ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

File Reference Number:
1/3/1/16/1E-268

Project Title:
Remediation of SAPPI Ngodwana Dam, on Farm Ngodwana 1030JT, Ngodwana, Mpumalanga Province.

Prepared for:

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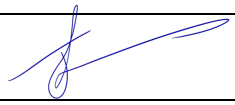
Reg: 2006/023163/23

DOCUMENT CONTROL

Table 1. Document Control.

PHASE	AUTHOR	STATUS	REVISION	DISTRIBUTED ON	SIGNATURE
Author	Philip Radford	Draft	00	25 October 2020	
Review	Justin Bowers	Draft	01	28 October 2020	
Approved	Justin Bowers	Draft	01	28 October 2020	
Approved	Justin Bowers	Final	00	13 January 2021	

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EXECUTIVE SUMMARY

Ngodwana Dam is a 41 m high zoned earthfill Category III Dam. The dam is located on the Ngodwana River, a tributary of the Elands River, Mpumalanga Province, directly upstream from the N4 highway and the Ngodwana Paper Mill, 40 km from Mbombela. The water surface area of the dam at the Full Supply Level of 959.8 masl is 87 ha. The catchment area of the dam is 229 km^2, which covers the entire X21H quaternary catchment. The Mean Annual Runoff (MAR) is 66.7 million m^3. The dam's gross storage capacity of 10.4 million m^3 is 16 % of the MAR. The historical firm yield of the dam is 26.3 million m^3/a.
The purpose of the remediation is to ensure the continued safe operation of this Category III dam and the stability of the main and right flank embankments and its foundations.

The scope of construction works to be included in the remediation and to be authorised is:

1. Stabilizing berm on the downstream face of the main embankment to RL 941.3 m, including approximately 30 000 m^3 of earthworks (predominantly rockfill), a new internal drainage system (sand & gravel filters, rock toe and drain pipes with inspection concrete manholes) and gabion retaining walls.
2. Subsoil pipe drains above the berm of 133 m length with inspection concrete manholes.
3. Raising of the right flank embankment with earth fill to prevent overtopping and failure during large floods and to improve the stability of the embankment, including a subsoil toe drainpipe with inspection concrete manholes.
4. Improvements to the road surfaces of existing roads, including widening to provide for passing lanes and extending in length of others, sections of which fall within the extent of a watercourse.
5. Construction of a pedestrian bridge and a low water vehicle crossing over the Ngodwana River to allow access during construction and dam safety inspections during operation.
6. Creation of temporary site establishment, stockpile and contractor's site office areas.

This Environmental Management Programme (EMPr) is developed in compliance with section 24N of the NEMA, 1998, as amended and contains those requirements prescribed in the EIA Regulations, 2014, as amended, including section 23 and Appendix 4 of GN No. R. 326 of 7 April 2017.

The EMPr has been developed in conjunction with the Final Basic Assessment Report (FBAR) providing detail on the affected environment as well as an impact assessment for the anticipated environmental impacts and the General Authorisation (GA) to be issued under the National Water Act (Act 36 of 1998).

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Activities to be undertaken during the construction, operation and decommissioning phases include:

Construction Phase

- Site preparation;
  - Clearly delineate the construction footprint to avoid construction creep outside the approved development footprints;
  - Search and rescue for fauna/flora of conservation concern and protected status ahead of any construction activities;
- Lengthen and upgrade internal haulage roads (Routes 1 and 2);
- Transport components and equipment to site;
- Establishment of laydown areas;
- Establishment of ancillary infrastructure;
- Earthworks to stabilise the main embankment, toe berm and lifting of the right flank embankment;
- Site rehabilitation; and
- Environmental management and monitoring throughout the construction process, inclusive of:
  - Continuous control and monitoring of alien invasive plant species;
  - Dust monitoring and management;
  - Storm water monitoring and management;
  - Erosion monitoring and remediation;
  - Fire management;
  - Habitat vegetation monitoring and management;
  - Hazardous substance monitoring and management, including detecting any leakage or spillage; and
  - Monitoring and management measures to protect hydrological features.

Operational Phase

- Maintenance and repairs of the Ngodwana Dam and associated equipment inclusive of:
  - Maintenance of roads;
  - Cleaning and maintaining spillway;
  - Control of alien invasive vegetation; and
  - Maintain and repair fencing.
- Environmental management and monitoring throughout the operational process, inclusive of:
  - Continuous control and monitoring of alien invasive plant species;
  - Storm water monitoring and management;
  - Erosion monitoring and remediation;
  - Fire management;
  - Habitat vegetation monitoring and management;
  - Monitoring and management measures to protect hydrological features.
- Waste management; and
- Health and safety implementations.

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- Dam maintenance and operation manual and associated Emergency Plan.

Decommissioning

The complete decommissioning of the Ngodwana Dam is unlikely but would include the following activities:

- Licence application to DWS for decommissioning a dam with safety risk,
- Environmental Authorisation for relevant Listed Activities,
- Site reparation,
- Demolition of the dam leaving the river to flow freely and recycling of existing components of the dam and associated infrastructure, and
- Rehabilitation of the site.

The implementation of the EMPr within the project is not an optional additional or "add on" requirement. The EMPr is legally binding, integral to the contract and is as important as the engineering aspects of the contract. The EMPr is a working document to be used throughout the life of the project, until such time that closure is achieved.

The general site information is as follows:
Descriptions of all affected farm portions
Farm Ngodwana 1030JT
21-digit Surveyor General codes of all affected farm portions
Farm Ngodwana 1030 JTT0JT00000000103000000
GPS coordinates of approximate centre of dam wall
25°34'58.92"S, 30°40'21.09"E

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CHECKLIST

An environmental management programme (EMPr) must comply with section 24N of the NEMA, 1998, as amended and contain those requirements prescribed in the EIA Regulations, 2014, as amended, including regulation 23 and Appendix 4. The full suite of requirements is listed in Table 2, which have dictated the layout and content of this EMPr.

Table 2. Environmental Management Programme Checklist.

Content of Environmental Management Programme (EMPr)	Checked
1. (1) An EMPr must comply with section 24N of the Act and include-	☑
(a) details of	☑
(i) the EAP who prepared the EMPr; and	☑
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	☑
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	☑
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	☑
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	☑
(i) planning and design;	☑
(ii) pre-construction activities;	☑
(iii) construction activities;	☑
(iv) rehabilitation of the environment after construction and where applicable post closure; and	☑
(v) where relevant, operation activities;	☑
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to -	☑
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	☑
(ii) comply with any prescribed environmental management standards or practices;	☑
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A

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(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	☑
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	☑
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	☑
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	☑
(m) an environmental awareness plan describing the manner in which-	☑
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	☑
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	☑
(n) any specific information that may be required by the competent authority.	☑
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

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ABBREVIATIONS / ACRONYMS AND DEFINITIONS

Table 3. List of terms for abbreviations used in this document.

Abbreviation / Acronym	Term
BA	Basic Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
CA	Competent Authority
CAR	Corrective Action Report
CLO	Community Liaison Officer
CRE	Chief Resident Engineer
DARDLEA	Department of Agriculture, Rural Development, Land and Environmental Affairs
DMRE	Department of Mineral Resources & Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
EIR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
ELU	Existing Lawful Use as per Part 3 of the National Water Act (Act 36 of 1998)
EM	Environmental Manager
IEA	Independent Environmental Auditor
GA	General Authorisation as per Section 39 of the National Water Act (Act 36 of 1998)
HSO	Health and Safety Officer
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LA	Listed Activity (EIA Regulations, 2014)
LN1	Listing Notice 1: GN. No. R. 983, 4 December 2014, as amended in GN. No. R. 327, 7 April 2017.
LN2	Listing Notice 2: GN R. 984, 4 December 2014, as amended in GN. No. R. 325, 7 April 2017.

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LN3	Listing Notice 3: GN R. 985, 4 December 2014, as amended in GN. No. R. 324, 7 April 2017.
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MS	Method Statement
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SEO	Site Environmental Officer
SO	Social Officer
SOP	Standard Operating Procedure
WUL	Water Use License

Table 4: Definitions of some terms used in this document.

Term	Source	Definition
Aspect (environmental)	ISO 14001: 2015	Element of an organisation's activities or products or services that interacts or can interact with the environment. An environmental aspect can cause (an) environmental impact(s). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).
Corrective Action	ISO 14001: 2015	Action to eliminate the cause of a non-conformity (or non-compliance in the case of an EMPr) and prevent recurrence.
Development	EIA Regulations (2014)	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified

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		activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Environmental Impact	ISO 14001: 2015	Change to the environment, whether adverse or beneficial, wholly or partially resulting an organisation's environmental aspects.
Maintenance	EIA Regulations (2014)	Means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.
Performance	ISO 14001: 2015	Measurable unit. Performance can relate either to quantitative or qualitative findings.
Regulated Area of a watercourse	National Water Act (Act 36 of 1998)	(a) The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; (b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or (c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.
Significant impact	EIA Regulations (2014)	Means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such

		as duration, magnitude, intensity and probability of occurrence.
Watercourse	EIA Regulations (2014)	(a)A river or spring; (b)A natural channel in which water flows regularly or intermittently; (c)A wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and A reference to a watercourse includes, where relevant, its beds and banks.

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SECTION 1: DETAILS & EXPERTISE OF THE EAP AND APPLICANT

Details of –

(i) The EAP who prepared the report;

Environmental Assessment Practitioner	Ecoleges Environmental Consultants
Contact Person	Justin Bowers
Postal Address	P.O. Box 516, Machadodorp, 1170
Telephone	+27(0)82 451 5608
E-mail	justin@ecoleges.co.za

Details of the Applicant;

Project Applicant	Sappi Paper and Paper Packaging
Trading Name (if any)	SAPPI
Contact Person	Mr. Errol von Berg
Physical Address	N4 highway, Ngodwana Paper Mill, Ngodwana 209
Postal Address	Private Bag X1001, Ngodwana
Postal Code	209
Telephone	+27(0) 13 734 6111
Cell	+27(0) 82 876 7486
Fax	+27(0) 13 734 6535
Email	Errol.VonBerg@sappi.com

(i) The expertise of the EAP to prepare the EMPr, including a curriculum vitae;

Abbreviated Curriculum Vitae of **Justin A. Bowers**

Name	Justin Bowers
Date of birth / ID No.	15 October 1972 7210155074089
Nationality	South African
Marital Status	Married with four children
Current Address	P O Box 516, Machadodorp, 1170. ● Redwing Farm, erf. Kaalbooi 368JT, Waterval Boven District, 1195, Mpumalanga, South Africa ● Cell: 082 451-5608 ● e-mail: justin@ecoleges.co.za
Languages	English, Afrikaans and Basic Zulu
Driver's Licence	Code EB, A & C1
Specialisations	Key Fields: Vegetation ecology, rehabilitation plans, environmental/ecological management plans, environmental auditing, Environmental Impact & Basic Assessment.
Qualifications & Courses Attended	**1998 – 2000** NATIONAL DIPLOMA: NATURE CONSERVATION, Technikon Pretoria **2001 – 2002** BACCALAUREUS TECHNOLOGIAE: NATURE CONSERVATION, Technikon Pretoria **2003 – 2007** MAGISTER TECHNOLOGIAE: NATURE CONSERVATION (CUM LAUDE), Tshwane University of Technology, Pretoria **2008** Environmental Law elective (MBA Programme), Rhodes University, Grahamstown. **2010 – Present** Certificate in Aquaculture, Department of Genetics & Aquaculture, University of Stellenbosch **2014** Implementing Environmental Management Systems, Centre for Environmental Management, North-West University, Potchefstroom. **2017** Transition ISO 14001 course, Centre for Environmental Management, North-West University, Pretoria locale. **2018** Lead Auditor's Course, Centre for Environmental Management, North-West University, Potchefstroom. **2020** Weed Control Course, Pest Control Industries Training Academy, Centurion, Pretoria.

Latest Publication	Sadie J. Ryan, Paul C. Cross, John Winnie, Craig Hay, Justin Bowers, Wayne M. Getz. 2012. The utility of normalized difference vegetation index for predicting African buffalo forage quality. *Journal of Wildlife Management* DOI: 10.1002/jwmg.407.
Countries worked	South Africa, United Kingdom.
Career Summary	**Jan 1995 – Jul 1997** Head Ranger (Idube Lodge, Sabi-Sands Wildtuin). **Dec 2000 – Dec 2001** Research student, Scientific Services, KNP. **Jan 2001 – Mar 2006** Senior Research Assistant, Mammal Research Institute, University of Pretoria. **Apr 2006 – current** Main Member, Ecoleges Environmental Consultants.

SECTION 2: INTRODUCTION AND BACKGROUND

The EMPr has been developed in conjunction with the Basic Assessment Report (BAR) providing detail on the affected environment as well as an impact assessment for the anticipated environmental impacts and the General Authorisation (GA) as water use authorisation.

The Ngodwana Dam is a 41 m high zoned earth fill Category III Dam. The dam is located on the Ngodwana River, a tributary of the Elands River, Mpumalanga Province, directly upstream from the N4 highway and the Ngodwana Paper Mill, 40 km from Mbombela. The water surface area of the dam at the Full Supply Level of 959.8 masl is 87 ha. The catchment area of the dam is 229 km^2, which covers the entire X21H quaternary catchment. The Mean Annual Runoff (MAR) is 66.7 million m^3. The dam's gross storage capacity of 10.4 million m^3 is only 16 % of the MAR. The historical firm yield of the dam is 26.3 million m^3/a.

The purpose of the remediation is to ensure the continued safe operation of this Category III dam and the stability of the main and right flank embankments and its foundations.

The scope of construction works to be included in the remediation and to be authorised is:

1. Stabilizing berm on the downstream face of the main embankment to RL 941.3 m, including approximately 30 000m^3 of earthworks (predominantly rockfill), a new internal drainage system (sand & gravel filters, rock toe and drain pipes with inspection concrete manholes) and gabion retaining walls.
2. Subsoil pipe drains above the berm of 133 m length with inspection concrete manholes.
3. Raising of the right flank embankment with earth fill to prevent overtopping and failure during large floods and to improve the stability of the embankment, including a subsoil toe drainpipe with inspection concrete manholes.
4. Improvements to the road surfaces of existing roads, including widening to provide for passing lanes and extending in length of others, sections of which fall within the extent of a watercourse.
5. Construction of a pedestrian bridge and a low water vehicle crossing over the Ngodwana River to allow access during construction and dam safety inspections during operation.
6. Creation of temporary site establishment, stockpile and contractor's site office areas.

The dam wall is going to have an expanded footprint due to the introduction of large quantities of infill to increase its strength and integrity, by 10 or more square metres. Additionally, the access road upgrades may require improvements to existing watercourse crossings e.g. culverts and/or low-water vehicle crossing. These activities will take place within 32m of a watercourse, outside an urban area, within a critical biodiversity area and within 5km of a protected area. The existing western access road is going to be widened along several sections of the road by more than 4m to allow for passing lanes and provide greater width for haulage. Additionally, the central access road is going to be widened to provide for haulage as well as being lengthened by an additional 200m to better access the works and site establishment area on the eastern side of the dam spillway. Thirdly, the existing roads to the General Fill and Topsoil Stockpile areas will require improvements to the road surface which in some cases is overgrown with vegetation with minor

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expansion activities possible. There will be more than 1 hectare but less than 20 hectares of indigenous vegetation to be cleared as part of the scope of the project. This activity takes place outside an urban area, within a critical biodiversity area and within 5km of a protected area. The development footprint sizes for the scope of works is given below in Table 5.

Table 5. Development Footprint Sizes.

Scope of Works	**Development Footprint Size**
Establishment Area Alternative 5: Temporary rock, fill and topsoil storage area (opposite Water Treatment Works)	10,000m^2
Upgrading of Haul route 2, including widening with passing lanes	1.2km x 4m = 4,800m^2
Widening/upgrading of existing access road (Haul Route 1, Section 6)	875m x 4m = 3,500m^2
Create link road to concrete spillway	200m x 5m = 1,000m^2
Create link road to main embankment	570m x 5m = 2,850m^2
Create link road to right flank embankment	100m x 5m = 500m^2
Establishment Area Alternative 3: Right flank site establishment area	32,150m^2 (including short access road)
Establishment Area Alternative 2: Main embankment site establishment area	3,300m^2
Works Area 1: Main embankment	9,900m^2 plus working area of 4,200m^2
Works Area 2: Raising of Right Flank embankment	6,150m^2 plus working area of 3,000m^2
Establishment Area Alternative 1: Alternative site establishment area	6,000m^2
Sub-soil toe drain - north	108m x 5m = 540m^2
Sub-soil toe drain - south	62m x 5m = 310m^2
Pedestrian footbridge	25m x 2m = 50m^2
Vehicle low-water crossing	8m x 6m = 48m^2
Contractor's site office	5,000m^2
Total footprint size	**93,298m^2**

SECTION 3: DESCRIPTION OF THE ACTIVITY

(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.

Table 6 describes all the activities that will be undertaken during the lifespan of this project including the identified listed activities and associated activities that do not require environmental authorization, but are needed to achieve the desired objective, that is the remediation of the Ngodwana Dam via:

Stabilising the Dam main embankment berm, raising of the right flank embankment, improving internal haulage roads, construction of a pedestrian bridge and low water vehicle crossing over the Ngodwana River.

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Table 6. A detailed description of the activities (including Listed Activities as per the EIA Regulations, 2014 as amended) and resultant aspects of the project that are covered by the EMPr.

Phase	Activity	Sub-activities	Aspects
Planning & Design (including pre-construction)	Compliance with legal requirements by acquiring authorisations, permits and/or licenses for activities/uses undertaken during construction and operation	Protected species	Impacting protected species prior to obtaining the required licenses / permits.
		Dam safety licence	Conditions and requirements of licence to construct, enlarge, alter, or repair dam with safety risk.
		Water use (21 c & i)	Impeding or altering the beds and banks of a watercourse.
		Access roads (not to exceed thresholds and layout to have minimal impacts)	Poor alignment and extent of linear activities like roads, fences, pipelines, or other cleared servitudes can increase runoff, cause erosion and sedimentation of aquatic habitats and result in regulatory non-compliance.
		Servitudes and wayleaves	Commencement without authorisation / permit from relevant authorities.
		Compliance monitoring	Commencement without appointment of an Environmental Control Officer (ECO) to monitor compliance with the EA, EMPr & GA.
		Municipal bylaws	Non-compliance with the municipal bylaws.
		Protection of archaeological findings	Destruction of graves and other sites of archaeological value and need for relevant permits where necessary.
	Socio-economic considerations	Employment of local labour	Insufficient employment of local labour.
			Presence of construction workforce.
			Influx of job seekers.
			Loss of farm labour to construction work.

Phase	Activity	Sub-activities	Aspects
			Job seekers may begin enquiring prior to commencement of construction as awareness of the project grows.
		Economic benefits from professionals	If the professionals are unreasonably expensive, the funds to head the projects might be exhausted.
		Expectations	Job seekers may begin enquiring prior to commencement of construction as awareness of the project grows.
		Uncertainty	Community confusion, frustration, and lack of information.
		Construction and use of temporary access roads	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Increase in vehicle movement in area.
		Provision of sanitation systems	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Ground water contamination.
		Demarcation, fencing and gates	Loss of vegetation and habitat.
			Impede faunal movement.
			Impeded human movement and disrupted daily activities.
		Vegetation clearing and soil compaction	Loss of vegetation, habitat, and soil fertility.
		Working near or on the watercourse	Decline in water availability of water resource.
		Water use, abstraction and management	
Construction			Dust generation.

Phase	Activity	Sub-activities	Aspects
	Site establishment (construction camp, sanitation, temporary accommodation)	Clear and grub (earthworks operations area, access roads, stockpiles, and spillway maintenance)	Loss of vegetation, habitat, and soil fertility.
			Noise generation.
		Construction, upgrade and use of haulage roads	Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Increased level of noise generation.
			Increase in vehicle movement in area.
			Dust generation.
		Sanitation	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Ground water contamination.
		Fencing and gates	Loss of vegetation and habitat.
			Impede faunal movement.
			Impeded human movement and disrupted daily activities.
		Lighting	Visual intrusion in remote areas.
	Access control	Construction and use of temporary access roads	Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Increased level of noise generation.
			Increase in vehicle movement in area.
			Dust generation.
	Contractor's employees (staff conduct, movement)	Water use and management	Water contamination.
			Misuse of available water.
		Cooking of food	Harvesting and fire control.

Phase	Activity	Sub-activities	Aspects
		Sanitation	Unpleasant odours.
			Mismanagement of sewerage.
		Employment of local labour	Insufficient employment of local labour.
			Presence of construction workforce.
			Influx of job seekers.
			Loss of farm labour to construction work.
	Construction of permanent and temporary access roads	Vegetation clearing and soil compaction	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased level of noise generation.
		Impact on the existing road conditions	The development of potholes.
			Damage to vehicles.
			Potential increase in vehicle accidents.
	Transport on site and accommodation of traffic (parking areas)	Parking	Increase in vehicle movement in area.
			Impact on the existing road conditions.
			Increase human safety risk.
			Increase in the level of noise generation.
			Greenhouse gas emissions (recognising that transport emissions are excluded in GHG Regs & carbon tax bill).
		Impact on the existing road conditions	The development of potholes.
			Damage to vehicles.
			Potential increase in vehicle accidents.
	Sourcing and management of water (for drinking, sanitation, and construction activities)	Drinking, dust suppression and sanitation	Water contamination.
			Misuse of available water.

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Phase	Activity	Sub-activities	Aspects
	Sourcing and management of dam remediation material	Excavation of suitable bedding and backfill material	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
		Topsoil stripping and storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Soil contamination.
			Encroachment and establishment of alien vegetation.
		Slopes and slope stabilisation	Dust generation.
			Increased potential for erosion.
			Water contamination.
			Decline in aesthetic quality of the environment.
			Increase human safety risk.
	Stockpiling and material laydown areas (spoil, mulch, building sand, topsoil, windrows, material, and equipment)	Topsoil stripping storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Soil contamination.
			Encroachment and establishment of alien vegetation.
			Reduced productivity of subsistence farmland.
		Slopes and slope stabilisation	Dust generation.
			Increased potential for erosion.
			Water contamination.
			Decline in the aesthetic quality of the environment.

Phase	Activity	Sub-activities	Aspects
			Increased human safety risk.
	Earthworks and drainage pipeline excavations (associated with the remedial works for the main embankment berm foundations and raising of the right flank embankment)	Trenching	Dust generation.
			Increased potential for erosion.
			Increase human safety risk.
		Importing of suitable bedding and backfill material	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Reduced productivity of subsistence farmland.
			Increased potential for erosion.
		Topsoil stripping and storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Soil contamination.
			Reduced productivity of subsistence farmland.
			Encroachment and establishment of alien vegetation.
		Slopes and slope stabilisation	Dust generation.
			Increased potential for erosion.
			Water contamination.
			Decline in aesthetic quality of the environment.
			Increase human safety risk.
		Crushing of material	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
		Spoil material generation and management	Dust generation.
			Loss of vegetation, habitat, and soil fertility.

Phase	Activity	Sub-activities	Aspects
	Construction of the concrete gabions and associated infrastructure. A new internal drainage system (sand & gravel filters, rock toe and drainpipes with inspection concrete manholes) and gabion retaining walls.		Decline in the aesthetic quality of the environment.
		Transportation and storage of the cement and associated materials	Increase in vehicle movement in area.
			Impact on the existing road conditions.
			Increase human safety risk.
			Increase in the level of noise generation.
			Greenhouse gas emissions.
		Protection of archaeological findings	Destruction of graves and other sites of archaeological value.
	Handling of waste and generation (solid waste including 'spoil', liquid waste, separation, storage, and disposal)	Domestic and construction waste collection, storage, handling and disposal	Unpleasant odours.
			Increase in waste generation.
			Decline in the aesthetic quality of the environment.
		Spoil material generation and management	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Decline in the aesthetic quality of the environment.
	Handling of hazardous substances (fuel/oil, cement, bitumen, sewage/grey water) and management (including storage) at sanitation sites, kitchens, batching sites, refuelling areas and on site.	Maintenance of sanitation systems	Unpleasant odours.
			Soil contamination.
			Water contamination.
			Mismanagement of sewerage.
		Bund area for fuel storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Soil contamination.
		Use of flammable material and other material stores	Dust generation.
			Loss of vegetation, habitat, and soil fertility.

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Phase	Activity	Sub-activities	Aspects
			Soil contamination.
		Refuelling of construction vehicles and plant	Soil contamination.
			Water contamination.
		Handling, storage, disposal of hazardous waste	Unpleasant odours.
			Soil contamination.
			Water contamination
		Transportation of hazardous waste	Potential spillages of hazardous waste.
			Increase human safety risk.
			Greenhouse gas emission.
	Plant management (parking, driving, repair and maintenance, and refuelling)	Refuelling of construction vehicles and plant	Soil contamination.
			Water contamination.
		Bund area for fuel storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Soil contamination.
		Operation and movement of construction vehicles and plant	Dust generation.
			Increase in level of noise generation.
			Soil contamination.
			Increase human safety risk.
			Vibration.
			Greenhouse gas emissions.
	Building work (concrete work)	Water use and management	Water contamination.
			Misuse of available water.
			Dust generation.

Phase	Activity	Sub-activities	Aspects
		Spoil material generation and management	Loss of vegetation, habitat, and soil fertility.
			Decline in the aesthetic quality of the environment.
		Excavation of suitable bedding and backfill material	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
	Disturbing natural areas	Slopes and slope stabilisation	Dust generation.
			Increased potential for erosion.
			Water contamination.
			Decline in aesthetic quality of the environment.
			Increase human safety risk.
		Topsoil stripping and storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
			Soil contamination.
			Reduced productivity of subsistence farmland.
			Encroachment and establishment of alien vegetation.
	Site closure & rehabilitation	Removal of structures and infrastructures	Increase in waste generation.
		Removal of inert waste and rubble	
		Hazardous waste and pollution control	

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Phase	Activity	Sub-activities	Aspects
		Final shaping of disturbed areas	Increased potential for erosion.
		Topsoil replacement and soil amelioration	
		Ripping and scarifying	
		Planting	Reduced productivity of subsistence farmland.
		Grassing	
		Maintenance	Encroachment and establishment of alien vegetation.
		Management of alien vegetation	Loss of vegetation, habitat, and soil fertility.
Operation (including maintenance)	Operation employment	Consultation with affected parties	Insufficient consultation.
		Employment of local labour	Insufficient employment of local labour.
			Presence of construction workforce.
			Influx of job seekers.
			Loss of farm labour to construction work.
	Consumption (energy, water, and other resources)	Water use and management	Water contamination.
			Misuse of available water.
		Cooking of food	Fire hazard.
			Illegal wood harvesting.
	Maintenance	Refuelling of operational vehicles and plant	Soil contamination.
			Water contamination.
		Handling, storage, and disposal of waste	Unpleasant odours.
			Soil contamination.

Phase	Activity	Sub-activities	Aspects
			Water contamination.
		Maintenance of sanitation systems	Unpleasant odours.
			Mismanagement of sewerage.
	Lighting to create visibility at night	Use of generators	Increase in level of noise generation.
			Soil contamination.
		Security	Trespassing.
	Terrestrial and aquatic ecological management	Use of herbicides	Loss of vegetation, habitat, and soil fertility.
			Soil contamination.
		Harvesting of indigenous plants	Encroachment and establishment of alien vegetation.
		Overgrazing	Increased potential for erosion.
			Reduced productivity of subsistence farmland.
			Dust generation.
	Inspection manholes, spillway, and scour valve infrastructure	Cleaning and maintenance	Water contamination.
			Misuse of available water.
	Social and community changes	Security	Trespassing.
		Fire Control	Loss of vegetation, habitat, and soil fertility.
		Employment of local labour	Insufficient employment of local labour.
			Presence of construction workforce.
			Influx of job seekers.
			Loss of farm labour to construction work.
		Visual aspects	Visual Intrusiveness.

Phase	Activity	Sub-activities	Aspects
Decommissioning (including rehabilitation)	Disposal of dam infrastructure including reinforced concrete and other waste	Demolition activities	Dust generation.
			Increased level of noise generation.
			Vibration.
			Increase in waste generation.
			Increase human safety risk.
		Removal of inert waste and rubble	Decline in the aesthetic quality of the environment.
			Soil contamination.
	Removal of impoundment on the Ngodwana River.	Reinstated flow of the Ngodwana River & flooding risk	Loss of aquatic habitat downstream
		Drainage of dam storage	Loss of aquatic habitat
	Human influence (staff conduct, movement)	Harvesting of indigenous plants	Loss of vegetation, habitat, and soil fertility.
			Decline in the aesthetic quality of the environment.
		Fires for heat & cooking	Fire hazard.
			Loss of vegetation, habitat, and soil fertility.
			Illegal wood harvesting.
		Littering	Decline in the aesthetic quality of the environment.
			Unpleasant odours.
			Increase in waste generation.
			Decline in the aesthetic quality of the environment.
		Noise	Increase human safety risk.
			Increase in the level of noise generation.
	Roads and access routes	Topsoil stripping and storage	Dust generation.
			Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.

Phase	Activity	Sub-activities	Aspects
			Encroachment and establishment of alien vegetation.
		Road decommissioning and rehabilitation	Dust generation.
			Increased level of noise generation.
			Soil contamination.
	Rehabilitation of affected footprint	Removal and transportation of structures and infrastructures	Increase in vehicle movement in area.
			Impact on the existing road conditions.
			Increase human safety risk.
			Increase in the level of noise generation.
			Greenhouse gas emissions.
			Increased potential for erosion.
		Maintenance and management of alien vegetation	Loss of vegetation, habitat, and soil fertility.
			Increased potential for erosion.
		Planting and grassing	Reduced productivity of subsistence farmland.
		Topsoil replacement and soil improvement	Loss of vegetation, habitat, and soil fertility.
		Final shaping of disturbed areas	Increased potential for erosion.

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SECTION 4: LAYOUT MAP OF PROPOSED ACTIVITY

(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.

"The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following:
ii. The final site layout map.
iv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
v. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map."

Figure 1 provides a map of the final site layout of the Ngodwana Dam and how they fit into the preferred alternative footprints. **Figure 2** provides a map of the proposed preferred development footprint in the context of the surrounding environmental sensitivities. The preferred footprint development has been determined through an iterative process, to ensure that it remains outside of all sensitive receptors assessed, including buffer zones (where applicable).

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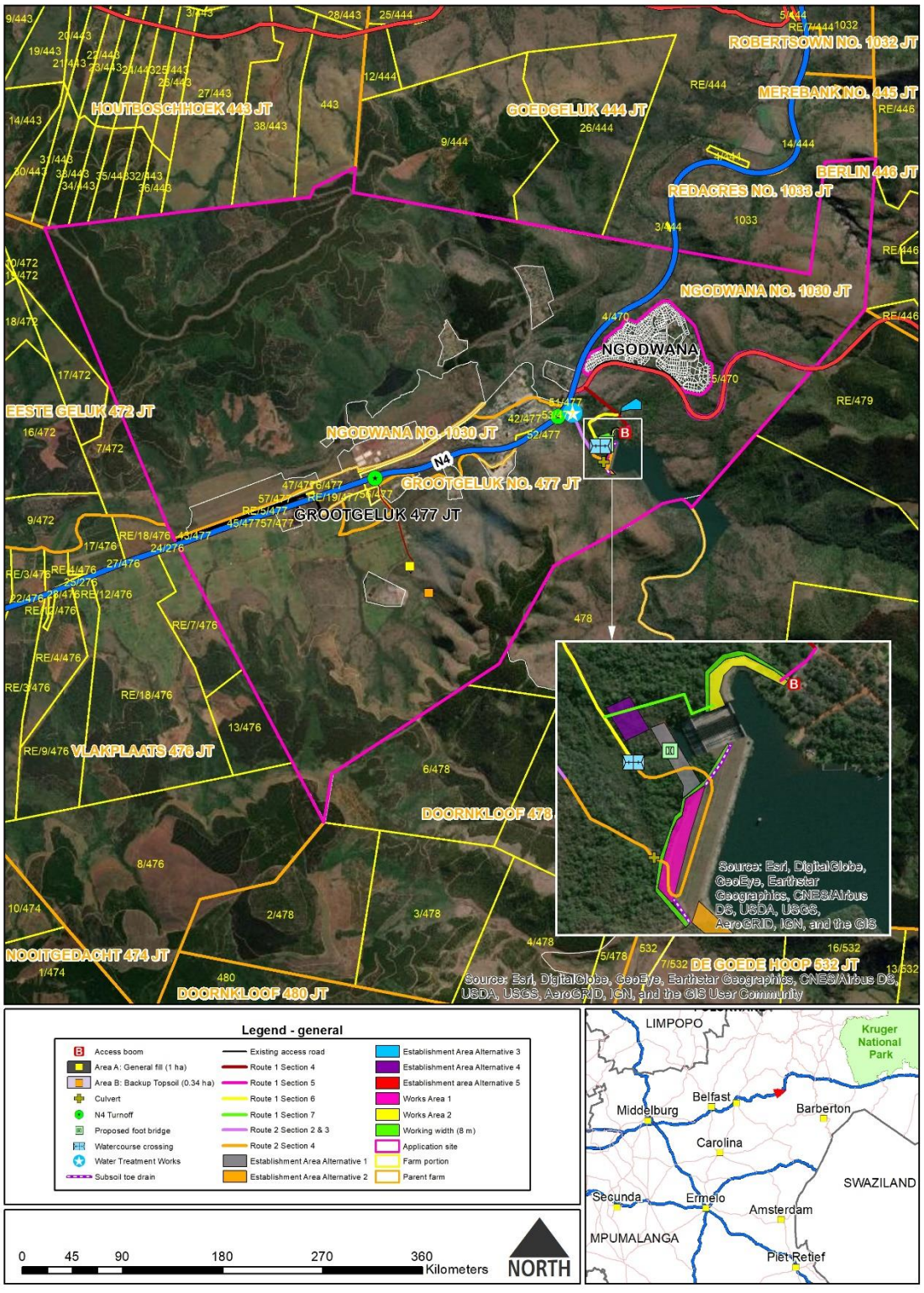

Figure 1. Site layout map.

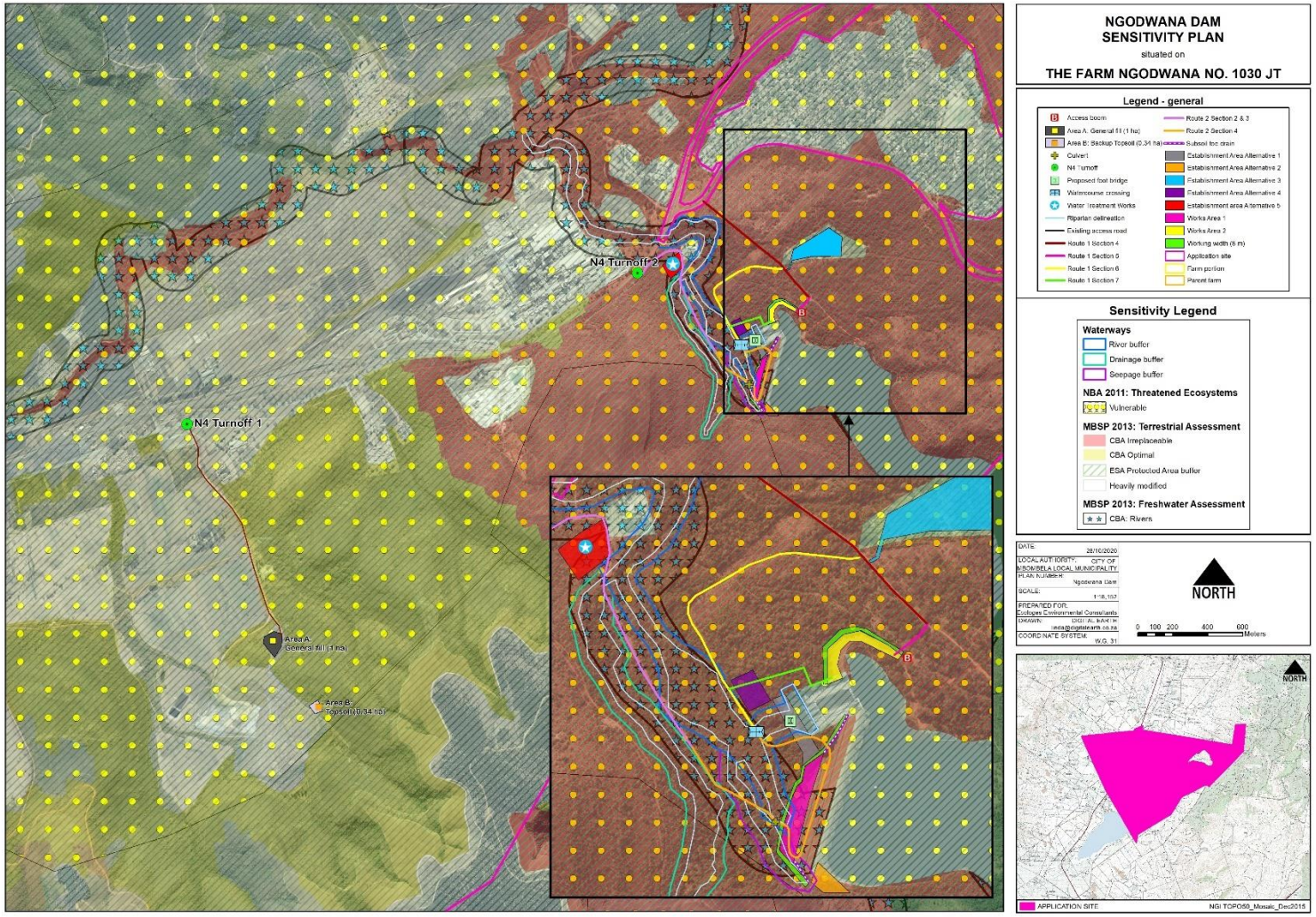

Figure 2. Site sensitivity map including proposed site development footprint.

SECTION 5: ACTIVITIES, ASPECTS AND IMPACTS AND THEIR MANAGEMENT, MITIGATION & DESIRED OUTCOMES

(d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed, and mitigated as identified through the environmental impact assessment process for all phases of the development including-
(i) planning and design;
(ii) pre-construction activities;
(iii) construction activities;
(iv) rehabilitation of the environment after construction and where applicable post closure; and
(v) where relevant, operation activities;

(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d),

(f) a description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to -
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) comply with any prescribed environmental management standards or practices;
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
(l) a program for reporting on compliance, considering the requirements as prescribed by the Regulations;
(m) an environmental awareness plan describing the manner in which-
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) risks must be dealt with to avoid pollution or the degradation of the environment; and
(n) any specific information that may be required by the competent authority.

The impacts are considered within the scope of the project, including but not limited to the Listed Activities. The relevant impacts resulting from listed activities and associated activities, including environmental, socio-economic and cultural heritage, are informed by a predetermined list of potential environmental impacts (generated by way of a Leipold Matrix), comments received from Interested and Affected Parties and the findings contained in specialist studies that were used to generate the EIR.

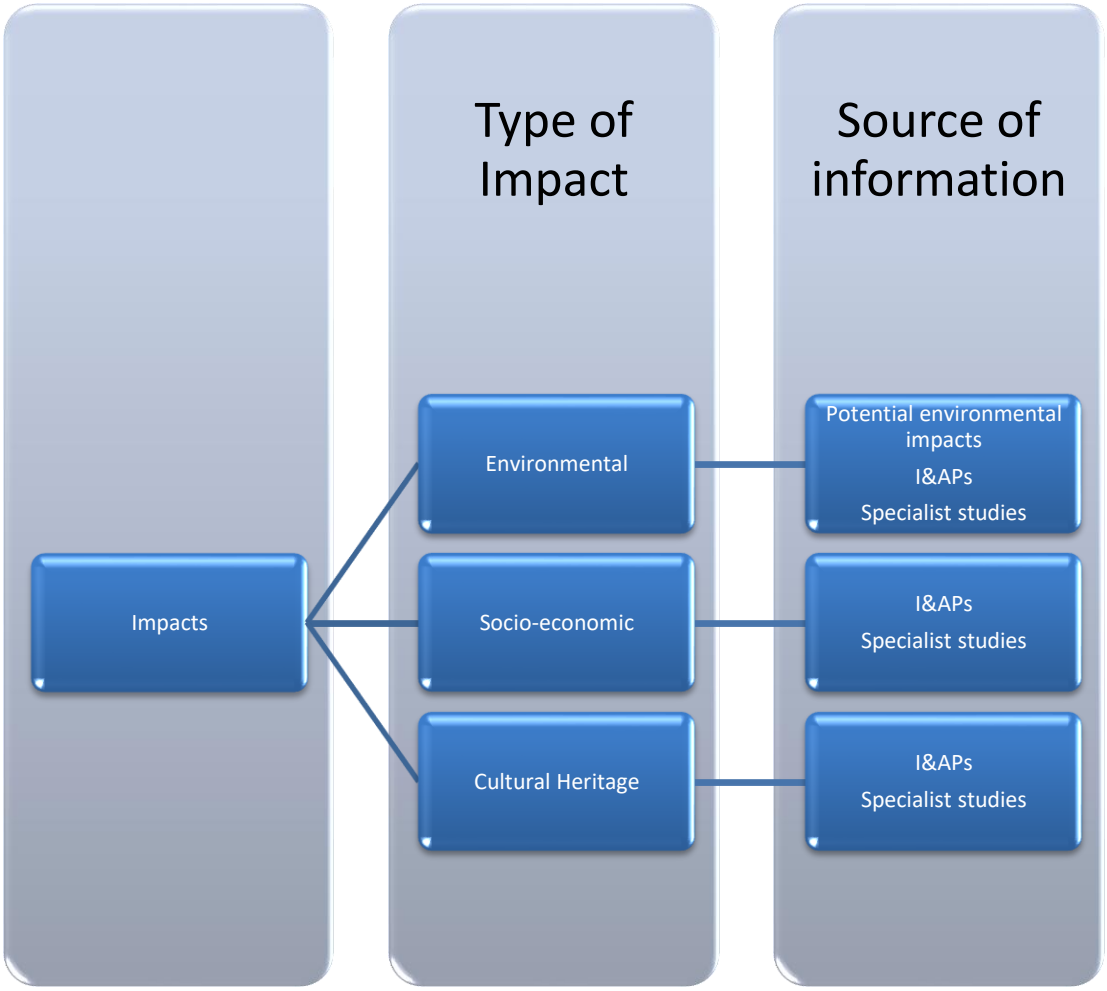

Figure 3. A breakdown of the different types of impacts including the resources used to identify them.

As stipulated in regulation 1(1)(d) of Appendix 4 of the EIA regulation (2014), as amended; the setting of desired impact management outcomes forms the principle objective of an EMPr. Outcomes are driven by impact management actions including measures and mitigations to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; to comply with any prescribed environmental management standards or practices, including legal requirements and in some cases, “best practices” that the Implementer aspires to fulfil (e.g. Equator Principles). The outcomes are achieved by implementing and achieving measurable Targets (both quantitative and qualitative). Management and mitigation measures are set to afford guidance and parameters to the implementer to achieve the set outcomes.

Table 7 provides a tabulated list of the aspects associated with the proposed activity that are covered by the EMPr, colour-coded by their risk significance assessed during the Impact Assessment process. Aspects are highlighted by colour by their assessed pre-mitigation risk. Pre-mitigation risk is used to indicate worst case scenario in the event that the prescribed mitigations are ineffective or not implemented. This table will further assist with future compliance audits of the EMPr, specifically where the auditor has to comment on the EMPr's ability to address Section 3(1) (e) of Appendix 7 of the EIA Regulations (2014) as amended specifically:
"an indication of the ability of the EMPr, and where applicable, the closure plan to—
(i) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis;
(ii) sufficiently provide for the avoidance, management and mitigation".

Table 7: Environmental Management Classes for each phase of the project and the impact significance of each associated aspect.

Legend:

Neutral Impact	
Very Low Impact	
Low Impact	
Medium Impact	
High Impact	
Positive Impact	

Planning & Design	Pre-Construction	Construction	Operation	Decommissioning
Entire Phase				
Low	Very Low	Low	Medium	Medium
Compliance Management				
POTENTIAL OFFENCES	POTENTIAL OFFENCES		POTENTIAL OFFENCES	POTENTIAL OFFENCES
Integrated Water Resource Management				

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INCREASED ABSTRACTION OF WATER	HYDROLOGICAL IMPACT ON EROSION	CONTAMINATION OF GROUND & SURFACE WATER	IMPACT ON DOWNSTREAM ENVIRONMENT AND USERS - DAM WALL CONTAINMENT FAILURE	DOWNSTREAM USERS OF SURFACE WATER AND GROUNDWATER
IMPACT OF EROSION ON SURFACE WATER POLLUTION - SEDIMENTATION	HYDROLOGICAL IMPACT ON SURFACE WATER POLLUTION	IMPACT OF ALIEN INVASIVE PLANTS ON GROUND & SURFACE WATER	IMPROVED ACCESS TO DAM FOR MAINTENANCE AND REPAIR REQUIREMENTS	
	CHANGES TO SURFACE WATER HYDROLOGY	IMPACT OF EROSION ON SURFACE WATER POLLUTION - SEDIMENTATION	IMPROVED STABILITY OF DAM WALL AND PROTECTION OF DOWNSTREAM ECOSYTEM AND USERS	
		IMPACT OF ALIEN INVASIVE PLANTS ON WATER QUALITY		
		CHANGES TO SURFACE WATER HYDROLOGY		
		SURFACE WATER POLLUTION		
		CONTAMINATION OF SURFACE WATER		
		SURFACE WATER POLLUTION - SEDIMENTATION		

		WATER POLLUTION IMPACT ON AQUATIC FAUNA		
		GROUND & SURFACE WATER POLLUTION		
		LOSS OF FISH SPECIES		
		AQUATIC FAUNA BEHAVIOR		
Biodiversity Management				
LOSS OF SOIL - EROSION	LOSS OF FLORA	CONTAMINATION OF SOIL	LOSS OF SOIL - EROSION	LOSS OF AQUATIC FLORA AND FAUNA
LOSS OF FLORA	HYDROLOGICAL IMPACT ON DEGRADATION	BUSHFIRE IMPACT ON FAUNA	ALIEN PLANT INVASION	
TERRESTRIAL ECOSYSTEM DEGRADATION	TERRESTRIAL DEGRADATION	BUSHFIRE IMPACT ON FLORA	IMPACT OF ALIEN PLANT INVASION ON HABITAT TRANSFORMATION	
		BUSHFIRE IMPACT ON HABITAT		
		LOSS OF FAUNA		
		LOSS OF FLORA		
		LOSS OF SOIL - EROSION		
		COMPACTION OF SOIL		

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		IMPACT OF ALIEN INVASIVES ON SOIL QUALITY		
		IMPACT OF ALIEN INVASIVE PLANTS ON FAUNA		
		IMPACT OF ALIEN INVASIVE PLANTS ON INDIGENOUS PLANTS		
		ALIEN INVASIVE PLANT INVASION		
		LOSS OF HABITAT		
		DISTURBANCE TO HABITAT		
		IMPACT OF ALIEN INVASIVE PLANTS ON HABITAT		
		CONTAMINATION OF TOPSOIL		
		COMPACTION OF TOPSOIL		
		FRAGMENTED AQUATIC HABITAT		
		LOSS OF TOPSOIL		
Air Quality Management				
VISUALLY UNAESTHETIC	AIR POLLUTION NOISE THAT IS A NUISANCE	NOISE POLLUTION IMPACT ON FAUNA	DUST POLLUTION IMPACT ON ANIMALS	

	AIR POLLUTION BAD ODOURS	AIR POLLUTION NOISE	DUST POLLUTION IMPACT ON PLANTS	
		AIR POLLUTION BUSHFIRE SMOKE	AIR POLLUTION - DUST	
		DUST POLLUTION IMPACT ON FAUNA	NOISE POLLUTION IMPACT ON FAUNA	
		AIR POLLUTION DUST	AIR POLLUTION - NOISE	
		NOISE POLLUTION IMPACT ON FAUNA		
		NOISE POLLUTION IMPACT ON HUMAN HEALTH		
		AIR POLLUTION EMISSIONS		
		AIR POLLUTION - SMOKE		
		DUST POLLUTION IMPACT ON PLANTS		
Resource Use & Management				
INCREASED DEMAND ON ELECTRICITY		INCREASED PRESSURE ON PUBLIC SERVICES	MAINTENANACE AND MONITORING ON DAM INFRASTRUCTURE - DAM SAFTEY AND SURVEILANCE	
		BUSHFIRE IMPACT ON PROPERTY		
		DAMAGE TO PROPERTY		

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		EXCESSIVE/WASTEFUL WATER USE - LOSS OF WATER		
		EXCESSIVE WATER USE IMPACT ON EROSION		
Heritage Resource Management				
LOSS OF HERITAGE RESOURCES	LOSS OF HERITAGE	LOSS OF HERITAGE		
Health & Safety Management				
		BUSHFIRE IMPACT ON HUMAN LIFE	DUST POLLUTION IMPACT ON HUMAN HEALTH	
		DUST POLLUTION IMPACT ON HUMAN HEALTH	NOISE POLLUTION IMPACT ON HUMAN HEALTH	
		ACCIDENT IMPACT ON HUMAN HEALTH		
		AIR POLLUTION IMPACT ON HUMAN HEALTH		
		WATER POLLUTION IMPACT ON HUMAN HEALTH		

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		SMOKE POLLUTION IMPACT ON HUMAN HEALTH		
		INCREASED WEALTH		
Visual Impact Management				
	VISUALLY UNAESTHETIC	VISUALLY UNAESTHETIC		

The following section describes management programmes for the different environmental attributes pertaining to the Project. As part of the Management Programmes, the section describes the potential environmental impacts which may result from the identified aspects / activities, the desired outcomes of mitigating these impacts as well as the targets used to measure the level of environmental compliance and performance.

The following legislation, guidelines, departmental policies, environmental management instruments and / or other decision-making instruments that have been developed or adopted by a competent authority in respect of activities associated with a development of this nature, were identified and considered in the preparation of this EMPr:

1. City of Mbombela. 2017-2022. Draft integrated development plan (IDP).
2. Conservation of Agricultural Resources Act (CARA, Act 43 of 1983). Government Gazette (GG) No. 8673, Government Notice (GN) No. 883, dated 27 April 1983; and subsequent regulations (including dealing with declared weeds and invader plants) under section 29 of the Act, in Government Notice R1048 in Government Gazette 9238, dated 25 May 1984, amended in Government Notice R2687 in Government Gazette 10029, dated 6 December 1985 and Government Notice R280 in Government Gazette 22166, dated 30 March 2001.
3. Constitution of the Republic of South Africa.
4. DEA. 2010. Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.
5. DEA. 2010. Public Participation, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa.
6. DEA. 2011. National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.
7. DEA&DP. 2010. Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning.
8. DEAT. 2002. Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism, Pretoria.
9. DWA. 2007. Guideline for Developments within a Flood line (Edition 1), Department of Water Affairs and Forestry, Pretoria, South Africa.
10. DWS. 2016. General Authorisation in GN No. 509, Government Gazette No. 40229 dated 26 August 2016.
11. DWS. 2016. General Authorisation in GN No. 538, Government Gazette No. 40243 dated 2 September 2016.
12. Ehlanzeni District Municipality. 2020/2021. Draft IDP and budget review.
13. EIA Regulations, GG No. 38282, GN No. R. 982, 983, 984, 985, 4 December 2014, amended in GN No. R. 324, R. 325, R. 326, R. 327, R. 328 in GG No. 40772, 07 April 2017, GG No. 41766, GN No. 706, 13 July 2018 and GG No. 43358, GN No. 599, 29 May 2020.
14. Electricity Regulation Act (Act 4 of 2006). Government Notice 660 in Government Gazette 28992 dated 5 July 2006. As amended by: Electricity Regulation Amendment Act 28 of 2007, Government Notice 23 in Government Gazette 30676, dated 21 January 2008.
15. Environment Conservation Act (Act 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment

Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this particular section of the Environment Conservation Act is not repealed by NEMA (107 of 1998)).

16. Minerals and Petroleum Resources Development Act (Act 28 of 2002). Gazette No. 23922, Notice No. 1273 dated 10 October 2002. As amended by: Minerals and Energy Laws Amendment Act 11 of 2005, Gazette No. 27897, Notice No. 824 dated 15 August 2005. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009.
17. MTPA. 2014. Mpumalanga Biodiversity Sector Plan Handbook. Compiled by Lotter M.C., Lechmere-Oertel R.G. and Cadman, M.J. Mpumalanga Tourism & Parks Agency, Nelspruit.
18. National Environmental Management Act (NEMA, Act 107 of 1998), Gazette No. 19519, Notice No. 1540. As amended by: National Environmental Management Act 56 of 2002 - Gazette No. 24251, No. 97. Mineral and Petroleum Resources Development Act 28 of 2002 - Gazette No. 23922, No. 1273. National Environmental Management Act 8 of 2004 - Gazette No. 26570, No. 842. National Environmental Management Act 46 of 2003 - Gazette No. 26018, No. 175. National Environmental Management Act 62 of 2008 - Gazette No. 31789, No. 22. National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, No. 1318. National Environment Laws Amendment Act 14 of 2009 - Gazette No. 32267, No. 617. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013. National Environmental Management Laws Amendment Act 25 of 2014 – Government Notice 448 in Government Gazette 37713, dated 2 June 2014. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013.
19. National Environmental Management: Air Quality Act (Act 39 of 2004). Gazette No. 27318, Notice No. 163. As amended by: National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, Notice No. 1318. National Environment Laws Amendment Act 14 of 2009 - Gazette No. 32267, Notice No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Air Quality Amendment Act 20 of 2014 – Gazette No. 37666, No. 390 dated 19 May 2014; including the list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage in Government Notice 893 in Government Gazette 37054 dated 22 November 2013. As amended by: Government Notice 551 in Government Gazette 38863 dated 12 June 2015. The National Dust Control Regulations are also relevant during the construction phase – GG No. 36974, GN No. R 827 dated 1 November 2013.
20. National Environmental Management: Biodiversity Act (Act 10 of 2004). Gazette No. 26436, Notice No. 700. As amended by: National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013; including the alien and invasive species regulations in Government Notice R598 in Government Gazette 37885

dated 1 August 2014, and species lists in GN No.599, amended in GG No. 40166, GN No .864 dated 29 July 2016, amended in GG No. 43386, GN No. 627 dated 03 June 2020.

21. National Environmental Management: Waste Act (Act 59 of 2008) ("NEM: WA"). Gazette No. 32000, Notice No. 278. As amended by: National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Waste Amendment Act 26 of 2014, Government Notice 449 in Government Gazette 37714 dated 2 June 2014. National Environmental Management Laws Amendment Act 25 of 2014, Government Notice 448 in Government Gazette 37713 dated 2 June 2014.
22. National Forest Act (Act 84 of 1998). Gazette No. 19408, Notice No. 1388 dated 30 October 1998. As amended by: National Forest and Fire Laws Amendment Act 12 of 2001 – Gazette No. 22479, No. 660. Forestry Laws Amendment Act 35 of 2005 – Gazette No. 28602, No. 220.
23. National Heritage Resources Act (Act 25 of 1999).
24. National Veld and Forest Fire Act, 1998 (Act 101 of 1998). Government Gazette No. 19515 dated 27 November 1998.
25. National Water Act, 1998 (Act 36 of 1998). Gazette No. 19182, Notice No. 1091. As amended by: National Water Amendment Act 45 of 1999 – Gazette No. 20706, No. 1476. National Water Amendment Act 27 of 2014 – Government Notice 450 in Government Gazette 37715, dated 2 June 2014; including Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses).
26. Sub-Division of Agricultural Land Act (Act 70 of 1970) as amended by Subdivision of Agricultural Land Amendment Act, No. 55 of 1972, Subdivision of Agricultural Land Amendment Act, No. 19 of 1974, Subdivision of Agricultural Land Amendment Act, No. 18 of 1977, Subdivision of Agricultural Land Amendment Act, No. 12 of 1979, Subdivision of Agricultural Land Amendment Act, No. 18 of 1981, Subdivision of Agricultural Land Amendment Act, No. 33 of 1984, Constitution of the Republic of South Africa Act, No 200 of 1993 (Proc. No. 100 of 31 October 1995), General Law Amendment Act, No 49 of 1996, Abolition of Racially Based Land Measures Act, No. 108 of 1991 (Proc. No. 116 of 24 June 1994).
27. Regulations regarding the safety of dams. GG No. 35062, GN No. R. 139, 24 February 2012.

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The following management programme aims to set management actions to achieve stated desired outcomes for each environmental aspect, including quantifying the measurable targets. While the impacts and management and mitigations have been addressed under the various project development phases, they are not intended to be mutually exclusive, and impacts from one phase are likely to occur in subsequent phases; but in the interest of reducing redundancy they have not been repeated for each phase. Any appendices to this EMPr form part of the EMPr which must be implemented accordingly.

TABLE 8. COMPLIANCE MANAGEMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
8.1	**All Phases with special emphasis on Planning & Design Phase (including Pre-Construction)**						
8.1.1	**DAM SAFETY REPAIR LICENCE FOR REMEDIATION WORKS**						
8.1.1.1	Contravention of section 23 (3) Regulations (GN No. R. 139, 24 February 2012) regarding the Safety of Dams in terms of Section 123 (1) of the NWA.	Comply with the relevant sections of section 23 (3) Regulations regarding the Safety of Dams in terms of Section 123 (1) of the NWA for the proposed remediation and repair of the Ngodwana Dam.	Obtain and provide proof of issuance of necessary Dam Safety Repair Licence for the proposed remediation and repair of the Ngodwana Dam.	The applicant shall apply for and obtain the relevant Dam Repair license from DWS to complete the repair and remediation works on the Ngodwana Dam.	Applicant / Dam Engineer	Prior to commencement of construction.	Compliance to be verified by ECO & IEA.
8.1.2	**PROTECTED SPECIES**						

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
8.1.2.1	Impacts on protected plants.	Comply with the relevant sections of the National Forest Act (NFA) (Act 84 of 1984), National Environmental Management: Biodiversity Act, 2004 (NEM:BA) (Act No. 10 of 2004), and the Mpumalanga Nature Conservation Act (MNCA) (Act 10 of 1998).	Obtain and provide proof of issuance of necessary permits for any listed species under NFA, NEMBA & MNCA.	The applicant shall apply for and obtain the relevant licenses / permits from the appropriate authorities (DEFF and Provincial Authority) prior to disturbing or destroying any protected species. Removing large trees should be avoided as far as possible and unnecessary clearing of areas should also be avoided. Trees, such as indigenous Paperbark thorn (*Vachellia sieberana*) and Sweet thorn (*Vachellia karroo*) that grows vigorously, should be planted during rehabilitation and thus replace trees that have been removed.	Applicant / Contractor to appoint botanist.	Prior to commencement of construction.	Compliance to be verified by ECO & IEA.
8.1.3	**WATER USE AUTHORISATION FOR ACTIVITIES WITHIN A WATERCOURSE**						

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
8.1.3.1	Contravention of section 21 (c) and (i) of the NWA.	The commencement of water uses that are authorised in terms of the NWA, 1998 (Act No. 36 of 1998).	Confirmation letter from DWS on relevant General Authorisation registration (GN. No. 665, GG. No. 36820, 6 September 2013).	The applicant shall adhere to the conditions of the water use authorisation (GA or license) for section 21(c) and (i) water uses for diverting, altering, or impacting the beds and banks of a watercourse.	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by ECO & IEA.
8.1.4	**WATER USE AUTHORISATION FOR ABSTRACTION AND STORAGE**						
8.1.4.1	Contravention of section 21 (a) of the NWA.	The commencement of water uses that are authorised in terms of the NWA, 1998 (Act No. 36 of 1998).	SAPPI have an existing WUL No: 24060427 for the Ngodwana Mill and associated activities for the Ngodwana Dam.	A valid license must be in place for abstraction and storage of water.	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by ECO & IEA.
8.1.5	**Compliance Monitoring**						
8.1.5.1	Commencement of construction prior to the appointment of an ECO.	Ensure compliance with the EA, EMPr & GA from the onset of	Proof of ECO appointment prior to commencement of construction.	A qualified, suitably experienced and independent ECO must be appointed to monitor and report to the competent	Applicant.	Prior to commencement of construction and until the rehabilitated	To be verified by IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		construction and until the rehabilitated development is handed over to the Applicant for operation.		authorities on compliance with the EA, EMPr & GA, and where necessary oversee or facilitate the identification and permitting / licensing of protected species prior to clearing of any vegetation.		development is handed over to the applicant for operation. The minimum frequency for ECO inspections is monthly.	
8.1.6	**DECOMMISSIONING OF A DAM WITH SAFETY RISK**						
8.1.6.1	Commencement of decommissioning prior to submission and approval of a decommissioning licence application for a dam with safety risk to DWS and environmental authorisation (EA) for decommissioning associated activities, from DEFF.	DWS approval or rejection of decommissioning licence application for a dam with safety risk and EA from DEFF.	Obtain and provide proof of issuance of the necessary Dam with safety risk decommissioning Licence & EA for the Ngodwana Dam closure.	The applicant shall apply for and obtain the relevant authorisations for the closure of the Ngodwana Dam if decommissioning is in the future ever contemplated.	Applicant / Dam Engineer	Prior to commencement of decommissioning.	Compliance to be verified by IEA.

TABLE 9. CONSTRUCTION CAMP, LAYDOWN AREAS, STOCKPILES, STORES & EQUIPMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
9.1	**Planning and Design Phase (including Pre-Construction)**						
9.1.1	Land surface pollution.	Low risk of pollution or harm to sensitive environments from the inappropriate location of construction related sites within or within proximity to those sensitive environments.	Approved and effectively implemented layout plan indicating designated construction-related sites.	A construction site layout plan must be developed by the contractor and approved by the SEO to ensure that all construction related sites are located outside sensitive environments, including no-go areas and buffer zones. Furthermore, those construction related sites or activities with the greater risk or potential for causing pollution or harm to the receiving environment, including but not necessarily limited to laydown areas, material stockpiles, toilets, waste skips and stores, must not be within close proximity to the aforesaid sensitive environments, i.e. these construction related sites or activities must not, as far as is	Applicant / Contractor	Prior to commencement of construction.	SEO, ECO & IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				practical, be located on the watercourse-side of any construction camp or area demarcated for construction activities.			
9.1.2	Degradation of the environment outside of the development footprint.	Zero construction creep into and subsequent degradation of areas outside the preferred or approved development footprints.	Approved and effectively implemented (demarcated on site layout plan) indicating all environmental sensitivities, especially no-go areas.	Permanent and temporary construction footprints must be designated, and sensitive terrestrial and aquatic habitats demarcated as no-go areas during construction, including required buffer zones. The Contractor shall locate the construction camp on existing disturbed or the least sensitive sites outside of the delineated DWS Regulated Area of a watercourse. The project footprint must be clearly demarcated on the ground to ensure that no construction	Applicant / Contractor	Prior to and ongoing enforcement during construction.	SEO, ECO & IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				creep results toward any watercourses or defined sensitive areas. This may include the use of droppers, standards, wooden stakes or similar visible structures that can be easily removed upon completion of construction. Placement of infrastructure and laydown and stockpile areas must be done so as not to negatively affect surface water runoff in a way that leads to erosion and export of material to be deposited in any watercourses.			
9.2	**Construction Phase**						
9.2.1	Land surface pollution.	To avoid and reduce human induced environmental pollution.	Incident registers that indicate incidence and reduction in pollution events, from the	Emergency breakdowns in the parking areas or along roads, must be addressed with immediate and adequate pollution containment measures including preventative measures that are not limited to drip trays and spill kits.	Applicant / Contractor	Throughout construction.	SEO, ECO & IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			operation of construction plant, equipment or other vehicles, over time.	No washing of plant and equipment, and no repairs or servicing of construction plant, equipment or other vehicles, except for emergency breakdowns and washing of vehicle tyres prior to entering the N4 (with adequate containment measures), are permitted. The contractor(s) and any sub-contractors, including their employees, are prohibited from entering the designated no-go areas for whatever reason and without the prior written consent of the SEO. Refuelling of vehicles and plant may only take place at a designated and permitted above-ground fuel storage tank (from			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				local Fire Chief) or mobile fuel bowser, under the guidance of a Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage. The contractor shall restrict the following activities to the construction camp: - Sanitation, - Waste storage, - Parking, - Storing hazardous materials, - Emergency vehicle or plant repair and maintenance as far as practicable, - Designated concrete mixing area - Material stockpiles, and - Lay down areas.			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Use chemical toilets that contain the sewerage in a closed and removable 'tank', i.e. do not use open drums. Environmentally friendly toilets should also be considered e.g. E-loos. In the event that alternative ablution facilities are easily accessible, mobile ablutions will not be required. Washing of equipment including brushes shall not occur on site or in a watercourse but shall be restricted to the main construction camp where adequate containment measures are in place.			
9.2.2	Noise pollution.	To avoid nuisance noise and reduce noise	Noise must fall within the parameters set by:	Noise generation must be managed, including the use of radios and other music playing appliances.	Applicant / Contractor.	Frequency of monitoring as stipulated in relevant	SEO or appointed specialist service

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		impacts to the environment.	**1.** (SANS) Standard 10103:2008: The measurement and rating of environmental noise with respect to annoyance and speech communication. **2.** DEA Regulations No. R.154. Noise Control Regulations promulgated in terms of Section 25 of the Environment Conservation Act, 1989 (Act	Vehicles and plant must be in a good state of repair to limit noisy operations.		regulation and standard, as amended from time to time.	provider. Verification to be done by ECO & IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			No. 73 of 1989). GG No. 13717, 10 January 1992.				
9.2.3	Degradation of the environment outside of the development footprint.	To avoid impacts to the biodiversity integrity and ecological function of areas outside the development footprint.	No impacts outside the development footprint. All contraventions to be recorded in incident register.	No residues of stockpiled material must be left on site, that can impede restoration of ecological function and remain a visual intrusion on the landscape. Disturbed habitats resulting from construction-related activities must be rehabilitated immediately after the cessation of those activities on or near the disturbed habitats. The alignment of fences or roads and the placement of potential impediments, such as walls, laydown and material stockpile areas must not alter surface water runoff patterns (i.e. impede or increase surface water runoff) in a	Applicant / Contractor.	Update to incident register following each contravention.	ECO & IEA.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				way that will cause ponding or erosion and sedimentation of a watercourse.			
No significant operational impacts expected.							

TABLE 10. WASTE MANAGEMENT (generation, handling, storage, and disposal, including hazardous waste).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
10.1	**Planning & Design Phase (including Pre-Construction)**						
10.1.1	Shortening the lifespan of the waste disposal site.	To minimise the generation of project-specific waste by implementing an effective waste management strategy based on the waste hierarchy.	Keep accurate records of waste volumes (litres, kg and / or m^3) generated by type in line with the Ngodwana Mill's waste recording system.	Implement SAPPI's Integrated Waste Management Plan including avoidance, reduction, re-using, recycling and disposal, i.e. the production of hazardous waste can be **avoided** by providing drip trays, **reduce** waste by using the correct quantities, **re-use** excavated soil as back fill or **recycle** steel off-cuts and **dispose** of non-recyclable waste at a registered dump site. Induct all labourers on the waste management strategy and enforce it through regular (at least weekly) toolbox talks.	Applicant / Contractor (SEO).	Prior to commencement of construction with ongoing maintenance and updates to Strategy.	ECO & IEA.

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No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Keep accurate records of waste generated by type including building rubble, contaminated oil and general waste.			
10.2	**Construction Phase**						
10.2.1	Removal of inert waste and rubble. Loss of ecological function.	Maintain ecological function.	Zero concrete hard pan layers observed on the ground.	In the event of concrete hard pan layers, break up all concrete hard pan layers and dispose of appropriately (at a registered landfill site) or re-use the concrete (following permission from Competent Authority for reuse).	Applicant / Contractor (SEO).	For each disposal event.	ECO & IEA.
10.2.2	The high economic cost of disposing hazardous waste at authorised landfills, and potential contamination of	The reduced generation of hazardous waste and the avoidance of environmental	Indicators and trends in hazardous waste generation and management over time while considering	The contractor shall contain contaminated & dirty water for appropriate disposal.	Applicant / Contractor (SEO).	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	land by illegal dumping.	(land and water) contamination.	amount of active construction to contextualise efforts. All waste waybills and landfill licenses in register and on file. Wastewater disposal according to relevant discharge/disposal regulations.	The contractor shall return used oil to the supplier or an oil recycling company.			
10.2.3	Solid and liquid waste can be harmful to fauna if swallowed / ingested or if the creature becomes entangled or impaled.	Healthy animals.	Zero incidence (in the incident register) of waste induced harm to wildlife. No litter observed in the development	Designate a temporary waste storage area and provide sufficient scavenger proof dust bins with black bags inside the construction camp.	Applicant / Contractor (SEO).	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			footprint and no-go areas.				
10.2.4	Improper handling, storage or disposal of waste can cause toxicity – the introduction of toxic or hazardous substances into a watercourse - spills can be washed into the watercourse by storm water run-off.	To ensure sound waste management practices that do not affect any aquatic environments.	Zero incidence (in the incidence register) of waste induced impacts on aquatic environments.	Hard-surfaces (e.g. concrete aprons, compacted soils) and parking areas with storm water outlets should not channel litter, oil, and fuel spills into a watercourse, causing water pollution. The contractor is prohibited from discharging wastewater, including domestic water from sanitation facilities, into a watercourse. The contractor shall store and contain hazardous chemicals within a secure, safe and bunded facility at the construction camp, to ensure spillages do not	Applicant / Contractor (SEO).	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				enter any aquatic environments.			
10.2.5	Construction activities will produce solid and liquid waste, which can contaminate the ground (litter, spillage) if improperly handled, stored, or disposed of.	To reduce contamination of the soil through improper management of waste.	Low incidence of waste induced ground contamination, with a trend indicating constant improvement over time (not just quantities but procedural improvements too). Suitable close-out of documentation and reviews of SOPs & MS following significant contamination events.	Do not mix concrete on open ground. Mix in a wheelbarrow, a mixing tray, on a level plastic sheet or similar containment measure. In the event of a leak or spill onto the ground, immediately remove contaminated soil to the depth of penetration and temporarily store in a designated solid hazardous waste container until sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of contaminated soil should be considered with a registered hazardous	Applicant / Contractor (SEO).	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				waste management company by way of bioremediation. The burning, burying or illegal dumping of waste is prohibited. When handling hazardous materials, the contractor shall implement appropriate precautionary measures, such as a ground cover or drip trays, to prevent spills from contaminating the ground. The contractor shall prevent the run-off of slurry or cement contaminated water from concrete / plaster mixing sites.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Adequate waste receptacles must be available, including those that track with the active work fronts, to ensure effective waste management. Remove ineffective danger tape / netting that has begun to litter the site or surrounding areas. Follow housekeeping rules to avoid littering (littering is likely to be more prevalent at designated eating / rest areas).			
10.2.6	The contamination of soil.	To reduce the amount of hazardous waste,	Sound management and disposal of	Drip trays must be regularly emptied, or they can be filled with	Applicant / Contractor	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		specifically contaminated soil, that is generated during construction.	contents of drip trays and / or utilisation of alternative hydrocarbon absorbents in drip trays. Zero sand observed in drip trays and bunds. Zero spills or leaks observed under or near stationary construction plant and equipment.	hydrophobic hydrocarbon absorbent material to avoid the content from overflowing during rainfall events.	(SEO & Plant Operators).		
10.2.7	The contamination of soil (and generation of waste) by undesirable practices.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated	Zero observations of spills covered with soil.	Do not cover spills with virgin soil. It merely increases the disposal cost for a greater volume of hazardous waste.	Applicant / Contractor.	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		during construction.					
10.3	**Operational Phase**						
10.3.1	Solid waste can be blown away and into the landscape.	A pristine environment, devoid of wind-blown litter.	No litter or other open sources of waste observed within the fenced premises.	The site will be kept tidy always. All waste shall be picked up daily.	Applicant / Operator.	Throughout operation.	IEA.

TABLE 11. FAUNA AND FLORA MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.1	**Planning & Design Phase (including Pre-Construction)**						
11.1.1	The establishment of laydown areas, stockpiles and expansion of service roads can destroy plants of conservation concern.	To reduce the impacts of construction activities including laydown areas, stockpiles and roads on fauna and flora.	The successful relocation of plants of conservation concern into suitable habitats.	Prior to the expansion of any roads, a search and rescue must be conducted by a suitably qualified specialist for protected fauna and flora and those of conservation concern, which must then be transplanted outside the works area in a comparative habitat type. Ascertaining	Applicant / Contractor.	Prior to & during construction.	SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				similar habitat types may require soil sampling and analysis over and above above-ground similarities.			
11.2	**Construction Phase**						
11.2.1	Increased risk of alien plant invasion to the detriment of the local ecology.	To effectively control the invasion of any alien plants.	No new alien plant recruitment (directly or indirectly resulting from construction activities) within the development footprint and neighbouring no-go areas or immediate surroundings.	All aggressive alien species should be removed. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984), and NEMBA (Act 10 of 2004) and Alien Invasive Regulations (GN No. 627 of 3 June 2020), alien species need to be managed and controlled in terms of their respective categories, where category 1 must be removed. Species specific and area specific eradication recommendations:	Applicant / Contractor.	Throughout construction.	SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. • MTPA requires that all exotic trees be removed within a radius of 500 meters of the development site, to be addressed though			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				SAPPI's Alien Invasive Species Management Plan.			
11.2.2	Construction activities (i.e. clearing and grading) have the potential to directly impact, that is damage / injure and destroy / kill, local fauna, and flora. (The impacts are exacerbated when the species affected are classified as protected, sensitive, rare, or threatened and endangered).	To reduce *in situ* losses of protected and conservation important flora & fauna.	Spatially explicit "Search and Rescue" register indicating the nature & position of all translocated flora & fauna.	Removing large trees should be avoided as far as possible and unnecessary clearing of areas should also be avoided. All fauna and flora that are protected or of conservation importance must either be cordoned off and protected or translocated outside of the site establishment and dam remediation footprint, into habitats of a similar nature. Avoid direct contact with fauna, through clearing and grading as it can cause injury or death.	Applicant / Contractor. All search & rescue & translocation activities must be carried out by suitably qualified specialists.	Pre-Construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.2.3	Harvesting of: - indigenous plants for muthi - firewood; and - poaching of animals.	To ensure no harvesting of natural resources within and adjacent to the development footprint.	Zero incidence of harvesting/poaching. All incidences recorded in the incident register including close-out actions.	The harvesting or collection of any natural product(s) from the environment is strictly forbidden. "Problem" animals must be handled with assistance from the provincial conservation authority and in accordance with the Norms and Standards for the management of damage-causing animals (GN No. 749, 10 November 2016). Except for search and rescue operations, no mammal, bird, reptile, invertebrate or fish shall be intentionally caught, hunted or poached, within the	Applicant / Contractor.	Throughout construction and operation.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				development footprint and no-go areas.			
11.2.4	Fragmenting the riparian corridor by removing riparian bushes or riverbank vegetation and thus compromise the function of riparian connectivity.	Prevent the clearing of vegetation or covering of indigenous riverine habitat in the project footprint area for construction purposes.	No impact into the delineated riparian and associated buffer zone outside of the construction footprints.	Care must be taken not to impact on areas outside the demarcated route and unnecessary clearing of areas should also be avoided. Whenever tall indigenous trees are removed on haul roads, these trees must be replaced (on a like-on-like species basis) to mimic the natural habitat impacted on. During site clearing, large trees should be left intact as they can become incorporated as shade and garden features in the site establishment areas.	Applicant / Contractor.	Throughout construction and operation.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Refrain from fragmenting the riparian corridor by respecting the buffer zones. No indigenous plants of Special Concern must be impacted on. Indigenous vegetation should be planted during rehabilitation. Corridors and buffers must be respected, and the riparian zone must not be disturbed outside the construction footprints.			
11.2.5	Vehicle and human movement and sounds will disturb riparian fauna in the vicinity of the construction activities.	Prevent the disturbance of local fauna from audio-visual disturbance during the construction activities.	Restrict construction activities within approved footprints and the movement of construction staff.	The disturbance will be for a relative short period and the activities will be contained to the dam wall, site establishment areas and roads leading to the construction site. Workers	Applicant / Contractor.	Throughout construction and operation.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				should be forbidden to move around off the construction site.			
11.3	**Operational Phase**						
11.3.1	Disturbance to or destruction of roosting & nesting sites.	An uninterrupted breeding season for the avifauna.	The effective control of incidental bird breeding sites with the least impact to the affected birds during the breeding season, and then the prevention of future disturbances.	Birds should not be shot, poisoned, or harmed as this is not an effective control method and has negative ecological consequences. Birds already with eggs and chicks should be allowed to fledge their chicks before nests are removed. If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.	Applicant / Operator through appointed avifauna specialist.	Throughout construction and operation.	IEA & Avifauna Specialist.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.3.2	Increased risk of alien plant invasion to the detriment of the local ecology.	To effectively control the invasion of any alien plants.	No new alien plant recruitment (directly or indirectly resulting from construction activities) within the development footprint and neighbouring no-go areas or immediate surroundings.	<u>Invasive alien plant management:</u> Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal, and encroachment. Promote the natural re-establishment and planting of indigenous species to retard erosion and alien plant invasion. This plan should be updated throughout the life-cycle of the operation, as required in order to ensure that appropriate measures	Applicant / Operator through appointed ecologist specialist	Throughout construction and operation.	IEA & Ecologist Specialist.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.			

TABLE 12. WATER USE & MANAGEMENT (INCLUDING WATERCOURSES).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
12.1	**Planning & Design Phase (including Pre-Construction)**						
12.1.1	Uncontrolled and unsustainable abstraction from a watercourse and depletion of water resources.	Utilisation of surface water within the valid Integrated Water Use License (IWUL) limits.	Implementation of a register recording utilisation, considering holistic usage by SAPPI.	A water usage register must be implemented which records water usage associated with the remediation project, but also provides for other SAPPI usage, to ensure that the allocation in the IWUL is not exceeded. Water meters must be installed at all supply points.	Applicant / Contractor / Landowner	Prior to and monthly throughout construction.	SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
12.2	**Construction Phase**						
12.2.1	Altering bed, banks, or course of a watercourse. Impediments to surface water runoff impacting stream flow of the Ngodwana catchment seep on the western slope and other surrounding network of riverine wetland areas which could be impacted adversely by the proposed project activities.	Prevent impacting the flow and water quality of this near-pristine mountain stream due to construction activities.	No physical and structural damage to the seep zone, watercourses, and riverine wetlands.	Flow down the Ngodwana catchment seep must be allowed to flow unhindered to its confluence with the Ngodwana river. No covering of material or dumping of any rubble will be allowed into the wetland seep system. Water flow in drainage lines and wetland systems must not be obstructed.	Applicant / Contractor.	Throughout construction.	SEO, ECO & IEA.
12.2.2	Soil erosion and siltation of watercourses from disturbing the soil	To retain as far as possible surface water hydrology.	Limited signs of erosion along haulage roads or resulting from the	The contamination of water leaving the site could be controlled by the use of silt-fencing, rows of hessian bags,	Applicant / Contractor.	Throughout construction.	SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	during the construction of roads, clearing areas, and creating bare patches, channelling stormwater and road run-off.		construction activities. Due to the proximity of the Ngodwana River and associated network of riverine wetland areas, erosion and siltation originating from construction activities could be impacted adversely by the proposed project activities.	mulch, brushwood and deflection berms. In any areas where the risk of erosion is evident, appropriate temporary or permanent works and water energy dispersion structures must be installed. Cleared or bare areas prone to erosion should be monitored and rehabilitation should be implemented wherever indications of potential erosion become evident.			
12.2.3	Excessive abstraction from a watercourse.	To reduce water usage for construction activities.	Evidence of dust control additives used to minimise water usage for dust suppression activities, including completed logbooks and no evidence of	An environmentally friendly water-soluble dust control additive / binder must be added as an additive to the water used for dust suppression. The additives generally assist with surface	Applicant / Contractor.	Throughout construction.	SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			over wetting, i.e. erosion or pools of water (puddles).	stabilization thereby significantly reducing water usage. All water bowsers must maintain logbooks in which quantities used for construction and dust suppression are recorded. Water bowsers implementing dust suppression, must determine optimal rates of application to ensure over-wetting does not occur.			
12.3	**Operational Phase**						
12.3.1	The excessive and/or wasteful use of water has the potential to reduce the ecological reserve	To use water in a manner that is ecologically sustainable and not wasteful.	No drips, leaks, or other evidence of wasteful water use.	Water leaks shall be repaired immediately upon being found. Educate employees on the importance and practices of water efficiency.	Applicant / Operator.	Throughout operation.	IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	required for sustaining the local ecosystem.'						
12.3.2	Poor water quality can be a health risk or harmful to humans.	To ensure safe potable water for employees.	Compliance of potable water to SANS 241 standard.	Water used for potable (drinking) purposes must be tested to ensure compliance with the minimum standard (SANS241). Should elements of the water not comply, the water must be treated to ensure no acute or chronic health risks.	Applicant / Operator.	Quarterly.	IEA.
12.4	**Decommissioning Phase**						
12.4.1	Impact on upstream and downstream aquatic/terrestrial flora and fauna from change in hydrology of catchment and possible flooding.	The safe and compliant decommissioning of the Ngodwana Dam.	Compliance with section 38 of the Regulations Regarding the Safety of Dams in terms of Section 123 (1) of the NWA for the decommission of a Dam with safety risk.	Conditions under section 38 of the Regulations Regarding the Safety of Dams in terms of Section 123 (1) of the NWA for the decommission of a Dam with safety risk.	Applicant / Operator.	Throughout operation.	IEA.
12.4.2	Impact on water users due to	The safe and compliant	Compliance with section 38 of the	Conditions under section 38 of the Regulations Regarding the	Applicant / Operator.	Throughout operation.	IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	change in hydrology of the catchment following decommissioning.	decommissioning of the Ngodwana Dam.	Regulations Regarding the Safety of Dams in terms of Section 123 (1) of the NWA for the decommission of a Dam with safety risk.	Safety of Dams in terms of Section 123 (1) of the NWA for the decommission of a Dam with safety risk.			

TABLE 13. AIR QUALITY MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
13.1	**Planning & Design Phase (including Pre-Construction)**						
No pre-construction impacts associated with this phase.							
13.2	**Construction Phase**						
13.2.1	Old and poorly maintained vehicles cause the most air pollution from cars, specifically GHG emissions that are released to the atmosphere,	To reduce the level of car or other combustion-related pollutants entering the atmosphere (by keeping well-	Evidence of servicing at required intervals. No visible evidence of	Construction plant and equipment shall be kept in a good state of repair to reduce combustion-related emissions.	Applicant / Contractor.	During construction.	Plant Manager, SEO, ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	contributing to global warming and acid rain.	maintained plant and equipment).	excessive emissions.				
13.2.2	Negative effects on floral photosynthetic functioning and potential increase in breathing ailments of site staff, surrounding communities, and fauna.	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control Regulations.	Full compliance with National Dust Regulations. Acceptable Dust fallout rate ($mg/m^2/day$): Residential area < 600 Non-residential area < 1200 Exceedance not more than twice in a year, not sequential months.	Ensure the effective implementation of the National Dust Control Regulations. Excessive vehicle movement, and the transport and off-loading of dispersive materials shall be avoided during windy conditions, unless additional dust suppression methods will ensure that the dust fallout does not exceed the acceptable limits. We suggest that the contractor take into consideration predicted wind speeds from a local weather station when planning construction-related activities with a high risk of generating dust.	Applicant / Contractor.	During construction, monthly.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident and compliance to be verified by ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Dust suppressant must be prioritised for any drilling activities.			
13.2.3	Safety risks and road accidents due to reduced visibility.	To reduce vehicular accidents due to poor dust-induced visibility.	Full compliance with National Dust Regulations.	Dust suppression must be carried out on access roads where high dust entrainment is evident.	Applicant / Contractor.	During construction. Dust fallout evaluation monthly and dust suppression as conditions dictate.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident and compliance to be verified by ECO & IEA.
13.2.4	Unpleasant odours.	To reduce unpleasant odours often associated with ablution facilities.	Records of regular servicing, and daily cleaning log.	Chemical toilets shall be kept hygienic and cleaned daily to avoid unpleasant odours.	Applicant / Contractor.	During construction.	SEO, HSO, ECO & IEA.
13.3	**Operational Phase**						
No significant impacts anticipated during operational phase.							

TABLE 14. SOIL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
14.1	**Planning & Design Phase**						
14.1.1	Loss of valuable topsoil.	To minimise disturbance and contamination of topsoil.	Compliance with site layout plans.	Clearing, and the location of topsoil stockpiles and / or windrows, shall take place in pre-authorised and clearly defined areas only.	Applicant / Contractor.	Prior to and during construction.	SEO, ECO & IEA.
14.2	**Construction Phase**						
14.2.1	Disturbing the soil during the construction of roads, clearing areas and creation of bare patches, channelling storm water and road run-off, will cause soil erosion.	To reduce erosion induced soil losses and consequential ecosystem degradation.	To record all areas prone and affected by erosion and implement suitable pre-emptive and remedial measures.	Areas disturbed and rehabilitated during construction shall be monitored for signs of erosion and if found to occur, immediately corrected ('source') and repaired ('symptom'). Bulk shape the areas where material is introduced to mimic or blend in with the surrounding, natural topography. Do not fine shape or rake because an uneven surface will impede surface water run-off and facilitate infiltration.	Applicant / Contractor (SEO).	During construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Correct any cause of erosion at the onset thereof by controlling / diverting storm water run-off, immediately repairing and stabilizing / rehabilitating impacted areas in the most appropriate manner. Ensure a quick and adequate cover with indigenous and local grass species on all servitudes. Ensure storm water run-off is adequately controlled on disturbed sites before rehabilitating them (ripping, replacing the topsoil and mulching/brush packing), i.e. cut-off berms. Grading of access roads must not be promoted, but farm tracks must be utilised as far as possible.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season.			
14.2.2	Decline in soil organisms.	To maintain the biological integrity of disturbed soil.	The list of plant species, and their relative abundancies, chosen for rehabilitation reflects the natural plant communities that need to be rehabilitated.'	Seed disturbed areas after construction with grass seeds of the naturally occurring plant species to create a functional and protective covering of exposed soil. A suitable fertiliser design must be compiled by a qualified soil scientist/agronomist in response to the soil fertility analysis provided in Appendix 1 of this EMPr.	Applicant / Contractor (SEO) / Agronomist.	Following construction or construction induced disturbance.	ECO & IEA.
14.2.3	Loss of valuable topsoil.	To retain all disturbed and cleared topsoil.	Comparative quantification of cleared and reinstated	Any topsoil removed during the establishment of parking areas, temporary roads, or any other cleared areas, must be quantified to ensure the same volume is	Applicant / Contractor (SEO).	During initial clearing and prior to reinstatement of topsoil.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			topsoil volumes.	reinstated at the end of construction; and must be protected from vehicular and construction impacts. Do not mix topsoil with cement and / or subsoil or let it be pulverised by trucks.			
14.2.4	Potential sterilisation of the soil.	To maintain soil viability.	Use of only selective, environmentally friendly herbicides.	Where possible, refrain from using non-selective herbicides to control vegetation, depending on the active ingredient, it can sterilise the soil. Application of herbicides may only be applied by or under the supervision of a Certified Pest Control Officer.	Applicant / Contractor (SEO).	Every treatment episode.	ECO & IEA.
14.2.5	Soil contamination.	To reduce and avoid soil contamination.	Separately stockpiled / windrowed / designated soil horizons.	Soil horizons must be stockpiled or windrowed separately during excavation to ensure they can be reinstated in reverse order and ensure restored soil structure.	Applicant / Contractor (SEO).	During construction.	ECO & IEA.
14.3	**Operational Phase**						

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
No significant impacts expected during the operational phase.							

TABLE 15. SOCIAL-ECONOMIC MANAGEMENT (HEALTH, SAFETY & SECURITY & COMMUNICATION).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
15.1	**Planning & Design Phase (including Pre-Construction)**						
15.1.1	Community confusion, frustration, and lack of information.	To avoid creating false hope where job creation opportunities are concerned.	Development of an effective job seeker database.	Implementation of a community relations strategy until all activities on site cease and rehabilitation is completed. Develop a job seeker database or integrate with the existing SAPPI database to ensure job seekers' details are captured. As positions become available, this database can be searched for suitable skills within the local populous before positions are outsourced. These measures will reduce the potential nuisance factor to the landowner, caused	Applicant / Contractor / Operator	Prior to and during construction and operation.	ECO & IEA

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No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				by job seekers reverting to visiting the proposed site of development.			
15.2	**Construction & Operation Phase**						
15.2.1	Increase in crime including damage to infrastructure and vandalism.	Reduce impacts associated with crime.	No perpetuating criminal activity. Improvements to security must be demonstrated following an incident.	Security must be appointed throughout construction & operation phases to discourage criminal elements and trespassers accessing the project area.	Applicant / Contractor / Operator.	At commencement of construction, especially site establishment and during operation.	ECO & IEA.
15.2.2	Potential social pathologies (social unrest).	Reduce impacts associated with disgruntled staff.	No strike actions by staff. Improvements to engagement with staff must be demonstrated following an incident.	Ensure effective communication and engagement with staff and surrounding community *via inter* alia the appointment of a suitably qualified CLO or use of the already employed SAPPI CLO. Transparent communication through the right channels to communicate with the	Applicant / Contractor / Operator (CLO).	At commencement of construction, and during operation.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				community as to when and how their contracts will come to an end.			
15.2.3	Injury to site staff from construction, demolition and blasting activities.	To ensure effective Health and Safety implementation.	Appointment of a suitably qualified HSO and compliance monitoring against the OHSA (Act 85 of 1993).	Implement a safety plan, access protocols, grievance mechanism and compensation policy. All staff must undergo a site induction that outlines the socio-environmental and health & safety constraints of the site.	Applicant / Contractor (HSO).	Construction.	Health & Safety Audits biannually.
15.2.4	Injury to trespassers resulting in possible lawsuits.	To avoid inadvertent injuries to trespassers.	No recorded injuries to trespassers.	Adequate signage must be placed around the development warning uninformed people of the potential hazards and dangers associated with the project.	Applicant / Contractor.	Throughout construction	ECO & IEA.
15.2.5	Negative effects on the wellbeing of the local inhabitants and site staff as well as the potential outbreak of disease	To avoid negative impacts on the health of the residents and occupiers.	Effective implementation of awareness training including measures to assess	AIDS / HIV & COVID-19 awareness training must be undertaken to ensure that the labour force is well informed on these matters.	Applicant / Contractor / Operator	Ongoing	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	(including HIV/AIDS & COVID-19).		effectiveness of training.	Dangerous fumes, noise, dust and water impacts must be avoided that may affect both the labour force and surrounding landowners and users.			
15.2.6	Potential increase in pedestrian and wildlife accidents.	To reduce impacts and injuries to pedestrian and wildlife.	No injuries recorded in incident register. Close-out Reports must demonstrate improvements to avert a recurrence.	An awareness must be fostered to drive carefully to avoid killing or injuring people or animals and damage to property. Open excavations must be secure and cordoned off to avoid accidental injury to humans and animals alike.	Applicant / Contractor / Operator.	Ongoing awareness.	ECO & IEA.

TABLE 16. CULTURAL, HERITAGE, ARCHAEOLOGICAL & PALEONTOLOGICAL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
16.1	**Planning & Design Phase (including Pre-Construction)**						
16.1.1	Lack of awareness of heritage resources.	To promote awareness about heritage resources and their potential presence within the development area.	Procedures for incidental discovery of heritage artefacts in site induction and toolbox and awareness talks.	Include an awareness of heritage resources in the environmental induction & toolbox talks. Categories of heritage resources include, inter alia: • Evidence of archaeological sites or remains include remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations. • Archaeological or paleontological sites over 100 years old, • Sites of cultural significance associated with oral histories, • Significant cultural landscapes or viewscapes, • Burial grounds, unmarked human burials, graves of victims of conflict, and/or graves older than 60 years,	Applicant / Contractor.	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• Structures older than 60 years, • Fossils, etc.			
16.2	**Construction Phase**						
16.2.1	Loss of archaeological and palaeontological valuable artefacts.	To ensure construction activities do not disturb know or incidental heritage sites.	No loss of archaeological valuable artefacts. Any incidental "heritage" sites within the development footprint are suitably cordoned off.	All areas of heritage value must be demarcated and avoided. Incidental discoveries during clearing and grubbing must be disclosed to site management with immediate cessation of activities until their significance can be assessed by a qualified heritage specialist. Any archaeological artefacts unearthed during excavations must be protected and left *in situ*. Works must cease until the significance of the finding can be assessed by a qualified archaeological specialist.	Applicant / Contractor.	Throughout construction.	ECO & IEA.
16.2.2	Loss of cultural and heritage value to society.	To ensure correct procedures are followed following	Adherence to protocols specified in	Contact a professional archaeologist, depending on the	Applicant / Contractor.	Throughout construction.	ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		chance finds to preserve the heritage resource.	management actions following a chance find.	nature of the finds, as soon as possible to inspect the findings. In the event of discovering a heritage resource, stop reconstruction activities and alert the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit immediately. Nokukhanya Khumalo, Heritage Officer T: +27 21 462 4502 | F: +27 21 462 4509 | C: +27 82 507 0378. E: nkhumalo@sahra.org.za			
No conditions applicable to the operational phase.							

TABLE 17. INFRASTRUCTURAL & TRAFFIC MANAGEMENT (INCLUDING PARKING ON SITE).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
17.1	**Planning & Design Phase (including Pre-Construction)**						
There are no significant impacts expected during this phase.							
17.2	**Construction & Operation Phase**						
17.2.1	Parking and driving carelessly can increase collisions with mammals, birds, reptiles, amphibians and insects – collectively referred to as "roadkill's".	To avoid and minimise impacts from traffic on animals residing on and around the property.	Compliance to speed limits. No recorded project vehicle associated animal mortalities.	Drivers shall always adhere to the relevant speed limit(s) (on the existing road network) and restrict their movements to the existing and / or approved roadway or servitude. The speed limit on the property shall be 40 km/h and 30km/h within the development footprint. A register must be maintained of all animal mortalities recorded on the property and localised access roads.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & IEA.
17.2.2	Contamination from spills when refuelling, parking, driving, emergency repairing, operating plant or equipment	To reduce contamination of soil from leaking plant and vehicles and upon occurrence is	Spills are removed within 48 hours of event.	Oil and fuel spills on roadways and parking areas must be removed to depth of penetration following their discovery and placed in a designated hazardous container for safe disposal.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & IEA.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	to soil or nearby or within the watercourse.	remediated promptly.	Records of servicing by off-site workshop. Drip tray issued to all plant and recorded in a register.	Drip trays must be placed under all plant that is parked overnight and extended periods not in operation.			
17.2.3	Impact to national road users.	The effective implementation of measures to negate impact on national road users and ensure the safe haulage of material to site.	Development of a traffic management plan.	A traffic management plan needs to be developed following the detailed design process. This plan must include the following: • The Applicant must notify TRAC at least 14 days prior to the commencement of the project activities. In response to the notification TRAC has committed to provide details of special high traffic days on which the project and associated haulage service providers are not allowed to transport material.	Applicant / Contractor / Logistics company.	During construction and deliveries.	Compliance to be verified by SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• No haulage of material is to be done on Fridays. • Traffic accommodation signage is to be implemented. • Flagmen must be positioned at N4 intersections during days when deliveries are expected. • Daily checking of vehicles must be done to confirm they are clean, road worthy and have operational amber construction lights. • Construction lights on trucks must be visible from back and front of the vehicle by other vehicles behind or approaching.			

TABLE 18. VISUAL ASPECT MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.1	**Planning & Design Phase (including Pre-Construction)**						
There are no significant impacts expected during this phase, as footprint location has already mitigated the planning and design requirements.							

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.2	**Construction & Operational Phase**						
18.2.1	Impact of construction on visual receptors near the Ngodwana Dam, including road users and local homesteads.	To manage the facility in a way that minimised its visual impacts on the surrounding environment.	Demonstration of effects to minimise visual impacts.	Have minimal placements that can be visually intrusive to sensitive receptors. Utilise fencing options that do not create a significant visual barrier.	Applicant.	Throughout the project lifecycle.	ECO & IEA.

SECTION 6: ENVIRONMENTAL AWARENESS PLAN

This section of the report is included in compliance with Section 24N(3)(c) of the NEMA and the EIA Regulations (2014) as amended.

The EMPr needs to include, inter alia:
An environmental awareness plan describing the manner in which-
(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) Risks must be dealt with to avoid pollution or the degradation of the environment;

Throughout the construction and operational phases environmental as well as health and safety awareness training should be provided to all employees to promote the effective implementation of the EMPr actions.

This section of the report focusses on the environmental awareness training. It provides a guideline as to the possible environmental risks that may be experienced as part of the project as well as way to avoid the risks and subsequent environmental degradation. The aim is to provide a guide to developing a comprehensive yet easily understandable awareness plan to present to employees of all education and skill levels which should be presented to the employees at least one week prior to commencement of construction. The following pointers are given for the environmental awareness training course:

- Environmental awareness training should be undertaken by the environmental and / or health and safety representative of SAPPI with the input of an EAP or ECO if required;
- Environmental awareness reminders should be undertaken at least bi-annually to ensure that employees and Contractors are kept aware of the risks and management thereof;
- It is recommended that awareness posters be developed and placed on site in highly visible areas to provide the required information when it needs to be referred to as well as reminding employees of their obligations regarding environmental protection;
- A slideshow can also be developed for initial awareness induction and for use as a reminder of the environmental risks and responsibilities at the site or induction of future Contractors; and
- Throughout the presentations (posters, meetings, slideshows, etc.), it is recommended that visual aids be used to explain the potential risks and management thereof as thoroughly as possible.

Should any new personnel be contracted or arrive on site during the construction period, they should attend the environmental awareness course. The environmental awareness training should be provided to all labourers, technical staff and any other Contractor appointed.

The awareness training forms part of this EMPr and should be implemented as part of the conditions of environmental management and risk prevention. Refer to the management measures in Tables 6 through 16 above for proposed management and mitigation actions to be

undertaken to prevent or minimise the risks described below. Attention should be focussed on the following areas of sensitivity during the construction phase:

- Removal of vegetation during site clearance within a critical biodiversity area;
- Covering and clearing of riverine habitat leading to fragmentation;
- Altering bed, banks or course of seepage lines and riverine wetland network;
- Animal habitat disturbance due to vegetation clearance and noise;
- Soil erosion, siltation, and pollution of watercourses;
- Soil compaction;
- Health and safety;
- Degradation of roads; and
- Fire risks.

Other elements to be taken into consideration by the employees during both the construction and operational phases include:

- The presence of animals on site;
- Disturbances to neighbours due to noise and traffic;
- The positive impacts, of the greener technology being implemented, on the biophysical and socio-economic environments; and
- Awareness should be raised regarding the possible occurrence of sensitive plant and animal species and heritage features.

The awareness training for this project should aim to prevent, and where prevention is not possible, mitigate detrimental environmental impacts. It should promote awareness of environmental risks and management thereof. It should furthermore promote green thinking and provide information on alternative energy sources and energy consumption reduction.

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SECTION 7: RESPONSIBILITIES OF ROLE PLAYERS

The approved EMPr shall be printed, completed, and kept in an on-site file designated for all matters pertaining to environmental management. Co-operation is required between the applicant, contractor, and ECO to ensure that activities are managed in an amicable and responsible manner and in accordance with the philosophies of environmental legislation and principles of the EMPr.

This EMPr is predominantly compiled for the management of construction and operations associated with the remediation of the Ngodwana Dam, once the Planning and Authorisation phases are complete. The tabulated management programmes assign responsibilities to one or more role player, the below descriptions identify responsibilities and accountabilities in the case of any uncertainty.

Applicant

The applicant remains ultimately accountable for ensuring that the development is implemented according to the requirements of the EMPr. Although the applicant delegates specific responsibilities to role players to perform functions on his / her behalf, the ultimate accountability cannot be delegated. The developer is responsible for ensuring that sufficient resources (time, financial, manpower, equipment, etc.) are available to the other role players (e.g. the contractor, SEO, etc) to efficiently perform their tasks in terms of the EMPr. The responsibility of restoring the environment in the event of any negligence, which leads to damage of the environment, also falls to the applicant.

The applicant must ensure that the EMPr is included in any documents (tender, appointment etc.) so that any contractor who is appointed is bound to the conditions of the EMPr. The applicant must appoint an independent Environmental Control Officer (ECO) prior to commencement of construction, to help identify pre-construction & construction criteria that need to be fulfilled timeously, to avoid non-compliance with the overarching authorisation conditions and/or legislation.

Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his/her contract with the developer and is responsible for ensuring that she/he adheres to all the conditions of the EMPr. The contractor shall be responsible for the actions undertaken by all their employees including sub-contractors. The contractor must thoroughly familiarise him/herself with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMPr conditions at the tender / appointment stage.

The contractor must comply with all instruction (whether verbal or written) given by the environmental manager, project manager or site engineer in terms of the EMPr.

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Site Environmental Officer (SEO)

The Site Environmental Officer (SEO) shall be appointed by the contractor to implement the EMPr daily. The SEO shall ensure that all construction activities are carried out in accordance with the relevant conditions of the EMPr, Environmental Authorisation (EA), General Authorisation (GA) (under the National Water Act), wayleaves, provincial ordinances and provincial bylaws.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the applicant as an independent monitor of the implementation of the EMPr, EA, and GA. He/she must form part of the project team and be involved in all aspects of the project planning that can influence environmental conditions on the site.

The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr, EA, and GA and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaising with relevant authorities;
- Liaising with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person / institution to be responsible for any specialist monitoring (if required).

The ECO has the right to enter the site and undertake monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (wearing safety boots, head gear, mouth mask etc.).

Independent Environmental Auditor (IEA)

An IEA shall be appointed by the Applicant to undertake EMPr, EA, and GA compliance audits at intervals stipulated in the EA and/or GA alternatively in accordance with Regulation 54A(3) of the EIA Regulations (2014), as amended. The purpose of conducting a periodic compliance audit would be to systematically check and evaluate progress on EMPr, EA, and GA implementation. The environmental audit will serve as a 'snapshot' of the environmental situation and progress at a given point in time. The purpose of the audit is to illustrate whether there has been any improvement or change over time.

The IEA will fulfil the auditing requirements by systematically auditing the Project's performance and compliance against the requirements of the EA, EMPr, and GA in a process that is carefully planned, structured and organised. The audit process must, on a sampled basis, track past actions, activities, events, and procedures through using existing documentation, conducting interviews with managers and personnel, and observing practices on site.

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SECTION 8. COMMUNICATION

At least monthly site meetings should be held where feedback can be given, and any potential problems identified and remedied. If they cannot be remedied then construction in that area should be stopped, until a suitable remedy is identified.

Monitoring Compliance

Pre-construction, Construction and Post-construction:

The ECO will be responsible for monitoring and reporting on compliance of the activity from pre- to post-construction.

Inspections and resulting compliance reports shall be a systematic, independent, and documented process for obtaining compliance evidence and evaluating it objectively to determine the extent to which the compliance criteria are fulfilled. The compliance criteria (or reference) against which the compliance evidence is compared shall include this EMPr, the Environmental Authorisation, and General Authorisations (under then National Water Act).

The ECO must undertake monthly inspections of the site and submit monthly environmental compliance reports to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs as the competent authority (DARDLEA) for this project, unless otherwise prescribed in the EA. The compliance reports must identify the actual and potential transgressions, describe the impacts, provide verifiable evidence (photographs, records, or statements) and recommend corrective and preventive actions (including completion dates). The compliance reports must measure the applicant/contractor's level of compliance against the aforesaid criteria. Performance scoring/reporting is optional.

The SEO shall maintain an on-site diary to record environmental aspects (elements of the construction activities that can interact with the environment) and environmental impacts (any change to the environment, whether adverse or beneficial, wholly or partially resulting construction activities), daily.

Operation:

The relevant authorities should be responsible for monitoring compliance with aspects of the activity that fall within their jurisdiction.

Time Periods and Failure to Comply with the EMPr

The time periods within which the measures prescribed in this EMPr must be implemented shall be applicable to the full duration of the activity that is being undertaken and mitigated. The time periods within which corrective and preventive actions need to be implemented shall be determined by the SEO and/or IEA, depending on the nature and severity of the finding. In the absence of a prescribed deadline or completion date, findings shall be corrected or prevented immediately upon being found to occur, if practical.

The EMPr is a legally binding document and should form part of the contract. Should there be failure to comply with the EMPr the following steps are envisaged:

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Step 1
The IEA meets with the contractor and points out the deviation from the EMPr. The IEA and Contractor agree on a solution and this non-compliance is recorded by the IEA as well as the solution put forward to rectify it.

Step 2
Should there still be non-compliance or there is a more serious infringement of the EMPr the contractor is informed in writing with a deadline by which the problem must be rectified. Any extra costs that may be accrued must be borne by the contractor.

Step 3
If non-compliance persists, the Chief Resident Engineer (CRE) or Project Manager (PM) shall order the contractor to suspend construction in that specific area or the project as a whole until the activity at variance with the EMPr is corrected and or remedial actions taken. Any cost that occurs because of such action shall be for the account of the contractor.

Step4
Where there is non-compliance with the EMPr and no evidence that the contractor intends complying even though the above 3 steps have been taken the applicant may terminate the contract due to non-compliance (breach of contract). Such measures do not replace any legal proceedings that may occur because of such non-compliance.

Environmental Awareness Plan
The applicant shall ensure that his project team, contractor, and labourers are adequately trained about the implementation of the EMPr, EA, & GA throughout construction.

Pre-construction

Environmental Awareness Inductions shall be targeted at two distinct levels of employment: management (applicant, architect, engineer, contractor / site agent) and labourers (including the site foreman). The SEO shall be responsible for preparing and presenting inductions appropriate to the audience. Inductions shall be undertaken prior to the commencement of construction. Where possible the presentation will be conducted in the language of the employees.

The Environmental induction for management shall include mitigations that are relevant to or require management's involvement prior to implementation including, but not limited to, the following:

- Measures required during the planning and design, and pre-construction phase, and
- Site establishment.

The Environmental induction for the contractor's labourers and foreman shall, as a minimum, include the following:

- A description of the actual and potential environmental impacts,

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- Standard operating procedures for undertaking construction activities (i.e. mixing concrete, driving, etc.) that can have an environmental impact,
- Staff conduct including sanitation and movement,
- The integrated waste management strategy,
- The steps to be taken should any item of perceived environmental importance including archaeological artefacts be located or unearthed, and
- The environmental emergency plans.

Construction

The SEO and ECO shall undertake an informal training needs analysis throughout construction to identify appropriate environmental topics and the appropriate labourers to target. The analysis shall be informed by the findings contained in the site diary and compliance reports. Training shall be given during toolbox talks.

The SEO and ECO shall keep records of the environmental inductions and subsequent toolbox talks in an on-site file designated for all matters pertaining to environmental management.

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SECTION 9: ENVIRONMENTAL EMERGENCY PLAN FOR THE CONTROL OF ENVIRONMENTAL INCIDENTS

Definition of an 'Environmental Incident'

1. An unexpected sudden occurrence including a major emission, fire or explosion leading to danger to the public or potentially serious pollution of or detriment to the environment whether immediate or delayed (NEMA, 1998, section 30 (1) (a)).

2. Any incident or accident in which a substance-
   (a) pollutes or has the potential to pollute a water resource or
   (b) has, or is likely to have, a detrimental effect on a water resource (NWA, 1998, section 20 (1))

Procedure

The contractor shall ensure that emergencies are reported and controlled in accordance with the sequence of events prescribed for spillages in a watercourse, on land and fire, including:

- Action to be taken
- Removal and remediation measures to be implemented
- Internal and external communication plan
- Prescribed reporting procedure

The measures prescribed in the tables to follow will need to be checked and compared to prevailing legislation, especially the NEMA & NWA, which are updated from time to time.

The contractor shall ensure that their employees are adequately trained to react to environmental emergencies in accordance with this procedure.

The SEO shall complete the table of contact numbers, erect them in a conspicuous place within the construction camp and make its whereabouts known to all the contractor's staff.

Equipment

The following equipment is required to successfully implement this procedure. It must be ensured that the equipment is supplied to or is readily available for all site offices, kitchen areas, workshop areas, stores and on site.

1. A spill kit including absorbent fibres, mats, and booms
2. A net
3. A whistle
4. Adequate lighting for night shifts
5. Spades
6. Sandbags
7. Designated hazardous waste drums
8. (Trained personnel with) protective clothing for extinguishing fires
9. Fire extinguishers
10. Fire beaters
11. Water carts/tankers with pumps and hoses
12. Water pumps and pipes (for fires started at the watercourse crossings)

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Contact Numbers

Organisation	Name	Telephone/cell Number
Project Personnel		
Applicant		
Engineer		
Contractor		
HSO		
SEO		
ECO		
Interested and Affected Parties		
Landowner		
Adjacent Landowner		
Adjacent Landowner		
Emergency Services		
Spill Clean-up Service Provider		
Fire Department		
Chief Fire Officer (Fire Chief)		
SA Police Services		
Disaster Management Centre		
Local Municipality		
District Municipality		
Irrigation Board		
Water Catchment Management Agency		
Water Treatment Works		

DWS (Regional Head of Department / Chief Director)		
DWS (Regional Director: Water sector Regulation & Use)		
DEFF (Provincial Head of Department)		
DEFF (Director: Environmental Impact Management)		
DEFF (Director General)		
DEFF (Director: Environmental Impact Evaluation)		

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APPENDIX 1: SOIL ANALYSIS TO INFORM REHABILITATION FERTILIZER DESIGN (AS PER CONDITION 14.2.2 OF EMPR)

LAB No.		A21-03592	A21-03593
Sample Name		Sample 2	Sample 1
Client name		SAPPI Ngodwana	
Property		Ngodwana 1030 JT	
pH	(KCl)	6,00	5,99
Resistance	(ohm)	-	-
H	(cmol/kg)	-	0,335
Stone (v/v)	%	-	-
P (Ambic I)	(mg/kg)	39,1	29,9
K	(mg/kg)	128	107
Exchangeable cations (cmol/kg)	Na	0,14	0,20
	K	0,33	0,27
	Ca	5,04	4,95
	Mg	0,48	1,03
Cu	mg/kg	1,70	7,41
Zn	mg/kg	4,58	4,07
Mn	mg/kg	34,9	15,1
B	mg/kg	0,15	0,16
B*	mg/kg	0,75	0,80
Fe	mg/kg	53,8	23,5
S	mg/kg	5	8
C	(%)	1,02	0,65
Base saturation (%)	Na	2,27	2,89
	K	5,50	4,03
	Ca	84,16	73,01
	Mg	8,08	15,14
T-Value	(cmol/kg)	5,99	6,78
EC	mS/cm	-	-
Clay	%	6	20
Silt	%	5	5
Sand	%	89	75
Sand	Fine (%)	-	-
Sand	Medium (%)	-	-
Sand	Coarse (%)	-	-
10 kPa	(%)	-	-
100 kPa	(%)	-	-
WHC	mm/m	-	-
CEC	cmol/kg	-	-
Acid Saturation (%)		-	4,94
NH4-N	(mg/kg)	-	-

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NO3-N	(mg/kg)	-	-
N	mg/kg	21	8
Cl	mg/kg	7,50	10,0
Al	mg/kg	1	1,82
As	mg/kg	-	-
Cd	mg/kg	-	-
Cr	mg/kg	-	-
Hg	mg/kg	-	-
Mo	mg/kg	-	-
Ni	mg/kg	-	-
Pb	mg/kg	-	-
Na	mg/kg	31	45
Ca	mg/kg	1008	991
Mg	mg/kg	58	123
Density	kg/L	-	-

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APPENDIX 2: EMPR AUDIT CHECKLIST.

No.	Management Actions & Mitigation Measures	Compliant (Y/N)	Comments
8.	**COMPLIANCE MANAGEMENT**		
8.1	**All Phases with special emphasis on Planning & Design Phase (including Pre-Construction)**		
8.1.1	**Dam safety repair licence for remediation**		
8.1.1.1	The applicant shall apply for and obtain the relevant Dam Repair license from DWS to complete the repair and remediation works on the Ngodwana Dam.		
8.1.2	**Protected species**		
8.1.2.1	The applicant shall apply for and obtain the relevant licenses / permits from the appropriate authorities (DEFF and Provincial Authority) prior to disturbing or destroying any protected species.		
	Removing large trees should be avoided as far as possible and unnecessary clearing of areas should also be avoided. Trees, such as indigenous Paperbark thorn (*Vachellia sieberana)* and Sweet thorn (*Vachellia karroo*) that grows vigorously, should be planted during rehabilitation and thus replace trees that have been removed.		
8.1.3	**Water use authorisation for activities within a watercourse**		
8.1.3.1	The applicant shall adhere to the conditions of the water use authorisation (GA or license) for section 21(c) and (i) water uses for diverting, altering, or impacting the beds and banks of a watercourse.		
8.1.4	**Water use authorisation for abstraction and storage**		
8.1.4.1	A valid license must be in place for abstraction and storage of water.		
8.1.5	**Compliance monitoring**		

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8.1.5.1	A qualified, suitably experienced and independent ECO must be appointed to monitor and report to the competent authority on compliance with the EA, EMPr & GA, and where necessary oversee or facilitate the identification and permitting / licensing of protected species prior to clearing of any vegetation.		
8.1.6	**Decommissioning of a dam with safety risk**		
8.1.6.1	The applicant shall apply for and obtain the relevant authorisations for the closure of the Ngodwana Dam if decommissioning is in future ever contemplated.		
9	**CONSTRUCTION CAMP, LAYDOWN AREAS, STOCKPILES, STORES & EQUIPMENT**		
9.1	**Planning and Design Phase (including Pre-Construction)**		
	A construction site layout plan must be developed by the contractor and approved by the SEO to ensure that all construction related sites are located outside sensitive environments, including no-go areas and buffer zones.		
9.1.1	Furthermore, those construction related sites or activities with the greater risk or potential for causing pollution or harm to the receiving environment, including but not necessarily limited to laydown areas, material stockpiles, toilets, waste skips and stores, must not be within close proximity to the aforesaid sensitive environments, i.e. these construction related sites or activities must not, as far as is practical, be located on the watercourse-side of any construction camp or area demarcated for construction activities.		
9.1.2	Permanent and temporary construction footprints must be designated, and sensitive terrestrial and aquatic habitats demarcated as no-go areas during construction, including required buffer zones.		
	The Contractor shall locate the construction camp on existing disturbed or the least sensitive sites outside of the delineated DWS Regulated Area of a watercourse.		

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	The project footprint must be clearly demarcated on the ground to ensure that no construction creep results toward any watercourses or defined sensitive areas. This may include the use of droppers, standards, wooden stakes or similar visible structures that can be easily removed upon completion of construction.		
	Placement of infrastructure and laydown and stockpile areas must be done so as not to negatively affect surface water runoff in a way that leads to erosion and export of material to be deposited in any watercourses.		
9.2	**Construction Phase**		
9.2.1	Emergency breakdowns in the parking areas or along roads, must be addressed with immediate and adequate pollution containment measures including preventative measures that are not limited to drip trays and spill kits.		
	No washing of plant and equipment, and no repairs or servicing of construction plant, equipment or other vehicles, except for emergency breakdowns and washing of vehicle tyres prior to entering the N4 (with adequate containment measures), are permitted. No service or wash-bays are to be constructed on site.		
	The contractor(s) and any sub-contractors, including their employees, are prohibited from entering the designated no-go areas for whatever reason and without the prior written consent of the SEO.		
	Refuelling of vehicles and plant may only take place at a designated and permitted above-ground fuel storage tank (from local Fire Chief) or mobile fuel bowser, under the guidance of a Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage.		
	The contractor shall restrict the following activities to the construction camp: - Sanitation,		

	- Waste storage, - Parking, - Storing hazardous materials, - Emergency vehicle or plant repair and maintenance as far as practicable, - Designated concrete mixing area - Material stockpiles, and - Lay down areas.		
	Use chemical toilets that contain the sewerage in a closed and removable 'tank', i.e. do not use open drums. Environmentally friendly toilets should also be considered e.g. E-loos. In the event that alternative ablution facilities are easily accessible, mobile ablutions will not be required.		
	Washing of equipment including brushes shall not occur on site or in a watercourse but shall be restricted to the main construction camp where adequate containment measures are in place.		
9.2.2	Noise generation must be managed, including the use of radios and other music playing appliances.		
	Vehicles and plant must be in a good state of repair to limit noisy operations.		
9.2.3	No residues of stockpiled material must be left on site, that can impede restoration of ecological function and remain a visual intrusion on the landscape.		
	Disturbed habitats resulting from construction-related activities must be rehabilitated immediately after the cessation of those activities on or near the disturbed habitats.		
	The alignment of fences or roads and the placement of potential impediments, such as walls, laydown and material stockpile areas must not alter surface water runoff		

	patterns (i.e. Impede or increase surface water runoff) in a way that will cause ponding or erosion and sedimentation of a watercourse.		
10	**WASTE MANAGEMENT (generation, handling, storage, and disposal, including hazardous waste)**		
10.1	**Planning & Design Phase (including Pre-Construction)**		
10.1.1	Implement SAPPI's Integrated Waste Management Plan including avoidance, reduction, re-using, recycling and disposal, i.e. the production of hazardous waste can be **avoided** by providing drip trays, **reduce** waste by using the correct quantities, **re-use** excavated soil as back fill or **recycle** steel off-cuts and **dispose** of non-recyclable waste at a registered dump site.		
	Induct all labourers on the waste management plan and enforce it through regular (at least weekly) toolbox talks.		
	Keep accurate records of waste generated by type including building rubble, contaminated oil and general waste.		
10.2	**Construction Phase**		
10.2.1	In the event of concrete hard pan layers, break up all concrete hard pan layers and dispose of appropriately (at a registered landfill site) or re-use the concrete (following permission from Competent Authority for reuse).		
10.2.2	The contractor shall contain contaminated & dirty water for appropriate disposal.		
	The contractor shall return used oil to the supplier or an oil recycling company.		
10.2.3	Designate a temporary waste storage area, and provide sufficient scavenger proof dust bins with black bags inside the construction camp.		
10.2.4	Hard-surfaces (e.g. concrete aprons, compacted soils) and parking areas with storm water outlets should not channel litter, oil, and fuel spills into a watercourse, causing water pollution.		

	The contractor is prohibited from discharging wastewater, including domestic water from sanitation facilities, into a watercourse.		
	The contractor shall store and contain hazardous chemicals within a secure, safe and bunded facility at the construction camp, to ensure spillages do not enter any aquatic environments.		
10.2.5	Do not mix concrete on open ground. Mix in a wheelbarrow, a mixing tray, on a level plastic sheet or similar containment measure.		
	In the event of a leak or spill onto the ground, immediately remove contaminated soil to the depth of penetration and temporarily store in a designated solid hazardous waste container until sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of contaminated soil should be considered with a registered hazardous waste management company by way of bioremediation.		
	The burning, burying or illegal dumping of waste is prohibited.		
	When handling hazardous materials, the contractor shall implement appropriate precautionary measures, such as a ground cover or drip trays, to prevent spills from contaminating the ground.		
	The contractor shall prevent the run-off of slurry or cement contaminated water from concrete / plaster mixing sites.		
	Adequate waste receptacles must be available, including those that track with the active work fronts, to ensure effective waste management.		
	Remove ineffective danger tape / netting that has begun to litter the site or surrounding areas.		
	Follow housekeeping rules to avoid littering (littering is likely to be more prevalent at designated eating / rest areas).		

10.2.6	Drip trays must be regularly emptied, or they can be filled with hydrophobic hydrocarbon absorbent material to avoid the content from overflowing during rainfall events.		
10.2.7	Do not cover spills with virgin soil. It merely increases the disposal cost for a greater volume of hazardous waste.		
10.3	**Operational Phase**		
10.3.1	The site will be kept tidy always. All waste shall be picked up daily.		
11	**FAUNA AND FLORA MANAGEMENT**		
11.1	**Planning & Design Phase (including Pre-Construction)**		
11.1.1	Prior to the construction of any new roads, a search and rescue must be conducted by a suitably qualified specialist for protected fauna and flora and those of conservation concern, which must then be transplanted outside the works area in a comparative habitat type. Ascertaining similar habitat types may require soil sampling and analysis over and above above-ground similarities.		
11.2	**Construction Phase**		
11.2.1	All aggressive alien species should be removed. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984) and NEMBA (Act 10 of 2004) and Alien Invasive Regulations (GN No. 627 of 3 June 2020), alien species need to be managed and controlled in terms of their respective categories, where category 1 must be removed. Species specific and area specific eradication recommendations: • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion.		

	• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. • MTPA requires that all exotic trees be removed within a radius of 500 meters of the development site, to be addressed though SAPPI's Alien Invasive Species (AIS) Management Plan.		
11.2.2	Removing large trees should be avoided as far as possible and unnecessary clearing of areas should also be avoided.		
	All fauna and flora that are protected or of conservation importance must either be cordoned off and protected or translocated outside of the site establishment and dam remediation footprint, into habitats of a similar nature.		
	Avoid direct contact with fauna, through clearing and grading as it can cause injury or death.		
11.2.3	The harvesting or collection of any natural product(s) from the environment is strictly forbidden.		
	"Problem" animals must be handled with assistance from the provincial conservation authority and in accordance with the Norms and Standards for the management of damage-causing animals (GN No. 749, 10 November 2016).		
	Except for search and rescue operations, no mammal, bird, reptile, invertebrate or fish shall be intentionally caught, hunted or poached, within the development footprint and no-go areas.		
11.2.4	Care must be taken not to impact on areas outside the demarcated route and unnecessary clearing of areas should also be avoided.		
	Whenever tall indigenous trees are removed on haul roads, these trees must be replaced (on a like-on-like species basis) to mimic the natural habitat impacted on.		

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	During site clearing, large trees should be left intact as they can become incorporated as shade and garden features in the site establishment areas.		
	Refrain from fragmenting the riparian corridor by respecting the buffer zones.		
	No indigenous plants of Special Concern must be impacted on.		
	Indigenous vegetation should be planted during rehabilitation.		
	Corridors and buffers must be respected, and the riparian zone must not be disturbed outside the construction footprints.		
11.2.5	The disturbance will be for a relative short period and the activities will be contained to the dam wall, site establishment areas and roads leading to the construction site. Workers should be forbidden to move around off the construction site.		
11.3	**Operational Phase**		
11.3.1	Birds should not be shot, poisoned, or harmed as this is not an effective control method and has negative ecological consequences.		
	Birds already with eggs and chicks should be allowed to fledge their chicks before nests are removed.		
	If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.		
11.3.2	<u>Invasive alien plant management:</u> Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal, and encroachment.		
	Promote the natural re-establishment and planting of indigenous species to retard erosion and alien plant invasion.		

	This plan should be updated throughout the life-cycle of the operation, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.		
12	**WATER USE & MANAGEMENT (INCLUDING WATERCOURSES)**		
12.1	**Planning & Design Phase (including Pre-Construction)**		
12.1.1	A water usage register must be implemented which records water usage associated with the remediation project, but also provides for other SAPPI usage, to ensure that the allocation in the IWUL is not exceeded.		
	Water meters must be installed at all supply points.		
12.2	**Construction Phase**		
12.2.1	Flow down the Ngodwana catchment seep must be allowed to flow unhindered to its confluence with the Ngodwana River.		
	No covering of material or dumping of any rubble will be allowed into the wetland seep system.		
	Water flow in drainage lines and wetland systems must not be obstructed.		
12.2.2	The contamination of water leaving the site could be controlled by the use of silt-fencing, rows of hessian bags, mulch, brushwood and deflection berms.		
	In any areas where the risk of erosion is evident, appropriate temporary or permanent works and water energy dispersion structures must be installed.		
	Cleared or bare areas prone to erosion should be monitored and rehabilitation should be implemented wherever indications of potential erosion become evident.		

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12.2.3	An environmentally friendly water-soluble dust control additive / binder must be added as an additive to the water used for dust suppression. The additives generally assist with surface stabilization thereby significantly reducing water usage.		
	All water bowsers must maintain logbooks in which quantities used for construction and dust suppression are recorded.		
	Water bowsers implementing dust suppression, must determine optimal rates of application to ensure over-wetting does not occur.		
12.3	**Operational Phase**		
12.3.1	Water leaks shall be repaired immediately upon being found.		
	Educate employees on the importance and practices of water efficiency.		
12.3.2	Water used for potable (drinking) purposes must be tested to ensure compliance with the minimum standard (SANS241). Should elements of the water not comply, the water must be treated to ensure no acute or chronic health risks.		
12.4	**Decommissioning Phase**		
12.4.1 & 12.4.2	Conditions under section 38 of the Regulations Regarding the Safety of Dams in terms of Section 123 (1) of the NWA for the decommission of a Dam with safety risk.		
13	**AIR QUALITY MANAGEMENT**		
13.2	**Construction Phase**		
13.2.1	Construction plant and equipment shall be kept in a good state of repair to reduce combustion-related emissions.		
13.2.2	Ensure the effective implementation of the National Dust Control Regulations.		
	Excessive vehicle movement, and the transport and off-loading of dispersive materials shall be avoided during windy conditions, unless additional dust suppression methods will ensure that the dust fallout does not exceed the acceptable		

	limits. We suggest that the contractor take into consideration predicted wind speeds from the local weather station when planning construction-related activities with a high risk of generating dust.		
	Dust suppressant must be prioritised for any drilling activities.		
13.2.3	Dust suppression must be carried out on access roads where high dust entrainment is evident.		
13.2.4	Chemical toilets shall be kept hygienic and cleaned daily to avoid unpleasant odours.		
14	**SOIL MANAGEMENT**		
14.1	**Planning & Design Phase**		
14.1.1	Clearing, and the location of topsoil stockpiles and / or windrows, shall take place in pre-authorised and clearly defined areas only.		
14.2	**Construction Phase**		
14.2.1	Areas disturbed and rehabilitated during construction shall be monitored for signs of erosion and if found to occur, immediately corrected ('source') and repaired ('symptom').		
	Bulk shape the areas where material is introduced to mimic or blend in with the surrounding, natural topography. Do not fine shape or rake because an uneven surface will impede surface water run-off and facilitate infiltration.		
	Correct any cause of erosion at the onset thereof by controlling / diverting storm water run-off, immediately repairing and stabilizing / rehabilitating impacted areas in the most appropriate manner.		
	Ensure a quick and adequate cover with indigenous and local grass species on all servitudes.		

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	Ensure storm water run-off is adequately controlled on disturbed sites before rehabilitating them (ripping, replacing the topsoil and mulching/brush packing), i.e. cut-off berms.		
	Grading of access roads must not be promoted, but farm tracks must be utilised as far as possible.		
	Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season.		
14.2.2	Seed disturbed areas after construction with grass seeds of the naturally occurring plant species to create a functional and protective covering of exposed soil.		
	A suitable fertiliser design must be compiled by a qualified soil scientist/agronomist in response to the soil fertility analysis provided in Appendix 1 of this EMPr.		
14.2.3	Any topsoil removed during the establishment of parking areas, temporary roads, or any other cleared areas, must be protected from vehicular and construction impacts.		
	Do not mix topsoil with cement and / or subsoil or let it be pulverised by trucks.		
14.2.4	Where possible, refrain from using non-selective herbicides to control vegetation, depending on the active ingredient, it can sterilise the soil.		
	Application of herbicides may only be applied by or under the supervision of a Certified Pest Control Officer.		
14.2.5	Soil horizons must be stockpiled or windrowed separately during excavation to ensure they can be reinstated in reverse order and ensure restored soil structure.		
15	**SOCIAL-ECONOMIC MANAGEMENT (HEALTH, SAFETY & SECURITY & COMMUNICATION)**		
15.1	**Planning & Design Phase (including Pre-Construction)**		
15.1.1	Implementation of a community relations strategy until all activities on site cease and rehabilitation is completed.		

	Develop a job seeker database or integrate with the existing SAPPI database, to ensure job seekers' details are captured. As positions become available, this database can be searched for suitable skills within the local populous before positions are outsourced. These measures will reduce the potential nuisance factor to the landowner, caused by job seekers reverting to visiting the proposed site of development.		
15.2	**Construction & Operation Phase**		
15.2.1	Security must be appointed throughout construction & operation phases to discourage criminal elements and trespassers accessing the project area.		
15.2.2	Ensure effective communication and engagement with staff and surrounding community via inter alia the appointment of a suitably qualified CLO or use of the already employed SAPPI CLO.		
	Transparent communication through the right channels to communicate with the community as to when and how their contracts will come to an end.		
15.2.3	Implement a safety plan, access protocols, grievance mechanism and compensation policy.		
	All staff must undergo a site induction that outlines the socio-environmental and health & safety constraints of the site.		
15.2.4	Increase security to avoid trespassers accessing the project area.		
	Adequate signage must be placed around the development warning uninformed people of the potential hazards and dangers associated with the project.		
15.2.5	AIDS / HIV & COVID-19 awareness training must be undertaken to ensure that the labour force is well informed on these matters.		
	Dangerous fumes, noise, dust and water impacts must be avoided that may affect both the labour force and surrounding landowners and users.		

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15.2.6	An awareness must be fostered to drive carefully to avoid killing or injuring people or animals and damage to property.		
	Open excavations must be secure and cordoned off to avoid accidental injury to humans and animals alike.		
16	**CULTURAL, HERITAGE, ARCHAEOLOGICAL & PALEONTOLOGICAL MANAGEMENT**		
16.1	**Planning & Design Phase (including Pre-Construction)**		
16.1.1	Include an awareness of heritage resources in the environmental induction & toolbox talks. Categories of heritage resources include, inter alia: • Evidence of archaeological sites or remains include remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations. • Archaeological or paleontological sites over 100 years old, • Sites of cultural significance associated with oral histories, • Significant cultural landscapes or viewscapes, • Burial grounds, unmarked human burials, graves of victims of conflict, and/or graves older than 60 years, • Structures older than 60 years, • Fossils, etc.		
16.2	**Construction Phase**		
16.2.1	All areas of heritage value must be demarcated and avoided. Incidental discoveries during clearing and grubbing must be disclosed to site management with immediate cessation of activities until their significance can be assessed by a qualified heritage specialist.		

	Any archaeological artefacts unearthed during excavations must be protected and left *in situ*. Works must cease until the significance of the finding can be assessed by a qualified archaeological specialist.		
16.2.2	Contact a professional archaeologist, depending on the nature of the finds, as soon as possible to inspect the findings.		
	In the event of discovering a heritage resource, stop reconstruction activities and alert the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit immediately. Nokukhanya Khumalo, Heritage Officer T: +27 21 462 4502 | F: +27 21 462 4509 | C: +27 82 507 0378. E: nkhumalo@sahra.org.za		
17	**INFRASTRUCTURAL & TRAFFIC MANAGEMENT (INCLUDING PARKING ON SITE)**		
17.2	**Construction & Operation Phase**		
17.2.1	Drivers shall always adhere to the relevant speed limit(s) (on the existing road network) and restrict their movements to the existing and / or approved roadway or servitude. The speed limit on the property shall be 40 km/h and 30km/h within the development footprint.		
	A register must be maintained of all animal mortalities recorded on the property and localised access roads.		
17.2.2	Oil and fuel spills on roadways and parking areas must be removed to depth of penetration following their discovery and placed in a designated hazardous container for safe disposal.		
	Drip trays must be placed under all plant that is parked overnight and extended periods not in operation.		
17.2.3	A traffic management plan needs to be developed following the detailed design process. This plan must include the following:		

	The Applicant must notify TRAC at least 14 days prior to the commencement of the project activities. In response to the notification TRAC has committed to provide details of special high traffic days on which the project and associated haulage service providers are not allowed to transport material.		
	No haulage of material is to be done on Fridays.		
	Traffic accommodation signage is to be implemented.		
	Flagmen must be positioned at N4 intersections during days when deliveries are expected.		
	Daily checking of vehicles must be done to confirm they are clean, road worthy and have operational amber construction lights.		
	Construction lights on trucks must be visible from back and front of the vehicle by other vehicles behind or approaching.		
18	**VISUAL ASPECT MANAGEMENT**		
18.2	**Construction Phase**		
18.2.1	Have minimal placements that can be visually intrusive to sensitive receptors.		
	Utilise fencing options that do not create a significant visual barrier.		
ENVIRONMENTAL AWARENESS PLAN			
	The awareness training for this project should aim to prevent, and where prevention is not possible, mitigate detrimental environmental impacts. It should promote awareness of environmental risks and management thereof. It should furthermore promote green thinking and provide information on alternative energy sources and energy consumption reduction.		
RESPONSIBILITIES OF ROLE PLAYERS			
	The approved EMPr shall be printed, completed, and kept in an on-site file designated for all matters pertaining to environmental management. Co-operation is required		

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	between the applicant, contractor, and ECO to ensure that activities are managed in an amicable and responsible manner and in accordance with the philosophies of environmental legislation and principles of the EMPr.		