDICES

Appendix 3.1-1: Surveyor General 21 Digit Codes

Appendix A: Site Plan – Layout Plan

Appendix A1: Proposed Site Layout Plan

Appendix A2: Alternative Site Layout Plan

Appendix B: Photographs (Pictorial View 1 Images)

Appendix C: Facility Illustration(s)

Appendix D: Specialist Reports – see Volume 3 of 5, Volume of 4 of 5 and Volume 5 of 5

Appendix E: Comments and Response Report

Appendix F: EMPr – see Volume 2 of 4

Appendix G: Other Information

Appendix G1: Declaration by EAP

Appendix G2: CV for EAP

Appendix G3: Declaration by Applicant

Appendix G4: CV for Applicant Representative:

Appendix H (Appendix 9): Public Participation Process Appendices

Appendix 9.2-1: Interested and Affected Parties Register

Appendix 9.2-2: Background Information Document

Appendix 9.2-3: Meeting Agenda's

Appendix 9.2-4: Meeting Outcomes

Appendix 9.2-5: Meeting Presentations

Appendix 9.2-6: Notification Letter

Appendix 9.2-7: Newspaper Advert

Appendix 9.2-8: Site Notice

Appendix 9.2-9: Written Issues and Comments

Appendix H7: Public Revision of the Draft BAR (Public Review Comments)

Appendix H8: Final Consultation BAR

Appendix I: Any other additional relevant information

Appendix 3.1-1: Surveyor General 21 Digit Codes

Appendix A: Site Plan – Layout Plan

Appendix A1: Proposed Site Layout Plan

Appendix A2: Alternative Site Layout Plan

The proposed Vulindlela Bridge Repairs does not contain any site alternative as the planned maintenance works and repairs are based on the existing structures.

Appendix B: Photographs

Appendix C: Facility Illustration(s)

Appendix D: Specialist Reports

Appendix E: Comments and Response Report

Appendix F: EMPr

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Appendix 9.2.9: Written Issues and Comments

Appendix 9.2-10: Record of Notification of the BAR

Appendix H7: Public Revision of the Draft BAR

Appendix H8: Final Consultation BAR

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