KWAZULU-NATAL PROVINCE
TRANSPORT
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
Financial Services

Private Bag X9043, PIETERMARITZBURG, 3200
Inkosi Mhlabunzima Maphumulo House, 172 Burger Street, Pietermaritzburg, 3201
Tel: 033 355 8600

ADDENDUM NO. 01:

CONTRACT NO.: ZNB 00764/00000/00/HOD/INF/21/T:
THE COMPLETION OF THE PARTLY CONSTRUCTED PONGOLA VEHICLE BRIDGE No. 3513 AT MBOZA IN THE UMKHANYAKUDE DISTRICT UNDER EMPANGENI REGION

Date Issued: **24 February 2023**

This Addendum No. 01 comprises a total of **ONE HUNDRED AND FIVE (105) PAGES**, including this page.

The addendum serves to re-insert into the Tender Document - H Key Personnel H1 (Part T2: Returnable Documents T2.2 of the Tender Section) and Part C: Environmental Management Specification (Part C3.3 Particular Specifications of the Contract Section). These documents were unintentionally omitted from the version of the tender document that was made available for download.

In making the above corrections, no deviation has been made from the Tender Document that was supported by the BSC and approved by the BAC.

The amendments required to the Tender Document are as follows:

Amendment No.	Amendment Required
1	Delete Page T46 in the tender document and replace with Page T46A attached.
2	Delete Page C194 in the tender document and replace with Pages C92 to C194 attached.

Non-acknowledgment of this addendum will lead to disqualification.

The acknowledgment of this addendum must only be submitted with the bid document.

Should you have any queries with regards to the above, please contact Njabulo Vezi or Sandile Nkala.

Yours faithfully

Signed by:Justice Siboniso Mbhele
Signed at:2023-03-15 15:47:42 +02:00
Reason:Witnessing Justice Siboniso Mbh

Mr. JS Mbhele
Head: Transport

H. KEY PERSONNEL

H1. KEY PERSONNEL - MANAGEMENT

The Tenderer must insert in the spaces provided below a list of the key personnel to be employed in the management of the construction of the Works, together with a resume of their experience with particular reference to the construction of similar Works.

The Tenderer shall attach the curriculum vitae of the listed key management personnel to the page included below for this purpose.

DESIGNATION	NAME	PROJECT TYPE	VALUE OF WORK	YEAR COMPLETED
CONTRACTS MANAGER				
CONSTRUCTION MANAGER				
FOREMAN OR SUPEVISOR				

Attach additional pages if more space is required

SIGNATURE: .....

DATE: .....

(Of person authorised to sign on behalf of the Tenderer)

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

Directorate: Environmental Services

Enquiries: Mr. B.Z. Mathenjwa
Imibuzo :
Navrae :

Telephone: 035-560 0330
Ucingo :
Telefoon :

Private Bag : Private Bag X008
Isikhwama Seposi : Mtubatuba
Privaat Sak : 3935

Reference: DC27/0006/2017
Inkomba KZN/EIA/0000598/2017
Verwysing:

Fax : n/a
iFeksi :
Faks :

Date :
Usuku : 13/06/2018
Datum :

Fax Transmission

KwaZulu-Natal Department of Transport

172 Burger Street, Pietermaritzburg

Private Bag X9043

Pietermaritzburg

3200

Attention: Ms Khumbu Sibiya

Tel: 033 355 0594

Fax: 033 345 7537

Email: Khumbu.sibiya@kzntransport.gov.za

Dear Madam

DC27/0006/2017: : THE ESTABLISHMENT OF THE MBOZA BRIDGE ACROSS THE PONGOLA RIVER LOCATED BETWEEN MBOZA AND ZIHLABENI AREAS, IN WARD 10 OF JOZINI AND WARD 13 OF UMHLABUYALINGANA, LOCAL MUNICIPALITIES, WITHIN UMKHANYAKUDE DISTRICT.

The KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs has **authorized** the abovementioned project. This environmental authorization and reasons for the decision are attached herewith.

ENQUIRIES

Please note that:

- All queries regarding this application for environmental authorization (including the Department's decision) must be directed to the official of this Department with contact details provided on the letterhead above.
- Only queries regarding appeals must be submitted to the Office of the MEC (details provided below).

BZ.

NOTIFICATION OF DECISION ON APPLICATION

In accordance with regulation 4(2) of the EIA Regulations 2014, the applicant must in writing **within 14 days** of the date of this decision ensure that;

a. All registered interested and affected parties are provided with access to this decision and the reasons for the decision; and

b. The attention of all registered interested and affected parties is drawn to the fact that an appeal may be lodged against the decision in terms of the National Appeal Regulations 2014, if such appeal is available in the circumstances of the decision.

APPEALS

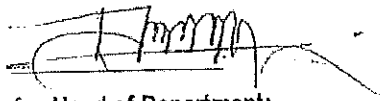
In accordance with regulation 4(1) of the National Appeal Regulations, 2014 an appellant must submit an appeal to the appeal administrator and a copy of the appeal to the applicant, any registered interested and affected party and organ of state with interest in the matter within 20 days from the date of notification of this decision.

An appellant must comply with regulation 4(2) and submit the appeal in writing and in the form obtainable from the appeal administrator by posted, faxed, e-mailed or hand delivered to the following address:

The Appeal Administrator,
Office of the KwaZulu-Natal MEC for Economic Development, Tourism & Environmental Affairs

POSTAL/ FAX/ E-MAIL:	PHYSICAL:
Private Bag X001 Bishopsgate 4008, Durban Tel: 031 310 5300 Fax: 031 310 5416 E-Mail: Haresh.Inderlall@kznded.gov.za (Haresh Inderlall)	9th Floor, The Marine Building, 22 Dorothy Nyembe Street, Durban 4001

Yours faithfully



for: **Head of Department:**

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

cc: **Environmental Assessment Practitioner (EAP)**

Company: Royal HaskoningDHV

Contact Person: Ms Humayrah Bassa

Tel: 087 350 6760, Fax: 031 719 5505 Cell: 083 642 7077, E-mail:Humayrah.bassa@rhdhv.com

edtea

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

Environmental Authorization

In terms of regulation 25 of the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE: THE ESTABLISHMENT OF THE MBOZA BRIDGE ACROSS THE PONGOLA RIVER LOCATED BETWEEN MBOZA AND ZIHLABENI AREAS, IN WARD 10 OFJOZINI AND WARD 13 OF UMHLABUYALINGANA, LOCAL MUNICIPALITIES, WITHIN UMKHANYAKUDE DISTRICT.

Local Municipalities: Jozini and uMhlabuyalingana

Application number: **NEAS No.**	DC27/0006 /2017 KZN/EIA/0000598/2017
Date of first issue:	13/06/2018
Date amended: (if amendment)	Not Applicable
Authorization holder:	KwaZulu-Natal Department of Transport
Location:	The proposed project is located on the Remaining Extent (Portion 0) of Farm **Makhathini Flats No. 16533**, (Portion 0) of **Farm Maarschalk No. 14924.** The Surveyor-General 21 digit site (erf/farm/portion): **N0HV00000001653300000** **N0HV00000001492400000**

Table of Contents

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Project Scope

The applicant; KwaZulu-Natal Department of Transport proposes to construct the Mboza Bridge (Bridge No. 3513) located across the Pongola river between Mboza and Zihlabeni Areas, in Ward 10 of Jozini and Ward 13 of Umhlabuyalina, Local Municipalities, within UMkhanyakude District. There is a pedestrian bridge, comprising of suspended structure with abutments constructed outside of the river banks, that was previously authorised at the same location (Ref: DC27/0009/2013, NEAS: KZN/EIA/0001216/2013) on 27 November 2013.This bridge does not cater for vehicles as it is only for pedestrians.

The proposed site (GPS co-ordinates; 27°11'17"S 32° 14'20"S) is located across the Pongola River about 3.5 kilometres (km) to the west of the Mboza Clinic off Road D1834. At this site the main channel of the river is approximately 55 m wide and 3 m deep and is frequently inundated with water. The nearest bridge to the site and local communities is 12 km south of this crossing point. Communities (including scholars) currently use a boat to cross the river at this site which is unsustainable and unsafe. The community thereafter expressed their need and wish for a vehicular bridge. Their request being that the site which had been earmarked for the pedestrian bridge be retained for the vehicular bridge and that the approach or connecting roads be improved.

The proposed bridge comprises a total deck span of approximately 60 m, with a width of 6 m that will accommodate a 3 m wide single lane, two 0.5 m shoulders and a 1.5 m wide pedestrian sidewalk with parapet hand railing. The proposed bridge will link two local municipalities namely, uMhlabuyalingana Local Municipality and Jozini Local Municipality. The east of the bridge (towards the uMhlabuyalingana Local Municipality) will lead to the D1834 road (2.8 kms away) and the Mboza clinic. The west of the bridge (towards Jozini Local Municipality) will lead to the D1836 (4.7 kms away) and the Munyu Primary school.

BZ

Decision

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014, the **KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs** (hereafter referred to as the "Department") **grants environmental authorization to:**

KwaZulu-Natal Department of Transport

(Herein after referred to as "the authorization holder")

Details of the contact person:

Ms. Khumbu Sibiya

172 Burger Street, Pietermaritzburg, 3200

Private Bag X9043

Pietermaritzburg

3200

Tel: 033 355 0594

Fax: 033 345 7537

E-mail: khumbu.sibiya@transport.gov.za

to undertake the following activities (hereafter referred to as "the activities") as described in section 1 below

1. Activities authorized and location of activity

The following activities in Government Notice No. GNR 327 dated 08 December 2014 as amended is triggered by the abovementioned project:

1.1 Description of Activities and location

Component (or phase) of the project		21 Digit Surveyor General code	GPS Coordinates
(a) The project will have a physical footprint of more than 100m² that will occur within a watercourse (b) The project will involve infilling and depositing of material of more than 10m³ from a watercourse.	➢ **Activity 12 of GNR 327** ➢ **Activity 19 of GNR 327**	**N0HV00000001653300000** **N0HV00000001492400000**	**Starting point** **Latitude:** 27° 11' 17.24" S **Longitude:** 32°14' 23.63" E
			Mid-point **Latitude:** 27° 11' 15.75" S **Longitude:** 32°14' 22.67" E
			End point **Latitude** 27° 11' 14.35" S **Longitude:** 32°14' 21.81" E

as described in the Basic Assessment Report (BAR) dated 21st of September 2017.

1.2 The physical address or farm name:

The east of the bridge (towards the Umhlabuyalingana Local Municipality) can be accessed via the D1834 road (2.8 kms away). The west of the bridge (towards Jozini Local Municipality) can be accessed via the D1836 (4.7 kms way).

BZ.

2. Conditions of Authorisation

This Environmental Authorization is subject to the conditions set out below:

2.1. Period of Validity: One or more of the listed activities authorized must commence within **ten years (10) years** from the date of issue. If commencement of the authorized activity/ any of the authorized activities does not occur within that period, this authorization lapses.

2.2 Environmental Audit Report

2.2.1 **During construction phase**; the authorization holder must submit **monthly** environmental audit reports compiled by the appointed Environmental Control Officer (ECO) to the Department.

2.2.2 The environmental audit reports must be prepared in terms of the requirements for auditing and the frequency of submission of environmental audit reports as indicated in Environmental Impact Assessment Regulations, 2014, Regulations26(e)-(f) &Appendix 7.

2.2.3 The environmental audit report must indicate: the date of the audit; the name of the auditor; and the outcome of the audit in terms of compliance with the environmental authorisation conditions as well as the requirements of the EMPr.

2.2.4 **During the operational phase**; the authorization holder must submit annual **environmental audit reports** prepared by the appointed ECO to the Department, for the first **two (02) years** of operation only.

2.2.5 Records relating to monitoring and auditing must be kept on site and made available for inspection to any person and competent authority in respect of this development.

2.2.6 The following Records must be kept on site for EDTEA officials if required:

- The Environmental Authorisation from this Department;
- The Environmental Management Programme (EMPr);
- Environmental Audit Reports;
- The construction layout plans;
- Photographic records of the affected area before, during and post construction; and all communication detailing changes of design that will have environmental implications.

BZ

2.3 Environmental Management Programme

2.3.1 The Environmental Management Programme (EMPr) for the construction and rehabilitation phases of this project as submitted for the environmental authorization of this project complies with section 24N of NEMA and Appendix 4 of the EIA Regulations, 2014.This EMPr is hereby **approved** and must be implemented.

2.3.2 The EMPr must be kept on site during construction and operational phases of the development.

2.4 Monitoring and Reporting to the Department

2.4.1 All requirements for the management, monitoring and reporting of impacts for all phases of the project must be adhered as specified in the EMPr.

2.4.2 The holder of the authorisation must appoint Environmental Control Officer (ECO) for the construction phase of the development that will conduct environmental audits and submit audit reports to the Department as specified in the approved EMPr.

2.4.3 The ECO must perform all duties as specified in the approved EMPr and keep all records of activities undertaken on site including reported incidents and solutions applied.

2.4.4 The ECO must be appointed before commencement of any land clearing or construction activities.

2.4.5 The ECO must be employed until all rehabilitation measures required for the construction phase are completed and the site is ready for operation.

2.4.6 The ECO must visit the site monthly during the construction phase unless otherwise agreed with the Department in writing.

2.5 The activities authorized must only be carried out at the location as described in **section 1** above.

2.6 Written notice of the commencement of the construction and operational phase

2.6.1 Not less than **seven (7) days** written notice must be given to the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), Department of Water and Sanitation (DWAS), and Department of Agriculture Forest and Fisheries (DAFF) that the construction phase will commence. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that construction will commence.

2.6.2 Not less than (thirty) **30 calendar days** written notice must be given to the Department that operational phase will commence.

BZ

2.7 Construction phase

2.7.1 The contractor and the contractor's employees must attend an environmental awareness training course presented by the appointed ECO, prior to construction commencement.

2.7.2 The ECO must keep record of the completed attendance register and minutes of such training, and produce such upon request. The environmental awareness training must at a minimum cover the following key aspects:-

- Basic awareness and understanding of the environmental features of the work site and the surrounding immediate natural environment.
- Understanding the importance of and reasons why the environment must be protected.
- Ways to minimise environmental impacts
- Worker code of conduct on site.
- Separation and appropriate disposal of different types of waste.
- Conditions of the environmental authorization and the approved EMPr.

2.7.3 Should there be a construction campsite; it must be located away from the natural vegetation and outside the 1:100 year flood line. No open fires are to be permitted in close proximity to flammable chemicals. Fires for cooking purposes must be permitted only in demarcated areas at the construction camp site, to minimize the risk of run-away veld fires.

2.7.4 The construction site must be clearly demarcated with the use of mechanisms such as fencing or barrier taping to prevent further physical disturbance of land outside of the development area.

2.7.5 The construction campsite and storage areas must be fenced off to keep unauthorized people and animals out of these areas.

2.7.6 Vegetation within the Bridge footprint must only be removed immediately prior to commencement of construction in order to minimize the period in which the soil will be exposed or left bare.

2.7.7 The construction of the Mboza Bridge must fully comply with the drawing plan submitted on the BAR, dated 5th of September 2017 (as attached in the BAR dated 5th of September 2017), and no deviation from this layout plan may be undertaken without prior written permission from this Department.

BZ

2.7.8 Erosion prevention and protection measures must be in place during stripping of groundcover.

2.7.9 Areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust and minimize air pollution.

2.7.10 The construction of the Mboza Bridge over the Pongola River must be undertaken in a manner that ensures that the natural movement patterns of aquatic life and the sustainable ecological functioning of the systems is not compromised.

2.7.11 The ECO must ensure that workers are limited to areas under construction within the Mboza site. No access to be allowed in undeveloped areas; especially the close woodland riparian zone of the Pongola River.

2.7.12 No animals must be intentionally killed or destroyed, hunting and poaching is prohibited on site.

2.7.13 Where disturbance on the watercourse is unavoidable, modification should be kept to a minimum in terms of removal of riparian vegetation and opening up of the stream channel.

2.7.14 Extreme care must be taken to ensure that river banks are not damaged. Stabillsing vegetation may only be removed where necessary, and the river banks must also be stabilised and re-vegetated after construction.

2.7.15 All machinery and equipment must be regularly serviced and maintained off-site to keep noise and dust to a minimum and to avoid any possible leaks.

2.7.16 Correct signage and traffic calming measures must be implemented and maintained throughout the construction phase (including prior to site preparation) at the site, to warn of the construction activities that will be underway.

2.7.17 All construction materials must be sourced from a licenced quarry. Documentary proof must be maintained on file and be made available to the Department on request.

2.7.18 Hazardous material storage and refuelling areas must be bunded with an impermeable liner to protect ground water quality.

2.7.19 Storm and surface water management measures must be put in place before construction commences.

2.7.20 A spill kit must be kept on site for use during accidental spillages. Staff must be trained on how to use the spill kit.

BZ

2.7.21 All spillages must be cleaned up as soon as they happen and disposed of at a hazardous waste site.

2.7.22 Stockpiles must not obstruct natural water pathways and they must be placed 32m away from the watercourse.

2.7.23 Earth, stone and rubble must not be placed in storm water channels, drainage lines or rivers.

2.7.24 Notice of noisy activities, if any, must be given to residents or businesses adjacent to the construction site, proof of such notice must be kept on site.

2.7.25 Bins and skips must be supplied on site for disposal of waste and burning of waste on-site is prohibited.

2.7.26 General waste must be removed and disposed of at a registered landfill site.

2.7.27 The authorization holder must ensure that temporary ablution facilities are in place for the contractor's and sub-contractor's employees to utilize during the construction phase. No temporary ablution facilities may be located within fifty (50) m of the watercourse, any drainage line or a water resource.

2.7.28 Sewage from these temporary ablution facilities must be disposed of at a permitted wastewater treatment facility.

2.7.29 Portable water must be supplied to the contractor and sub-contractor's employees for the duration of construction phase.

2.7.30 In areas where construction activities have been completed and where no further disturbance would take place rehabilitation must commence immediately after construction.

2.7.31 Landscaping must make use of indigenous vegetation found within a 10 kilometre radius of the site and occurring naturally within river line ecosystem and no exotic plants are to be introduced.

2.7.32 Soil erosion measures must be implemented during all phases of the development; pre-, during and post construction activities, especially along areas sensitive to erosion.

2.7.33 An area must be allocated for the contractor's and sub-contractor's employees to change and store their personal belongings.

2.7.34 The ECO must ensure that all recommendations in the storm water management plan is implemented and strictly adhered to.

BZ

2.7.35 KZN Department of Transport made a commitment on the letter dated 17 May 2018 that the community members whose agricultural crops will be affected due to the construction activities associated to the Mboza Bridge will be compensated in line with the Department of Transport compensation policy. **KZN Department of Transport** must ensure adherence to this commitment regarding compensation.

2.7.36 This does not negate the holder of this Authorisation from complying with statutory requirement of any other relevant State Department.

2.7.37 Should any archaeological or heritage resources be uncovered on site due to the development, the contractor or subcontractor's must stop all activities within the immediate vicinity of the finding and Report to AMAFA KwaZulu Natal to investigate.

2.8 Operational Phase

2.8.1 All construction vehicles as well as construction material, must be removed from the site after completion of the construction phase.

2.8.2 The control of alien invasive plants within the development's footprint and within the road reserve must be undertaken in accordance with the approved EMPr during the operational phase.

2.8.3 As part of the regular maintenance programme, the constructed causeway must be monitored by the authorization holder every 06 (six) months for erosion and concrete culverts cleared of silt to ensure their efficient functioning.

2.9 Availability of this environmental authorisation.

2.9.1 A copy of this environmental authorisation must be kept by the authorisation holder and made available to any official of the Department.

2.10 Notification of interested and affected parties

2.10.1 The authorisation holder must notify every registered and interested party, in writing and within **fourteen (14) calendar day from the date of** the Department's decision to authorise the activity.

2.10.2 The notification referred to must- Specify the date on which the authorisation was issued; Inform the interested and affected parties of the appeal procedure provided for in regulation 4 of the National Appeal Regulations, 2014; and Advice interested and affected parties that a copy of the authorisation will be furnished on request

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3. General

3.1 Compliance with the conditions of this authorization

In terms of section 24F of the National Environmental Management Act, 1998 (Act No. 107 of 1998), no person may commence with an activity listed in terms of section 24(2) (a) or (b) of the Act, unless the competent authority has granted an environmental authorisation.

3.2 Understanding the conditions of this authorization

It is the responsibility of the authorization holder to understand the conditions of this authorization. Any queries regarding this environmental authorisation must be submitted in writing to the Department (contact details in section 3.5).

3.4 Amendments to the project / EMPr/Closure Plan

Any changes to, or deviations from, the project description set out in this authorisation must be approved, in writing, by the Department before such changes or deviations may be effected.

3.4.1 Any subsequent amendments to the approved EMPr must also be submitted to the Department for review. The amendments must only be implemented after being approved by the Department.

3.4.1 Should the activity ever cease or become redundant, the authorisation holder must contact the Department to determine the required action for rehabilitation and closure of the site.

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3.5 Contact details of the Department

The following contact details for the Department must be used for all reports, notices etc. which must be submitted to the Department:

Department of Economic Development, Tourism and Environmental Affairs

Private Bag X008

Mtubatuba

3935

Tel No: 035 550 0330

Attention: Control Environmental Officer: Compliance, Monitoring & Enforcement, UMkhanyakude District Office).

Date of environmental authorisation: 13/06/2018

for: Head of Department

KwaZulu Natal Department of Economic Development, Tourism and Environmental Affair

Annexure 1: Reasons for Decision

1. **Information considered in making the decision**

In reaching its decision, the Department took, *inter alia*, the following into consideration -

a) Application form dated 29th of June 2017.

b) The BAR dated 5th of September 2017.

c) The comments received from the organs of state and interested and affected parties as included in the BAR dated 5th of September 2017.

d) Mitigation measures as proposed in the BAR dated 21st of September 2017 has been incorporated in the EMPr dated 5th of September 2017.

e) The findings of the site visit undertaken by Departmental official on the 20th of December 2017.

2. **Key factors considered in making the decision**

a) **Basic Assessment Report dated 21 September 2017**

i. The BAR dated 5th of September 2017complies with the requirements of the EIA Regulations, 2014 and has been accepted by the Department;

ii. The BAR received by the Department on the 5th of September 2017included a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;

iii. The methodology used in assessing the potential impacts identified in the BAR dated 5th of September 2017 and the specialist studies have been adequately indicated.

b) **Public participation:**

The public participation process complies with the requirements of Chapter 6 of the EIA Regulations, 2014 and the comments from the organs of state, interested and affected parties have been included in the BAR dated 5th of September 2017. Stakeholders who were notified to submit comments on the application include: Department of Water and Sanitation, Ezemvelo KZN Wildlife, Department of Agriculture Forest and Fisheries and KZN, EDEA.

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There is a proof that all stakeholders mentioned above were given time to comment on the project within (thirty) 30 calendar days.

c) **Socio-economic impact**

The local community will benefit from having a safer and more efficient way of crossing the Pongola River especially during periods of floods when crossing is highly dangerous. This improved connectivity will give the local community members greater access to important road networks within the region, allowing them to get employment opportunities and school facilities in a timely and easier manner. It also anticipated that a number of contract job opportunities will be provided to the local community members during the construction phase.

d) **Need and desirability**

The construction of the Pongola Bridge is aimed at assisting the local communities by providing safe river crossing and also to link both areas. For the local communities, crossing this river throughout the year is a necessity in order to access public services, community facilities and infrastructure such as schools, local shops, pension pay-out points, towns and health facilities without using a boat as they currently do in order to cross the 55 m wide Pongola River. At present, crossing the river is not safe, especially during rainy seasons when the river flow is stronger and flooding may occur.

e) **Site alternatives**

Site alternatives were not assessed in details, as the proposed location is currently used as an informal crossing site and is therefore already disturbed by the communities accessing the area to cross the Pongola River by boat. Additionally, an Environmental Authorisation for a pedestrian bridge at the same location was granted on the on 27th of the November 2013 (Ref: DC27/0009/2013, NEASE: KZN/EIA/0001216/2013).The community is also requested a vehicular bridge to be constructed in a place of the pedestrian bridge and that the approach roads be improved. A preliminary Ecological assessment was undertaken to identify the alignment which would have the least impact on the surrounding flora and fauna.The original alignment was therefore move slightly at the request of the Ecologist in order to ensure the alignment was within the most disturbed portion of the receiving environment.

BZ.

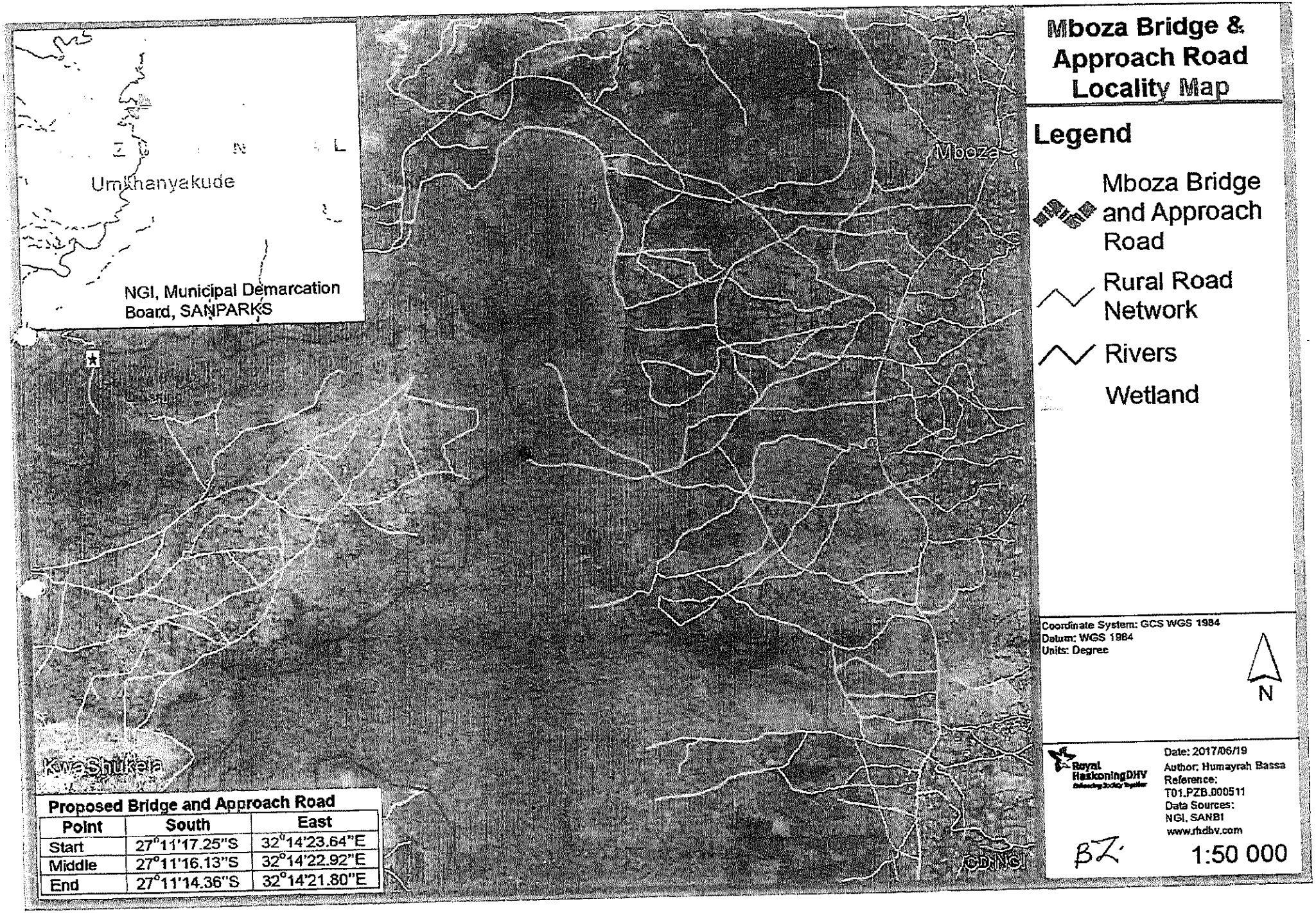
f) **No-go option**

The No-Go alternative, which means that the bridge will not be constructed, will mean the status quo will remain as is. The communities will have to continue to travel 12 km to the next nearest bridge crossing or continue to cross the river by boat when the Pongola River is full of water. Primary goal of increased mobility as well as safe and efficient access to essential services for the communities will not be met. Existing transportation options such as using the bridge 12 km away are both costly and time consuming for the communities, whilst using a boat to cross the Pongola River poses a safety risk to all users.

Should the status quo remain, the direct and indirect positive socio- economic benefits to the surrounding communities will not be realised.

g) **Objectives of integrated environmental management:**

The Department is satisfied that, subject to compliance with the conditions contained in the environmental authorization, the general objectives of integrated environmental management laid down in Chapter 5 of NEMA will be met.



Mboza Bridge & Approach Road Locality Map

Legend

- Mboza Bridge and Approach Road
- Rural Road Network
- Rivers
- Wetland

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

N

Royal HaskoningDHV

Date: 2017/06/19
Author: Humayrah Bassa
Reference: T01.PZB.000511
Data Sources: NGI, SANBI
www.rhdhv.com

BZ

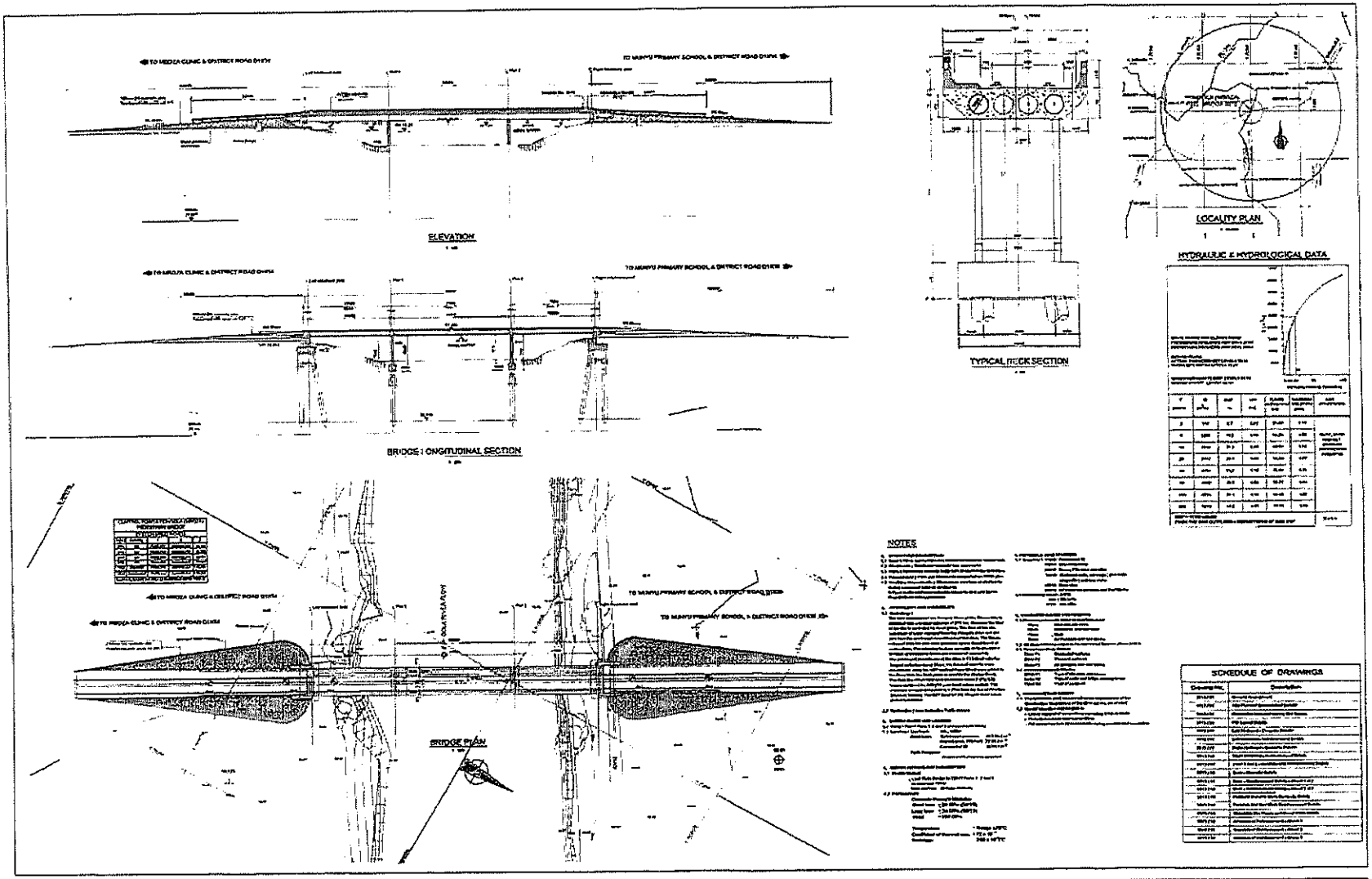
1:50 000

Proposed Bridge and Approach Road

Point	South	East
Start	27°11'17.25"S	32°14'23.64"E
Middle	27°11'16.13"S	32°14'22.92"E
End	27°11'14.36"S	32°14'21.80"E

Annexure 2: Locality map of the Mboza Bridge

Annexure 3: Layout Plan of the Mboza Bridge



		AS BUILT			Royal HaskoningDHV	OFF DISTRICT ROAD D1834 (MBOZA CLINIC) TO D1836	
						MBOZA RIVER BRIDGE No.3513 GENERAL ARRANGEMENT	3513/1

BZ'

REPORT

Environmental Management Programme for the Proposed Construction of the Pongola (Mboza) River Bridge and Vehicular Approaches off District road D1834

Client: KZN Department of Transport

Reference: MD1676

Revision: 01/Final

Date: 05 September 2017

Royal HaskoningDHV

Enhancing Society Together

Royal HaskoningDHV

ROYAL HASKONINGDHV (PTY) LTD

19 Park Lane
3rd Floor The Boulevard Umhlanga
Umhlanga
Umhlanga Rocks
4319
Transport & Planning
Reg No. 1966/001916/07

+27 (0)873508660 T
durban@rhdhv.com E
royalhaskoningdhv.com W

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Author(s): Vivienne Vorster

Drafted by: Vivienne Vorster

Checked by: Bronwen Griffiths

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Approved by: Bronwen Griffiths

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Table of Contents

Royal HaskoningDHV

Royal HaskoningDHV

Royal HaskoningDHV

Table of Tables

Table of Figures

Royal HaskoningDHV

Acronyms

CA	Competent Authority
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EMPr	Environmental Management Programme
ERP	Emergency Response Plan
GNR	Government Notice Regulation
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
MSDS	Material Safety Data Sheet
NCR	Non-Conformance Report
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 36 of 1998) (as amended)
NEMA	National Environmental Management Act (Act No. 107 of 1998) (as amended)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
PES	Present Ecological State
RoW	Right of Way
SDC	Safe Disposal Certificate
SEF	Site Environmental File
SEMA	Suite of Environmental Management Acts
SHE	Safety, Health and Environmental
WUL(A)	Water Use Licence (Application)

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Glossary

Accident	A road vehicle accident.
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	Companies appointed on behalf of the Developer to undertake activities, as well as their sub-contractors and suppliers.
Construction Project Management Team	The team consists of a Project Manager as well as a Safety, Health and Environmental officer.
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.
Emergency	An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.
Environment	In terms of the National Environmental Management Act (NEMA) (No 107 of 1998)(as amended), "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, plants and animal life; (iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Control Officer	An individual nominated through the Developer to be present on-site to act on behalf of the Developer in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.
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 environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project.
General Waste	General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes - (i) domestic waste; (ii) building and demolition waste; (iii) business waste; and (iv) inert waste.

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General Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.
Hazardous Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.
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
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.
Principal Agent	The principal agent is appointed by the Developer to oversee the overall project management and the management of the professional project team.
Recovery	The controlled extraction of a material or the retrieval of energy from waste to produce a product.
Re-Use	To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.
Recycle	A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.
Safety, Health And Environmental Officer	The SHE officer is a Contractor representative, responsible for the safety, health and environmental aspects on the construction-site. The SHE officer will be responsible for the day-to-day monitoring of the EMPr and Health and Safety Plan.
Waste	Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered - (i) that is surplus, unwanted, rejected, discarded, abandoned or disposed of; (ii) which the generator has no further use of for the purposes of production; (iii) that must be treated or disposed of; or (iv) 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— o a by-product is not considered waste; and o any portion of waste, once re-used, recycled and recovered, ceases to be waste
Waste Disposal Facility	Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.
Workforce	The entire project team including people employed by the Principal Agent or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

1 INTRODUCTION

1.1 Project Background

Royal HaskoningDHV have been appointed by the KwaZulu-Natal Department of Transport (KZN DoT) to perform feasibility studies and to investigate, design, and manage the construction for the proposed Pongola (Mboza) Bridge (Bridge No. 3513). The proposed bridge is located between Ward 10 of Jozini Local Municipality and Ward 13 of the uMhlabuyalingana Local Municipality. The purpose of the bridge will be to link the two (2) communities within the uMkanyakude District Municipality, KwaZulu-Natal.

The proposed site (GPS co-ordinates: 27°11'17"S 32°14'20"E) is located on the Pongola River about 3.5 km to the west of the Mboza Clinic off District Road D1834. The nearest bridge to the site and the associated local communities is 12 km south of this proposed crossing point.

It is proposed that the bridge comprises a total deck span of approximately 60 metres (m). Further the approaches on either side, (50 m) on either side of the bridge, be upgraded. The total combined length of the proposed works is 160 m. The width of the proposed bridge will be 6 m in order to accommodate a 3 m wide single lane with two (2) 0.5 m shoulders, and a 1.05 m wide pedestrian sidewalk and two (2) 0.475 m parapet hand railings. The height of the carriageway would be approximately 2 m above the water level.

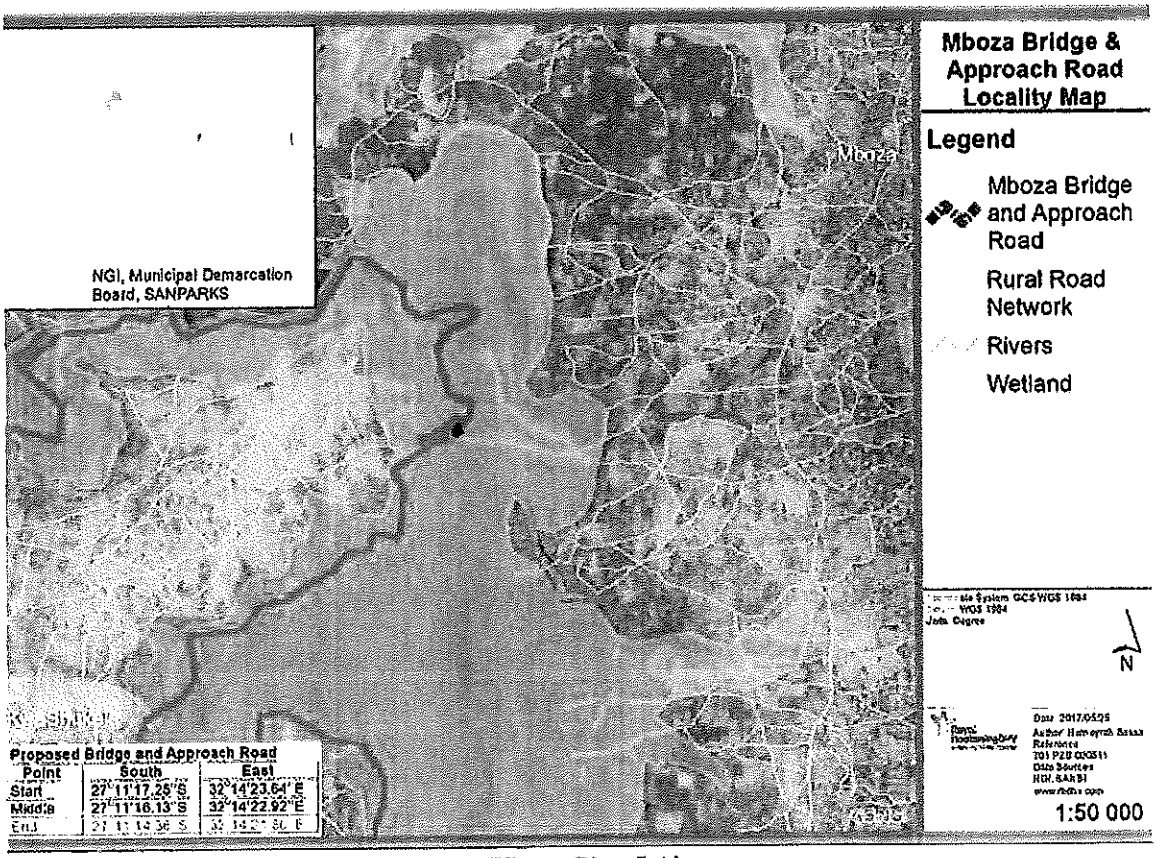

Figure 1-1: Locality of the Proposed Pongola (Mboza) River Bridge

1.2 Purpose of the Environmental Management Programme

In terms of The Constitution of the Republic of South Africa (1996), everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and the use of natural resources whilst promoting justifiable economic and social development (Section 24). The needs of the environment as well as affected parties should thus be integrated into the overall project concept and a balance achieved where possible negative impacts are reduced to low levels and the positive benefits compounded.

The Constitution is underpinned by the suite of Specific Environmental Management Acts (SEMA) – including the National Environmental Management Act (Act No. 107 of 1998, NEMA), National Environmental Management Waste Act (Act No. 59 of 2008, NEM:WA), National Environmental Management Air Quality Act (Act No. 39 of 2004, NEM:AQA), National Environmental Management Biodiversity Act (Act No. 10 of 2004, NEM:BA), National Environmental Management Integrated Coastal Management Act (Act No. 24 of 2008, NEM:ICMA), National Environmental Management Protected Area Act (Act No. 57 of 2003, NEM:PAA), as well as, the National Water Act (Act No. 36 of 1998, NWA). These acts combined serve to control all relevant facets of the environment so as to ensure that Section 24 of the Constitution is ensured.

The Environmental Management Programme (EMPr) is developed in terms of the SEMA and ensures that construction activities meet the requirements of existing environmental legislation and good environmental practice in terms of local and international standards and guidelines. This is achieved by identifying those construction activities for the proposed development that may have a negative impact on the environment; outlining the mitigation measures that will need to be taken and the steps necessary for their implementation and describing the reporting system to be undertaken during construction.

It is noted that protection of the environment is enshrined in the Duty of Care requirement of the National Environmental Management Act (section 28 of the Act No. 107 of 1998) (as amended), which thus means that it is the duty of all land-owners and users to ensure that the activities they carry out on a site do not cause detriment to the environmental facets thereof. The EMPr thus functions as a programme which can be monitored and audited that will allow the Developer the ability to ensure that all that operate on the site do so in an environmentally safe manner. It is also structured in such a way that the conditions may be linked to a standard construction contract. It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented.

Core to the purpose of the EMPr is to implement the 'mitigation hierarchy' (DEA *et al.*, 2013), which is illustrated in Figure 1-2 below.

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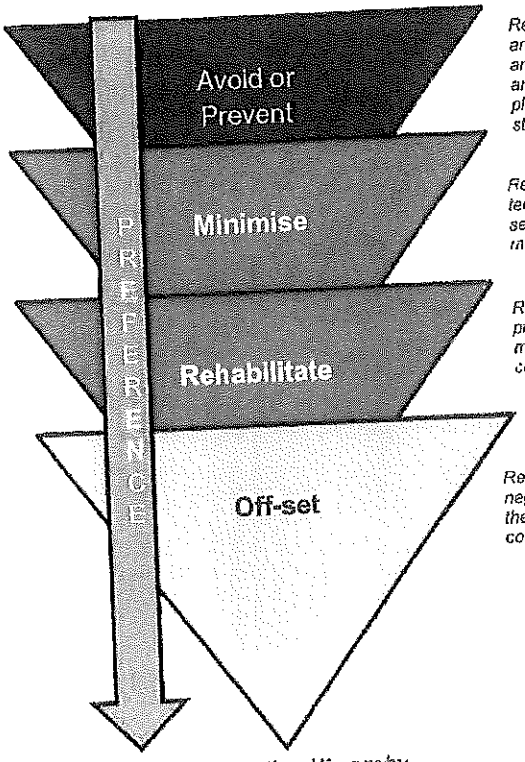

Refers to considering options in project location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services, and people. This is the best option, but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts the activity should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation.

Refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort must be made to minimise impacts.

Refers to rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to near-natural state or an agreed land use after mine closure. Although rehabilitation may fall short of replicating the diversity and complexity of a natural system.

Refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

Figure 1-2: The Mitigation Hierarchy

1.3 Objectives of the EMPr

The EMPr has the following objectives:

- To ensure compliance with regulatory authority stipulations and guidelines; which may be local, provincial, national, and / or, international.
- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved / complied with 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 associated with the proposed project.
- To identify measures that could optimise beneficial impacts.
- To prevent long-term or permanent environmental degradation.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the draft environmental management programme must be implemented, where appropriate.
- To provide an environmental awareness plan.
- Provide rational and practical environmental conditions / requirements to:
  - Minimise disturbance of the natural environment;
  - Ensure water resource protection;

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- Prevent or minimise all forms of pollution;
- Protect indigenous flora and fauna;
- Prevent soil and sand erosion and facilitate the re-vegetation of affected areas;
- Maintenance of newly re-vegetated areas;
- Restrict noise disturbance;
- Ensure compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment;
- Adopt the best practical means available to prevent or minimise adverse environmental impacts;
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste; and
- Train the Developer, their employees and contractors (including all sub-contractors) with regard to their environmental obligations.

The EMPr is essentially, a written programme of how the environment is to be managed in practical and achievable terms.

An independent Environmental Control Officer (ECO) must be appointed by the Developer (i.e. KZN DoT), to ensure compliance with the EMPr.

1.4 Scope of the Environmental Management Programme

In accordance with the requirements of the National Environmental Management Act (Act No. 107 of 1998, NEMA), this EMPr is to be implemented by the Developer as well as any employee, contractor, agent, or sub-contractor appointed to act on behalf of the Developer in the execution of the project, in order to ensure environmental compliance on site.

The specifications outlined in this EMPr are thus applicable to all activities undertaken by the Developer as well as their appointed contractors and all persons involved in the execution of the works, including sub-contractors, the workforce, suppliers, and volunteers, for the duration of construction, operation and future maintenance.

Included within the EMPr is guidance for on-going training with respect to the implementation of the conditions included therein, including induction by all new people coming onto site to carry out work, and 'top-up' activities such as regular 'toolbox talks' on specific key issues.

An Environmental Code of Conduct has also been developed that provides a simplified set of rules that must be adhered to by all persons involved with the project at all times. This is to be displayed at strategic points to ensure constant environmental awareness.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in the EMPr by the Developer, the Contractor and Sub-contractors. It is further assumed that compliance with the EMPr will be monitored and audited as set out in this EMPr and contractual clauses.

1.5 Structure of the EMPr

The EMPr provides proposed mitigation and management measures for the following phases of the project (Table 1-1).

Table 1-1: Different Phases of the Project Life-cycle

PHASE	DESCRIPTION
Pre-Construction	This section will provide guidelines on pre-construction activities including site establishment and clearance; environmental induction and training and awareness; site access and health and safety.

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PHASE	DESCRIPTION
Construction	This section will provide guidelines on construction methods and considerations.
Post-Construction	This section of the EMPr provides management principles for the rehabilitation, maintenance and operational phases of the Pongola (Mboza) River Bridge project. This will include best practice, procedures and responsibilities as required for various associated activities.

1.6 The EMPr as a "Live" Document

The approach adopted for this EMPr is derived from the Deming Cycle (**Figure 1-3**), a cycle of continuous improvement that entails the reiterative actions of plan, do, check, act, and critically to then return to the planning phase.

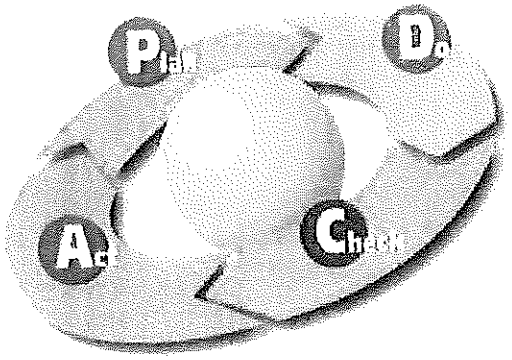

Figure 1-3: Deming Cycle of Continuous Improvement

1.6.1 Plan

Project-specific planning for the proposed project involves consideration of the legal triggers, the specifics of the proposed development, and the nature of the receiving environment. This provides a starting point for targeted environmental management objectives.

Environmental performance indicators are then determined with measurable targets prescribed to monitor the environmental performance of the project. Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

1.6.2 Do

Throughout the development's life-span, the Developer will be required to develop and maintain a Quality Management System (QMS) – designed to ensure that best management practices are implemented in day-to-day management.

Such a QMS must at least include the following information:

- Location and extent of associated infrastructure;
- Associated activities, such as the transportation of people and equipment;
- Resources and experience required (staffing);
- Materials and equipment to be used;
- Management actions;
- Human resources used;
- Construction-monitoring activities;
- Emergency / disaster incident and reaction procedures; and
- Rehabilitation procedures for the impacted environment.

These topics will be cross-linked into the contracts related to the development of the project.

1.6.3 Check

A system of assessing monitoring results has been developed to check the environmental management performance. Continuous assessment facilitates proactive management of the environmental issues. Mitigation measures can then be successfully implemented on an on-going basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability.

1.6.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed and instructions will be given in order to implement these in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and must be updated regularly to address the changing circumstances of the scheme.

1.7 Details of the Developer

The Developer is the KZN DoT and the details of the responsible person are listed below.

Table 1-2: Details of the Developer

DEVELOPER	TONGAAT HULETT DEVELOPMENTS
Contact Person	Ms Khumbu Sibiya
Postal Address	Private Bag X9043, Pietermaritzburg, 3200
Telephone	033 355 8600
E-mail	Khumbu.Sibiya@kzntransport.gov.za

1.8 Details of the Environmental Assessment Practitioner

Royal HaskoningDHV have been appointed as the Independent Environmental Assessment Practitioner (EAP) to prepare the EMPr. The team responsible for the preparation of the EMPr has been identified below:

Table 1-3: Details of the Environmental Team

NAME	ORGANISATION	PROFESSIONAL REGISTRATION	TELEPHONE	EMAIL
Vivienne Vorster	Royal HaskoningDHV	EAPASA	087 350 6660	vivienne.vorster@rhdhv.com
Bronwen Griffiths	Royal HaskoningDHV	Professional Natural Scientist, 400169/11	087 350 6660	bronwen.griffiths@rhdhv.com
Bjorn Hoffmann	Royal HaskoningDHV		087 350 6660	bjorn.hoffmann@rhdhv.com

2 ENVIRONMENTAL CODE OF CONDUCT

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on-site activities. This environmental code of conduct provides the basic rules that must be strictly adhered to.

It is the responsibility of the Site Environmental Officer, the Environmental Officer and ECO (as appointed) to ensure that each contractor, sub-contractor and workforce understand and adhere to the Code of Conduct.

All persons are obliged to keep to the rules of this code of conduct

Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution must not be tolerated!

Environmental Rules

- Do not waste electricity, water or consumables;
- Only use authorised accesses;
- Do not litter;
- Dispose solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated waste water to the storm water or the environment;
- Immediately report any spillage from containers, plant or vehicles;
- Do not burn or bury any waste in the sand;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal;
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions;
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the fire fighting procedure and locations of fire fighting equipment; and
- Know the environmental incident procedures.

3 SITE DESCRIPTION

3.1 Project Description

The proposed site (GPS co-ordinates: 27°11'17"S 32°14'20"E) is located on the Pongola River about 3.5 km to the west of the Mboza Clinic off District Road D1834. At this site the main channel of the river is approximately 55 m wide and 3 m deep and is a perennial river. The nearest bridge to the site and the local communities is 12 km south of this crossing point.

A pedestrian bridge, comprising of a suspended structure with abutments constructed adjacent to the riverbanks, was previously authorised at the same location (Ref: DC27/0009/2014, NEAS: KZN/EIA/0001216/2013) on 27 November 2013.

The community thereafter aired their need and wish for a vehicular bridge. Their request being that the site which had been earmarked for the pedestrian bridge be retained and a vehicular bridge constructed and that the approach roads be upgraded.

It is proposed that the bridge comprises a total deck span of approximately 60 metres (m). Further the approaches on either side (50 m) of the bridge be upgraded. The total combined length of the proposed works is 160 m. The width of the proposed bridge will be 6 m in order to accommodate a 3 m wide single lane with two (2) 0.5 m shoulders, and a 1.05 m wide pedestrian sidewalk and two (2) 0.475 m parapet hand railings. The height of the carriageway would be approximately 2 m above the water level.

The 50 m access road on either side of the bridge, will be surfaced with concrete paving at natural ground level or up to 300 mm above the natural ground level and keyed into the ground. The deeper areas in the flood plain will be utilise low lying 1,800 x 1,800 mm culverts to allow water normal flows to pass under, and peak flood levels to pass over the approaches, without causing erosion and without trapping debris.

3.2 Coordinates

Table 3-1: Co-ordinates for the extent of the proposed project site

STARTING POINT OF SITE			
Latitude / Longitude	**Degrees**	**Minutes**	**Seconds**
South	27°	11'	17.24"
East	32°	14'	23.63"
MID-POINT OF SITE			
Latitude / Longitude	**Degrees**	**Minutes**	**Seconds**
South	27°	11'	15.75"
East	32°	14'	22.67"
END POINT OF SITE			
Latitude / Longitude	**Degrees**	**Minutes**	**Seconds**
South	27°	11'	14.35"
East	32°	14'	21.81"

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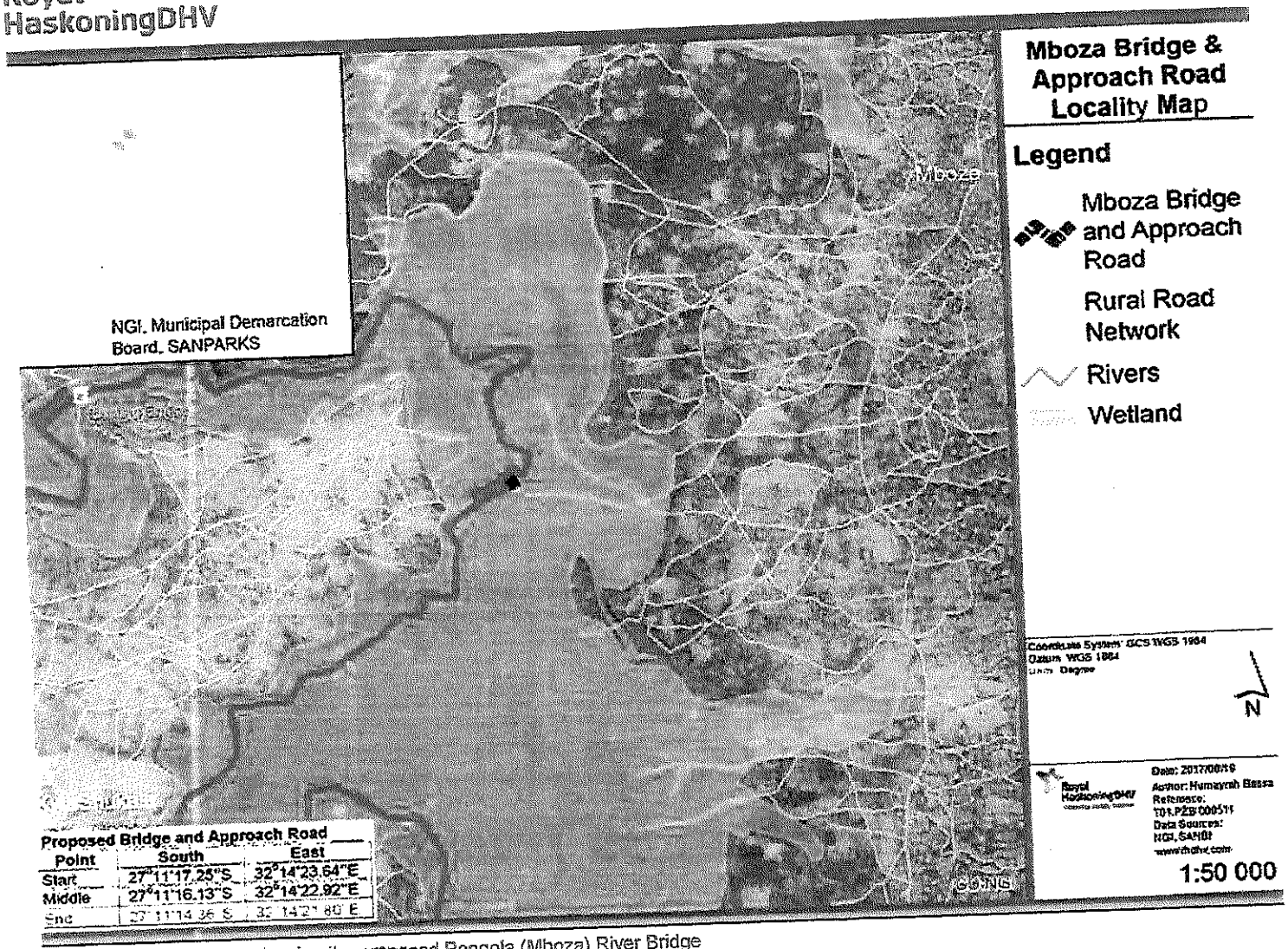

Figure 3-1: Locality map showing the proposed Pongola (Mboza) River Bridge

3.3 Sensitivity Map

All rivers including the Pongola River as well as adjacent floodplain (to a lesser extent) must be considered as Highly sensitive habitats due to ecological functioning as well as providing suitable habitat as well as biological or dispersal corridors for remaining faunal species. The Pongola River and Lowveld Riverine Forest azonal vegetation type comprises an 'Endangered' vegetation type (Mucina & Rutherford 2006).

The overall sensitivity map for the area is show in Figure 3-2 below:

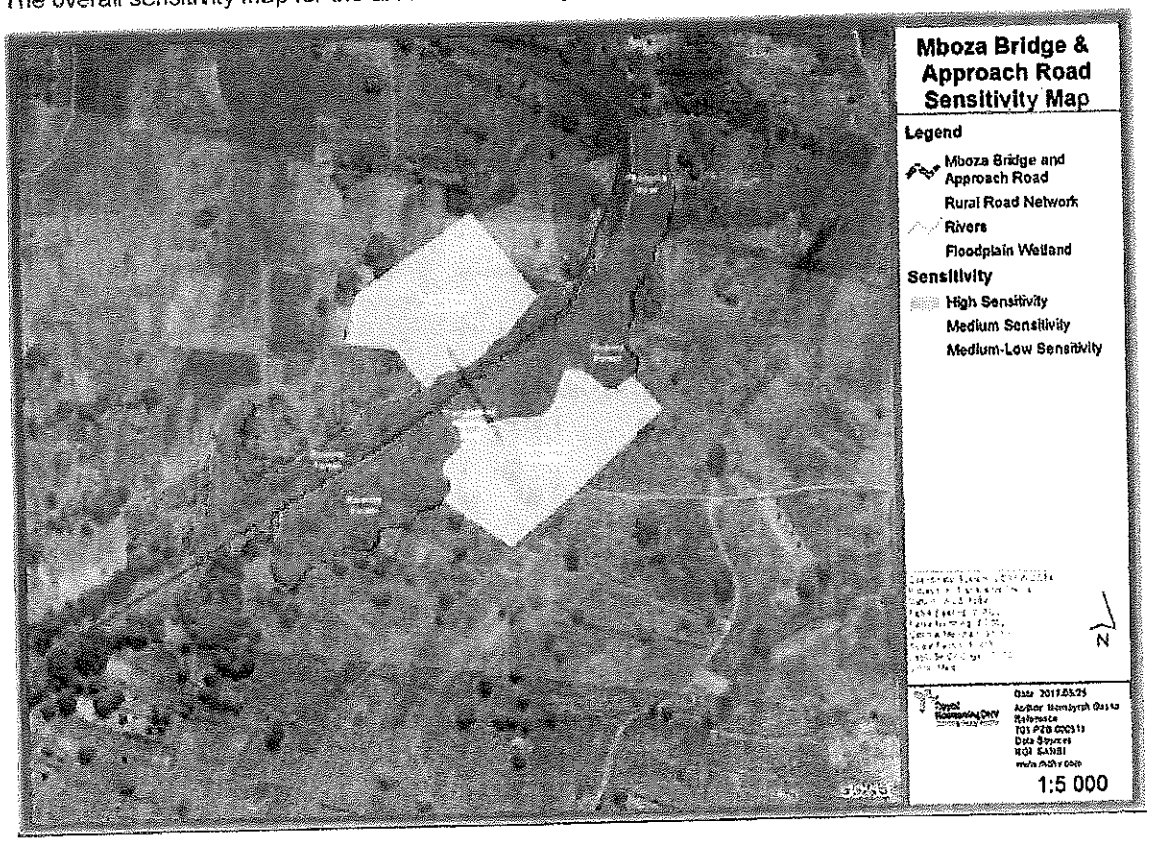

Figure 3-2: Sensitivity Map for the Pongola (Mboza) River Bridge

4 LEGAL FRAMEWORK

4.1 Summary of Relevant Environmental Legislation

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

Table 4-1: Legislative Requirements1

LEGISLATION	SECTIONS	RELATES TO
The Constitution (No. 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights.
National Environmental Management Act (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.
EIA Regulations 2014 (as amended)	GNR983	Activities requiring a Basic Assessment study to be undertaken.
	GNR984	Activities requiring a Scoping and Impact Assessment study to be undertaken.
	GNR985	Activities in special geographical areas requiring a Basic Assessment study to be undertaken.
National Waste Act (Act No. 59 of 2008) and List of Waste Activities (November 2013)	Entire Act must be considered	Provides for specific waste management measures and the remediation of contaminated land.
Norms and Standards for the Storage of Waste, 2013	GNR 926 – Sections 7 – 20	Provides specific guidelines for the operational procedures for a facility for the storage of waste.
National Heritage Resources Act (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 paleontological 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

It is noted that the legal framework provided in this document relates to the most recent legislation at the time of compiling this document. It is noted that legislation changes continuously and it is the Developers responsibility to ensure that they are compliant with the most relevant legislation at any given time.

LEGISLATION	SECTIONS	RELATES TO
		on or associated with such place
	Section 38	This section provides for Heritage Impact Assessments (HIAs), not already covered under the environmental law. Where covered under such law the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The HIA is thus approved under the environmental authorisation, which must take into account the provincial heritage resources authorities' comments prior to making a decision on the HIA.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Section 34	Control of noise
	Section 35	Control of offensive odours
National Dust Control Regulations (GNR 827 of November 2013)	Entire regulatory document must be considered	Control of dust
Occupational Health and Safety Act (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 (Act No. 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
	Section 21	Water uses
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 22	Application for a mining permit/right
	Section 39	Environmental management programme and environmental management plan.
Hazardous Substances Act (Act No. 15 of 1973) and regulations	Entire Act must be considered	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances
National Environmental Management: Biodiversity Act (No. 10 of 2004)		Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources
	Section 53	Protection of threatened or protected ecosystems
	Section 65	Control of alien species
	Section 71	Control of invasive species
National Forests Act (Act No. 84 of 1998) and Regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette
	Sections 12 – 16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular

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LEGISLATION	SECTIONS	RELATES TO
		woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodland or species. In terms of 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 of dispose of any protected tree, except under a licence granted by the Minister
National Road Traffic Act (Act No. 93 of 1996)	Entire Act must be considered	Road safety
Ordinance		Town Planning and Townships Ordinance 15 of 1986
By-laws		Promulgated by-laws: ▪ Waste Management ▪ Property Rates by laws ▪ Legal Services ▪ Municipal Cemeteries ▪ Discharge of Industrial Effluent ▪ Electricity Supply
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication
Natal Nature Conservation Ordinance (Ordinance 15 of 1974)		Sensitive species are protected under this Ordinance and must be considered

4.2 Authority Consultation and Approvals

The following environmental documentation is applicable to the project, and must be read in conjunction with this EMPr:

- Environmental Authorisation (EA) – once issued;
- Final Approved Consultation Basic Assessment Report for the project;
- Water Use Authorisation– once issued;
- Construction Method Statements;
- Wetland Maintenance Management and Rehabilitation Action Plan;
- Stormwater Management Plan

Once the relevant confirmations have been obtained, these must be appended to this EMPr and kept on site

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5 MANAGEMENT AND MONITORING PROCEDURES

5.1 Organisational Structure and Responsibilities

Figure 5-1 below gives an indication of the organisational and team structure for the project.

The KZN DoT is the Developer for the Project. The organisational structure between the Developer's Project Team is illustrated overleaf.

Each of the team members roles are elaborated on in terms of their specific duties hereafter.

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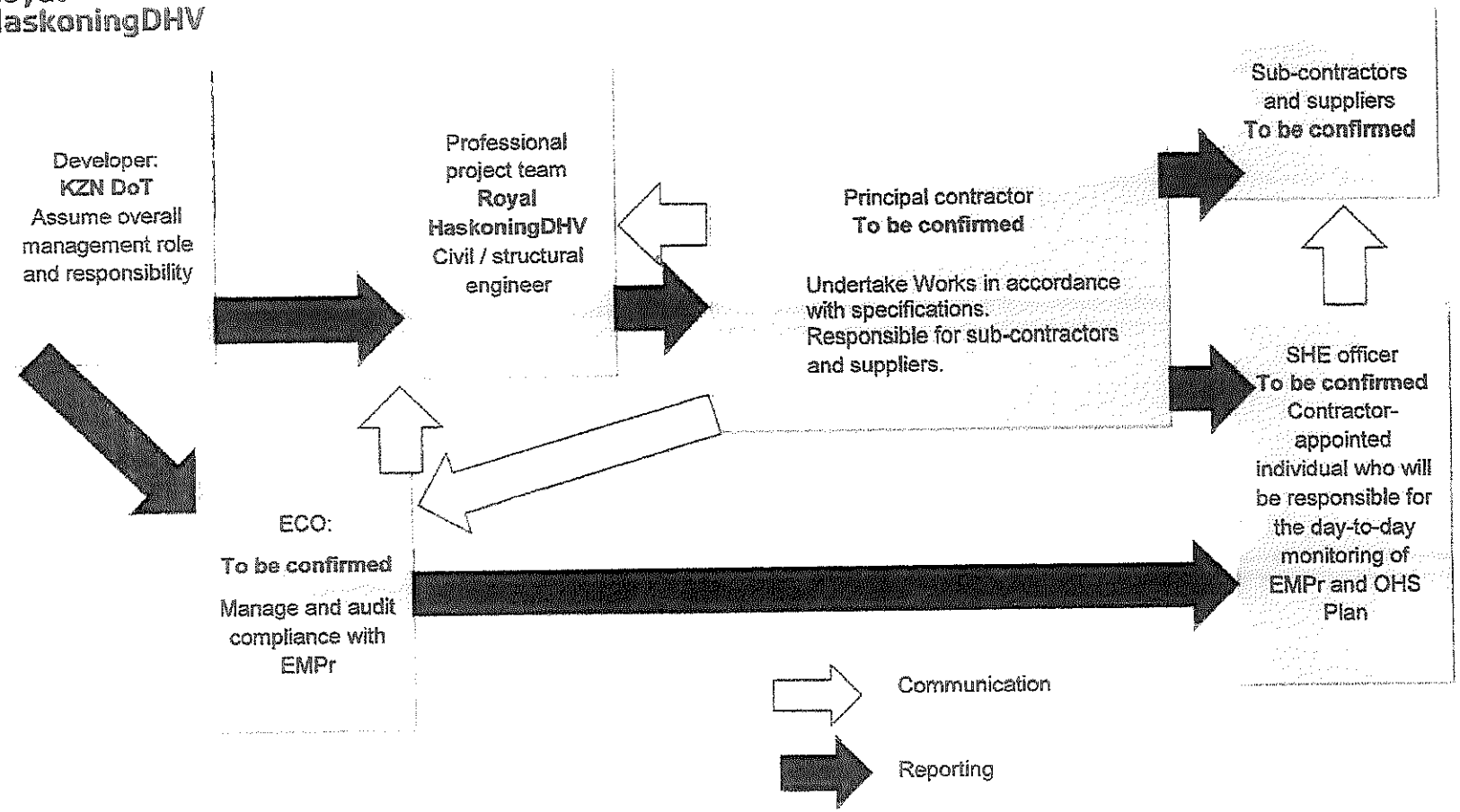

Figure 5-1: Team Organogram2

[2] *The organisational structure will need to be reviewed and finalised on inception, especially in terms of both reporting and responsibility of the parties involved*

The following outlines the defined and specific roles and responsibilities of each team member:

Table 5-1: Roles and Responsibilities

ROLES AND RESPONSIBILITIES
DEVELOPER

The Developer is ultimately responsible for ensuring compliance with the environmental specification and upholding DoT's environmental commitment to 100% compliance with all National, Provincial and local legislation that relates to management of the environment.

The Developer will:

- Appoint a Project Manager (PM) to assume ultimate project responsibility;
- Be familiar with the contents of the EMPr;
- Ensure the EMPr is in the tender documentation issued to prospective contractors;
- Request for, review and approve the Method Statements prepared by the Contractor;
- Review and comment on environmental assessments and / or reports produced by the Contractor and ECO;
- Undertake regular site visits and ensure environmental specifications are implemented;
- Discuss with the ECO the application of penalties for the infringement of the Environmental Specifications, and other possible enforcement measures necessary;
- Issue penalties as and when required;
- Arrange information meetings for or consult with I&APs about the impending construction activities;
- Must on the recommendation of the Engineer and / or Environmental Officer order the Contractor to suspend any or all works on-site if the Contractor or his Sub-Contractor / Supplier fails to comply with the said specifications;
- Maintain a register of complaints and queries by members of the public at the site office; and
- Ensure the EMPr is implemented as well as revised and updated as and when required.

ENGINEER

The Engineer will:

- Enforce the environmental specification on site;
- Be familiar with the contents of the EMPr;
- Ensure the EMPr is in the tender documentation issued to prospective contractors, for pricing of the mitigation measures that are required to facilitate a reduction in impacts associated with the proposed Mboza Bridge construction;
- Request for, review and approve the Method Statements prepared by the Contractor;
- Review and comment on environmental assessments and / or reports produced by the Contractor and ECO;
- Act on advisements made in the audit reports and field observations made by the EO and the independent ECO.
- Undertake regular site visits and ensure environmental specifications are implemented;
- Monitor compliance with the requirements of the specification;
- Assess the Contractor's environmental performance in consultation with the Environmental Officer (EO) from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported to project meetings; and
- Ensure the documentation, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

CONTRACTOR (INCLUDING SUB-CONTRACTORS)

The Contractor is required to:

ROLES AND RESPONSIBILITIES

- Be fully conversant with the EMPr;
- Implement, manage and maintain the EMPr for the duration of the contract;
- Appoint a suitably qualified Environmental Officer (EO) whose responsibility includes on-going monitoring and control of all construction activities concerning minimisation of environmental impact and adherence to the EMPr for the duration of the construction phase;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the Contract Document.
- Supply method statements timeously for all activities requiring special attention as specified and/ or requested by the Developer, Environmental Officer and/or Engineer during the duration of the Contract.
- Be conversant with the requirements of this environmental specification / EMPr. Brief all his/ her staff about the requirements of the environmental specification;
- Comply with requirements of the EMPr and any subsequent revisions in terms of this specification and the project specification, as applicable, within the time period specified.
- Ensure any Sub-Contractors / Suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf;
- Provide appropriate resources – budgets, equipment, personnel and training – for the effective control and management of the environmental risks associated with the construction of the development;
- Bear the cost of any delays, with no extension of time granted, must he or his Sub-Contractors / Suppliers contravene the said specifications such that the Engineer orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected;
- Bear the costs of any damages / compensation resulting from non-adherence to the said specifications or written site instructions;
- Review ECO reports and take cognisance of the information / recommendations contained therein;
- Comply with all applicable legislation;
- Ensure that he informs the EO timeously of any foreseeable activities which will require input from the ECO;
- Notify the ECO and PM, verbally and in writing at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, so that mitigatory measures may be implemented timeously;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them;
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract; and
- Communicate and liaise frequently and promptly with the ECO and the PM to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts.
- The Contractor will conduct all activities in a manner that minimises disturbance to the natural environment as well as directly affected residents and the public in general.
- The primary contractor assumes responsibility and accountability of all appointed sub-contractors and must ensure their compliance with this EMPr.

ENVIRONMENTAL CONTROL OFFICER

The ECO will:

- Be familiar with the recommendations and mitigation measures of the associated EMPr for the project;

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ROLES AND RESPONSIBILITIES

- Monitor the implementation of the EMPr during the construction and rehabilitation phases;
- Ensure site protection measures are implemented on-site;
- Monitor that the Principal Contractor, sub-contractors, construction teams and the Developer are in compliance with the EMPr at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities monthly for compliance;
- Conduct monthly audits of the site according to the EMPr, and report findings to the Developer / Contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions;
- Conduct once-off training with the Contractor on the EMPr and general environmental awareness; and
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Developer and the SHE Officer.

SAFETY, HEALTH AND ENVIRONMENTAL (SHE) OFFICER

The Safety, Health and Environmental Officer will:

- Be fully conversant with the EMPr;
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved;
- Convey the contents of this EMPr to the construction-site staff and discuss the contents in detail with the Contractor;
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr;
- Take appropriate action if the specifications contained in the EMPr are not followed;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;
- Order the removal from the construction-site of any person(s) and/or equipment in contravention of the specifications of the EMPr;
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr;
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that the list of transgressions issued by the ECO is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction.

5.2 Training and Environmental Awareness

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. Training needs must be identified based on the available and existing capacity of site personnel (including the Contractors and Sub-contractors) to undertake the required EMPr management actions and

monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- Promoting environmental awareness;
- Informing the Contractor 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.

Training will be done in a verbal format. The training will be a once-off event. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximised.

Ongoing training and re-enforcement of the training in the form of Tool Box Talks must be undertaken. The SHE Officer, with the assistance of the ECO must develop a series of Tool Box Talks that will be run to ensure that the staff are aware of their actions / non-actions and to re-enforce the EMPr on a continual basis. These TBT must be held weekly and a register maintained of the site staffs attendance. An 85 to 90% compliance (attendance must be achieved) on a weekly basis.

5.3 Monitoring

A monitoring programme will 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.

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Monthly audits will be conducted by the ECO/s for the duration of the construction phase – the ECO shall undertake this environmental monitoring with the audits considering compliance with the EMPr.
- On-going monitoring is to be undertaken by the Contractors' Environmental Managers – this will include notification to the ECO should an incident take place.
- External auditing may take place at unspecified times by the authorities and / or other relevant authorities.
- The Contractor's Environmental Officer must undertake daily site inspections to ensure all legislative requirements are adhered to.

5.4 Reporting Procedures

5.4.1 Documentation

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

- An Environmental File which includes:
  - Copy of the EMPr;
  - Construction Method Statement;
  - Spill Contingency Plan;
  - Copy of the Stormwater Management Plan;
  - Copy of relevant legislation;
  - Environmental Policy of the Main Contractor;

- Environmental Method Statements compiled by the Contractor;
- Non-conformance Reports;
- Environmental register, which shall include:
  - Communications Register – including records of Complaints, and, minutes and attendance registers of all environmental meetings;
  - Monitoring Results – including environmental monitoring reports, register of audits, non-conformance reports; and
  - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
- Waste Documentation such as, but not necessarily limited to: Waste Manifest Documents, Safe Disposal Certificates (SDCs) and Sewerage Disposal Receipts;
- Material Safety Data Sheets (MSDSs) for all hazardous substances;
- Dust suppression register;
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

5.4.2 Environmental Register

The Developer will put in place an Environmental Register. The Contractor will ensure that the following information is recorded for all complaints / incidents:

- Nature of complaint / incident.
- Causes of complaint / incident.
- Party / parties responsible for causing complaint / incident.
- Immediate actions undertaken to stop / reduce / contain the causes of the complaint / incident.
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint / incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented.
- Copies of all correspondence received regarding complaints / incidents.

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 by the Developer.

5.4.3 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information must be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and must take the hierarchy of controls into account;

- Agreed timeframe by which the actions documented in the NCR must be carried out; and
- ECO must verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor must sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

5.4.4 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following:

- Construction employees shall be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor and their sub-contractor(s) must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

5.4.5 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements must be developed for each set of tasks.

A Method Statement details how and when a process will be carried out, detailing possible dangers / risks, and the methods of control required.

- Type of construction activity;
- Timing and location of the activity;
- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to / from site;
- How equipment / material will be moved while on site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;
- Methodology and/or specifications for impact prevention / containment;
- Methodology for environmental monitoring;
- Emergency / disaster incident and reaction procedures (required to be demonstrated); and
- Rehabilitation procedures and continued maintenance of the impacted environment.

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The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statements. The Contractor shall keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

As a minimum the following Method Statements will be required to be generated:

- Construction of Bund areas;
- Construction site and office / yard establishment;
- Cement mixing / concrete batching / bentonite mixing;
- Contaminated water;
- Dust;
- Environmental awareness course(s);
- Environmental monitoring;
- Erosion control;
- Fire, hazardous and / or poisonous substances;
- Fuels and fuel spills (may form part of the item above);
- Storage, handling and decanting of diesel (may form part of the item above);
- Personnel, public and animal safety;
- Rehabilitation of modified environment(s);
- Solid and liquid waste management;
- Sources of materials (including MSDSs);
- Topsoil management;
- Haulage, stockpiling and management of surplus fill material;
- Stormwater Management; and
- Wash areas.

5.4.6 Public Communication and Liaison with I&APs

The Developer must ensure that the adjacent landowners are informed and updated throughout the construction phases.

Sufficient signage must be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards must include the following information:

- The name of the Contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

6 COMPLIANCE WITH THE ENVIRONMENTAL SPECIFICATION

The EMPr forms part of the Contract Documentation and is thus a legally binding document. It is also necessary for the Contractor to make provisions as part of their budgets for the implementation of the EMPr.

In terms of *Polluter Pays Principle*, section 28 of the NEMA, an individual responsible for environmental damage must pay the costs for both environmental and human health damage. As far as possible preventative measures must be in place to reduce or prevent additional pollution and/or environmental damage from occurring.

The Contractor is deemed not to have complied with the Environmental Specification / EMPr if:

- There is evidence of contravention of clauses within the boundaries of the site, site extensions and haul / access roads;
- Environmental damage ensues due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Developer, ECO or Engineer within a specified time; or
- The Contractor fails to respond adequately to complaints from the public.

6.1 Penalties

Application of a penalty clause will apply for incidents of non-compliance. The Contractor will be allowed one offence and a written warning will be issued to the Contractor's Environmental Officer by the ECO in consultation with the Developer's agent / Site Manager. Failure to rectify the offence within one (1) working week of the issue of the warning or a repeat offence will result in a penalty.

It is noted that the penalty system may be linked to the construction contract controls which are linked to contractual payments and may be more easily enforceable. These controls must be linked into the construction contract before it is released for tender for the site and must make allowance for fines, penalties, and stoppage of work (with linked time-related penalties).

The penalty will be issued by a representative of the Developer. The penalty imposed will be per incident at the discretion of the Developer's SHEQ Manager or any other duly authorised representative. The value of the penalty imposed shall be as defined in the contract and enforcement shall be at the discretion of the Developer. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the EMPr. The Developer will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.

The penalty monies will become the property of the Developer to be used for rehabilitation and maintenance of the site. This shall be applicable both during construction and operational phases of the development. Unless stated otherwise in the project specification (see comment above), the penalties imposed per incident or violation will be:

Table 6-1: Penalties Applicable

OFFENCE	AMOUNT
Failure to demarcate working areas	R10,000
Working outside of demarcated areas	R30,000
Failure to strip topsoil with intact vegetation	R50,000
Failure to stockpile topsoil correctly	R30,000
Failure to stockpile materials in designated areas	R10,000

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OFFENCE	AMOUNT
Failure to take measures to prevent soil contamination	R10,000
Failure to take measures to control dust dispersion on-site	R10,000
Washing of vehicles on-site	R10,000
Pollution of water bodies and / or groundwater	R20,000
Failure to implement stormwater management provisions during construction	R20,000
Failure to control stormwater run-off	R30,000
Downstream erosion	R30,000
Failure to provide adequate sanitation	R10,000
Failure to erect temporary fences around trenches	R10,000
Failure to provide adequate waste disposal facilities and services	R50,000
Failure to reinstate disturbed areas within the specified time-frame	R30,000
Any other contravention of the project specific specification	R10,000

The Developer is responsible for the implementation of the EMPr and for compliance monitoring of the EMPr.

The EMPr will be made binding on all contractors (including sub-contractors) operating on the site and will be included with the Contract.

Non-Compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. Non-compliance with the conditions of the EMPr constitutes a breach of Contract.

6.2 Removal from Site and Suspension of Works

Failure to undertake remediation (corrective action) after the issuance of a financial penalty may result in additional reporting. Dependent on the severity and significance of the impact related to non-compliance, the ECO may undertake to report directly to EDTEA (Compliance) recommending that for:

- High impact: to issue a notice to cease construction;
- Medium impact: to issue a notice instructing the Client to implement recommended remedial action; or
- Low impact: ECO to notify, but up to the discretion of EDTEA to apply sanction.

The Developer, at the direction of the ECO. or of his own conviction, has the power to remove from site any person who is in contravention of the EMPr, and if necessary, the Developer can suspend part or the whole of the works, as required.

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7 DETAILED ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr specifies the minimum requirements to be implemented by the Developer as per the scope of works, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices. It also provides the framework for environmental monitoring throughout the construction and operational phases.

The provisions of this EMPr are binding on the Developer and their teams during the life of the project (i.e. across all phases of the development process). The EMPr must be binding to KZN DoT or any authority to which responsibility for the construction activities has been delegated to.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times.

To simplify the EMPr requirements, each aspect related to the EMPr has been addressed in the tables hereafter.

Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below (Table 7-1) for ease of reference.

Table 7-1: Summary of Aspects included in the EMPr Tables

ENVIRONMENTAL MEASURES, ACTIONS AND CONTROLS:
This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.
RESPONSIBILITY:
This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.
MONITORING FREQUENCY:
This section indicates when the actions for that specific aspect must be implemented and/or monitored.

7.1 Pre-Construction Phase

Table 7-2: Pre-Construction Phase EMPr

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.1.1 Authorisations, Permits and Licences		
All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction (if required). These include, but are not limited to; *EKZN* Wildlife Permits for removal of Protected plants or a DAFF Licence for removal of Protected trees.	Developer	Once-off and On-going
All activities must comply with the EMPr.		
7.1.2 Appointment of Contractor		
The Developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The Contractor must make adequate provision in their budgets for the implementation of the EMPr.	Developer	Once-off
The Principal Contractor (including sub-contractors and suppliers) must comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws.		
Tender documents must include statements to include the use of local communities or local community organisation in supplying services and labour to the construction activities.		
7.1.3 Monitoring		
A monitoring programme must 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. A monitoring programme must be implemented for the duration of the construction phase of the project. This programme must include: ▪ Monthly audits must be conducted by the ECO for the duration of the construction phase. The ECO must undertake environmental monitoring on a monthly basis and the audits must consider compliance with the EMPr. ▪ External auditing may take place at unspecified times by the authorities and / or other relevant authorities. ▪ The ECO must undertake regular site inspections to ensure all legislative requirements are adhered to. ▪ The ECO must compile a monthly audit report with a quantitative rating of the compliance with the EMPr. ▪ The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. The Contractor must be held liable for all unnecessary damage to the environment.	Developer	Once-off and On-going

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
The monitoring by the ECO must be extensive and inclusive; this involves the monitoring of construction related impacts as identified. Regular monitoring of the construction activities is critical to ensure that any problems which are identified are dealt with in a timeous manner. In this regard, the following potential concerns must be taken into consideration: ▪ Destruction of habitat outside the construction servitude including 'No-Go' areas; ▪ Erosion of the bed and banks of water resources; ▪ Signs of intense or excessive erosion (gullies, rills, scouring and headcuts) and / or sedimentation within, along the edge and / or immediately downstream of the construction zone; ▪ Erosion of disturbed soils and soil stockpiles by surface wash processes; ▪ Sedimentation of aquatic habitats downstream of work areas; ▪ Altering the hydrology and through flows to downstream habitat during construction across rivers / streams / wetlands; ▪ Pollution of water resources (with a particular focus on water turbidity and hazardous substances such as fuels, oils and cement products); ▪ Poorly maintained and damaged erosion control measures (e.g. sand bags, silt fences and silt curtains); and ▪ Evidence of unsafe working conditions (e.g. evidence of flow overtopping the bund wall / running tracks).		
7.1.4 Public Communication		
The Developer must ensure that the adjacent landowners are informed and updated throughout the construction phases. Sufficient signage must be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards must include the following information: ▪ The name of the Contractor. ▪ The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.	Contractor / ECO	Once-off
7.1.5 Site Set-Up		
Prior to the establishment of the site area, the Contractor must produce a site layout plan showing the positions of all equipment storage, waste stockpiling, fuel storage areas and other infrastructure for the comment of the ECO and approval by the Developer. Choice of location for construction item storage must take into account location of local residents and environmentally sensitive areas ('no-go' areas) where applicable.	Contractor	Once-off
The construction area must be clearly demarcated on the layout plan, and all other areas must be considered no-go areas for the construction personnel. All sensitive areas, outside of the construction footprint, such as the wetlands must be protected by appropriate temporary fencing and 'no-go' signage during construction, and vehicular access into these sensitive areas must not be permitted.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
No-go areas must be agreed to in consultation between the ECO, EO, Engineer and, Developer prior to construction.		
Adequate signage must be placed in the area where construction will take place informing the public of the activities taking place.		
The site camp must be secured.		
The Contractor must take responsibility for the site to conform to all contractual aspects and environmental standards applicable.		
On-site accommodation (if required) and the construction camp must be comprised of: ▪ site office; ▪ residential accommodation which meets the basic needs of site workers and is compliant with the relevant standards; ▪ ablution facilities; ▪ designated first aid area; ▪ eating areas; ▪ staff lockers; ▪ storage areas; ▪ batching plant (if required); ▪ refuelling areas (if required); ▪ maintenance areas (if required); and ▪ crushers (if required).		
Vegetation removed for any additional construction camp establishment must to be kept to a minimum. No trees are to be removed with the exception of alien weeds and invader plants identified and approved by the EO and ECO.		
No persons, other than a night-watchman / security guard, may stay overnight at the construction camp.		
The size of the construction camp must be minimised and agreed to by the ECO prior to the commencement of construction.		
Adequate yet not extensive parking must be provided for site staff and visitors at the construction camp with the intention to disturb as little grassland as possible.		
The Contractor must provide adequate refuse bins that must be cleaned / emptied and the waste removed from site on a regular basis. These bins must be tamper proof (animals).		
The construction areas must be kept in an orderly state at all times.		
Vegetation removed for site establishment must be kept to a minimum.		
Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste must be strictly prohibited in identified 'no-go' areas		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
The Contractor must ensure that drainage on-site is such to prevent standing water and / or sheet erosion from taking place or that current flow regimes must not be altered, even temporarily, which adversely impacts on drainage.		
Unauthorised access onto / into private properties must be strictly prohibited.		
7.1.6 Ablution / Sanitation		
Temporary chemical toilets must be provided by a company that has been approved by the Developer. Such toilets must be available for all site staff, both at the construction camp, and on-site as agreed by the Developer. Toilets must be provided in a minimum ratio of 10 staff per toilet.	Contractor	Daily
The EO and ECO must be consulted on the location of any temporary chemical toilets.		
Temporary toilets must be located outside of wetland and buffer areas.		
7.1.7 Access		
Access to the site is permitted only *via* existing gravel access roads. Any new access roads must be assessed by the ECO and / approved by the CA, prior to establishment.	Contractor Engineer Developer	On-going
Wherever possible, the temporary chutes / berms must not be aligned perpendicular to the slope.		
The Contractor must only be permitted to make use of the existing road entrances to the site as well as those agreed to with by the relevant authorities prior to construction commencing.		
The construction-site must have strict access control, to reduce the risks associated with vehicular transportation and pedestrian access on the site.		
Retained wetland or other sensitive sites and no-go areas must be maintained free of any vehicular activity.		
All 'no-go' areas must be indicated as such, with warning signs in all relevant languages.		
7.1.8 Equipment, Vehicles and Storage Areas		
Washing of vehicles on-site is prohibited.	Contractor	On-going
Note that vehicle maintenance must not be permitted on-site. If emergency repairs are required to vehicles or construction plant, then this needs to be undertaken in accordance with an approved Method Statement for Emergency Repairs.		
Fire prevention facilities must be present at all storage facilities.		
Material Safety Data Sheets (MSDSs) must be readily available on-site for all chemicals and hazardous substances to be used on-site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
minimise negative environmental impacts during accidental releases or escapes.		
An oil balance must be implemented to demonstrate appropriate management of hydrocarbons.		
Plant and equipment must be adequately maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.		
Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste oils and greases. All used oils, grease or hydraulic fluids must be placed therein and these receptacles must be removed from the construction camps on a regular basis for recycling.		
A procedure (method statement) for the management of oils spills must be introduced. This must address the cleaning of spillage from hard surfaces, utilising environmental friendly cleaning materials as well as the removal and disposal of polluted sand.		
Fuel must be stored in tanks with lids, which will be kept firmly shut and under lock and key at all times, within a secondary containment facility. A single individual will be responsible for the dispensing of this type of hazardous material and a register of use must be kept at all times.		
Fuel decanting and refuelling must take place within the construction camp. A minimum of 50 kg of hydrocarbon absorbent is to be placed at the construction camp.		
7.1.9 Waste Disposal Facilities		
General waste produced on-site includes: ▪ Office waste (e.g. food, waste, paper, plastic); ▪ Operational waste (i.e. clean steel, wood, glass); and ▪ General domestic waste (i.e. food, cardboards, paper, bottles, tins). An adequate number of general waste receptacles, including bins must be arranged around the Construction area, on-site to collect all domestic refuse, and to minimise littering.	Contractor	Daily
Different waste bins, for different waste streams must be provided to ensure correct waste separation and subsequent recycling, where applicable. Bins must be clearly marked and lined for efficient control and safe disposal of waste.		
A fenced area must be allocated for waste sorting and disposal within the contractors camp.		
7.1.10 Security and Safety		
A security guard must be appointed to guard the site at all times.	Contractor	Once off

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
Potentially hazardous areas such as trenches must be demarcated and clearly marked.		
Lighting on-site must be installed to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.		
Material stockpiles or stacks, such as pipes, must be stable and well secured to avoid collapse and possible injury to site workers / local residents.		Daily
Flammable materials must be stored as far as possible from adjacent residents / businesses.		
Fire fighting equipment must be present on-site at all times.		
Obstruction to driver's line of sight due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	Developer	On-going
No materials must be stored in unstable or high-risk areas, such as on steep slopes.		
7.1.11 General and Hazardous Substances and Materials		
Storage areas must not be within any watercourses.	Contractor SHE Officer	Daily
Storage areas must be designated, demarcated and fenced. Storage areas must be secure, under lock and key, so as to minimise the risk of crime.		
Fire prevention facilities must be present at all storage facilities.		
Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater around the storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume. Such a facility must be on an impervious surface. The storage area must be securely fenced and all hazardous substances such as fuel, oils, chemicals, etc., must be stored therein. Drip trays, a thin concrete slab or a facility with PVC lining, must be installed in such storage areas with a view to prevent soil and water pollution.		
All fuel storage tanks and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes, local fire chief and other relevant requirements.		
Symbolic safety signs depicting "No Smoking", "No Naked Flames", and "Danger", must be prominently displayed in and around the fuel storage area.		
The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified.		
Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
If fuel is dispensed from 200 ℓ (litre) drums, the proper dispensing equipment must be used. The drums must be in a bunded area or a least a drip tray must be placed under the drum and at the dispensing position.		
The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.		
All waste fuel and chemical contaminated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.		
Storage sites will be provided with bunds to contain any spilled liquids and materials. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of stormwater from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.		
Material Safety Data Sheets (MSDSs) must be readily available on-site for all chemicals and hazardous substances to be used on-site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or spillages.		
Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. Staff must undergo training in the dispensing, use and potential hazards of these substances.		
A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes must only be disposed of at licensed landfill sites designed to handle hazardous waste. Appropriate SDCs must be provided for all hazardous waste being disposed of and must be kept on-site within the Site Environmental File.		
The Contractor must ensure that his staff are made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training.		
Cement / concrete must not be mixed directly on the ground. Dagga boards, mixing trays and impermeable sumps must be used at all mixing and supply points. Unused cement bags are to be stored so as not to be effected by rain or run-off events.		
The washing of concrete trucks on-site is prohibited.		
Used cement bags must be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis via the solid waste management system, and must not be used for any other purpose.		
The washing of concrete trucks on-site is prohibited.	Contractor	Daily

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
All visible remains of excess concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur.	SHE Officer	
No paint products are allowed to be disposed of on-site.		
Storage areas must not be within any watercourses or buffer areas.		
The Contractor must maintain a record of the sourcing of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners) used during construction. Licences must be sourcd from the relevant suppliers and maintained within the Environmental Site File.		
The Mineral and Petroleum Resources Development Act requirements must be complied with. Should borrow material be required, these must be sourced from a licensed borrow pit or commercial source.		
7.1.12 Demarcation of the Construction Servitude		
▪ The footprint of the construction area will be kept to fifty [50] m wide by seventy [70] m in length. This must be demarcated in the field by a qualified surveyor. ▪ The outer edge of the construction servitude/working area (as defined above) must be clearly demarcated for the entire construction phase using a brightly coloured hazard fence or danger tape with steel droppers. ▪ Maintain site demarcations in position until the cessation of construction works. ▪ The location of stockpile areas, site camps and equipment laydown areas must be agreed to and demarcated to the satisfaction of the ECO prior to the clearing. A recommended setback distance of at least 30m from the active river channel edge is recommended. ▪ All areas outside (including upstream and downstream) of this demarcated construction servitude must be considered 'No-Go' areas. Any contractors found working inside the no-go areas should be fined as per fining schedule/system setup for the project. ▪ The demarcation work must be signed off by the ECO before any work commence	Engineering team ECO	Once-off
7.1.13 Design		
The crossing design must ensure that the soils in the Pongola River and wetland remain inundated with water after heavy rainfall events. In order to achieve this the following must be implemented: ▪ The pioneer layer must be constructed out of a porous material or from material which is coarse enough to assist with the movement of water through the structure to allow wetting of the soils to occur on the downstream side of the crossing and prevent excessive upstream inundation; ▪ The extent to which culverts are used in the system must reach as far as possible to ensure that during freshets the broadest possible area becomes inundated allowing for recharge of the wetland soils across the width of the wetland; ▪ The design must ensure that the permanent wetland zone must have inundated soil conditions throughout the year	Engineer Contractor	Ongoing

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
extending to the soil surface; ▪ The design must ensure that the seasonal wetland zone must have water logged soils within 300 mm of the soil surface for at least the high flow season (November to January); ▪ Temporary wetland zone areas must have waterlogged soil conditions occurring to within 300 m of the land surface during the wettest part of the summer season ; ▪ The contractor must ensure that no incision and canalisation of the Pongola River takes place as a result of the construction of the bridge: ▪ The crossing structure must allow for sufficient dispersion of water through the wetland area to prevent the concentration of flow in the permanent zone or the active channel which could lead to scouring and incision of the system.		

7.2 Construction Phase

Table 7-3: Construction Phase EMPr

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.2.1 Health and Safety		
All Procedures and equipment must comply with the Occupational Health and Safety Regulations (OHSA) of South Africa, Act No. 85 of 1993. The Contractor must familiarise himself and his employees with the contents of the aforementioned legislation.	Contractor SHE Officer	Daily
First Aid contents must be on hand at all times.		
The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the deconstruction. Such safety measures and work procedures / instructions must be communicated to construction workers.		
The wearing of Personal Protective Equipment (PPE) on-site is mandatory for all personnel and construction team members. Minimum requirements must include the wearing of an approved safety helmet, safety boots, safety eyewear, safety reflective jackets and dust masks, ear plugs, etc. where appropriate.		
PPE signs must be erected on-site at the areas where it is required and the integrity and availability of the signs must be maintained.		
No person must be allowed on-site, unless they are wearing approved safety equipment.		
Casual visitors must be required to sign a register at the security checkpoint and must undergo a site induction by the SHE Officer. The responsible person must then be contacted before the visitor is allowed access to site.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
No unauthorised visitors must be allowed to access the works area or the contractors camp.		
Workers' right to refuse work in unsafe conditions must be respected.		
All personnel must be trained in basic site safety procedures.		
The Contractor must design, test / exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; fires, etc.		
The Developer and / or Developer's agent must carry out regular audits on the principal contractor at least once per month. Similarly, principal Contractors must be responsible for carrying out regular audits on their contractors at least once per month. The results of both audit types must be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate.		
7.2.2 Fires		
No open fires or uncontrolled fires are permitted on-site.	Contractor	Daily
Fire fighting measures such as fire extinguishers must be located on-site.		
The workforce must be made aware of fire prevention and fire fighting measures.		
7.2.3 Worker Conduct on-site		
A general regard for the social and ecological wellbeing of the site and adjacent areas is expected of the site staff. Workers must to be made aware of the following general rules: ▪ No alcohol / drugs to be present on the site. ▪ No firearms allowed on-site or in vehicles transporting staff to and from site, unless used by security personnel. ▪ Prevent excessive noise. ▪ Prevent unsocial behaviour. ▪ Bringing pets onto the site is forbidden. ▪ No harvesting of firewood from the site or from the areas adjacent to it. ▪ Construction staff are to make use of the facilities provided for them, as opposed to *ad hoc* alternatives (e.g. fires for cooking, the use of surrounding bush for toilet facilities). ▪ Trespassing on private properties adjoining the site. ▪ Driving under the influence of alcohol is prohibited.	Contractor SHE Officer	Daily
7.2.4 Clearing and Protection of Fauna and Flora		
Prior to commencement of construction, a qualified botanist must be appointed to undertake a walk through of the site to identify all species of conservation importance and apply for the necessary permits and licences.	Contractor / SHE Officer	Once-off prior to construction

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
A Search and Rescue operation of any fauna within the construction footprint must be undertaken prior to construction commencing.		
No natural vegetation is permitted to be collected for use as firewood, medicinal purposes or any other uses.	Contractor	Daily
No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason. Any wildlife that is injured or killed on the site by accidental means i.e. hit by a vehicle, are to be reported to the Developer, who must take appropriate action to facilitate the recovery of the animal where possible i.e. take the animal to the SPCA.		
Indigenous vegetation and topsoil cleared for the construction servitude / working area must be rescued and stored at the designated vegetation and soil stockpile area outside of the wetland / aquatic zone for use later in rehabilitation. In this regard, vegetation must be cleared *in-situ* (i.e. with sods / topsoil).		
All alien invasives found, must be immediately removed and disposed of responsibly in accordance with the requirements of the ECO. No alien (non-indigenous) plants are permitted to be brought to site.		
Cleared areas must be planted with the present, indigenous grass sods as soon as is possible. All alien invasive vegetation that has colonised the construction-site must be removed, preferably by uprooting. The contactor must consult the ECO regarding the method of removal.		
All bare surfaces across the construction-site must be checked for alien invasive plants at the end of every month and alien plants removed by hand pulling / uprooting and adequately disposed of.		
Herbicides must be utilised where hand pulling / uprooting is not possible. ONLY herbicides which have been certified safe for use in wetlands by independent testing authority to be used. The ECO must be consulted in this regard. If uncertain, a specialist must be contracted (e.g. PPRI at Cedara).		
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.		
Where alien plants have been introduced on to the site during clearing and infilling, they must be removed. The Contractor must develop an Action Plan for the removal of alien invasive species and submit it to the ECO for approval.		
Invader species and weeds must be removed and disposed of in accordance with existing legislation on a regular basis.		
The removal of indigenous / endemic shrubs and small trees must be kept to a minimum and only be removed if absolutely necessary and where authorisation has been received where applicable.		
7.2.5 Heritage		
If an artefact on-site is uncovered, work in the immediate vicinity must be stopped immediately.	Contractor	Daily

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
The Contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Construction Engineer of such discovery which in turn must contact a registered archaeologist and AMAFA.		
Work may only resume once clearance is given in writing by an archaeologist and/or AMAFA.		
7.2.6 Traffic and Safety		
The Contractor must erect proper road signs to warn any motorists of construction activities. The Contractor must ensure that there are flag men and signs in place at access points to the construction-site.	Contractor	Daily
All contractors must ensure that their employees and in particular, construction vehicle drivers / operators comply with the safe access and egress plans that are to be put in place during the construction process. Appropriate warning and reduced speed signage must be erected where necessary.		
Keep to a safe speed limit (recommended 25 km/h) when driving on the gravel roads, even though it is anticipated that the speed limit for the gravel roads will be 40 km/hr.		
7.2.7 Pedestrian Protection		
Pedestrians and surrounding residents must be protected from construction activities at all times.	Contractor	Daily
Any pedestrian conflict with site access and construction vehicles must be managed by traffic officer.		
The construction-site camp must remain fenced for the entire construction period.		
7.2.8 Construction Vehicles		
Access of all construction and material delivery vehicles must be strictly controlled.	Contractor	Daily
Non-project related vehicles or persons will be prohibited from using the Construction right of way (ROW).		
North and South access to the bridge is required and will be via existing farm roads (tracks). These tracks must be graded in order to provide safe access to site and better management of storm-water.		
Vehicles and equipment must be serviced regularly to avoid the contamination of the area from substances such as, oil and hydraulic fluid leaks.		
Servicing of vehicles must be done off-site.		
All speed limits must be adhered to.		
Machinery or equipment used on-site must not constitute a pollution hazard in respect of the above substances. The Constructor must order such equipment to be repaired or withdrawn from use if they consider the equipment or machinery to be polluting the environment and / or irreparable.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste. All used oils, grease or hydraulic fluids must be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.		
7.2.9 Road Maintenance		
Contractors must ensure that any damage to roads / tracks and pedestrian walkways, which have been created as a result of construction, must be rectified by the Contractor as soon as these develop.	Contractor	Daily
If necessary, staff must be employed to clean surfaced roads adjacent to construction-sites where materials have spilt.		
All temporary road signs must be removed at completion of works.		
Any covered road signs must be reinstated.		
7.2.10 Topsoil		
The Contractor must strip and stockpile all topsoil within the work area for subsequent use at a later stage.	Contractor	Daily
The removal of any topsoil from site is prohibited and this must be stockpiled and used solely in the rehabilitation of the works area.		
Stockpiles must be protected from wind and rain with the use of tarpaulins where necessary. The Engineer is to use his discretion as to the mechanism to be used to ensure this protection.		
Topsoil must be kept separate from overburden and must not be used for infilling.		
Noxious weeds must be eradicated from topsoil stockpiles. Topsoil stockpiles must be seeded with *Eragrostis tef* to retain water, prevent wind and water erosion and to assist in maintaining the topsoil in a balanced and fertile state.		
The Contractor must exercise suitable precautions with the storage, handling and transport of all materials that could adversely affect the environment. If pollution of any surface or groundwater occurs, it must immediately be reported to the DWS and appropriate mitigation measures must be employed.		
7.2.11 Spoil		
Litter and general waste must be removed from the topsoil and spoil material before stockpiling.	Contractor	Daily
Spoil sites must be shaped to fit the natural topography.		
Erosion / sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment run-off from stockpiles.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
Subsoil and topsoil is to be stockpiled separately. Stockpiled soil must be replaced in the reverse order as to which it was removed (i.e. subsoil first followed by topsoil).		
Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any cross contamination of soils.		
The stockpiles must only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The Contractor must, where possible, avoid stockpiling materials in vegetated areas that will not be cleared.		
Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions.		
The slope and height of stockpiles must be limited to 2 m to avoid collapse.		
Spoil sites must receive a minimum of 75 mm topsoil and be grassed with a recommended seed mixture by a qualified horticulturist.		
Slopes must not exceed a vertical: horizontal ratio of 1:3.		
7.2.12 Soil Erosion and Sedimentation		
No soil stockpiles may be located within 32 m of the river. Stockpiles must be limited in height to 2 m and must either be dampened on a regular basis or vegetated depending on the length of time the stockpile will exist. Given the project length I would suggest vegetated with *E. tef.*	Contractor	Daily
Stormwater run-off and erosion control measures must be installed as part of the access on either side of the bridge. These must include the establishment of drains and / or berms / cut-off drains at regular intervals along slopes that direct surface run-off from the road.		
The natural flow of the Pongola River must be maintained as far as possible during construction activities.		
Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. In this regard, the contractor must be aware of weather forecasts.		
Run-off generated from cleared and disturbed areas / slopes that drains into the river and wetland area must be controlled using erosion control and sediment trapping measures like silt fences, sandbags, earthen berms and synthetic logs, particularly where slopes are exposed. These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment.		
Sediment barriers (e.g. silt fences, sandbags, earthen filter berms, retaining walls, and/or technologies such as soil		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
saver) must be established to protect the watercourse from erosion and sedimentation impacts from the river banks and construction activities. Sediment barriers must be regularly maintained and cleared so as to ensure effective drainage.		
Monitoring of silt fences and sediment barriers must be undertaken, should sand bars or obstruction of flows within the river become evident, the sediment must be removed using an excavator. The excavator should access the sediment via a temporary non-erodable substrate such as rocks and or gabion stone in order to protect the river bed substrate.		
The berms, sandbags and / or silt fences must be maintained and monitored for the duration of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the disturbed areas post-rehabilitation.		
The suitable use of geo-textiles, turf blankets, or mats must be used as slope protection for exposed slopes.		
During construction, the Contractor must check the site for erosion damage after every rainfall event, and rehabilitate this damage immediately.		
Erosion / sediment control measures such as silt fences or low soil berms must be placed around the stockpiles to limit sediment run-off from any stockpiles.		
Soil erosion on-site must be prevented at all times, i.e. pre-, during, and post construction activities. Suitable erosion control measures must be implemented in areas sensitive to erosion such as the river bank and edges of slopes. These measures must include: ▪ Phased construction activities must take place to ensure the removal of vegetation, only as it becomes necessary for work to proceed. This enables erosion and sedimentation to be minimised and centralised in relatively small areas easier to control and to stabilize. Topsoil storage must be as brief as possible and storage must occur in a bunded area away from the river. ▪ Vegetative Cover – vegetation reinforces soil and holds it in place thereby reducing erosion. Temporary or permanent vegetation must be planted on all bare soil immediately after any ground disturbance. This is particularly important on slopes, to minimise erosion. Disturbed areas must be rehabilitated as soon as possible. ▪ Proper drainage controls such as culverts and cut-off trenches must be used to ensure proper management of surface water run-off to prevent erosion and sedimentation. ▪ Construction vehicles must remain on designated demarcated areas. Constant cognisance of the inherent high erosion risk potential of all soils and sites on the property must be taken and appropriate control and preventative measures put in place.		
All surplus, and especially loose, materials must be removed from the watercourse to preserve water quality and avoid sedimentation of downstream riverine habitat.		
Material used to create the cofferdam, to divert waters away from the works area, must be protected from scouring and		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
erosion through the placement of rock material (i.e. non-erodible material) at the contact point between the cofferdam and the river (i.e. on the face of the cofferdam both up- and downstream of the works area).		
7.2.13 General Waste Management		
General waste produced on-site is to be collected in skips for disposal at a registered landfill site. Hazardous waste must not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site.	Contractor SHE Officer	Daily
Under no circumstances must waste be burnt or buried on-site.		
Waste bins must be cleaned out on a regular basis to prevent any windblown waste and / or visual disturbance.		
All general waste must be removed from the construction areas on a daily basis and disposed of in suitable waste receptacles.		
Any form of waste material and rubble generated during construction must be removed from the site and disposed of at a facility registered in terms of section 20(b) of the NEM:WA (Act No. 59 of 2008), if it cannot be responsibly reused or recycled on-site. The Contractor responsible for the removal of the rubble and waste must supply the applicant with a certificate indicating safe disposal.		
7.2.14 Hazardous and Industrial Waste Management		
Hazardous waste produced on-site includes: ▪ Oil and other lubricants, diesel, paints, solvent; ▪ Containers that contained chemicals, oils or greases; and ▪ Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (i.e. oil, fuel, grease, chemicals or bitumen). Hazardous waste is to be disposed of at a Licensed Hazardous Waste Landfill Site. The ECO must approve a licensed waste disposal site at the inception of the project.	Contractor	Daily
Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (i.e. either stored under a roof, or, the top of the container must be covered with a re-sealable lid).		
SDCs must be obtained from the waste removal company as evidence of correct disposal and kept on-site within the Site Environmental File.		
It may be feasible for the waste to be transported to a central point where it can be collected in bulk by the waste disposal company. It must however be noted that: ▪ Transport of hazardous materials must be done in accordance with legislative control; and ▪ Relevant SABS Codes of Practice must be adhered to.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.2.15 Wastewater		
All wastewater generated at the proposed development must be disposed of in a suitable manner so as not to cause any surface or subsurface water pollution or health hazard. Wastewater, including cement-contaminated water, must not enter any watercourse and must be managed by the site manager to ensure that the existing water resources on and off site are not polluted by activities emanating from the above development.	Contractor	Daily
Contaminated wastewater including cement-contaminated water must not enter any watercourse and must be managed by the Contractor to ensure that the existing water resources on and off site are not polluted by activities emanating from the above development.		
Used oil and wastewater must be disposed of at a registered facility. A SDC is to be obtained by the Contractor and kept on-site within the Site Environmental File.		
Water containing waste must not under any condition be discharged into the natural environment. Measures to contain water containing waste and safe disposal of such must be implemented.		
7.2.16 Water Pollution Management (including groundwater and soil contamination)		
The flow direction of any surface water run-off must be established prior to disturbing any area.	Contractor	Daily
Construction methods must comply with the stormwater management plan.		
Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on-site.		
Dirty water originating from maintenance activities is to be contained and disposed of correctly, to prevent the contamination of soil and/or any watercourses.		
Bathing or washing of clothes, equipment or machinery within any watercourse is prohibited.		
Erosion and loss of soil must be prevented by minimising construction areas exposed to surface water run-off.		
Bare areas are to be rehabilitated as soon as the areas become available or after use.		
All water consumption on-site must be recorded on a daily basis.		
The abstraction of water from any water resource for construction purposes and / or dust suppression must not be permitted without a water use licence authorisation from the Department of Water and Sanitation (DWS).		
7.2.17 Watercourse and Wetland Management		
Construction activities must only be undertaken within the defined working servitude required for the bridge and	Contractor	Daily

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
approaches road. No other disturbance of any kind must be allowed within the riparian zone and floodplain wetland.		
The Contractor must ensure that the construction footprint is kept to a minimum. The construction footprint must be limited to fifty [50] m wide by seventy [70] m in length. This must be demarcated in the field by a qualified surveyor.		
No clearing of the areas adjacent to the bridge and access road is permitted.		
No batching or chemical / fuel storage areas to be located within 50 m of the river and riparian zone.		
The use of protective measures such as gabions and revetments to protect the riverine habitats must be undertaken.		
It is recommended that construction take place in the winter / dry months to reduce erosion and sedimentation risks associated with high summer rainfall and opening of the Pongolapoort Dam sluice gates. The following measures must be implemented: ▪ The natural flow of the Pongola River must be maintained as far as possible during construction activities. ▪ Maintain adequate through flows to downstream aquatic ecosystems to protect aquatic life, and prevent the interruption of existing downstream uses. ▪ Clearing activities must only be undertaken during agreed working times and permitted weather conditions. ▪ If heavy rains are expected, clearing activities must be put on hold. In this regard, the contractor must be aware of weather forecasts.		
Flow within the Pongola River will be maintained at all times through fluming or damming by constructing a cofferdam and over-pumping, with sufficient pump capacity available in case of flooding.		
The natural downstream flow of the river is to be maintained during construction by employing flumes and concrete culverts within the cofferdam to direct flows away from the immediate works areas around the base of each of the in-stream piers.		
Should water be pumped from the dry working space within the Pongola River, this water must be pumped into a retention dam / silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the watercourse.		
Wherever possible, and in case work during the dry season cannot be achieved, work in-stream channels will be carried out without the use of 'in-river' techniques, instead using techniques that divert the flow around the works through flumes or by damming and pumping.		
Construction within the channel should progress as quickly as practically possible to reduce the impacts on aquatic biota and the natural flow regime of the river due to temporary diversion measures.		
Water diversion will be temporary in nature and only while the piers are constructed within the main river channel.		
Only compacted clean quarry rock will be used as a piling mat.		
Only when the piling is complete will a cofferdam be constructed to allow the pile cap and pier / abutment to be		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
constructed.		
No new channels or canals will be excavated while construction activities are being undertaken.		
Any excavated material from within the riverbed and banks must be stockpiled where it will not be washed away downstream by water.		
Any such bed material must be stockpiled for use in rehabilitation.		
No building material, soils or rubble is to be disposed of within the Pongola River, including the associated wetland and riparian habitats.		
Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse.		
Any contractors found working inside 'no-go' areas (i.e. areas outside the working servitude) must be fined as per fining schedule / system setup for the project.		
Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns, and the channel and riparian zone rehabilitated / restored to their original configurations as soon as practically possible. The status of the rehabilitation must be confirmed by the ECO once rehabilitation is deemed to be complete.		
Construction activities must be undertaken strictly in accordance with the Method Statement for Watercourse Crossing contained within Section 8 of this EMPr.		
7.2.18 Spills, Incidents and Pollution Control		
Handling, Storage and Response procedures in the event of a spill, must be undertaken in accordance with the Spill Contingency Plan.		
Any spill incident, which may occur, must be investigated and immediate action must be taken. This must also be reported to the ECO and SHE Officer.	Contractor SHE Officer ECO	Daily
In the case of a spill of hydrocarbons, chemicals or bituminous material in the construction camp or on the construction-site / bunding area, the spill must be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity.		
Should a small pollution incident occur on-site, the Contractor must: ▪ Implement reasonable measures immediately to contain and minimise the impacts of the incident; ▪ Contain the spill; ▪ Notify all persons whose health may be affected by the incident; ▪ Undertake clean up procedures immediately; ▪ Notify the Contractor of the incident immediately who will advise the employee as to the measures that must be implemented;		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
▪ Record the incident in the Environmental Incident Register; and ▪ Implement measures to prevent similar incidents from occurring in the future. For pollution incidents in excess of 30 litres, a professional services provider will be required to assist in the clean up.		
The following measures must be implemented in conjunction with the generic pollution prevention measures: ▪ Hazardous storage and refuelling areas must be bunded prior to their use on-site during the construction period following the appropriate SANS codes. ▪ The bund wall must be high enough to contain at least 110% of any stored volume. ▪ The surface of the bunded area must be graded to the centre so that spillage may be collected and satisfactorily disposed of. ▪ The proper storage and handling of hazardous substances (e.g. fuel, oil, cement, bitumen, paint) needs to be administered. ▪ Storage containers must be regularly inspected so as to prevent leaks. ▪ Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.		
Drip trays, with plugs, must be utilised at all dispensing areas.		
Vehicle maintenance must not take place on-site unless a specific bunded area is constructed for such a purpose.		
Ensure that transport, storage, handling and disposal of hazardous substances is adequately controlled and managed.		
Correct emergency procedures and cleaning up operations must be implemented in the event of accidental spillage.		
All equipment to be used within the sensitive working areas (within the channel) must be checked daily for oil and diesel leaks before gaining access to these working areas.		
An emergency spill response procedure must be formulated and staff are to be trained in spill response		
All necessary equipment for dealing with spills of fuels / chemicals must be available at the site. Spills must be cleaned up immediately and contaminated soil / material disposed of appropriately at a registered site, 44 gallon drums must be kept on-site to collect contaminated soil. These drums must be disposed of at a registered hazardous waste site.		
Fire prevention facilities must be present at all hazardous storage facilities.		
Concrete mixing must be confined to as few areas as possible and *ad hoc* mixing is to be avoided. Areas where concrete was mixed must be cleaned up after use. Concrete mixing is to be undertaken on an impervious surface.		
Subsoil and construction material stockpiles are to be bermed to prevent leachate and polluted run-off.		
In the event of a spill incident, the Emergency Response developed by the contractor must be followed.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.2.19 Noise		
Neighbouring landowners must be notified about construction activities timeously.	Contractor	Daily
All construction vehicles and equipment are to be kept in good repair and must be fitted with standard silencers prior to construction.		
Where possible, stationary noisy equipment (e.g. compressors, generators) must be encapsulated in acoustic covers, screens or sheds. Portable acoustic shields must be used in the case where noisy equipment is not stationary (e.g. drills, angle grinders, chipping hammers).		
Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening.		
Machines in intermittent use must be shut down in the intervening periods between work sessions or throttled down to a minimum.		
In general, operations must meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993).		
Construction staff working in areas where the 8 hour ambient noise levels exceed 75 dBA must wear ear protection equipment.		
Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SANS 10103 specifications for maximum allowable noise levels for central business districts. No pure tone sirens or hooters may be utilised except where required in terms of SANS standards or in emergencies.		
Noisy operations must be combined so that they occur where possible at the same time.		
Noise from labourers must be controlled.		
Noise suppression measures must be applied to all construction equipment.		
The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the Contractor or his sub-contractors by the contractors own transport.		
Construction activities are to be contained to reasonable hours during normal working hours.		
Neighbours are to be given at least three (3) days warning prior to any blasting, piling or other 'noisy' activities.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.2.20 Air Quality Pollution Management and Odour Control		
Any oil containing equipment or containers must be managed in a manner to avoid oil exposure to atmosphere and to limit evaporation of volatiles to atmosphere.	Contractor	Daily
Portable toilets must be regularly emptied to avoid and minimise sanitary odour pollution.		Weekly
No fires must be permitted on-site.		Daily
Vehicles must be maintained to avoid excessive emissions and smoke. Similarly equipment must be serviced.		
7.2.21 Dust Control		
Dust "tracked-on" from disturbed areas to gravel road surfaces must be avoided by making use of one of the following measures to: ▪ Road sweeping. ▪ Chemical dust suppression of disturbed areas to reduce the amount of dust which can be lifted by the wheels of trucks. ▪ Wet suppression to the roads using a light spray. ▪ The washing down of the wheels of trucks before they enter onto paved road surfaces.	Contractor SHE Officer ECO	Daily
Dust liberated to atmosphere must not reduce the visibility for private vehicles making use of the road passing by the site.		
Wet suppression and wind speed reduction are common methods used to control open dust sources at construction-sites.		
Re-vegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. Plant roots bind the soil, and vegetation cover breaks the impact of falling raindrops, thus preventing wind and water erosion. Plants used for re-vegetation must be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (i.e. pioneer plants) and must easily be propagated by seed or cuttings.		
All construction vehicles and equipment are to be kept in good repair.		
Construction vehicles must keep to a safe speed limit (recommended 25 km/h) when driving on the gravel roads, even though it is anticipated that the speed limit for the gravel roads will be 40 km/hr.		
Dust liberated to atmosphere must not become a nuisance to surrounding landowners and agricultural activities.		
Shade cloth fencing is to be used to reduce dust aggravation.		
Construction activities are to be contained to reasonable hours during the day avoiding periods of sunrise and sunset.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
In areas where there is a large potential for dust liberation (high wind days) wet suppression using a light spray must be applied to the areas in question.		
A dust suppression register as well as a complaints register needs to be kept.		
All complaints received need to be investigated with remedial action taken communicated to the affected party within 14 days.		
7.2.22 Stormwater Management		
The Stormwater Management Plan (SWMP) must be implemented to ensure proper management of stormwater on the site during and after construction to ensure that pollutants and sediment are not released into the Pongola River.	Contractor Engineer	Daily
As detailed in the SWMP, suitable erosion control measures shall be implemented at stormwater discharge points, exposed areas and high embankments. These measures may include the following options: ▪ Sand bags ▪ Bunds or grips adjacent to watercourse. ▪ Technologies similar to Soil Saver on embankments. ▪ Planting of indigenous vegetation on embankments. ▪ Minimise clearing and grubbing to necessary sections within the road reserve. ▪ Over-wetting, saturation and unnecessary runoff during dust control, curing and irrigation activities will be avoided		
Temporary stormwater management facilities / silt fences and traps are to be formalised prior to bulk earthworks commencing. These attenuation ponds / silt traps can help considerably with stormwater attenuation as well as sediment trapping and erosion prevention during the construction phase.		
Detailed plans to control and prevent erosion by water must be agreed prior to the commencement of any works, including site clearance, on any portion of the site.		
Removal of vegetation cover must be carried out with care and attention to the effect, whether temporary or long-term, that this removal will have on erosion potential.		
Precautions must be taken at all times on building sites to contain soil erosion and prevent any eroded material from being removed from the site.		
Landscaping and re-vegetation of areas not occupied by buildings or paving must be programmed to proceed immediately after building works have been completed, or have reached a stage where newly established ground cover is not at risk from the construction works.		
On-site stormwater control systems, such as swales and soil fences are to be constructed before any construction commences on the site. As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
erosion and pollution control at all times.		
Earthworks on-site are to be kept to a minimum. Where embankments have to be formed, stabilisation and erosion control measures must be implemented immediately.		
No materials, fluids or substances are allowed to enter the stormwater system that could have a detrimental effect on the flora, fauna and aquatic life in the river and wetland. Regular monitoring of the sites must be undertaken.		
7.2.23 Social Considerations		
Working hours are restricted to 07:00 – 18:00 during weekdays and 08:00 – 17:00 over weekends, if necessary. Should work be required after these hours, the ECO must be notified and any person who resides in close proximity to the site and who may be impacted upon by the disturbance must also be notified.		
All neighbouring landowners and those that are disturbed due to construction activities are to be notified of construction activities and provided with regular feedback on the status of construction.		
The Contractor must arrange for a suitable candidate to assist with the appointment of local labour and assist with labour disputes.		
Due to the concentration of a workforce in the area over the construction period, the Contractor must implement an HIV/AIDS Awareness Programme on-site. The Contractor must appoint an HIV / AIDS Awareness Officer for the duration of the construction period. Activities for HIV / AIDS awareness and prevention will be broad based, targeting both individuals and groups. They may consist of: ▪ Information posters must be erected in public places both on and off site (e.g. eating places, bars, guest houses); ▪ Peer educators (reference people) must be drawn from the local labour force and trained in HIV / AIDS issues for discussions with colleagues (estimate 1 per 30 employees); ▪ Small focus group discussions and information covering key issues must be held; ▪ Inclusion of HIV / AIDS activities at site meetings and other discussions; and ▪ Voluntary Counselling and Testing. Education must cover: ▪ Stigma and discrimination issues; ▪ Preventative behaviours including partner reduction, condom use, and awareness and importance of treatment of STDs; ▪ Skills including negotiating safer sex, correct condom use, purchase without embarrassment; and ▪ Referral to local health centres and services available.	Contractor	Daily
7.2.24 Visual Considerations		
Storage facilities, elevated tanks and other temporary structures must be located such that they have as little visual	Contractor	Daily

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
impact on local residents as possible. Special attention must be given to the screening of highly reflective materials on-site.		
7.2.25 Reporting & Record Keeping - Complaints Register		
Complaints received must be registered and recorded by the contractor and also brought to the attention of the contractor. Both parties will respond accordingly. The following information must be recorded in the case of any complaint / incident: ▪ Time, date and nature of complaint; ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.	Contractor	Daily
All complaints received must be investigated and a response is to be given to the complainant within 7 days.		
7.2.26 Reporting & Record Keeping - Environmental Incidents Register		
All environmental incidents occurring on the site must be recorded in an Environmental Incident Book and brought to the attention of the ECO. The following information must be provided: ▪ Time, date and nature of complaint; ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.	Contractor	Daily

7.3 Post Construction / Rehabilitation / Operational and Maintenance Phase

Table 7-4: Post Construction Phase EMPr

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.3.1 Construction areas		
All structures comprising the construction affected areas must be removed from the site and surrounding areas.	Contractor Developer	Post-Construction
The area that previously housed the construction materials must be checked for spills of substances such as oil, paint, diesel, etc. and these must be cleaned up.		
All hardened surfaces within the construction affected area must be ripped, all imported materials removed, and the area must be top soiled and re-grassed accordingly with indigenous species.		
The Contractor must arrange the cancellation of any temporary services.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
7.3.2 Vegetation		
All areas that have been disturbed by construction activities (including the construction affected areas) must be cleared of alien vegetation.	Developer	Post-Construction
All vegetation that has been cleared during construction is to be removed from site or used as mulch – except for vegetation which may result in inadvertently seeding alien vegetation.		
7.3.3 Materials and Infrastructure		
All residual stockpiles must be removed to spoil or spread on-site as directed by the Developer and/or Engineer.	Developer Engineer Contractor	Post-Construction
All leftover building materials must be returned to the depot or removed from the site.		
The Contractor must repair any damage that the construction works has caused to any neighbouring properties.		
Fences, barriers, and demarcations associated with the construction phase, are to be removed from the site unless stipulated otherwise by the Developer.		
7.3.4 Rehabilitation		
The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998.	Contractor Engineer Developer ECO	Post-Construction
The '*precautionary principle*' must apply and cost-effective measures must be implemented to pro-actively prevent degradation of the region's water resource and the social systems that depend on it. Ultimately, the risk of water resource degradation must drive sustainability in development design. The protection of water resources begins with the avoidance of adverse impacts and where such avoidance is not feasible; to apply appropriate mitigation in the form of reactive practical actions that minimises or reduces impacts. Examples of mitigation can include changes to the scale, design, location, siting, process, sequencing, phasing, and management and/or monitoring of the proposed development activities, as well as the restoration or rehabilitation of disturbed sites. Where environmental impacts can be severe, the guiding principle must be "anticipate and prevent", rather than "assess and repair.		
All remaining maintenance materials, building rubble and waste are to be removed from the site to an approved disposal site. Burying rubble on the site is prohibited.		
All disturbed surfaces compacted by construction activities including the ablutions and loading areas must be ripped to a minimum depth of 30 cm to allow organic contaminants to breakdown and promote vegetation establishment.		
The Contractor must rehabilitate all impacted areas according to the approved Method Statement.		
Final rehabilitation must be completed within a period specified by the Engineer and the ECO.		

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
The site and surrounding areas must be cleared of all litter.		
Surfaces must be checked for waste products from activities such as concreting or asphalting.		
All embankments must be trimmed, shaped and replanted to the satisfaction of the ECO.		
Immediately after construction disturbed areas must be re-vegetated using the rescued plant sods and supplemented with transplants from adjoining like habitats if required. Alternatively, reseeding via broadcasting using an indigenous seed mix reflecting the general species composition of the area must also be used where necessary. If such seed mixes are not available, seed will need to be harvested from the area and grown nearby for later re-vegetation using plugs / sprigs.		
A biodegradable geo-fabric mat (or vegetation blanket) must be utilized to protect the topsoil on any steep slopes from water and wind erosion during re-vegetation. Alternatively, the plants can be secured using a coarse mesh (steel wire or plastic). The mesh or mat is placed over the vegetation securing it until it can fully establish. The plants must be able to grow unhindered through the mesh or matting. Mats can be staked down.		
Alien and weedy vegetation that colonises the disturbed areas must be removed and eradicated.		
The soils must be adequately prepared prior to planting by a contractor with experience in re-vegetation and under no circumstances must fertiliser be applied.		
Once the initial transplants / plugs are planted, the Contractor to conduct weekly site visits to monitor re-establishment and remove alien plants (in accordance with the latest revised NEM:BA requirements) and address any re-vegetation concerns until re-vegetation is considered successful (i.e. >90% indigenous cover). Thereafter, the rehabilitation must be signed off by the ECO. Once the ECO sign-off is achieved the EDTEA representative must also sign-off the rehabilitation.		
Where drainage channels have been disturbed, the channels must be re-graded, stabilised using erosion control measures and re-vegetated as per the relevant re-vegetation / re-planting plan.		
The Contractor must check that all watercourses are free from building rubble, spoil materials and waste materials.		
7.3.5 End of Contractor Services		
A meeting must be held on-site between the Developer and the ECO to approve all remediation activities and ensure that the site has been restored to a condition acceptable to the ECO and the Developer.	ECO Developer	Post-Construction
A site close-out audit is to be undertaken by the ECO prior to handover of the site by the Contractor.		
7.3.6 Waste Management		
The site must be kept free of litter.	Developer	On-going

ENVIRONMENTAL SPECIFICATION	RESPONSIBILITY	FREQUENCY
Waste management at the site must subscribe to the principles of sustainable waste management. This includes: ▪ Waste prevention – the prevention and avoidance of the production of waste at source; ▪ Waste reduction – the reduction of the volume or hazardous nature of the waste during production; ▪ Resource recovery – recycling or re-use of the waste: ▪ Waste treatment – the treatment of waste to reduce volume or risk to human and environmental safety and health to reduce the degree of hazard when waste is disposed of in a landfill or discharged into a water source; and ▪ Waste disposal – the environmentally acceptable and safe disposal or discharge of waste, (e.g. encapsulation, incineration, landfill or discharge to a water source). These principles must be practiced to the greatest extent possible.		
7.3.7 Invasive Alien Plant Eradication		
Eradicate and control alien invasive plants that invade the site footprint and all areas disturbed during construction and operation of the proposed bridge and approaches.	Developer ECO	On-going
Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.		
The methods employed to control and eradicate a listed invasive species must also be directed at the new growth, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.		
It is recommended that bi-annual alien plant clearing be undertaken by the applicant for the first year post-rehabilitation. Thereafter, alien plant clearing must be undertaken annually.		
Measures contained within Section 9, Method Statement for Invasive Alien Plant Eradication must be adhered to during construction and rehabilitation activities.	Developer ECO	Ongoing

8 Method Statement of Watercourse Crossing

The construction methodology adopted for each individual watercourse will be dependent on:

- the season within which construction arrives; and
- the permanent / semi-permanent saturation status of the watercourse.

8.1 General Guidelines

The Contractor must, where applicable, flume ditches, canals, small streams and drains so as not to interfere with or cause pollution of the water flow and to avoid damage to any banks.

Personnel, equipment and materials must be moved across or around all crossings, which may require the construction of temporary bridges. No ditches, canals, streams or drains may be filled, bridged or otherwise obstructed without written approval of the Project Manager, Environmental Control Officer (ECO) and the relevant Competent Authorities having effective control over such watercourses.

The following principles will be observed:

- The Contractor must ensure that the construction footprint is kept to a minimum in these areas. The construction footprint must be limited to fifty [50] m wide by seventy [70] m in length;
- River/ stream flow will be maintained at all times through fluming or damming/ over-pumping, with sufficient pump capacity available in case of flooding;
- Should water be pumped from the dry working space within any watercourses, this water must be pumped into a retention dam / silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the watercourse;
- All necessary material for silt and pollution control will be installed at the watercourse crossing, including, but not limited to, silt fences and silt lagoons constructed using suitable geotextile fabric or high density (95%+) shade cloth;
- Should there be any watercourse crossings (as at the Phongola River crossing itself) within the wetland then soil / topsoil stockpiles must be kept away from the banks to avoid silt run-off. Soil / topsoil stockpiles must be appropriately protected using silt fences, sand bag barriers and other methods as required;
- No refuelling or fuel storage will be allowed within fifty (50) m of water bodies or wetland areas;
- Specific oil spill response equipment will be kept on site for intervention. Where required, bunds, grips and other measures will be implemented adjacent to watercourses to prevent silt/ pollutants ingress from the construction spread;
- Wherever possible, and in case work during the dry season cannot be achieved, work in stream channels will be carried out without the use of 'in-river' techniques, instead using techniques that divert the flow around the works through flumes or by damming and pumping. This will minimise sediment release;
- If wet cement and / or concrete works are necessary, ready-mix is to be preferred and care will be taken not to spill any product. All priming of hoses for concrete pours must be done away from sensitive areas in a manner that reduces environmental impacts to the bare minimum and can be cleared from site easily, for safe disposal to a recognised local waste landfill site (as provided by the local municipality);
- Full reinstatement of the beds must be undertaken upon completion of the necessary works within any watercourses;
- The pre-construction profile must be restored, and the banks must not be steeper than at pre-construction;

- The pre-construction gradient of the drainage line must be reinstated as exactly as possible, without humping or hollowing over the construction right of way (ROW) so as to limit erosion or replaced material and possible creation of knick-points;
- All surplus, and especially loose, materials must be removed from the watercourse to preserve water quality and avoid sedimentation of downstream riverine habitat;
- Banks must be re-vegetated as soon as construction works are completed. Standard grassing procedures must be used, except in the wetland and except if there is significant risk of fertilizer entering the channel.
- Local indigenous vegetation may be sourced from adjacent areas for the purposes of transplanting onto the construction ROW during the rehabilitation phase, however, the sourcing of transplants must be carefully undertaken under the supervision of a Wetland Specialist.
- Non-project related vehicles or persons will be prohibited from using the Construction ROW.
- Construction personnel must be made aware (through training) and reminded of all project-related environment requirements.

8.2 Preparation Activities (Site Establishment)

The method adopted during the preparation activities, specifically the Construction ROW phase of construction, will depend on the saturation status of the wetland.

Prior to any construction activity, the boundary of each wetland crossed by the proposed bridge and access road/s must be demarcated in the field.

A thirty-two (32) m buffer area must be maintained around each water course that will not be directly impacted on by the development and for which a Water Use Licence (WUL) has not been granted, and will be dependent on site specific conditions, topography and construction requirements.

Within this buffer zone, a setback buffer area must be preserved where vegetation and root systems will remain undisturbed. Topsoil will only be removed from any temporary accesses (where applicable) and within the construction footprint.

The footprint of the construction area will be kept to fifty [50] m wide by seventy [70] m in length. This must be demarcated in the field by a qualified surveyor.

Prior to construction commencing an Ecologist will be appointed and undertake a walk-through of the site in order to identify, relocate or remove protected species under the appropriate permits. This activity will be undertaken in close liaison with the Contractor and the Employers environmental team.

Where the wetland is encountered in a saturated state at the commencement of construction, topsoil stripping width will be minimised. The stripping operation will subsequently allow the installation of a temporary load spreading access, and allow construction operations to proceed with limited damage to the topsoil or underlying soils.

Topsoil stripped from the ROW will be windrowed on the opposite side of the ROW to the storage of subsoil arising from stripping operations (if applicable), and suitably protected from washout and compaction through soil retention curtains and sandbags where necessary; to retain the functionality of the wetlands uppermost stratum.

Planning of crossings will incorporate the location of all environment and pollution prevention devices and equipment. This includes: location of parking and refuelling areas (if any), location of environment equipment storage where appropriate, of spill response equipment, silt control measures, retention dams (silt lagoons), etc.

The establishment of the Contractor's site camp, including offices, services and amenities will be competently supervised by the project team in order to ensure that work is undertaken with respect to managing environmental impacts, as well as health, safety and quality aspects. A detailed environmental risk assessment will be produced and construction monitored accordingly.

The site camp must be securely fenced to prevent unauthorised access and will have:

- Approval from the ECO for the location and layout of the site camp;
- A designated bunded plant refuelling area situated a minimum of fifty (50) m away from any watercourse or wetland; and
- Emergency spill kits will be available and maintained at all times.

In addition to this all plant will be inspected on a daily basis for fluid leaks and will not be allowed to be used if a leak is identified (until it is repaired).

A separate Beam Casting Yard will be established for the construction of precast concrete beams. This facility must be located off-site at the Contractor's site camp.

All other requirements contained in the Environmental Authorisation (EA), EMPr, and all other relevant permits and licenses (where required), related to site establishment, shall be adhered to at all times for the duration of the project.

8.3 Access

Access to the bridge site will be required from both the northern and southern approaches. Access to the bridge is required for the transport of plant, equipment, machinery and materials during construction and will be via existing farm roads (tracks). These tracks may be graded in order to provide safe access to site and better management of storm-water.

Where machinery is to be used, the necessary precautionary mitigation measures need to be implemented to minimise their environmental impact, especially when this involves entering a watercourse. Vehicles with tracks (as opposed to tyres) are preferable – the wider the track the more load spreading and therefore less compaction there is.

Clearing and grubbing works will be undertaken over the full extent of the works area. This will require the removal of vegetation, topsoil and sods, all of which must be used for the sole purpose of rehabilitation.

The method adopted to access the site during this phase of construction will depend on the saturation status of the floodplain wetlands. This may require the construction of a temporary load-spreading access. A temporary load spreading access in a saturated wetland will comprise of geotextile, which will underlie an amount of locally sourced stone-material appropriately wide to allow subsequent construction operations to proceed in a safe manner, providing a safe stable working platform to support plant during construction. Alternatively the Contractor may consider gaining access to saturated wetland areas *via* suitable bog-mats.

Where a dry wetland is encountered, topsoil stripping will also be minimised and stored in a similar manner to protect it from vehicular compaction and washout. In this situation, no locally sourced stone-material will be laid to complement the temporary access, as a safe working platform can be provided on the dry stable underlying strata.

If precipitation occurs, however, access through such areas may be restricted, to prevent compaction of soils. Access will be restored once the soil conditions permit. Furthermore, if access is urgently required, or rainfall is encountered during a vital phase of construction, the method employed for a saturated wetland will be implemented to protect the underlying soil profile and permit construction to proceed in a safe manner

8.4 Excavations

Where material is excavated from the works area at a saturated wetland, the excavations will be side dug from the temporary access, with careful separation of soil types / strata as identified. Where a previously dry wetland is saturated, a temporary access will be installed to prevent rutting and degradation of the exposed subsoil, to permit construction to proceed.

Where excavating operations arrive at a dry seasonal wetland, the excavation will be dug on-line, creating a much narrower excavation, with less subsoil removed as a result, and at a greater speed. The soils will be removed in such a way that they can be easily reinstated (if required) in the reverse order as detailed below.

A common approach is to be applied to all wetlands, with regard to removal of excavated material, whether side dug or on-line. The soil that is removed from the excavation at its deepest point will be laid closest to the excavation. The first layer of topsoil will be laid furthest away from the excavation. This will ensure that soil layers (strata) are well separated and can be more successfully re-used for rehabilitation elsewhere.

Subsoil will not be stored on geotextile, but instead will be laid directly on the un-stripped topsoil.

As a result of the standard approach to excavations, whereby separate strata, as identified, are removed and stored to one side in the order in which they were removed, rehabilitation operations elsewhere are somewhat simplified.

Where special conditions occur, such as the presence of an impermeable clay layer, the foreman will be advised accordingly on site by an Environmental Representative of the Contractor, and may be instructed via signage at the entrance to the wetland area to ensure it is clearly returned to the same depth and compaction as the surrounding layer (if the intention is to return the soil to the area excavated).

Where trench breakers are required, these will be imported appropriately and installed by a suitably qualified and experienced crew, as instructed by the Engineer, using information provided in the relevant specialist reports.

However, if a saturated wetland is encountered, it will be important to ensure that any backfill (where required) to excavations is not overly compacted, such that it creates a subsurface dam. In these areas, the Engineer proposes that mechanical compaction should be minimised as far as possible. The principal aim will be to restore the backfilled material to a compaction resembling that of the trench walls and existing strata.

Where a dry wetland is encountered, backfill (where required) will be done to the standard specification using mechanical aids, if and when practicable.

Depending on the type of material removed from the excavated area, it will be necessary to import amounts of layering material. This is typically defined by the Engineer according to the Clients specifications.

Any large boulders encountered during excavations will not be returned to the excavation, but removed off site and disposed of according to the requirements outlined in the EA and EMPr.

Excess soil material will be temporarily windrowed and used within the rehabilitation phase elsewhere on site.

During excavation, piling or any other relevant works, the watercourse and its banks will be continually monitored.

8.5 River Crossing

The construction works area within the river must be completely isolated (see Table 8-1 for examples).

It is envisaged that temporary restriction of the watercourse will be required during the construction of the bridge sub-structure, which includes the bridge piers and abutments. River / stream flow will be maintained at all times through fluming or damming by constructing a cofferdam and over-pumping, with sufficient pump capacity available in case of flooding. The natural downstream flow of the river is to be maintained during construction by employing flumes and concrete culverts within the cofferdam to direct flows away from the immediate works area around the base of each of the in-stream piers. The flume pipes must be removed from the channel when the cofferdam is removed and the original flow patterns re-instated on completion of construction and removal of the cofferdam.

Turbidity curtains must be erected to limit downstream impacts of construction activities. These floating barriers are designed to control sediment and run-off at construction sites and usually comprise of vertical liners with floats at the top and a ballast chain at the bottom. These will only be required during the most high risk activities relating to the cofferdam construction, dredging of the river bottom for the foundation and abutment construction and the removal of the cofferdam structure.

During bridge construction, the Contractor will place a debris catch netting / containment system under the bridge structure to ensure that no building materials fall into the river.

The construction servitude (footprint) within the river must be kept to fifty [50] m wide by seventy [70] m in length.

Material used to create the cofferdam, to divert waters away from the works area, must be protected from scouring and erosion through the placement of rock material (i.e. non-erodible material) at the contact point between the cofferdam and the river (i.e. on the face of the cofferdam both up- and downstream of the works area).

Should water be pumped from the dry working space within the river, this water must be pumped into a retention dam / silt lagoon (or similar structure, such as a conservancy chamber) to ensure sediment settles and clean water is released back into the water course. These structures are generally constructed on the cofferdam wall, allowing an overflow on the downstream side.

No fuel may be stored within the (dry) bund area inside the river, or anywhere else within fifty (50) m of a watercourse.

The onus is on the Contractor to routinely check weather forecasts (on a daily basis) to prepare for inclement weather conditions, including possible flood events. The Contractor must also check for planned releases of water from the Jozini Dam. All tools, equipment and machinery that could potentially have an adverse effect of the environment must be removed from the works area before the arrival of inclement weather with the potential for flooding. Appropriate spill response material must be available on site.

All petrochemical, cement and / or concrete and other hazardous spillages must be reported to the ECO, the Project Manager and any of the relevant authorities. Incidents are to be captured on the environmental incidents register when they occur and must be closed-out by the ECO following corrective action, where applicable, by the Contractor.

Prefabricated elements will be used where practicable in order to minimise construction duration and potentially environmental impacts associated to fabricating elements on site.

If wet cement and / or concrete works are necessary, ready-mix is to be preferred and care must be taken not to spill any product. All priming of hoses for concrete pours must be done away from sensitive areas in

a manner that reduces environmental impacts to the bare minimum and can be cleared from site easily, for safe disposal to a recognised local waste landfill site (as provided by the local municipality).

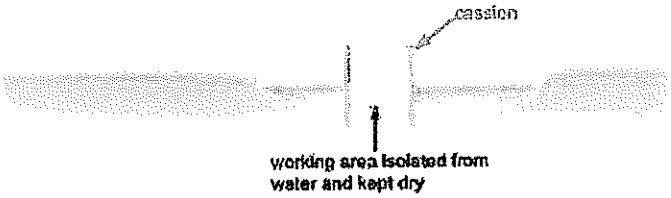
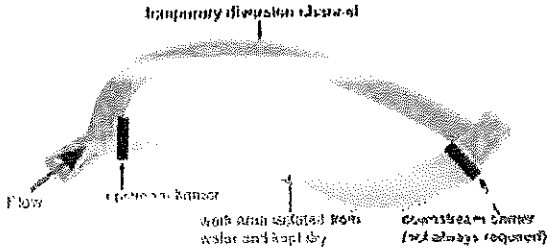
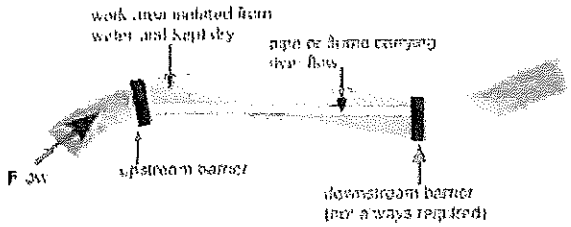
Waste management and house-keeping must be maintained at all times during construction. Sufficient waste receptacles must be available in the laydown area/s for containment of all waste produced on site. As a minimum requirement, general and hazardous waste must be separated and kept within sealed receptacles which do not allow for the ingress of water.

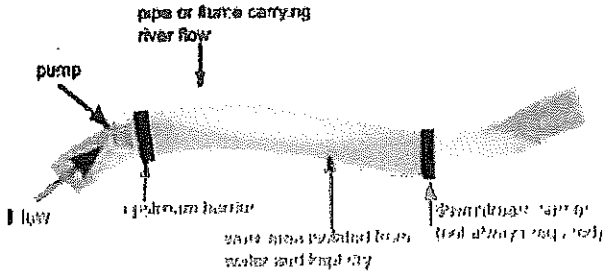
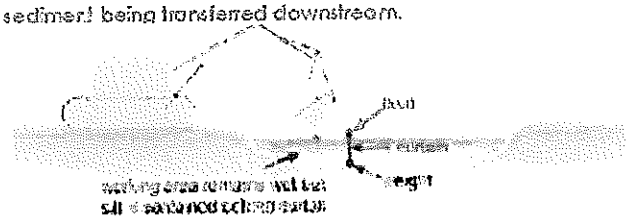
No material may be stored for longer than twenty-four (24) hours within the working area within the river. Material sufficient for the day's work may only be allowed within the working area within the river.

Where the Contractor wishes to deviate from this prescribed CMS, he must draft a site specific method statement for the approval of the Project Manager and ECO, and must ensure the method statement complies in its entirety with the Environmental Authorisation, EMPr and all applicable licenses and permits for the project.

Monitoring will be undertaken as per the requirements stipulated in the Environmental Authorisation, EMPr and all applicable license and permits, including the Water Use Licence.

Table 8-1: Best Practice Methods for Practical and Full Isolation

Method/Approach	Description
Partial Isolation	Partial area of the channel is isolated and kept dry with the use of barriers (often referred to as a cofferdam) and flow is allowed to continue in the remainder of the channel. Barriers used to isolate part of the channel can be made of a number of different materials. 
Partial Isolation using a Caisson	Provides isolation of the channel similar to cofferdams. They are essentially large boxes or cylinders (usually pre-cast concrete and steel) which are open at the top and bottom and are lowered into the water to isolate an area of bed. 
Full Isolation Temporary diversion channel	A whole section of the channel is isolated and kept dry, and the water is transferred downstream of the works area by excavating a temporary open channel. 
Full Isolation gravity/flume pipe	A whole section of the channel is isolated using barriers that span the full width of the river. This keeps a stretch of the river dry and the water is transferred downstream of the works area through gravity fed flumes/pipes. The flume(s) is normally placed on the bed of the watercourse through the works area and outfalls at the downstream barrier, if present, or far enough downstream to prevent the water backing up into the work area. 
Full Isolation over pumping / siphon	A whole section of the channel is isolated using barriers that span the full width of the river. This keeps a stretch of the river dry and the water is transferred downstream of the works area by mechanical assistance (pumping or siphon). The pump and associated pipe work need not be located in the isolated area.

Method/Approach	Description
	
Isolation with silt curtain	In this case the works area s[illegible] remains wet and a silt curtain is placed around the works area to minimise sediment being transferred downstream. 

8.6 Piling

Founding conditions at the site are considered to be poor, particularly in view of the likely thick alluvial deposits and boulder bed. All foundations are being designed to carry the load in end-bearing, founded in the underlying competent weathered bedrock. Due to the anticipated significant depth to bedrock, the presence of a shallow water table and prominent boulder beds across the site, piled foundations are the most feasible option for supporting the proposed bridge structure. Pressure Grouted Continuous Flight Auger (CFA) and Driven Cast In-situ (DCI) piles are not considered suitable for the project as they are likely to refuse on the boulders beds and ferricrete layer that was observed on site. The following types of piles are therefore being considered in the pile design:

- Auger piles; or
- Frankie with bulbous base or
- Friction piles or
- Driven precast piles.

In order to create a stable platform for the piling rig it would be necessary to construct a temporary piling mat and cofferdam. The piling mat will be in the form of layers of compacted clean quarry rock to achieve a strong working platform. Flumes utilising suitable pipes will be installed in the piling mat to ensure that that the flow of the river is maintained at all times. Alternatively the contractor could opt for piling off a pontoon / barge but this is unlikely taking into account the remote location of the site and the scale of this project / crossing.

The piling rig will be set up in position on the pile mat and drilling will take place in the soil down to competent weathered bedrock. The ready-mixed concrete will be delivered by truck and will be poured into the newly bored holes from a position that will not allow any concrete to spill near to the watercourse or its banks. Any concrete that does spill will be disposed of in a specially designated skip and this skip will also be used to contain the water used for washing out the mixer. The skip's contents will be disposed of as inert waste when all the cement has cured. Reinforcement (rebar cages) will be pushed into the wet concrete and the completed pile left to cure before the top is cut off to the correct level to suit the design

and disposed of as inert waste at a recognised local waste landfill site (as provided by the local municipality).

When the piling is complete, a cofferdam will be constructed to allow the pile cap and pier / abutment to be constructed. This is critical as it will essentially provide a dry construction space within the Pongola River. Should seepage occur and water is required to be pumped from the dry working space within the river, this water must be pumped into a retention dam/silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the water course; perhaps being allowed to build-up and flow over the top of the retention dam/silt lagoon (or similar structure) and cascade down the clean dump rock of the cofferdam.

On completion of construction the working platform of clean quarry rock and the cofferdam will be removed and the river bed and banks will be restored to the condition they were in prior to construction.

8.7 Abutment and Pier Construction

A layer of blinding concrete will be placed to provide a clean, level working surface on which to construct the reinforced concrete foundations for all piers and abutments. As with the piling operation and all forthcoming concrete placing operations, the same controls will be employed to prevent concrete being deposited in or near the watercourse. If, after thorough risk assessment, the level of risk to the watercourse from contamination from cement remains too high, fast setting concrete mixes may be specified.

Formwork / shutters and steel reinforcement will be erected in-situ to form the pier and abutment base and walls in a number of separate pours.

All backfilling behind the abutment and associated wing-walls will be carried out in a manner to limit the impact on the watercourse. Placement of fill layers will be undertaken in layers not exceeding 200 mm thick when placed loose and compacted using suitable compaction plant to achieve the required Modified AASHTO maximum dry density. Density control of placed fill material will be undertaken at regular intervals during fill construction.

The bridge bearings will be installed and fixed using a cementitious grout ensuring the same levels of environmental protection as for concrete pours.

Backfilling around the abutment and pier walls will be done in layers to ensure adequate compaction and with very great care to ensure that no fill material falls into the watercourse.

8.8 Deck Construction

Each of the spans making up the bridge deck will comprise of cast in situ voided deck. Falsework in the form of staging, shuttering formwork will be placed onto the deck soffit to support the deck during erection. Once this formwork is erected the steel reinforcement for the deck will be placed, deck shutter erected and the concrete deck slab will be poured using ready mix concrete. The concrete will be pumped with the wet concrete spread by hand tools and compacted using electric vibrating pokers.

Parapets will finally be installed together with bridge expansion joints. Once surfaced the bridge deck will be marked accordingly and all relevant signage would be erected.

8.9 Rehabilitation Activities

As soon as backfilling is complete, and the crew has vacated the wetland area, re-instatement of the construction footprint including dewatering areas (if required), can commence subject to appropriate site conditions.

Where a saturated wetland is encountered, all machines will work on the temporary access. The access will be removed in the reverse order in which it was laid.

Machines will remove the stone material which may be transported to another location and re-used if it is required (dependent upon the progress of construction), removed correctly to a recognised municipal landfill, or offered to the landowner. The geotextile base material is also removed during this operation, which ensures that no foreign material is left behind in the wetland area. Following the removal of these materials, the area below can be ripped to an appropriate depth to remove any minor compaction suffered by the preceding construction operations, and topsoil replaced. The pre-construction landscape profile will be restored, matching as closely as possible to the original land form prior to the distribution of the topsoil. This includes the re-distribution of any remaining windrowed material.

Where a dry wetland is encountered, there is no temporary access material to remove. The process of re-instatement will be similar to that described above. Machines will enter the area, and rip the subsoil area to a greater depth to fully reverse compaction from the preceding construction operations. All foreign materials, including boulders which may have arisen from the excavations, will be removed completely. Working out of the wetland, the topsoil will be replaced in the same position as it was originally sited, and de compacted where necessary in preparation for seeding.

For all wetlands, re-instatement will be implemented through continued liaison with a Wetland Specialist and / or the ECO, and both the Employer and the Contractors environmental team. Locally sourced wetland plants may be relocated into the re-instatement area. Relocation of plants from one part of an undisturbed wetland into another (the re-instatement area) can often prove far more successful in terms of survival rates, and this will be the preferred method for re-instatement, bolstered with the original seedbank within the replaced topsoil. Sourcing of wetland plants for transplanting will be scattered so as to limit impact on the source areas. This must be undertaken under the supervision of a Wetland Specialist.

Mineral fertilizers and organic material (manure, compost, chicken litter etc.) will not be used in re-vegetation of wetland areas, and reliance will be chiefly on transplanting (as above).

All effort will be taken to reverse compaction wherever it has occurred by loosening the soil to its original texture and restoring the natural soil profile of the affected area.

Special mitigating measures such as drainage, riprap, sediment and silt traps, diversion berms and gabions will be used throughout (where required) to mitigate soil erosion as per design by the Employer. Information in the wetland database, experience and judgment of the terrain will be used to inform the location of such measures.

Regular inspections of the reinstatement efforts are to be carried out by the Contractor's Environmental Representative(s) and ECO to monitor the progress of the reinstatement and to determine when such efforts are deemed to be successful. Such inspections will be undertaken throughout the duration of the contract period. Should additional measures be required within this period, the Contractor will implement these on instruction. Rehabilitation of disturbed wetland areas will be completed to the satisfaction of the ECO.

The content of this CMS will be brought to the attention of all persons associated with the undertaking of these activities and such measures as necessary will be taken to bind such persons to the requirements herein.

9 Method Statement for Invasive Alien Plant Eradication

It is the responsibility of the Developer to eradicate and control alien invasive plants that invade all areas disturbed by the construction and operation of the proposed development. In terms of section 75 of NEM:BA, the following applies to the control and eradication of invasive species:

- The control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs (see Box 1 below for guidance on alien plant control methods);
- Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment; and
- The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

It is recommended that bi-annual alien plant clearing be undertaken by the applicant for the first year post-rehabilitation. Thereafter, alien plant clearing should be undertaken annually until such a time that further risks of alien invasion resulting from disturbance factors are considered negligible.

Box 1. Guidance on Invasive Alien Plant Control

There are various means of controlling invasive alien plants in South Africa. The primary methods are discussed below. The suitability of control methods depends on a number of factors, including practical constraints, economic constraints and applicability of methods for particular species of alien plants. It is generally advised that a form of integrated control be implemented; however the final selection of the appropriate methods of control should be based on the following criteria:

- **Species to be controlled:** herbicides are registered for specific species. Selection should be based on "*A Guide to the use of Herbicides*" issued by the Directorate: Agricultural Production Inputs and labels and information brochures provides by herbicide suppliers.
- **Size/age of target plants:**
  - For seedlings: hand-pulling or hoeing and foliar applications of herbicides for dense stands.
  - For saplings: hand-pulling or hoeing, foliar applications of herbicides for dense stands, basal stem treatments and cut stump treatments recommended.
  - For mature trees: ring barking, frilling, basal stem treatments and cut stump treatments recommended.
- **Density of stands:** Overall applications of herbicide can be made to dense stands of seedlings or saplings. Where dense stands of large trees are present, treatment of standing trees may be appropriate to obviate the problem of disposing felled trees.
- **Accessibility of terrain:** In inaccessible areas, methods that rely on the minimum amount of transportation of equipment and chemicals should be given preference.
- **Environmental considerations:** Riparian/wetland areas require a careful approach to treatment/control. Only herbicides approved for use in wetland/riparian areas are to be considered. Washing of equipment or disposal of any chemical substances is prohibited in or near areas where there is a potential risk of contamination of wetlands/riparian areas.
- **Desirable vegetation:** Control methods that will cause the least damage to desirable vegetation must be considered. Selective herbicides or mixes that will not damage other desirable vegetation should be applied where relevant.
- **Disposal of dead vegetation:** Where possible, utilizable wood should be removed after tree felling. This is also the case for trees that could cause the blockage of watercourses. Brushwood should be spread rather than stacked to limit soil damage in instances where burning is planned.
- **Cost of application:** the cost of application and re-treatment should be taken into consideration when selecting methods/herbicides, etc.

The control methods detailed below have been adapted from the ARC-PPRI (Agricultural Research Commission: Plant Protection Research Institute) Weed Research Programme (online at www.arc.agric.za/arc-ppri/), the DWA Working for Water Programme ((http://www.dwaf.gov.za/wfw/Control/) and eThekwini Municipality's *Practical tips on the management and eradication of invasive alien plants* (EcoFiles Sheet 4.

Local Action for Biodiversity).

1. Mechanical control

Mechanical control entails physically damaging or removing the target alien plant. Mechanical control is generally labour intensive and therefore expensive, and can also result in severe soil disturbance and erosion. Different techniques can be applied and include uprooting/hand-pulling, felling, slashing, mowing, ring-barking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice (e.g. *Eucalyptus spp., Melia azedarach)* need to have the cut stumps or coppice growth treated with herbicides following mechanical treatment.

Examples of mechanical controls include:

- **Hand pulling / uprooting:** should be reserved for small plants and shrubs with shallow root systems (not recommended for trees with a stem diameter of more than 10cm). Grip the young plant low down and pull out by hand (using gloves). Uprooting is similar but is undertaken on slightly older individuals
- **Chopping / cutting / slashing:** This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/trunks. An effective method for non re-sprouters or in the case of re-sprouts (coppicing). It must be done in conjunction with chemical treatment of the cut stumps. Cut/slash the stem of the plant as near as possible to ground level. Paint re-sprouting plants with an appropriate herbicide immediately after they have been cut.
- **Strip bark:** Using a bush knife, strip bark away from tree from waist height down to soil. Cambium is stripped with the bark. No herbicide used.
- **Felling:** Large trees can be cut-down in their entirety, however, this is often not recommended unless absolutely necessary as large trees can play a pivot role in soil protection and biodiversity maintenance.
- **Girdling:** Girdling involves cutting a groove or notch into the trunk of a tree to interrupt the flow of sap between the roots and crown of the tree. The groove must completely encircle the trunk and should penetrate into the wood to a depth of at least 1.5 centimetres on small trees, and 2.5 to 4 centimetres on larger trees. .

2. Chemical control

Chemical control involves the use of registered herbicides to kill the target weed. The use of herbicide is often essential to the success of an eradication/control programme as it greatly reduces the re-growth potential of alien plants. Unfortunately, if the wrong herbicide is chosen, one can potentially cause more harm than good to the environment.

Some additional recommendations regarding herbicide use include:

- Herbicides should be applied during the active growing season.
- Always observe all safety precautions printed on the labels and manufacturer's instructions when mixing and applying herbicide.
- Herbicides can be applied in various ways. They can be sprayed onto dense infestations or painted onto the main stem of the plant or cut stump.
- Spraying herbicide on small infestations is not recommended, rather cut and apply herbicide to the stumps either with a brush.
- Spraying should be restricted to windless days when there is less risk of droplets drifting onto non-target species.
- Pressure or flow regulators should be fitted to sprayers for overall application. Spraying should be restricted to plants waist height or lower, but also ensuring there is sufficient foliage to carry the applied herbicide to the root system of the target plant.
- For water-based applications, Actipron Super Wetter should be added where recommended on the herbicide label, at a rate of 1.75 / ha for dense-closed stands of alien vegetation.
- For all water-based treatments, a suitable brightly coloured dye should be added to the mix to ensure that all target plants are treated. For diesel-based applications, Sudan Red Dye should be added.
- Chemical control of IAPs is not recommended in aquatic systems due to the risk of water pollution, but

may be used in conjunction with cutting or slashing of plants.
- Chemicals should only be applied by qualified personnel.
- Only herbicide registered for use on target species may be used.
- Follow the manufacturer's instructions carefully.
- Appropriate protective clothing must be worn.
- Only designated spray bottles to be used for applying chemicals.
- The number of herbicides for safe use under wet conditions is very limited.

3. Biological control

Biological weed control involves the releasing of natural biological enemies to reduce the vigor or reproductive potential of an invasive alien plant. Research into the biological control of invasive alien plants is the main activity of the Weeds Research Programme of ARC-PPRI and a list of biocontrol agents released against invasive alien plants in South Africa can be downloaded from their website. To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF).

4. Mycoherbicides

A mycoherbicide is a formulation of fungal spores in a carrier, which can be applied to weeds in a similar way as a conventional chemical herbicide (using herbicide application equipment). The spores germinate on the plant, penetrating plant tissues and causing a disease which can eventually kill the plant. Mycoherbicides are indigenous to the country of use and therefore are already naturally present in the environment and do not pose a risk to non-target plants. Under natural conditions they do not cause enough damage to the weed to have a damaging impact and are therefore mass produced and applied in an inundative inoculation, which leads to an epidemic of the disease knocking the weed population down. Mycoherbicides need to be re-applied at regular intervals.

5. Integrated control

It is frequently advisable to use a combination of two or more of the control method mentioned above, which is referred to as *integrated control*. Killing plants without cutting down causes the least disturbance to the soil and is the ideal.

The following integrated control options are available:

- **Basal bark and stem application:** apply recommended herbicide mixed in diesel carrier to the base of the stem of trees (<25cm stem height) and saplings. This method is appropriate for plants with thin bark or stems up to 25cm in diameter. Do not cut the bark. Apply herbicide mix with paintbrushes or using a coarse droplet spray from a narrow angle solid cone nozzle at low pressure. For multi-stemmed plants, each stem must be treated separately.
- **Ring barking:** Invasive trees growing away from any structures or roads can be ring-barked, poisoned and left standing rather than felled. They will slowly collapse over time and can establish habitat for birds, etc. Strip all bark and cambium from a height of 75cm to 100cm down to just below soil level. Cut a ring at the top and pull strips. All bark must be removed to below ground level for good results. Where clean de-barking is not possible due to crevices in the stem or where exposed roots are present, a combination of bark removal and basal stem treatments should be carried out. Bush knives or hatchets should be used for debarking.
- **Frilling:** Using an axe or bush knife, make angled cuts downward into the cambium layer through the bark in a ring. Ensure to effect the cuts around the entire stem and apply herbicide into the cuts.
- **Cut stump treatment:** This is a highly effective and appropriate control method for larger woody vegetation that has already been cut off close to the ground. The appropriate herbicide should be applied to the stump using a paintbrush within 30 min of being cut. Apply recommended herbicide mixture to the cut surface with hand sprayers, a paintbrush or knapsack sprayer at low pressure. Apply only to the cambium or outer layer of large stumps and the entire cut surface of small stumps. Ensure the stumps are cut as low to the ground as practically possible (about 10 – 15cm or as stipulated on specific herbicide

label). Herbicides are applied in diesel or water as recommended for the herbicide. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

- **Scrape and paint:** This method is suitable for large vines and scrambling plants i.e. creepers. Starting from the base of the stem, scrape 20-100cm of the stem to expose the sapwood just below the bark. Within 20 seconds apply the herbicide to the scraped section. Do not scrape around the stem. Stems over 1cm in diameter can be scraped in 2 sides. Leave the vines to die in place to prevent damaging any indigenous plants they may be growing over.
- **Foliar spray:** This is not an advocated method of application by unqualified applicators due to the danger of spraying indigenous species. Should be restricted to droplet application made directly on the leaves on plants that are no higher than knee height. Use a solid cone nozzle that ensures an even coverage on all leaves and stems to the point of runoff. Do not spray just before rain (a rainfall-free period of 6 hours is recommended) or before dew falls. Avoid spraying in windy weather as the spray may come into contact with non-target plants. Spraying dormant or drought stressed plants is not effective as they do not absorb enough of the herbicide.
- **Burning:** Spindly invasive alien plant species, such as Triffid Weed (*Chromolaena odorata*), growing on sandy soils, where there is between 30-40% grass still present, can be eradicated using annual controlled burns. Moderate to low infestations in wetland areas can be treated by controlled burning at the beginning of autumn, followed by mechanical removal or herbicide application in mid spring. *Note that burning would generally not be acceptable in an urban area due to fire hazard/risk and nuisance.*

Note that no heavy machinery should be used to remove invasive alien plants, no matter how high the infestation, without prior authorization from relevant government departments when operating in wetlands and riverine areas.

6. Disposal of alien plant material

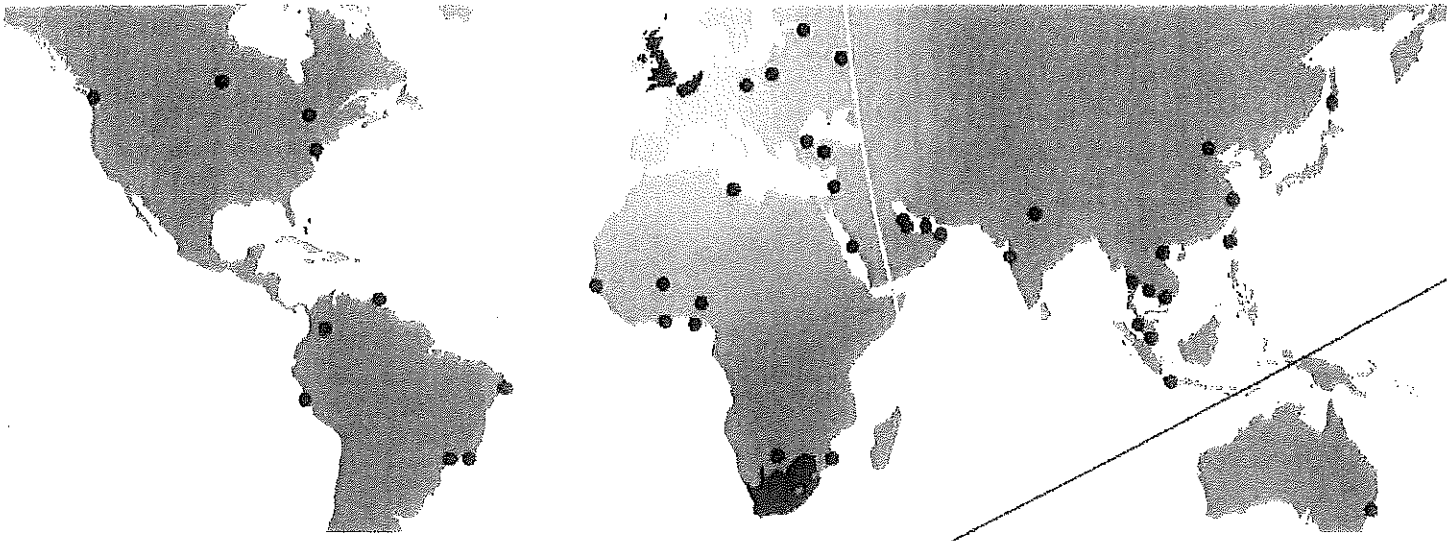
Treated / removed alien plant material will need to be removed from the site and disposed of at a proper / registered receiving area such as a local registered land fill site.

10 COMPLIANCE WITH THE ENVIRONMENTAL SPECIFICATION

The EMPr forms part of the Contract Documentation and is thus a legally binding document. It is also necessary for the contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of *Polluter Pays Principle*. Section 28 of the NEMA, an individual responsible for environmental damage must pay the costs for both environmental and human health damage. As far as possible preventative measures must be in place to reduce or prevent additional pollution and/or environmental damage from occurring.

The Contractor is deemed not to have complied with the Environmental Specification / EMPr if:

- There is evidence of contravention of clauses within the boundaries of the site, site extensions and haul/ access roads;
- Environmental damage ensues due to negligence;
- The contractor ignores or fails to comply with corrective or other instructions issued by the Developer, ECO or Engineer within a specified time; or
- The contractor fails to respond adequately to complaints from the public



With its headquarters in Amersfoort, The Netherlands, Royal HaskoningDHV is an independent, international project management, engineering and consultancy service provider. Ranking globally in the top 10 of independently owned, non-listed companies and top 40 overall, the Company's 6,500 staff provide services across the world from more than 100 offices in over 35 countries.

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Royal HaskoningDHV
Enhancing Society Together

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

KWAZULU-NATAL PROVINCIAL OPERATIONS

Southern Life Building, 9th Floor, 88 Joe Slovo Street, Durban, 4000 ; Private Bag X54304, Durban, 4000

Mr L.S.M. Ntenga
(031) 336 2956
NtengaL@dws.gov.za
27/2/2/W45A/4/1/3/9

Department of Transport-KZN
Private Bag X9043
Pietermaritzburg
3200

Attention: Miss Khumbu Sibiya

GENERAL AUTHORISATION IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998) KZN-DEPARTMENT OF TRANSPORT: CONSTRUCTION OF PONGOLA (MBOZA) RIVER BRIDGE AND VEHICULAR APPROACHES OFF DISTRICT ROAD D1834

Your water use authorisation application for the taking of water in terms of Section 21(a) and impeding or diverting the flow of water in a watercourse and altering the bed, banks, course or characteristics of a watercourse lodged in terms of Section 21(c) and (i) of the National Water Act, 1998 (Act 36 of 1998), for the construction of Pongola (Mboza) River bridge and vehicular approaches off District Road D1834, located between Ward 10 of Jozini Local Municipality and Ward 13 of uMhlabuyalingana Local Municipality, Quaternary Catchment W45A within the Pongola to Mtamvuna Water Management Area, KwaZulu-Natal Province.

The Department has evaluated the submitted documents and has confirmed that the intended water use falls within the ambit of a General Authorisation No. 538 dated 02 September 2016 as published in Government Gazette 40243 and General Authorisation No. 40229 of 2016 dated 26 August 2016 as published in Government Gazette 509. The Department hereby authorises the following water uses under the General Authorisation:

Water Use(s)

Section 21(a): Taking water from a water resource.

Section 21(c): Impeding or diverting the flow of water in a watercourse.

Section 21(i): Altering the bed, banks, course or characteristics of a watercourse

Table 1: Details of water use and the property where water use will occur

No.	Activity	Water Resource/HGM Type	Purpose	Quaternary Catchment	Property description	Volume (m^3/a) /Dimensions (m) / Diameter (mm)	Co-ordinates
01	Section 21(a)	Pongola River	Abstraction of water for construction purposes	W45A	Portion 0 of Farm Makhathini Flats 16533	$40m^3$ per month for 24 months	27°11'17.24"S 32°14'23.63" E
02	Section 21(c) & (i)	Floodplain wetland of the Pongola River	Construction of **Left bank Abutment**	W45A	Portion 0 of Farm Maarschalk 14924	Length: 6m Width:0.6m Height: 2.3m	**Start:** 27°11'15.03"S 32°14'22.07" E **End:** 27°11'14.90"S 32°14'22.32" E
03	Section 21(c) & (i)	Pongola River	Construction of **Pier 1**	W45A	Portion 0 of Farm Maarschalk 14924	Length: 6m Width:0.6m Height: 7.5m	**Start:** 27°11'15.50"S 32°14'22.44" E **End:** 27°11'15.43"S 32°14'22.58" E
04	Section 21(c) & (i)	Pongola River	Construction of **Pier 2**	W45A	Portion 0 of Farm Makhathini Flats 16533	Length: 6m Width:0.6m Height: 7.5m	**Start:** 27°11'16.13"S 32°14'23.02" E **End:** 27°11'16.17"S 32°14'22.95" E
05	Section 21(c) & (i)	Floodplain wetland of the Pongola River	Construction of **Right bank Abutment**	W45A	Portion 0 of Farm Makhathini Flats 16533	Length: 6m Width:0.6m Height: 2.3m	**Start:** 27°11'16.73"S 32°14'23.14" E **End:** 27°11'16.60"S 32°14'23.39" E

You are required to fully comply with the conditions of Government Gazette as specified in Schedule.

Please take note that if you do not comply with the conditions of the General Authorisation, The intended Section 21 (c) and (i) water uses will be regarded as unlawful.

You may subsequently be required to apply for a water use licence in terms of the National Water Act, Act 36 of 1998, however the issuing of such a licence cannot be guaranteed.

Your attention is further drawn to the following:

1. This Authorisation is valid from the date of publication of the above-mentioned Government Notice for a period of twenty (20) years unless it is replaced by another General Authorisation or the water user is required to apply for a licence in terms of the Act.

2. The conditions of this authorisations shall be brought to the attention of all persons (employees, sub-consultants, contractors etc.) associated with the undertaking of this activities and the authorised party shall take such measures that are necessary to bind such persons to these conditions.

3. The proposed water use activities have been Generally Authorised because the ecological risks involved are minimal.

4. The responsible person for these activities shall immediately inform the Provincial Head: KwaZulu-Natal region of any change in the name, address and/ or premises and legal status.

5. The Department accepts no liability of any damage, loss or inconvenience of whatever nature, suffered as a result of the authorised activities.

6. This Authorisation shall not be construed as exempting the water user from compliance with any other applicable Act, Ordinance, Regulation or By-law.

This Department reserves the right to request additional measures that could be taken, which may include an application for a water use licence, should the activity be deemed to cause a significant impact to the environment.

Please do not hesitate to call this office should you have any queries.

Yours faithfully

DIRECTOR: PROTO CMA: PONGOLA-UMZIMKHULU
MR. J REDDY
DATE: 31/8/2011.