APPENDIX E6

NOTIFICATION OF WARD COUNCILLORS AND LAND OWNERS

BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA (DEA REF: 14/12/16/3/3/1/639) Registered Mail List:

Nicolaas Johannes Grobler
PO Box 173,
Bethal,
2310
Mpumalanga

REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za
RD 392 400 963 ZA
CUSTOMER COPY 301028R

Hendrik Christiaan Johan Joubert
PO Box 145,
Bethal
2310
Mpumalanga

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RD 392 400 985 ZA
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Reveck Hariram
PO Box 1820
Secunda
2302
Mpumalanga

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RD 392 400 994 ZA
CUSTOMER COPY 301028R

Alex Present
PO Box 2258,
Embalenhle
2285
Mpumalanga

REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za
RD 392 401 500 ZA
CUSTOMER COPY 301028R

Len Roodtman
Private Bag X1012
Evander
2280
Mpumalanga

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RD 392 401 120 ZA
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Geyser Marinda
PO Box 28,
Secunda
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Mpumalanga

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ITEM IDENTIFIER LISTING

Date: 11-JUL-12 Time: 13:24

Item Identifiers

RD392401500ZA
RD392401120ZA
RD392400977ZA
RD392400994ZA
RD392400963ZA
RD392400985ZA

MONUMENTPARK
2012 -07- 11
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BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA (DEA REF: 14/12/16/3/3/1/639) Registered Mail List:

Sibongile Zikalala
Director Environment and Tourism
Private Bag X1017
Secunda
2302
Mpumalanga

REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za
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Joseph Mtsweni
Bethal: Ward 15 Councillor
Private Bag X1017
Secunda
2302
Mpumalanga

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RD 392 401 204 ZA
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Johannes van baalen
Bethal: Ward 28 Councillor
Private Bag X1017
Secunda
2302
Mpumalanga

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Edwin and Trevor Friedman
Edmar Farms CC
PO Box 64188
Highlands North
Gauteng
2037

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Edwin and Trevor Friedman
Edmar Farms CC
PO Box 156
Bethal
Mpumalanga
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CUSTOMER COPY 301028R

Joseph Basil Kourie
PO Box 20
Bethal
Mpumalanga
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Mike Vertue
Anglo American Inyosi Coal (Pty) Ltd
Private Bag X9
Leraatsfontein
Witbank
Mpumalanga
1035

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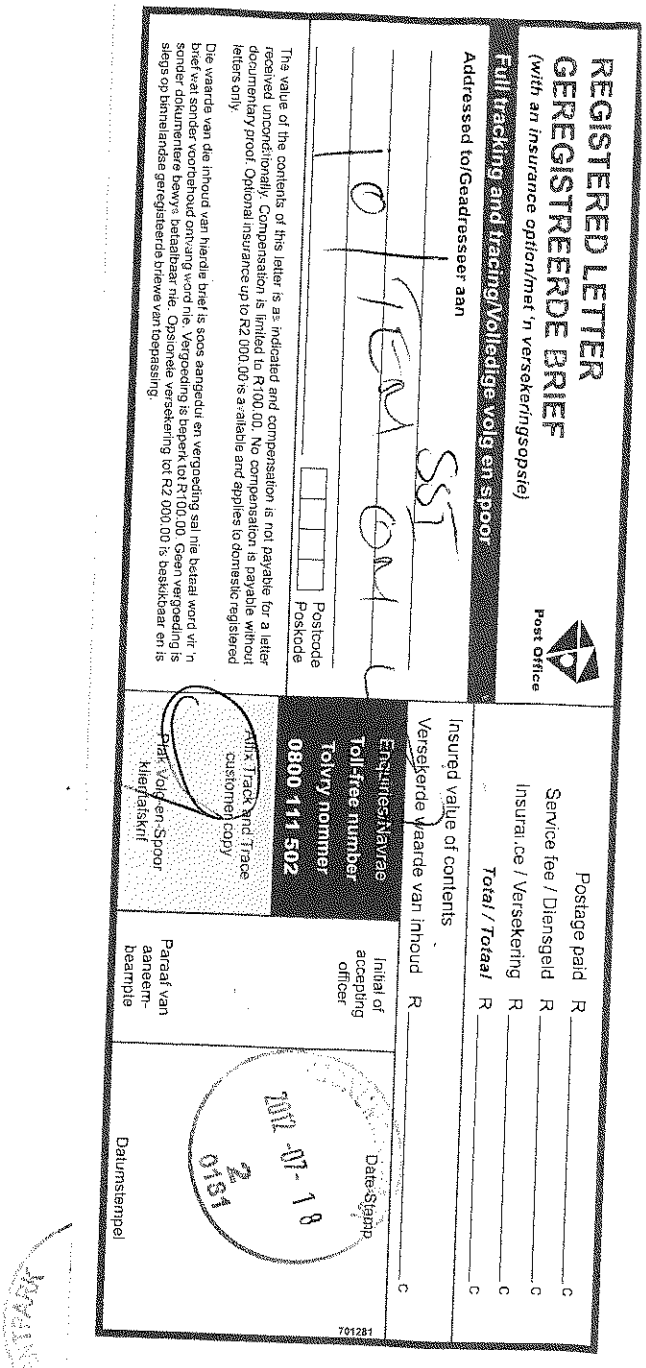
Alexander Adams
SudorCoal (Pty) Ltd
Suite P152

REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za
RD 392 401 218 ZA
CUSTOMER COPY 301028R



Postnet X7260
Witbank
Mpumalanga
1035

BETHAL WARD COUNCILLORS
GOVAN MBEKI LOCAL MUNICIPALITY
PRIVATE BAG X1017
SECUNDA
MPUMALANGA
2302

REGISTERED LETTER
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RD 392 401 460 ZA
CUSTOMER COPY 301028R

Mmela F. MAHLANGU
MUNICIPAL MANAGER
PRIVATE BAG X1017
SECUNDA
MPUMALANGA
2302

REGISTERED LETTER
(with a domestic insurance option)
SharecallO860 111 502 www.sapo.co.za
RD 392 401 473 ZA
CUSTOMER COPY 301028R

2012 -07- 18

SSI Engineers and Environmental Consultants (Pty) Ltd
Reg No. 1966/001916/07

T: 012 367 5916 / F: 012 367 5878
Email: phyllisk@ssi.co.za

A DHV COMPANY

Linking **People**
Promoting **Growth**

Facsimile Transmission

This transmission consists of 8 page(s) including this cover sheet. If you do not receive all the pages, please call us immediately to resend.

Date: 11 July 2012

Company: Bethal Ward Councillors

Attention: Municipal Officials

Fax: 017 647 5232

From: Phyllis Kalele **Our Ref:** E02.JNB.001228

RE: BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA (DEA REF: 14/12/16/3/3/1/639)

Dear Bethal Ward Councillors,

Please find the enclosed notice of Public Participation.

Joseph Mtsweni	Bethal: Ward 15
Johannes van Baalen	Bethal: Ward 28
Bethal Ward Councillors	

Kind regards,

SSI Environmental

TX RESULT REPORT

N... :SSI
TEL :0123675878
DATE :JUL.11.2012 07:58

SESSION	FUNCTION	NO.	DESTINATION STATION	DATE	TIME	PAGE	DURATION	MODE	RESULT
4989	TX	001	00176475232	JUL.11	07:56	008	00h02min44s	ECM -33.6	OK

SSI Engineers and Environmental Consultants (Pty) Ltd
Reg No. 1966/001916/07

T: 012 367 5916 / F: 012 367 5878
Email: phyllisk@ssi.co.za

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Dear Bethal Ward Councillors,

Please find the enclosed notice of Public Participation.

Joseph Mtsweni	Bethal: Ward 15
Johannes van Baalen	Bethal: Ward 28
Bethal Ward Councillors	

Kind regards,

SSI Environmental

SSI
A DHV COMPANY

Linking **People**
Promoting **Growth**

TRANSPORT
WATER
ENERGY AND RESOURCES
BUILDINGS AND STRUCTURES
ENVIRONMENTAL
PROJECT AND CONSTRUCTION MANAGEMENT

Botswana
Mozambique
Zimbabwe
South Africa

10 July 2012

Dear Interested and Affected Party (I&AP),

BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA (DEA REF: 14/12/16/3/3/1/639)

Notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended and the Environmental Impact Regulations (2010) that Eskom SOC Holdings Ltd ("Eskom") has submitted an application for Environmental Authorisation to the Department of Environmental Affairs (DEA).

Eskom proposes the upgrade of bridges 1 and 3 by:

a) Constructing temporary deviations for bridges 1 and 3 crossing in order to allow full width travelway and prevent disruption of traffic flow along the D622.
b) Demolishing the existing bridges 1 and 3 and constructing new, wider and raised concrete bridges.
c) Upgrading the roads at the bridge section from the single 6 m wide lane to 12.4 m wide within the existing 25 m wide road reserve.

The key objectives of the project are to:

- Ensure the safety of all road users by constructing structurally sound bridges.
- Ensure compliance with the road design standards of the Mpumalanga Department of Public Works, Roads and Transport (MPWRT) because being a strategic road the proposed bridges are designed for a 1:50 year flood event instead of the 1:20 year flood event.
- Upgrade bridges 1 and 3, and consequently complete the two missing sections (at the bridge points) of the road D622. The D622 road is strategic to Eskom as it ensures that coal from the Halfgewonnen Colliery belonging to Sudor Coal (which is situated along this road) is supplied to the Eskom power stations.

Eskom currently holds a Water Use License (WUL No. 27/2/1/B111/102/3) which was granted by the Department of Water Affairs (DWA) in 2010. Presently, the applicant is in the process of consultation with the DWA for the amendment of the WUL in order to cater for the new bridge designs.

Consequently, Eskom intends to undertake a BA study and submit a BA report to DEA in support of the proposed project. A WUL amendment application will be submitted to DWA as well.

WHO SHOULD YOU CONTACT?

SSI Environmental is the appointed independent Environmental Assessment Practitioner (EAP), to undertake the required Basic Assessment, Water Use License amendment and Public Participation process for the project. To register as an Interested and Affected Party (I&AP) and to obtain details about the project, please submit your name, contact information and interest in the project to:

Phyllis Kalele
SSI Environmental
Tel: 012 367 5800
Fax: 012 367 5878
Email: phyllisk@ssi.co.za

PO Box 25302
Monument Park, 0105
Pretoria

BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA

DEA REF NO: 14/12/16/3/3/1/539

BACKGROUND INFORMATION DOCUMENT

JULY 2012

1. WHAT DOES THIS DOCUMENT TELL YOU?

This document aims to provide you, as an Interested and/or Affected Party (I&AP), with background information regarding the application for environmental authorisation for the proposed upgrade of bridges 1 and 3 along the D622 road, in the Govan Mbeki Local Municipality and the Gert Sibande District Municipality in Mpumalanga, as well as the required environmental studies to be undertaken.

It further indicates how you can become involved in the project, receive information, or raise issues which may concern and/or interest you. The sharing of information forms the basis of the public participation process and offers you the opportunity to become actively involved in the project from the outset. Input from I&APs ensures that all potential environmental issues are considered within the study.

2. AIM OF THE PROJECT

The key objectives of the project are:

- Ensuring the safety of all road users by constructing structurally sound bridges.
- Ensuring compliance with the road design standards of the Mpumalanga Department of Public Works, Roads and Transport (MPWRT) because being a strategic road the bridges are designed for a 1:50 year flood event instead of 1:20 year flood event.
- Upgrade bridges 1 and 3, and consequently complete the two missing sections (at the bridge points) of the road D622. The D622 road is strategic to Eskom as it ensures that coal from the Halfgewonnen Colliery belonging to Sudor Coal (which is situated along this road) is supplied to the Eskom power stations.

In order for the project to commence, Environmental Authorisation (EA) must be obtained in terms of the National Environmental Management Act (No 107 of 1998) as amended and the Environmental Impact Regulations (EIA) 2010.

3. PROJECT DESCRIPTION

3.1 Background

South Africa's fast growing economy and ever increasing demand for electricity has necessitated the construction of new power stations such as Kusile and Medupi, the return to service of mothballed power stations e.g. Camden, Grootvlei, Komati, and the operation of existing power stations beyond their intended lifespan at higher load factors. The extension of the lives of Eskom's coal-fired stations is in most cases beyond the contracted duration of the tied collieries whose contracts commence expiring as early as 2013. In many cases coal reserves have not yet been dedicated to meet the extended life spans of power stations. In light of this situation, Eskom SOC Holdings (hereafter referred to as Eskom) has commenced investing in various long-term infrastructure projects, which includes the Coal Haulage Road Repair Programme. The Coal Haulage Road Repair Programme project resulted from the drastically increased coal tonnages hauled in Mpumalanga on roads which have now been identified as the Mpumalanga Coal Haulage Road Network (MCHRN).

The increased coal tonnages transported on the MCHRN has detrimentally impacted the condition of the roads and the consequent safety of all road users. In order to address the situation, Eskom, South African National Roads Agency Limited (SANRAL) and the MPWRT developed a Roads Prioritisation Model that focuses on rehabilitation initiatives to improve and maintain the conditions of the MCHRN. Road D622 (classified as a Class 3 road) forms part of the MCHRN and carries an average of 493 vehicles (this includes the 420 coal trucks carting 12 000 tonnes per day) resulting in design loading of 6.53 million E80's over the 20 year design period, and falls within the jurisdiction of MPWRT.

3.2 Location of the bridge

The bridges 1 and 3 proposed to be upgraded are located in Bethal, which is within the Govan Mbeki Local Municipality and the Gert Sibande District Municipality in Mpumalanga.

Table 1: Location of Bridges

Bridge	Farm	Portions	Coordinates
Bridge 1	Halfgewonnen 190 IS	0, 4, 9 and 17	26°13'59" S, 29° 31'34" E
Bridge 3	Uitgedacht 229 IS	1 and 6	26°20'20" S, 29°30'07" E

Please refer to the locality map attached at the end of this document.

Table 2: Characteristics of Bridges 1 and 3

Characteristic	Bridge 1	Bridge 3
Location	Klein Olifants River	Joubertsvlei Spruit
Existing Span	3 spans of 3 m x 2 m, 6 m x 3.2 m, 3 m x 2 m	2 spans of 3 m x 3 m
Proposed Span	3 spans 41.7 m total length	1 span 17 m total length
Existing Year Flood Design	1:5	1:5
Proposed Year Flood Design	1:50	1:50

3.3 Present status of the bridges

The existing bridges are low lying and single carriageway. A visual assessment of the inlet and outlet conditions as well as the culvert underneath the roadway was carried out. Damage identified on the site consisted of:

- Heavily eroded side drains.
- Blocked culverts.
- Soil erosion on the upstream and downstream sides of the roadway.
- Damaged apron slabs due to the soil erosion.

The stormwater drainage systems across the road were found to be generally inadequate and reports have been received that the bridges flood regularly.

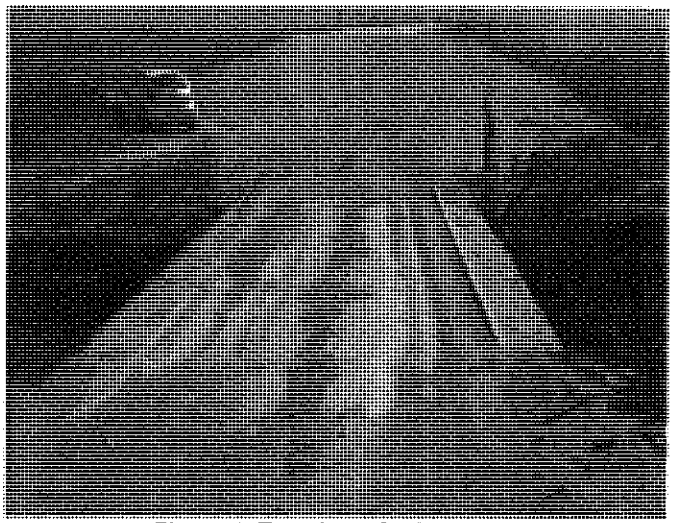


Figure 1: Top view of bridge 1

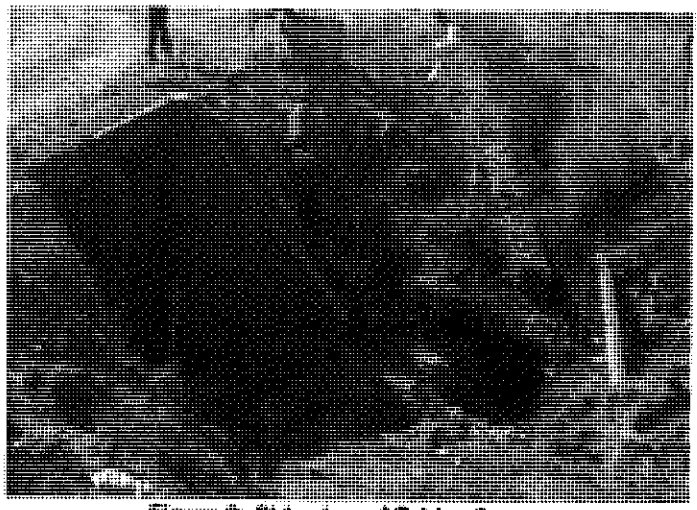


Figure 2: Side view of Bridge 3

3.4 Proposed bridge upgrade

The upgrade of the bridges 1 and 3 will involve the following key tasks:

a) The construction of temporary deviations for bridges 1 and 3 crossing in order to allow full width travelway and prevent disruption of traffic flow along the D622. The lengths of the new temporary deviations to be constructed are:
   - Bridge 1 – 500 m
   - Bridge 3 – 95 m

b) The demolition of the existing bridges 1 and 3 and construction of concrete bridges with a secondary metal arch structure. The new proposed bridges will be wider and raised with possible construction of concrete canals along the road.

c) Construction of new bridges designed to accommodate a 1:50 year flood event as the existing design, previously approved, was for a 1:20 year flood event. The proposed design flood is as a result of the road being considered strategic due to the coal mining vehicles that use the road on route to several power stations.

d) Upgrading of the roads at the bridge section from the single 6 m wide lane to 12.4 m wide within the existing 25 m wide road reserve.

3.5 Alternatives for the proposed development

An alternative is defined as *a different means of meeting the general purposes and requirements of the proposed activity*. For this project, the design of the proposed bridges will be assessed as an alternative. Table 3 below shows the features of the alternatives proposed to be used in the design of the bridges.

Table 3: Proposed Alternatives

	Bridge 1	Bridge 3
Preferred Alternative	4 metal semi-circle arches Diameter = 3.2 m each	3 metal semi-circle arches Diameter = 3.2 m each
Alternative 1	7 steel ARMCO culverts Diameter = 4.5 m each	4 steel ARMCO culverts Diameter = 3.5 m each

4. PREVIOUS ENVIRONMENTAL AUTHORISATION

A Basic Assessment (BA) study which included a successful Public Participation (PP) process was previously conducted for the project in 2009. Consequently, a positive Environmental Authorisation (EA) No. 12/12/20/1461, DEAT/EIA/4461/2009 valid for two years, was granted by the Department of Environmental Affairs (DEA) in February 2010. The EA granted was for the use of ARMCO culverts in the bridge designs, whereby:

- Bridge 1 consisted of 7 ARMCO culverts with a diameter of 4.5 m each and
- Bridge 3 consisted of 4 ARMCO culverts with a diameter of 3.5 m each.

The EA expired in February 2012 and a subsequent extension and amendment application was rejected by DEA. The amendment application was due to a change in the material (proposed preferred alternative) to be used in the bridge construction.

5. WATER USE LICENSE

A Water Use License (WUL) application was compiled during the previous BA study and consequently a license (No. 27/2/1/B111/102/3) was granted in June 2010. The WUL is for the following activities:

- ***Section 21 c*** *– Impeding or diverting the flow of water in a watercourse; and*
- ***Section 21 i*** *– altering the bed, banks, course and characteristics of a watercourse.*

The applicant is in the process of consultation with Department of Water Affairs (DWA) for the amendment of the WUL in order to cater for the new bridge designs.

6. ENVIRONMENTAL STUDIES

In order to obtain the necessary environmental approval from DEA (competent authority), a Basic Assessment study will be undertaken in terms of Government Notice No. R. 543, R.544 and R546 of the EIA Regulations (2010).

The following activities are triggered:

Government Notice	Listed Activities
R.544	11, 13, 18, 22, 39, 40, 47
R.546	10, 16, 19, 24

The Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) is the commenting authority for this proposed project.

Eskom is the applicant for the proposed development because of the road's strategic importance in terms of coal supply to their several power stations. On completion of the upgrade, the MPWRT will take ownership of the road and bridges and the EA will be transferred to them.

6.1. Specialist Studies

A number of potential environmental impacts associated with the project have been identified. As part of the previous BA study, an ecological and wetland assessment was conducted. These specialist studies will be revised based on the new bridge design.

The draft Basic Assessment Report (BAR) will be made available for public comment in due course, for a period of 40 calendar days and registered I&APs will be notified of the availability of the report.

Following the public, commenting authority (MDEDET) and competent authority (DEA) comment period, the draft Basic Assessment Report (BAR) will be finalised and submitted to DEA for review and decision making together with all comments received from I&APs during this period.

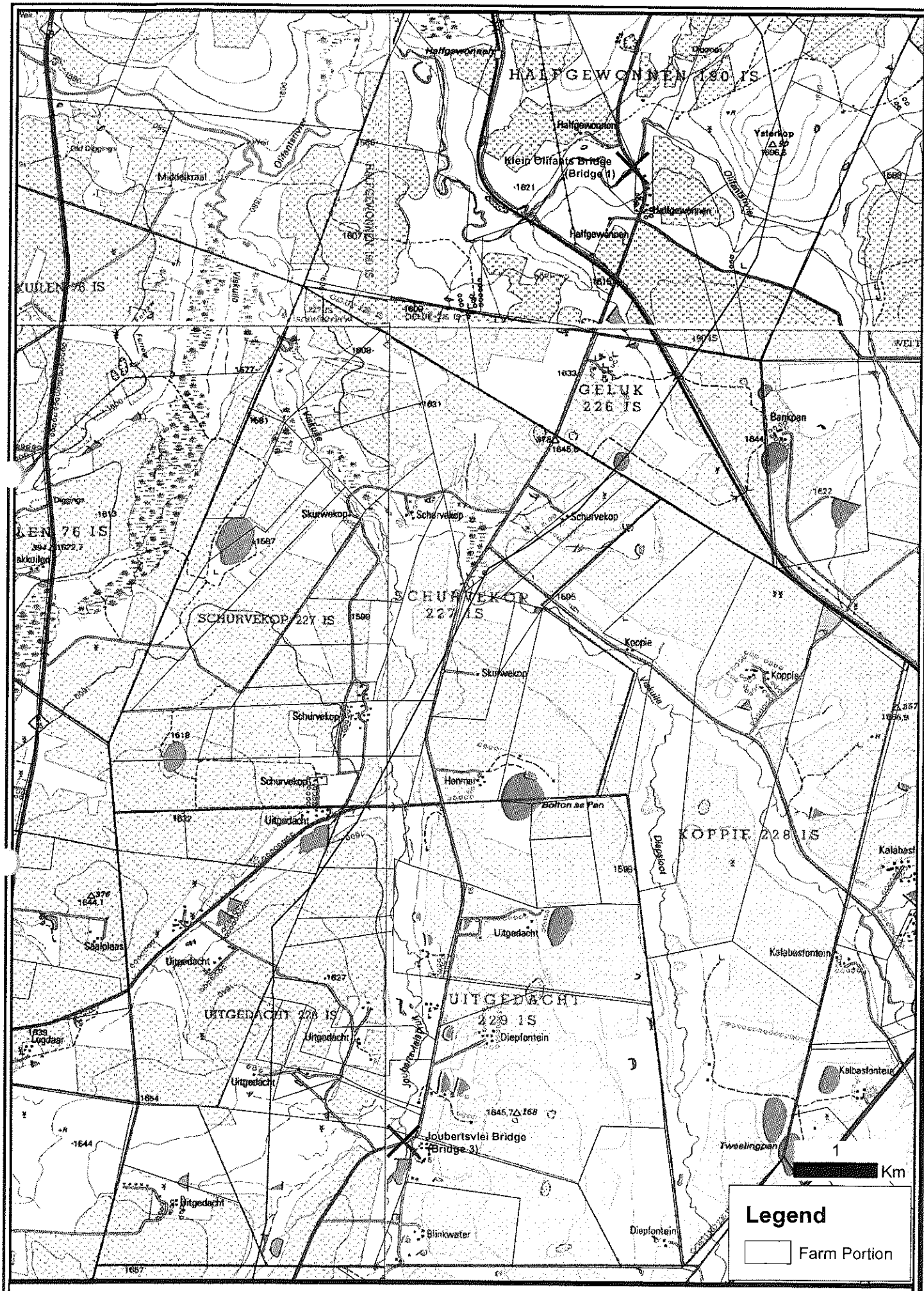
7. WHAT IS YOUR ROLE?

If you consider yourself an I&AP for the proposed project, we encourage you to make use of the opportunities created by the public participation process to become involved in the process and raise the issues and concerns which affect and/or interest you, and about which you require more information.

By completing and submitting the accompanying registration form, we will ensure that you are registered as an I&AP for the project, and that your concerns or queries regarding the project will be noted. We will also ensure that you are provided with future information pertaining to the project as well as the availability of the draft BAR for comment.

8. COMMENTS AND QUERIES

APPENDIX A
LOCALITY MAP



Site Location Map

Upgrading of 2 bridge structures on Road D622 between Hendrina and Bethal

Source: Surveys and Mapping, MCBP 2007

14 June 2012

BASIC ASSESSMENT FOR THE PROPOSED UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD IN BETHAL, GOVAN MBEKI LOCAL MUNICIPALITY, MPUMALANGA (DEA REF: 14/12/16/3/3/1/639)

REGISTRATION AND COMMENT FORM

KINDLY COMPLETE THIS FORM IN DETAIL AND RETURN IT TO:

Phyllis Kalele
SSI Engineers and Environmental Consultants
PO Bos 25302
Monument Park, 0105
Pretoria

Telephone: 012 367 5916
Fax: 012 367 5878
Email: phyllisk@ssi.co.za

PERSONAL DETAILS:

Title: ..... **First Name:**.....

Surname:.....

E-mail:.....

Telephone: ..... **Fax:**.....

Organisation (if applicable):.....

Capacity (e.g. Chairperson, member, etc): .....

Physical Address:.....

Town: ..... **Code:**.....

Postal Address: .....

Town: ..... **Code:**.....

1. **What is your main area of interest with regards to the proposed project?**

.....

.....

.....

.....

.....

2. **Do you have any points of concern or support regarding the proposed project?** YES/NO

If "yes", please briefly list these in point form:

.....

.....

.....

.....

.....

3. **Are there any additional stakeholders who you feel should be consulted with regards to the proposed project?**

If "yes" please list their names and contact details below: YES/NO

.....

.....

.....

.....

.....

.....

.....

.Please add more pages if necessary

APPENDIX E7

LIST OF STATE ORGANS

I&AP DATABASE FOR THE BASIC ASSESSMENT FOR THE UPGRADE OF BRIDGES 1 AND 3 ALONG THE D622 ROAD, BETHAL, MPUMALANGA						
Name	**Company / Organization**	**Telephone**	**Cell No.**	**Fax No.**	**Email**	**Postal Address**
	GOVERNMENT AUTHORITIES					
Stephan Pienaar - Senior Manager Roads Planning	Mpumalanga Department of Public Works, Roads and Transport	013 766 8522	079 513 5074		spienaar@mpg.gov.za	Priivate Bag X11310, Nelspruit 1200
Peter Sonemann - Chief Engineer,Planning Directorate	Mpumalanga Department of Public Works, Roads and Transport	013 766 8528	082 459 7978		psonemann@mpg.gov.za	Priivate Bag X11310, Nelspruit 1200
Martha Mokonyane - Deputy Director, Mining & Environment	Department of Mineral Resources	013 653 0500		013 690 3288/ 2390	martha.mokonyane@dmr.gov.za	Private Bag X7279 Emalahleni, 1035
MJ Musekene	Department of Water Affairs	013 759 7450		013 932 2071	MusekeneM@dwa.gov.za	Private Bag X11259 Nelspruit, 1200
Stanford Macavele	Department of Water Affairs	013 932 2061	078 460 3439		MaceveleS@dwa.gov.za	Private Bag X 10580, Bronkhorstspruit, 1020
Sibongisani Sibiya	Department of Labour	017 631 2585	082 908 2809	017 631 2672	sibongisani.sibiya@labour.gov.za	Private Bag X9057 Secunda, 2302
Prinsloo Vaino	Mpumalanga Tourism and Parks Agency	017 819 4707		017 819 4709	vaino@vodamail.co.za	Private Bag X11338 Nelspruit, 1200
Thamsanqa Xesibe	Department of Water Affairs	013 759 7450			xesibeT@dwaf.gov.za	Private Bag X11259 Nelspruit 1200
Israel Silinda	Mpumalanga Department of Agriculture, Rural Development and Land Administration	013 766 6096			silindail@mpg.gov.za	Private Bag X11219, Nelspruit, 1200
A Van Niekerk	Mpumalanga Department of Economic Development, Environment and Tourism	013 766 6314			avanniekerk@mpg.gov.za	
	Department of Health and Social Services	017 632 2211				PO Box 3930, Secunda, 2302
N Machete	South African Heritage Resources Agency (SAHRA)	013 752 2884		013 752 8498	nmachete@mp.sahra.org.za	PO Box 18403 Nelspruit, 1200
Dan Hlanyane	Eastvaal District Council	017 620 3000		017 631 1607	dan.hlanyane@gsibande.gov.za	
	GOVAN MBEKI LOCAL MUNICIPALITY					
Mmela F Mahlangu	Municipal Manager	017 620 6000		017 634 8019		
Kamesh Rohan	Manager Physical Development	017 620 6075		017 631 3599	kamesh.r@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Albert Olivier -	Deputy Director Technical and Engineering Services				albert.o@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Ignatius Mathebula	Town Planning Department	017 620 6200		017 631 3599	ignatius.m@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Sibongile Zikalala	Director Environment and Tourism	017 620 6209	082 802 5082			Private Bag X1017 Secunda, 2302
Mercia Mitchell	Municipal official	017 620 6209		017 634 5373	mercia.m@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Willie Coetzee	Municipal official	017 620 6206	072 068 2583	017 634 1179	willie.c@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Bongani Cedric Malaza	Municipal official				cedric.m@govanmbeki.gov.za	Private Bag X1017 Secunda, 2302
Joseph Mtsweni	Bethal: Ward 15 Councillor	017 624 3000	073 334 8915	017 647 5232		Private Bag X1017 Secunda, 2302
Johannes van baalen	Bethal: Ward 28 Councillor	017 624 3000	084 514 5071	017 647 5232		Private Bag X1017 Secunda, 2302
Bethal Ward Councillors	Bethal Region			017 647 5232		Private Bag X1017 Secunda, 2302
	GERT SIBANDE DISTRICT MUNICIPALITY					
Tunu Agnes Mnisi	Acting Executive Mayor	017 801 7000		017 811 1207		PO Box 1748, Ermelo 2350
Patrick Magagula	MMC: Infrastructure & Technical Services	017 801 7000		017 811 1207		PO Box 1748, Ermelo 2350
Nhlakanipho Zuma	MMC: Planning &Economic Development	017 801 7000		017 811 1207		PO Box 1748, Ermelo 2350

APPENDIX F

ENVIRONMENTAL MANAGEMENT PROGRAMME

DEA REF: 14/12/16/3/3/1/639

Draft Environmental Management Programme for the Proposed Upgrade of Bridges 1 and 3 Along the D622 Road, Bethal

July 2012

A Project for: Eskom SOC Holdings Ltd.

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DOCUMENT DESCRIPTION

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Eskom SOC Holdings Ltd.

Proposal Name:
Environmental Management Programme for the Proposed Upgrade of Bridges 1 and 3 Along the D622 Road, Bethal

SSI Environmental Reference Number:
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Signature

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GLOSSARY OF TERMS AND ABBREVIATIONS

Accident:
A motor vehicle accident.

Agent:
Duly appointed competent person, i.e. clerk of works, engineer or other such person in whom the client vests authority to represent him on the project.

Building and Demolition Waste:
Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.

Contractor:
A person or company appointed by Eskom and/or the owner of the road, to carry out stipulated activities.

Degradation:
The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.

Domestic Waste:
Domestic waste means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.

Environmental Emergency:
An undesired event that does result in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Environment:
In terms of the National Environmental Management Act (NEMA) (No 107 of 1998), “environment” means the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) of (ii) and the interrelationships among and between them;
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Control Officer:
An individual nominated through the Project Manager to be present on site to act on behalf of the Project Manager in matters concerning the implementation and day to day monitoring of the EMP. The Environmental Control Officer is assumed to be the regional Environmental Practitioner appointed by Eskom.

Environmental Impact:
A change to the environment, whether adverse or beneficial, wholly or partially, resulting from an organisation’s activities, products or services.

Environmental Management Programme:
A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

General Waste:
General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes:

a) domestic waste;
b) building and demolition waste;
c) business waste; and
d) inert waste

Hazardous Waste:
Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment.

Impact:
A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Environmental Incident:
An undesired event which may result in a significant environmental impact but can be managed through internal response.

Mitigation:
Measures designed to avoid, reduce or remedy adverse impacts.

Safety, Health and Environmental Officer:
The SHE officer is a Contractor representative, responsible for the safety, health and environmental aspects on the construction site.

Waste:
Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered-

a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
b) which the generator has no further use of for the purposes of production;
c) that must be treated or disposed of; or
d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but-

- a by-product is not considered waste; and
- any portion of waste, once re-used, recycled and recovered, ceases to be waste.

1 INTRODUCTION

The existing bridges 1 (Klein Olifants River) and 3 (Jouberstvlei Spruit) along the D622 road in Bethal are low lying, single carriageway structures with narrow single lanes 3.5 m wide. The bridges are in a poor condition and exhibiting:

- Heavily eroded side drains.
- Blocked culverts.
- Soil erosion on the upstream and downstream sides of the roadway.
- Damaged apron slabs due to the soil erosion.
- Inadequate stormwater drainage systems across the road.

In addition, the bridges are a safety hazard with no guard rails; and are non-compliant with the requirements of the road design standards of the South African National Roads Agency Limited (SANRAL) and Mpumalanga Department of Public Works, Roads and Transport (MPWRT) because, being a strategic road they need to be designed for a 1:50 year flood event. In addition, reports have been received that the bridges flood regularly.

The key objectives of the project are:

- Ensuring the safety of all road users by constructing structurally sound bridges.
- Ensuring compliance with the road design standards of the Mpumalanga Department of Public Works, Roads and Transport (MPWRT) because being a strategic road the bridges are designed for a 1:50 year flood event instead of 1:20 year flood event.
- Upgrade bridges 1 and 3, and consequently link both sides of the bridges to the newly upgraded D622 The D622 road is strategic to Eskom as it ensures that coal from the Halfgewonnen Colliery belonging to Sudor Coal (which is situated along this road) is supplied to the Eskom power stations.

1.1 Project Description

Eskom SOC Holdings Ltd. proposes the upgrade of bridges 1 and 3 along the D622 road by:

a) Constructing temporary deviations for bridges 1 and 3 crossing in order to allow full width (two-way) travel way and prevent disruption of traffic flow along the D622.
b) Demolishing the existing bridges 1 and 3 and constructing new, wider and raised concrete bridges.
c) Upgrading the roads at the bridge section from the single 6 m wide lane to 12.4 m wide within the existing 25 m wide road reserve.

TABLE 1: LOCATION OF BRIDGES

Bridge	Farm	Portions	Coordinates
Bridge 1	Halfgewonnen 190 IS	0, 4, 9 and 17	26º13’59” S, 29º 31’34” E
Bridge 3	Uitgedacht 229 IS	1 and 6	26º20’20” S, 29º30’07” E

Please refer to the locality map (**Annexure A**).

1.2 Applicable Documentation

The following documentation is applicable for the project, and should be read in conjunction with this EMPr:

- Basic Assessment Report for the proposed upgrade of bridges 1 and 3 along the D622 road in Bethal, Mpumalanga.
- The Environmental Authorisation and conditions from the Department of Environmental Affairs (DEA) – *once issued*.

1.3 Structure of the EMPr

The EMPr provides mitigation and management measures for the following key phases of the project:

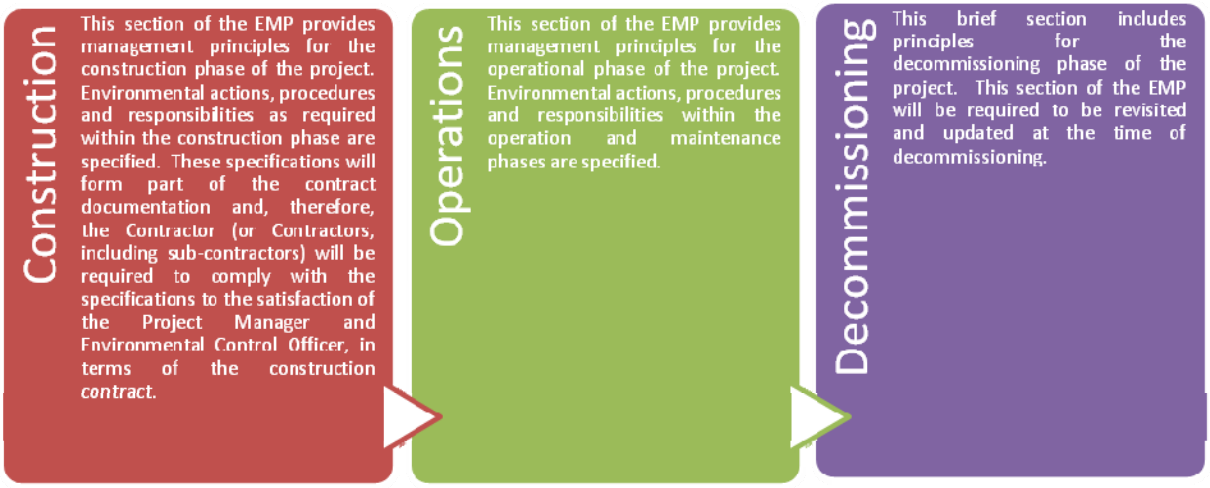

FIGURE 1: KEY PHASES OF THE PROJECT LIFE-CYCLE

Relevant environmental legislation pertaining to the project is listed within Section 3. Eskom shall be responsible for ensuring compliance with the conditions by any person acting on their behalf, including but not limited to, an agent, contractor, sub-contractor, employee or person rendering a service to the holder of the authorisation.

This EMPr is a dynamic document which will be updated as required on a continuous basis to ensure environmental best practices. Any amendments made, must be submitted to both the Sasol EIA specialist and Project Manager for approval. Amendments to the EMPr must be submitted to the DEA.

1.4 Objective of the EMPr

The EMPr has the following objectives:

- To outline functions and responsibilities of responsible persons;
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation;
- To outline mitigation measures and environmental specifications, which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts; and
- To prevent long-term or permanent environmental degradation.

An independent ECO must be appointed by the proponent (Eskom) before construction commences to ensure compliance with the EMPr. The EMPr will be considered an extension of the Conditions of Approval as set forth by the Department of Environmental Affairs (DEA). Non-compliance with the EMPr will constitute non-compliance with said Conditions.

The EMPr is binding on all contractors operating on the site.

It should be noted that in terms of the National Environmental Management Act No 107 of 1998 (Section 28) those responsible for environmental damage must pay the costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and / or environmental damage (The “polluter pays” principle).

1.5 Details of the Environmental Assessment Practitioner

Consultant:	SSI Environmental
Contact Person:	Prashika Reddy and Phyllis Kalele
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Expertise:	Prashika Reddy is a senior environmental scientist / associate (BSc Honours – Geography) with experience in various environmental fields including: environmental impact assessments, environmental management programmes, public participation and environmental monitoring and auditing. Ms Reddy has extensive experience in compiling environmental reports (Screening, Scoping, EIA and Status Quo Reports). She is a registered Professional Natural Scientist (*Pr Sci Nat* 400133/10) with the South African Council for Natural Scientific Professions (SACNASP). Phyllis Kalele is a senior environmental consultant with experience in various facets of environmental management. These include conducting the Public Participation process; compiling Environmental Impact Reports; writing Environmental Management Programmes; conducting environmental awareness training; and conducting legal compliance audits. She is a registered Professional Natural Scientist (*Pr Sci Nat* 400456/11) with SACNASP.

2 MANAGEMENT AND MONITORING PROCEDURES

Several professionals will form part of the project team. The implementation of the EMPr will be structured as follows:

- Eskom is responsible for the implementation of the EMP during the **Construction Phase**.
- Mpumalanga Department of Roads and Transport is responsible for **Operational** and **Decommissioning** phases of the project.

Decommissioning will however entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases. It is unlikely that the bridges will be decommissioned for several years.

2.1 Organisational Structure and Responsibility

2.1.1 Project Manager

The Project Manager is responsible for overall management of project and EMPr implementation during the construction phase. The Project Manager will:

- Be fully conversant with the Basic Assessment (BA) study for the project, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.
- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- Monitor site activities on an agreed schedule for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

2.1.2 Environmental Control Officer

The Environmental Control Officer (ECO) is responsible for monitoring the implementation of the EMPr during the construction phase as well as liaison and reporting to Eskom, the Contractor, Landowners and Authorities. The ECO will:

- Be fully conversant with the BA study.
- Be fully conversant with the conditions of the Environmental Authorisation.
- Be fully conversant with the recommendations and mitigation measures of this EMPr.
- Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with them.
- Convey the contents of this document to the Contractor site staff and discuss the contents in detail with the Project Manager and Contractor. Training will be required to ensure all staff understand the process.
- Conduct weekly / monthly audits of the construction site and surrounding areas in order to monitor compliance with the EMPr.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Ensure that activities on site comply with all relevant environmental legislation.
- Recommend corrective action for any environmental non-compliance incidents on the construction site.
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the EMPr.
- Liaise regularly with the construction team and the project leader.
- All negotiations for any reason shall be between the ECO, Eskom, affected parties (landowners) and the Contractor. No verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.

- Always inform the affected parties about any changes to the construction programme should they be involved. If the ECO is not on site then the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

2.1.3 Contractor

The Contractor is responsible for the implementation and compliance with recommendations and conditions of the EMPr during the construction phase.

The Contractor will:

- maintain an environmental register which keeps a record of all incidents which occur on the site during construction of the temporary deviations and bridges. These incidents include but not limited to public involvement / complaints; health and safety incidents; Incidents involving hazardous materials stored on site; and non compliance incidents.
- Conduct environmental training and awareness to employees.
- Arrange for all employees and those of subcontractors to receive training before the commencement of construction in order that they are aware of the conditions of the environmental authorisation and the EMPr.

2.2 Environmental Awareness Plan

It is important to ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. To achieve effective environmental management, it is important that employees, contractors and sub-contractors are aware of their responsibilities in terms of the relevant environmental legislation and the contents of this EMPr.

The environmental awareness plan is aimed at:

- promoting environmental awareness amongst all personnel on site;
- informing personnel of all environmental procedures, policies and programmes applicable;
- providing generic training on the implementation of environmental management specifications; and
- providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

The environmental awareness training programme will include:

- the induction of all construction and operation staff;
- signing by all persons an acknowledgement of receiving and understanding the induction;
- identification of environmental risks and job specific training on addressing these risks; and training on the implementation of emergency procedures (where necessary).

Topics covered by the Environmental Awareness Programme should include:

- What is meant by “Environment”?
- Why does the environment need to be protected and conserved?
- How can construction activities impact on the environment?
- What can be done to mitigate against such impacts?
- Waste management.
- Health and Safety.
- Awareness of emergency and spills response provisions.
- Social responsibility during construction of the bridges and temporary deviations e.g. being considerate to local residents.

Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. The training must ensure that the contents and requirements of the EMPr are transferred to the audience. Where training has been done verbally, persons having received training must sign an attendance register (which must be properly filed). Training should be conducted monthly by the ECO and can also be dealt with weekly during the ‘Toolbox Talks’.

2.3 Monitoring

A monitoring programme shall be in place not only to ensure compliance with the EMPr through the contract/work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required.

As part of the contract or work instruction, Eskom shall stipulate the period and frequency of monitoring required. The Project Manager shall ensure that the monitoring is carried out.

The ECO must be appointed to ensure compliance with the EMPr, and to carry out monitoring activities. The ECO will report to the Contractor should any non-compliance be evident or corrective action necessary. Only in severe cases of non-compliance, or repeated offences, will the ECO be required to report to the Project Manager.

2.4 Reporting Procedures

2.4.1 Documentation

The following documents must be kept on site in order to record compliance with the EMPr:

- Record of complaints.
- Monitoring results.
- Non-conformance reports.
- Written corrective action instructions.
- Notification of emergencies and incidents.
- Environmental Authorisation.

2.4.2 Reporting

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested during audits.

3 ENVIRONMENTAL GUIDELINES STANDARDS AND PERMITS

3.1 Environmental Legislation

The following is a summary of the environmental legislation applicable to the proposed project.

LEGISLATION	SECTIONS	RELATES TO
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
Environment Conservation Act (No 73 of 1989) and regulations	Sections 19 and 19A	Prevention of littering by employees and subcontractors during construction and the maintenance phases of the proposed project.
National Heritage Resources Act (No 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.

LEGISLATION	SECTIONS	RELATES TO
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust.
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self employed persons to persons other than their employees.
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents.
	Section 21	**c** – Impeding or diverting the flow of water in a watercourse; and **i** – Altering the bed, banks, course and characteristics of a watercourse. Presently, Eskom is in the process of consultation with the DWA on the WUL that was granted in order to establish which process (amendment / new application) needs to be undertaken and thus, ensure that the new bridge designs are catered for.
Hazardous Substances Act (No 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
National Environmental Management: Waste Act (No. 59 of 2008)		Provides for specific waste management measures and the remediation of contaminated land.
National Biodiversity Act No. 10 of 2004		Provides for the identification, listing and promotion of threatened or protected ecosystems. The Act also provides tools for alien invasive species control and enforcement.
National Forests Act (No 84 of 1998),	Section 15	No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.

LEGISLATION	SECTIONS	RELATES TO
Conservation of Agricultural Resources Act (No 43 of 1983),		The following regulations are applicable with regards to the control of invasive alien vegetation and declared weeds: • It is illegal to have declared weed species or invasive alien vegetation on one's property. • The landowner must immediately take steps to eradicate them by using the methods prescribed in the regulations, namely: - uprooting and burning, or - the application of a suitable chemical weed-killer (herbicide), or - any other method of permanent eradication. • One may not uproot or remove such plants and dump or discard them elsewhere to re-grow or allow their seeds to be spread or blown onto other properties. • If the landowner does not comply with requirements above, a person may be found guilty of a criminal offence.

3.2 Other Relevant Acts and Guidelines

All applicable environmental standards contained within the environmental legislation will be adhered to. At the time of compiling this draft EMPr, the following Acts, environmental guidelines, department policies, environmental management instruments were identified as being applicable:

OTHER RELEVANT ACTS, GUIDELINES, DEPARTMENTAL POLICIES, ENVIRONMENTAL MANAGEMENT INSTRUMENTS
Mpumalanga Biodiversity Conservation Plan (2006)
Hazardous Substances Act (No 15 of 1973) and Regulations
Fencing Act No. 31 of 1963
Mpumalanga Roads Act No. 1 of 2008
The Road Transportation Act No. 74 of 1977
Govan Mbeki Local Municipality Integrated Development Plan 2007-2011
Gert Sibande District Integrated Development Plan 2011/12 and 2013/14
Gert Sibande District Municipality Spatial Development Framework (2009)
South African National Standard SANS 10103:2008 (*The Measurement and Rating of Environmental Noise with Respect to Annoyance and Speech Communication)* National Noise Control Regulations (1998)
Eskom Environmental Policy

4 PLANNING AND DESIGN PHASE

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	RESPONSIBLE PERSON/S
1. Bridge design - Use of concrete bridges	• The in-situ bridge deck will be built on formwork over the river and construction will be carried out during the dry season. • The pre-cast option would have less interference with the Klein Olifants River and Joubertsvlei Spruit from an environmental point of view. There is also less risk to the Contractor when it comes to flooding during construction. • As bridges are located on flat terrain large flood plains will occur. The use of the ARMCO culverts in the Klein Olifants River (in the new bridge design) on one side of the bridge to accentuate the flows and to obtain even flow distributions over the flood plains during large floods.	Project Manager, Engineering Team
2. Bridge design - Incorporation of ARMCO culverts	• The base of each of the culverts within the stream bed should be located at stream bed level so as not to create a drop in levels between the culvert base and stream bed on the downstream side which may lead to scouring of the downstream channel. • At the areas on and on top of the macro-channel bank, the base of the culvert must be placed at natural ground level of the banks and surrounding wetland to allow seepage from the upstream part of the wetland to bypass the bridge. • Culverts that are transversally corrugated on the inside should be used because the created rough surface reduces water velocity.	Project Manager, Engineering Team

5 CONSTRUCTION PHASE - BRIDGES AND TEMPORARY DEVIATIONS

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
1. Site Clearing	• Site clearing must take place in a phased manner, as and when required. Areas which are not to be maintained within two months of time must not be cleared to reduce erosion risks. • The area to be cleared must be visibly demarcated and this footprint strictly maintained. • Spoil that is removed from the site must be moved to an approved spoil site or Department of Water and Environmental Affairs licensed landfill site.	• Ongoing monitoring during construction.	Contractor
2. Employment	• The appointed Contractor will be required to use local workers where possible.	• Ongoing monitoring during construction.	Contractor
3. Environmental Awareness	• The environmental awareness plan is aimed at: – promoting environmental awareness amongst all personnel on site; – informing personnel of all environmental procedures, policies and programmes applicable; – providing generic training on the implementation of environmental management specifications; and – providing job-specific environmental training in order to understand the key environmental features of the	• Ongoing monitoring during construction.	Contractor and ECO

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	construction site and the surrounding environment. • The environmental awareness training programme will include: – the induction of all construction and operation staff; – signing by all persons an acknowledgement of receiving and understanding the induction; – identification of environmental risks and job specific training on addressing these risks; and training on the implementation of emergency procedures (where necessary). • Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. • The training must ensure that the contents and requirements of the EMPr are transferred to the audience. • Where training has been done verbally, persons having received training must sign an attendance register (which must be properly filed). • Training should be conducted monthly by the ECO and can also be dealt with weekly during the 'Toolbox Talks'.		
4. Construction camp - Establishment	• Choice of site for the Contractor's camp requires the ECO's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones and slip / unstable zones. A site plan must be	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	submitted to the ECO and project manager for approval. • Site establishment shall take place in an orderly manner and all required amenities shall be installed at the camp site before the main workforce move onto site. • The construction camp may not be situated within the 1:100 year flood line or on slopes greater that 1:3. • If the Contractor chooses to locate the camp site on private land, he must get prior permission from both the project manager and the landowner. • Run-off from the camp site must not discharge into neighbours' properties or into adjacent wetlands, rivers or streams. • The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction). • The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. • Run-off from the camp site must not discharge into neighbouring properties or into adjacent wetlands, rivers or streams. • Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	implemented. • No development, or activity of any sort associated with the camp, is allowed below the 1:100 year flood line of any water system. • Food preparation areas should be provided at the construction camp with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis. • The construction camp shall have the necessary ablution facilities at the commencement of construction activities. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities. • The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a licensed landfill site. A certificate of disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. • The construction camp must be kept clear of litter at all times.		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt on site. • No open fires are allowed within the construction camp and no wood from surrounding vegetation may be used to create a fire. • Once construction has been completed on site and all excess material has been removed, the construction camp must be rehabilitated to its natural state. If the area was badly damaged, re-seeding shall be done and soil compacted during construction shall be ripped, levelled and re-vegetated.		
5. Construction camp – Storage of materials	• Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general on site topography and water erosion potential of the soil. • Storage areas must be designated, demarcated and fenced. • Storage areas should be secure so as to minimize the risk of theft. • Access must be strictly controlled and only authorised persons may enter. • Fire fighting equipments must be present at all storage facilities. • Lubricants, chemicals and other hazardous substances must be stored in a designated area that is well	• Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and DEA, as well as local authorities if so required.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	ventilated, with an impervious surface, bunded, covered, and able to contain 110% of the total volume of materials stored at any given time. • The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only • The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages. • The Contractor must ensure that spill kits are always available on site. • MSDS's of chemicals must always be available at the construction camp. • Clear signage must be placed at all storage areas containing hazardous substances / materials. • A Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at a licensed landfill sites designed to handle hazardous wastes. A disposal certificate must be obtained from the Waste Disposal Contractor. • The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	solvents and other chemicals possibly used in the construction time.		
6. Training	• The Contractor shall ensure that all its employees are adequately orientated, inducted and trained to perform the tasks. • Tool Box Talks - The Contractor is expected to have safety "tool box" talks. These talks shall be in accordance with the risks and trends associated with the project. Proof of these talks shall be kept on site. • The Contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. • Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. • Use should be made of environmental awareness posters on site. • Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.		Contractor
7. Personal Protective Equipment (PPE)	• No person is allowed to enter the site without the approved required PPE. • All workers shall be trained on the	• Strict non-compliance measures must be administered to any employees not complying with	Contractor

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	correct use of PPE. • The Contractor is required to keep an updated register of all PPE issued. • The contractor shall ensure action is taken against an employee who continuously fails to comply. • PPE minimum requirement notice boards shall be placed at all entrances to construction areas.	the use of PPE. • Ongoing monitoring during construction.	
8. Excavation of foundations and piling activities.	• All site disturbances must be limited to the area where the bridges will be constructed. • Suitable excavated material must be stockpiled next to the excavations for use as backfill. • Excess material obtained from excavation activities must be removed and properly disposed off.		Contractor Project Manager
9. Alteration of topography due to stockpiling of soil, rubble and building material.	• Stockpiles must not exceed 2 m in height (where possible) and must be completely removed after construction is completed to prevent establishment of invasive and pioneer species which would alter the wetland vegetative composition.		Contractor
10. Disturbance of surface soils, loss of topsoil, contamination and potential erosion.	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately by not leaving soils exposed for a long time to prevent soil erosion. • Topsoil should be used for rehabilitation	• Ongoing monitoring during construction.	Contractor

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	purposes in order to facilitate re-growth of species that occur naturally in the area. • Topsoil that has been removed from excavation areas must be stored separately in a designated area and in a manner that erosion does not occur. • Construction activities should be scheduled as far as possible to take place during winter / low flow periods when as little of the construction site and exposed sediment is in contact with the flow as possible. • Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible. • Refuelling of machinery must be done using a drip tray. • Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored at any given time. • The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only. • Mixing of cement must be done on an impervious lined material and any spillage must be immediately cleaned up.		

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	• The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages. • The Contractor must ensure that spill kits are always available on site and any spillages must be recorded and reported to the responsible person. • Repair of equipment and vehicles must be undertaken only in the Contractor lay-down area. • The placing of erosion protection measures at culvert and drain inlets and outlets such as gabion baskets and mattresses, stone pitching, rip-rap etc.		
11. Physical disturbance of the channel bed and banks.	• No vehicles should be allowed to cross the wetlands on site. Access to the construction site must be through use of the existing road and temporary deviations to be constructed.	• Ongoing monitoring during construction.	Contractor
12. Pollution of wetlands through disposal of litter and oil leaks and spillage from equipment.	• Skips for the disposal of general waste should be provided around the site. The skips should have a well fitting lid to prevent wind from blowing away the litter and they should be emptied regularly and disposed off at a licensed waste diposal site. • Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible.	• Any accidental fuel spills must be cleaned up immediately. • Waste records must be kept available for review. • Implement appropriate actions and measures to reduce, stop or contain oil spill. • Keep written records detailing the type of spill, the corrective and remedial measures	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Storage areas for machines and equipment must be located outside of the wetland boundaries (at least 50 m away). • Refuelling of machinery must be done using a drip tray and no vehicle refuelling is allowed within the wetland and buffer area. • The area of permanent saturation in the wetland at bridge 1 (Klein Olifants River) must be marked as a no-go area due to its sensitivity and can be fenced off temporarily if required. • The sensitive valley bottom wetland at bridge 3 must be fenced if necessary in order to restrict access and prevent disturbance.	implemented in the stopping or reduction of the spill, and the cleanup of the spill. • Report the nature and extent of the spill to the Construction Safety Officer / ECO or Project Manager, as soon as reasonably possible, but within 24 hours. • The Contractor and the Construction Safety Officer / ECO will ensure that preventative measures are implemented in order to prevent spills of potentially hazardous substances.	
13. Pollution of wetlands by dumping of spoil material.	• Excess material obtained from excavation activities must be removed and properly disposed off. • The area of permanent saturation in the wetland at bridge 1 (Klein Olifants River) must be marked as a no-go area due to its sensitivity and can be fenced off temporarily if required. • The sensitive valley bottom wetland at bridge 3 must be fenced if necessary in order to restrict access and prevent disturbance. • All coffer dams, causeway and construction materials should be removed from the river and riparian	• Any spoil material deposited on the wetlands must be immediately removed and disposed off correctly.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	zone immediately after construction.		
14. Degradation of water quality due to sedimentation (as a result of erosion and excavation of banks) into the watercourse.	• Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Low speed limits at the site should be enforced and adhered to prevent dust generation. • Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately by not leaving soils exposed for a long time to prevent soil erosion. • Removal of vegetation / plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • Construction activities should be scheduled as far as possible to take place during winter / low flow periods when as little of the construction site and exposed sediment is in contact with the flow as possible. • Sediment input into the watercourse can be controlled by packing hay bales in rows across the diversions and active flow areas during construction. • Silt traps / curtains must be installed downstream of the construction works	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	to trap silt that is mobilised by the construction activities. • Stormwater channels and erosion prevention measures such as gabions must be constructed adjacent to the macro-channel banks where there is a risk of high stormwater flows. • The banks of the watercourse must be protected with a geotextile material or similar material to protect reinstated topsoil and any re-seeded vegetation. The banks must be rehabilitated to their original profile once construction is completed. • The area of permanent saturation in the wetland at bridge 1 (Klein Olifants River) be marked as a no go area due to its sensitivity and can be fenced off temporarily if required. • The sensitive valley bottom wetland at bridge 3 must be fenced if necessary in order to restrict access and prevent disturbance.		
15. Disruption of water flow in the watercourse by pumping water out and into the watercourse.	• Care must be taken to ensure that the water is discharged in a manner that does not cause siltation or erosion into the wetland or downstream watercourse. • Any water discharged from pumping around the construction area must first be discharged into a structure that allows the settlement of all suspended	Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	material and which allows the discharge of water into the wetland close to the banks of the river.		
16. Alteration of the natural drainage due to soil compaction as a result of removal of natural substrate, movement of people and machines.	• As part of the rehabilitation of the area, it is critical that the channel bed and banks be restored to a condition as close to the pre-construction state as possible. If the channel bed is disturbed, then it is very important that the bed be rehabilitated to a state as close to the pre-construction state as possible. • The movement of machinery and construction personnel should be limited to the existing disturbed footprint and not unnecessarily into adjacent undisturbed areas of the wetland. • If a separate access into the wetland needs to be created, care should be taken to prevent compaction by use of a running track constructed of geotextiles or 'bogmats' to protect the underlying soils and vegetation.	• Ongoing monitoring during construction.	Contractor
17. Loss of wetland soils and vegetation.	• Suitable textile material must be placed over the existing wetland vegetation to protect it from overlying substrate to be used. All imported foreign material must be removed from the wetland on rehabilitation and reseeding should be undertaken if necessary. • In areas where the wetland substrate is not removed, with imported material being placed over the existing	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	substrate, the existing grassy vegetation should be retained and not excavated / graded away. • If wetland substrate (soil) needs to be removed and replaced with imported material, the original wetland substrate material must not be removed from the wetland area, but stockpiled adjacent to the deviation to allow it to be returned at the time of rehabilitation. • The area of permanent saturation in the wetland at bridge 1 (Klein Olifants River) must be marked as a no-go area due to its sensitivity and can be fenced off temporarily if required. • The movement of machinery should be limited to the existing disturbed footprint and not unnecessarily into adjacent undisturbed areas of the wetland.		
18. Preservation of flora and fauna e.g. Marsh Sylph (*Metisella meninx*) butterfly	• Mitigation plan to be put in place and provide training for species identification. • Low speed limits at the site should be enforced and adhered to prevent fauna fatalities. • Disturbance of vegetation cover within sensitive areas should be limited. • Construction activities for the proposed upgrade of the bridges and temporary deviations must be restricted to the existing bridge servitudes as well as road reserves. • The Contractor shall under no	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	circumstances interfere with livestock without the landowner being present. This includes the moving of livestock where they interfere with construction activities. • Speed limits must be restricted (40 km/hr) preventing unnecessary road fatalities of surrounding livestock. • All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), namely: – Uprooting, felling or cutting; – Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer; – The application of control measures regarding the utilisation and protection of veld in terms of regulation 9 of the Act; – The application of control measures regarding livestock reduction or removal of animals in terms of regulations 10 and 11of the Act; – Any other method or strategy that may be applicable and that is specified by the executive officer by means of a directive. • All alien invasive plant should be removed from the site to prevent further invasion. • The establishment and re-growth of alien vegetation must be controlled		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	after the removal of grass.		
19. Interference with plant processes namely transpiration and photosynthesis as a result of dust coating surrounding vegetation.	• Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Low speed limits at the site should be enforced and adhered to prevent dust generation.	• Ongoing monitoring during construction.	Contractor
20. Destruction of Faunal Habitats e.g. swallow nests.	• The underside of the bridges must be inspected before the bridge is demolished. • Animal habitations such as bird nests must be moved to areas away from the construction site and not destroyed. • Disturbance of vegetation cover within sensitive areas should be limited. • Contracted employees must be educated about the value of wild animals and the importance of their conservation. • No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires. • The Contractor shall have operational fire-fighting equipment available on site at all times. The level of fire fighting equipment must be assessed and evaluated thorough a typical risk assessment process. It may be	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	required to increase the level of protection, especially during the winter months.		
21. Contamination of groundwater and surface water due to spillage, leakage, incorrect storage and handling of chemicals; oils; lubricants, and cement.	• Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible. • Refuelling of machinery must be done using a drip tray and no vehicle refuelling is allowed within the wetland and buffer area. • Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored at any given time. • The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only. • Mixing of cement must be done on an impervious lined material and any spillage must be immediately cleaned up. • Repair of equipment and vehicles must be undertaken only in the contractor lay-down area. • Ablution facilities in the form of mobile chemical toilets must be provided on site and construction workers must not under any circumstances relieve themselves elsewhere.	• Ongoing monitoring during construction. • The Contractor must ensure that spill kits are always available on site and any spillages must be recorded and reported to the responsible person. • The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Chemical toilets must be sited away from the watercourses (further than 50 m), cleaned and emptied regularly by a registered service provider. • Potable water must be provided for the construction workers. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Specific areas must be designated for cement batching plants. Sufficient drainage for these plants must be in place to ensure that soils do not become contaminated.		
22. Impairment of water quality due to sedimentation and construction effluent discharge.	• Run-off from the construction area must be prevented from directly entering the wetlands. • The intensity of stormwater run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. • It is strongly recommended that a number of silt traps / silt curtains be installed in the stretch of the two rivers downstream of the construction works to trap any silt that is mobilised by the construction activities. • Should water in the river channel need to be pumped around the construction site and discharged back into the river, care must be taken to ensure that the	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	water is discharged in a manner that does not cause siltation or erosion into the wetland or downstream watercourse. As such it is recommended that any water to be discharged from pumping around the construction area or from dewatering operations be first discharged into a structure that allows the settlement of all suspended material, and which allows the diffuse discharge of water into the wetland close to the banks of the river. • Care must be taken when working with cement in the wetlands / riverine areas. Should cement mixing need to occur within the boundaries of the wetland, this should be done on impervious lined material. Any spillage of cement must be immediately cleared up. • Activities that lead to elevated levels of turbidity must be minimised.		
23. Stormwater management	• Erosion prevention structures such as gabions should be constructed adjacent to the macro-channel banks; where there is a risk of high stormwater flows. The existing gabion baskets at bridge 1 (Klein Olifants River) and 3 (Joubertsvlei Spruit) will require upgrading. • The installation of the stormwater system must take place as soon as possible after commencement of the	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	construction activities, to attenuate stormwater from the construction as well as the operational phase. • Concrete side drains as well as subsoil drains will be provided on both sides of the road where the road is in cut to prevent the ingress of stormwater and groundwater into the road sub-grade layers as indicated in the condition assessment of the existing pavement. • There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. • The intensity of stormwater run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. • The installation of a stormwater system must take place as soon as possible after commencement of construction, to attenuate stormwater from the construction phase as well as the operation phase.		
24. Impact on potential heritage and archaeological artefacts.	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	archaeological finds to the ECO so that appropriate action can be taken. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.		
25. Waste management (Waste includes domestic waste, general construction rubble, metal sheets, spent grinding material, and hazardous waste (used oil, cement, paint, and concrete etc.).	• The rubble from the demolition of the existing bridges must be disposed of at an approved waste disposal facility. The rubble can be reused where possible; some of the demolition material of the existing bridge will be reused in the bulk fill of the road approaches. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste on site is not permitted. • Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	accordance with relevant legislative requirements. • General waste disposal bins must be made available for employees to use throughout the construction phase. • Waste should be temporarily stored on site (less than 90 days) before being disposed off appropriately. • General waste must be disposed of at an approved waste disposal facility. • Building rubble will be used, where possible, in construction. Where this is not possible, the rubble will be disposed of at an appropriate landfill site. • Records of all waste being taken of site must be recorded and evidence of correct disposal must be kept. • Hazardous materials will be generated if there are spillages during construction. This waste should be cleaned up using absorbent material provided in spill kits on site. Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. • Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored at any given time. • Provide employees with appropriate		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	PPE for handling hazardous materials. • All hazardous waste will be disposed of in a registered hazardous waste disposal facility. • Ablution facilities in the form of mobile chemical toilets must be provided on site and construction workers must not under any circumstances relieve themselves elsewhere. • Chemical toilets must be cleaned and emptied regularly by a registered service provider		
26. Dust control Possible sources of dust include: movement of construction vehicles; dust from bare areas that have been cleared for construction; and handling of spoil and fill material and rubble.	• Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Low speed limits at the site should be enforced and adhered to prevent dust generation. • Retention of vegetation where possible should be exercised in order to reduce dust generation. • Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.	• Ongoing monitoring during construction.	Contractor
27. Noise Possible sources of noise include: excavation and site clearing; demolition of existing bridges which	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
could involve blasting or drilling; and movement of construction vehicles.	vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment. • Construction activities must be limited to 07:00 - 17:00, Monday to Friday and 08:00 - 13:00 on Saturday.		
28. Traffic Accommodation and Construction traffic.	• During demolition and construction of the new bridges, temporary deviations will be constructed to prevent the disruption of traffic. • The constructed temporary deviations at the 2 bridge sites must be utilised for passage over the watercourses. Construction routes must be clearly defined. •	• Ongoing monitoring during construction.	Contractor
29. Health and Safety assurance Activities on site that could pose a safety risk including: movement of construction vehicles; operation of equipment and machines; demolition of the existing structures and construction of new ones; and passage of coal trucks and other vehicles.	• Low speed limits at the construction site must be adhered to. • All workers on site must wear the appropriate PPE equipment at all times. • All employees operating machinery and equipment must be properly trained on the use. • A safe and designated crossing point for community members must be demarcated. • Clear signage must be provided at any excavations and trenches to avoid people falling in.	• Ongoing monitoring during construction.	Contractor

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• A safety officer must be appointed for the entire duration of the construction period. • The existing farm accesses close to the site will be assessed and considered during the work programme to ensure the safety of road users. • On completion of construction the lanes on the new bridges must be painted to ensure they are well marked. • Guard rails will be erected and maintained at the bridges. • A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety. • The Contractor must ensure that all equipment is maintained in a proper operating condition. • Any health and safety incidents must be reported to the project manager immediately. A record of health and safety incidents must be kept on site. • First aid facilities must be available on site at all times. • Workers have the right to refuse work in unsafe conditions. • A record shall be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Contractor.		

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers. • Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. • All construction staff must be trained in fire hazard control and fire fighting techniques.		
30. Employment	• The Contractor will be required to use local workers where possible. • Ensure that employment procedures / policy are communicated to local stakeholders, especially community representative organisations and ward councillors.	• Ongoing monitoring during construction.	Contractor

6 OPERATIONAL PHASE - BRIDGES

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
1. Wetland functioning.	• Regular maintenance of the culvert must be conducted in order to clean out any debris that would cause blockage.		MPWRT
2. Erosion protection.	• The relevant mitigation measures proposed for erosion control during the construction phase should be carried forward to operations, where potential environmental impacts may still occur. • Sufficient gabions must be installed and the riparian zone must be re-vegetated with indigenous plant, forb and tree species to control erosion. • The integrity of erosion prevention structures such as gabions and mattresses, stone pitching, rip-rap etc. should be inspected and appropriate maintenance and cleaning should be carried out. • The bridges must be regularly inspected to ensure that the rehabilitation on the adjacent macro channel banks is well established and the area is stabilized.		MPWRT
3. Stormwater management.	• The relevant mitigation measures relating to stormwater management proposed for the construction phase should be carried forward to operations, where potential environmental impacts may still occur. • Periodic clearing of existing drainage structures including existing open drain, pipe culverts, box culverts and inlets and outlet structures.		MPWRT

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Concrete side drains as well as subsoil drains provided on both sides of the road where the road is in cut to prevent the ingress of stormwater and groundwater into the road sub-grade layers must be inspected for blockages and be cleaned when necessary.		
4. Prevention of obstruction of migration of fauna.	• Periodic cleaning of existing drainage structures including existing open drain, pipe culverts, box culverts and inlets and outlet structures. • Alternative methods of cleaning out the pipes should be used e.g. pressurized air / water can be used to flush out trapped debris.		MPWRT

7 OPERATIONAL PHASE-TEMPORARY DEVIATIONS

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
1. Alteration of the hydraulic conditions of the watercourse at the culvert /pipe location.	• Regular inspections must be conducted to ensure that the rehabilitation on the adjacent macro-channel banks is well established and the area is stabilized. • Regular maintenance of the culvert and pipes must be conducted in order to clean out any debris. • Regular inspections on the culverts must be undertaken to ensure that natural low flow depths are maintained through the culvert base e.g. by use of a two stage channel.		MPWRT
2. Erosion protection.	• The relevant mitigation measures proposed for erosion control during the construction phase should be carried forward to operations, where potential environmental impacts may still occur. • Sufficient gabions must be installed and the riparian zone must be re-vegetated with indigenous plant, forb and tree species to control erosion. • The integrity of erosion prevention structures such as gabions and mattresses, stone pitching, rip-rap etc. should be inspected and appropriate maintenance and cleaning should be carried out.		MPWRT
3. Stormwater management.	• The relevant mitigation measures relating to stormwater management proposed for the construction phase should be carried forward to operations, where potential environmental impacts may still occur.		MPWRT

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Periodic clearing of existing drainage structures including existing open drain, pipe culverts, box culverts and inlets and outlet structures. • Alternative methods of cleaning out the pipes should be used e.g. pressurized air / water can be used to flush out trapped debris.		
4. Prevention of obstruction of migration of fauna	• Periodic cleaning of existing drainage structures including existing open drain, pipe culverts, box culverts and inlets and outlet structures. • Alternative methods of cleaning out the pipes should be used e.g. pressurized air / water can be used to flush out trapped debris.		MPWRT

8 REHABILITATION, CLOSURE AND DECOMMISSIONING PHASE – BRIDGES AND TEMPORARY DEVIATIONS

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
1. Waste management.	• The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste on site is not permitted. • Disposal of waste must be in accordance with relevant legislative requirements. • General waste disposal bins must be made available for employees to use throughout the deconstruction phase. • Waste should be temporarily stored on site (less than 90 days) before being disposed off appropriately. • General waste must be disposed of at an approved waste disposal facility. • Records of all waste being taken of site must be recorded and evidence of correct disposal must be kept. • Hazardous materials will be generated if there are spillages during construction. This waste should be cleaned up using absorbent material provided in spill kits on site. Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. • Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	contain 110% of the total volume of materials stored at any given time. • Provide employees with appropriate PPE for handling hazardous materials. • All hazardous waste will be disposed of in a registered hazardous waste disposal facility. • Ablution facilities in the form of mobile chemical toilets must be provided on site and construction workers must not under any circumstances relieve themselves elsewhere. • Chemical toilets must be cleaned and emptied regularly by a registered service provider.		
2. Erosion control.	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All areas where topsoil was removed should be landscaped using indigenous vegetation in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	stabilised the soil.		
3. Pollution of wetlands, ground water and surface water.	• Skips for the disposal of general waste should be provided around the site. The skips should have a well fitting lid to prevent wind from blowing away the litter and they should be emptied regularly and disposed off at a licensed waste disposal site. • Equipment and vehicles should be regularly inspected in order to detect leaks as early as possible. • Storage areas for machines and equipment must be located outside of the wetland boundaries (at least 50 m away). • Refuelling of machinery must be done using a drip tray and no vehicle refuelling is allowed within the wetland and buffer area. • Lubricants and other hazardous substances must be stored in a designated area that is well ventilated, with an impervious surface, bunded, covered, properly labelled and able to contain 110% of the total volume of materials stored at any given time. • The storage areas must be regularly inspected to ensure their integrity and access should be limited to authorised employees only. • Repair of equipment and vehicles must be undertaken only in the contractor lay-down area. • The Contractor must ensure that spill kits are always available on site and any spillages must be recorded and reported to the responsible person.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	• The Contractor and employees must be trained on correct handling of spillages and precautionary measures that need to be implemented in order to minimise potential spillages. • Ablution facilities in the form of mobile chemical toilets must be provided on site and construction workers must not under any circumstances relieve themselves elsewhere. • Chemical toilets must be sited away from the watercourses (further than 50 m), cleaned and emptied regularly by a registered service provider. • Potable water must be provided for the construction workers. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • The area of permanent saturation in the wetland at bridge 1 (Klein Olifants River) must be marked as a no-go area due to its sensitivity and can be fenced off temporarily if required. • The sensitive valley bottom wetland at bridge 3 (Joubertsvlei Spruit)_ must be fenced if necessary in order to restrict access and prevent disturbance.		
4. Disruption of water flow in the watercourse by pumping water out and into the watercourse.	• Should the WUL expire during the time of decommissioning, a new WUL should be applied for. • Care must be taken to ensure that the water is discharged in a manner that does not cause siltation or erosion into the wetland or downstream watercourse.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

ACTIVITY / ISSUE	ENVIRONMENTAL MEASURES AND CONTROLS	MONITORING AND CORRECTIVE ACTIONS	RESPONSIBLE PERSON/S
	• Any water discharged from pumping around the deconstruction area must first be discharged into a structure that allows the settlement of all suspended material and which allows the discharge of water into the wetland close to the banks of the river.		
5. Alteration of the natural drainage due to soil compaction as a result of movement of construction workers and machines.	• The movement of machinery and construction personnel should be limited to the existing disturbed footprint and not unnecessarily into adjacent undisturbed areas of the wetland. • If a separate access into the wetland needs to be created, care should be taken to prevent compaction by use of a running track constructed of geotextiles or 'bogmats' to protect the underlying soils and vegetation.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT
6. Wetland modification as a result of imported material being left on the original substrate.	• All imported foreign material must be removed from the wetland and the original substrate placed back in situ, with subsoil replaced prior to the topsoil. This material must be restored to the original ground level (or slightly higher to allow for settlement), but not lower than the original ground level as this would create a rut that would capture flow and disrupt the hydrology of the wetland. • Once removed, the footprint area of the deviation should be lightly 'scarified' to counteract compaction of the wetland substrate that may have occurred. • Reseeding should be undertaken if necessary. • If the wetland vegetation and substrate is	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	retained and imported foreign material is carefully removed, the topsoil and overlying vegetation should have been retained in a largely intact state. An existing seed base would still occur in the topsoil, and given the right conditions, should largely re-vegetate itself, even if some of the vegetation died off. It is important that the rehabilitated area be pegged with a geotextile or similar material if soils are exposed to protect the exposed topsoil, and to protect seedlings. • It is important that rehabilitation be an ongoing process over a few seasons, which entails that the sites should be periodically checked to determine the success of vegetation regrowth and to check for any emergence of erosion. Follow-up actions such as hydroseeding and manual removal of emergent weeds must be implemented, where necessary.		
7. Disturbance of the bed and banks due to removal of culverts and pipes.	• It is critical that the channel bed and banks within the road reserve be restored to a condition as close to the pre-construction state as possible. If the channel bed is disturbed, then it is very important that the bed be rehabilitated to a state as close to the pre-construction state as possible. This should involve the replacement of similar substrate within the channel to replicate the pre-construction habitat. • If the macro-channel banks are appropriately rehabilitated and re-vegetated with indigenous (to the area) plant species this will result in reduced	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	levels of siltation and sedimentation as well as allowing for the natural dispersal movements of remaining faunal species along the rivers. • It is thus important that the pre-construction channel profile be recorded before construction so that the banks can be returned to this profile, as far as is reasonably possible; e.g. if banks are eroded to a vertical profile, then a less vertical, but more stable bank profile can be reinstated.		
8. Preservation of flora and fauna e.g. Marsh Sylph (*Metisella meninx*) butterfly	• Low speed limits at the site should be enforced and adhered to prevent fauna fatalities. • Disturbance of vegetation cover within sensitive areas should be limited. • Construction activities for the proposed upgrade of the bridges and temporary deviations must be restricted to the existing bridge servitudes as well as road reserves. • The Contractor shall under no circumstances interfere with livestock without the landowner being present. This includes the moving of livestock where they interfere with construction activities. • Speed limits must be restricted (30 km/hr) preventing unnecessary road fatalities of surrounding livestock. • All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), namely: – Uprooting, felling or cutting; – Treatment with a weed killer that is	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	registered for use in connection with such plants in accordance with the directions for the use of such a weed killer; – The application of control measures regarding the utilisation and protection of veld in terms of regulation 9 of the Act; – The application of control measures regarding livestock reduction or removal of animals in terms of regulations 10 and 11of the Act; – Any other method or strategy that may be applicable and that is specified by the executive officer by means of a directive. • All alien invasive plant should be removed from the site to prevent further invasion. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass.		
9. Impairment of water quality due to sedimentation and construction effluent discharge.	• Run-off from the deconstruction area must be prevented from directly entering the wetlands. • The intensity of stormwater run-off should be reduced where possible. • Should water in the river channel need to be pumped around the deconstruction site and discharged back into the river, care must be taken to ensure that the water is discharged in a manner that does not cause siltation or erosion into the wetland or downstream watercourse. As such it is recommended that any water to be discharged from pumping around the construction area or from	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	dewatering operations be first discharged into a structure that allows the settlement of all suspended material, and which allows the diffuse discharge of water into the wetland close to the banks of the river. • Activities that lead to elevated levels of turbidity must be minimised.		
10. Stormwater management.	• The relevant mitigation measures relating to stormwater management proposed for the construction and operation phases should be carried forward to closure and decommissioning, where potential environmental impacts may still occur.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT
11. Dust control.	• Dust must be suppressed on the deconstruction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Low speed limits at the site should be enforced and adhered to prevent dust generation.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT
12. Noise Possible noise sources include: demolition of temporary deviation which could involve drilling; movement of construction vehicles.	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Contracted staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment. • Construction activities must be limited to	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	07:00 - 17:00, Monday to Friday and 08:00 - 13:00 on Saturday.		
13. Health and Safety Assurance.	• Low speed limits at the site must be adhered to. • All workers on site must wear the appropriate PPE equipment at all times. • All employees operating machinery and equipment must be properly trained on the use. • A safe and designated crossing point for community members must be demarcated. • Clear signage must be provided at any excavations and trenches to avoid people falling in. • A safety officer must be appointed for the entire duration of the deconstruction period. • The existing farm accesses close to the site will be assessed and considered during the work programme to ensure the safety of road users. • A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety. • The contractor must ensure that all equipment is maintained in a proper operating condition. • Any health and safety incidents must be reported to the project manager immediately. A record of health and safety incidents must be kept on site. • First aid facilities must be available on site at all times.	• Ongoing monitoring during rehabilitation, closure and / or decommissioning.	MPWRT

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	• Workers have the right to refuse work in unsafe conditions. • A record shall be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Contractor. • Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. • All workers must be trained in fire hazard control and fire fighting techniques.		

ANNEXURE A
LOCALITY MAP