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SAPPI SAICCOR MILL: PROPOSED COMRIE DAM EXPANSION

Sappi Southern Africa (Pty) Ltd

Draft Basic Assessment Report

DEDTEA Reference: DC/43/0009/2015

2015/08/21

Draft Basic Assessment Report for Public and Stakeholder Comment – Commenting Period 25 August 2015 to 23 September 2015

Quality Management

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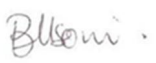
Signature				
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Sappi Saiccor Mill: Proposed Comrie Dam Expansion

Sappi Southern Africa (Pty) Ltd

2015/08/21

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Executive Summary

Introduction

Sappi Southern Africa Limited (Sappi) proposes to increase the capacity of the Comrie Dam to ensure water security during dry seasons for their production processes at the Saiccor Mill. The proposed expansion of Comrie Dam triggers a number of listed activities within Listing Notice 1 of the National Environmental Management Act (No. 107 of 1998) 2014 Environmental Impact Assessment (EIA) Regulations and therefore requires a Basic Assessment process to facilitate the receipt of an environmental authorisation.

Project Description

The proposed project entails raising the existing dam wall (12m) by 4m to increase the storage capacity. The toe of the new wall is 1.3m lower than the existing toe, giving an overall wall height of 17.3m. The expansion of the dam will result in the inundation of an additional area of approximately 79.2 hectares in extent, including both the banks and the headwater area. This will result in a total area of inundation of 150.2 ha and a total dam capacity of 6 500 000m^3. Floodplain and wetland vegetation established in the headwater area of the dam will become inundated. The proposed development also entails the construction of three new roads to access the dam and provide haulage routes as the existing Plantation Road will be inundated. Other elements of the project include the expansion of an existing spillway and installation of a gauging weir downstream of the dam wall on the Ngudwini River.

Project Motivation

South Africa is facing water shortages after the worst drought since 1992 cut dam levels by 12% from a year earlier as most of the country enters its four-month dry season. The country's dams are currently 79% full, down from 90% a year earlier (DWS, May 2015). The primary motivation for the Comrie Dam expansion is based on long term water security for the Sappi Saiccor Mill. A water shortage without the dam expansion being implemented will result in the Mill restricting operations and taking commercial downtime. This will result in affecting the following socio-economic factors:

- The Mill contributes approximately R4.7 billion to the KZN economy with almost 99% of its product being exported. Two billion Rands is spent on raw materials, of which just under R1 billion is from sourcing timber locally - the balance of which is chemicals and packaging.
- Sappi also supports Eskom and local mines by spending approximately R425 million per annum on electricity and coal.
- Sappi Saiccor employs approximately 1200 permanent staff and majority of the employees are from the local areas surrounding uMkomazi. On an annual basis, Saiccor interacts with +/-10 000 indirect contractors, service suppliers, and hauliers.

Therefore the need and desirability of the proposed expansion is to secure the Sappi Saiccor Mill's contribution to the local, regional and national economy. The proposed expansion of Comrie Dam will help secure employment and maintain economic growth. The expansion of Comrie Dam will also assist in supply water to local communities. There is a vast need for potable water in the Greater Mbulelweni Corridor in the upper reaches of the Mkomazi River, where there are some 30000 people requiring water. The Ingwe Local Municipality has a backlog of water services infrastructure. Sappi has an agreement with Harry Gwala District Municipality which will allow the Municipality to abstract water for the provision of water to local communities.

Summary of Potential Impacts

Following an assessment of the baseline environmental status, the potential impacts associated with the construction and operational phase of the proposed project were identified. The significance rating of the potential social and biophysical impacts were then determined using a rating matrix. The criteria used to determine the significance rating included the magnitude, extent, reversibility, duration and probability of the impact occurring. The impact significance summary presented below has been assigned to residual impacts (i.e. post mitigation):

Construction Phase	Operational Phase
Socio-economic Impacts ▪ Disruption to sense of place for recreational user ***(Very Low Negative*)**. ▪ Employment Opportunities ***(Low positive*)**. ▪ Disturbance to heritage resources ***(Very Low negative*)**.	Socio-economic Impacts ▪ Disruption to Contractor's Village ***(Low negative***) ▪ Water Availability at Sappi Saiccor Mill (***High positive***) ▪ Water Availability to Surrounding Communities (***High positive***) ▪ Water availability to Downstream Users (**Low positive)** ▪ Disturbance to Heritage Resources ***(Very Low negative*)**
Traffic Increased congestion and public safety risks **(*Very Low Negative*).**	Traffic Improved dam access and haulage routes (***Low positive*)**
Air Quality Dust generation and decreased ambient air quality ***(Very Low negative*).**	Flood Risk Reduced flood risk downstream of Comrie dam **(*Moderate positive*).**
Noise Elevated noise levels and disruption to sensitive receptors ***(Very Low negative*).**	Change in Hydrogeological Conditions Increase in recharge of underlying aquifer system **(*Moderate positive*).**
Soils, Erosion and Sedimentation ▪ Earth moving activities - increased potential for localised soil erosion ***(Low negative)*** ▪ Placement of spoil material in dam – increased turbidity ***(Very Low negative)***	Flora and Fauna Disturbance to avifauna ***(Low negative*).** Loss of indigenous vegetation ***(Low negative*).**
Hazardous Substances and Waste Management Potential spillage leading to soil, surface and groundwater contamination and secondary impacts on downstream water quality ***(Very Low negative*)**	Disruption to Water Quantity and Flow ▪ Impacts on the movement and spawning of aquatic species ***(Low negative*)** ▪ Maintenance of Mkomazi River Substrate **(*Moderate positive*).**
Stability Risks Stability risks and potential collapse of infrastructure ***(Low negative*)**	Wetland Direct Loss and Loss of Functionality ▪ Direct loss of portions of valley bottom wetlands due to road construction **(High negative)** ▪ Sedimentation of wetlands and reduced functionality **(Low negative)** ▪ Direct loss of floodplain wetland and services due to dam increased inundation **(High negative)**
Fauna and Flora Removal of vegetation during ground clearing and excavation - loss of natural habitats for fauna and flora ***(Very Low negative*)**	
Wetlands **Construction of Class A Road:** ▪ Increased sedimentation and loss of functionality **(Moderate negative)** ▪ Potential spillages – reduced water quality **(Low negative)** ▪ Damage by workforce and alien species colonisation – reduced functionality **(Low negative)**	

Conclusion

Potential impacts associated with the proposed project have been assessed and the significance of these evaluated with consideration of proposed mitigation measures (i.e. post-mitigation):

- Construction Phase Impacts: The majority of the potential impacts which are negative in nature (social, physical and biotic) are expected to be of **low and very low significance post-mitigation**. The potential loss of wetland functionality as a result of increased sedimentation from the Class A road construction is deemed to be a negative impact of **moderate significance** post mitigation.
- Operational Phase Impacts: The majority of the potential impacts which are negative in nature (social, physical and biotic) are expected to be of **low significance post-mitigation**. Potential negative impacts associated with the loss of channelled valley bottom wetlands (due to road construction) and floodplain wetlands (due increased dam inundation) are deemed to be of **high significance** post-mitigation. Although the probability or extent of this impact cannot be reduced with mitigation measures this impact will be required to be offset through the rehabilitation or conservation of wetland systems elsewhere within the catchment. Appropriate offset requirements will need to be recommended by the Department of Water and sanitation (DWS) based on the area of loss (~33ha) and functionality of wetlands. A number of **positive impacts** of have been identified – these range from low to high significance. Potential positive impacts of **low significance** include: increased water availability to downstream users; and improved dam access and haulage routes. Potential positive impacts of **moderate significance** include: reduced flood risk downstream of Comrie Dam; increase in recharge of underlying aquifer system; and maintenance of Mkomazi River Substrate. Water availability at the Sappi Saiccor Mill and to surrounding communities is identified as a potential positive impact of **high significance**.
- No-Go Alternative: Potential negative impacts of the continued status quo were assessed to have **low to medium significance**. Water shortage at the Sappi Saiccor Mill leading to a loss of employment opportunities and broader socio-economic benefits (GDP) is deemed to be an impact of **high significance**. A shortage in water availability for communities within Ingwe Municipality is deemed to be an impact of **moderate significance**.

An Environmental Management Programme (EMPr) **(Appendix F)** has been developed which contains all mitigation and management measures required to ensure that the project would be undertaken without significant environmental impact.

The information contained in the report is considered sufficient for the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) to reach a decision on granting environmental authorisation and conditions of the decision.

Table of Contents

Abbreviation/Acronym	Description
BA	Basic Assessment
BAR	Basic Assessment Report
BWS	Bulk Water Scheme
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EWR	Ecological Water Requirements
FPA	Fire Protection Agency
GA	General Authorisation
GDP	Gross Domestic Product
HIA	Heritage Impact Assessment
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Waste and Water Management Plan
KZN	KwaZulu-Natal
WULA	Water Use Licence Application
NEMA	National Environmental Management Act (107 of 1998)
NWA	National Water Act (36 of 1998)
RDM	Resource Directed Measures
SAHRIS	South African Heritage Resources Information System
SANS	South African National Standards
SAPPI	Sappi Southern Africa Limited
SWMP	Storm Water Management plan
WARMS	Water Authorisation Registration and Management System
WMA	Water Management Area
WSP	WSP Environmental (Pty) Ltd

edtea

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

(For official use only)

EIA File Reference Number:	DC/43/0009/2015
NEAS Reference Number:	KZN/EIA/0000078/2015
Waste Management Licence Number: (if applicable)	N/A
Date Received:	

BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- Environmental Authorization subject to basic assessment for an activity that is listed in Listing Notices 1or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- Waste Management Licence for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This basic assessment report meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Economic Development, Tourism & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a cross in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
9. The KZN Department of Economic Development, Tourism & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.
10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.

11. Please note that this report must be handed in or posted to the District Office of the KZN Department of Economic Development, Tourism & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).

DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	DC/43/0009/2015
File reference number (Waste Management Licence):	N/A

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:	Carla Elliott		
Business name of EAP:	WSP Environmental (Pty) Ltd		
Physical address:	Block A, 1 on Langford, Langford Road, Westville		
Postal address:	PO Box 1442, Westville		
Postal code:	3629	Cell:	
Telephone:	031 240 8860	Fax:	031 240 8861
E-mail:	Carla.elliott@wspgroup.co.za		

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	**Education qualifications**	**Professional affiliations**	**Experience at environmental assessments (yrs)**
Carla Elliott	Masters Environmental Management, University of KwaZulu-Natal	EAPSA	9 Years
Bathabile Msomi	Hons Geography and Environmental Management	IAIAsa	2.5 years

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

Name of Specialist	Education qualifications	**Professional affiliations**	**Experience at environmental assessments (yrs)**	**Title of Specialist Report**
Greg Matthews	Bachelor of Science (Honours) in	South African Council for	15 Years	Comrie Dam Hydrological

	Hydrology, University of Natal, Pietermaritzburg	Scientific Professions – Professional Natural Scientist (Environmental Scientist and Hydrological Scientist)		Impact Assessment
Andrew Pickles	Bachelor of Science, Honours (Hydrology), University of KwaZulu Natal, Pietermaritzburg	-	2 Years	Comrie Dam Hydrological Impact Assessment
Jake Alletson	Bachelor of Science, Biological Sciences, University of Natal, Durban. Bachelor of Science Honours (Zoology), Rhodes University	IAIASA	40 Years	Study on Indigenous Vegetation in the Vicinity the Dam on the Sappi Comrie Plantation
Len Van Schalkwyk	MA (Archaeology)	ASAPA	15 Years	Heritage Impact Assessment (HIA)

SECTION B: ACTIVITY INFORMATION

1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

Proposed Comrie Dam Expansion

2. PROJECT DESCRIPTION

Provide a detailed description of the project:

Terms of Reference

Sappi Southern Africa Ltd (Sappi) proposes to expand Comrie Dam by raising the dam wall height by a total of 4m. WSP Environmental (Pty) Ltd (WSP) has been appointed by Sappi to undertake the function of independent Environmental Assessment Practitioner (EAP) to facilitate the Basic assessment (BA) process in accordance with the Environmental Impact Assessment (EIA) Regulations, 2014.

Background

Comrie Dam is controlled and owned by Sappi and was constructed in 1978 to augment the uMkomazi River which supplies water to the Sappi Saiccor Mill (Mill). The Mill is the world's largest single site that produces specialised chemical cellulose. It is located 50km south of the port of Durban in the province of KwaZulu-Natal and has a capacity of producing 800 000 tons per annum. Chemical cellulose is manufactured from a 100% renewable resource primarily Eucalyptus trees. The very high quality pulp produced is used as a raw material in a wide variety of end products. The main one of these is viscose staple, filament and lyocell fibres. Chemical cellulose is however also used in the manufacture of cellophane; acetate flake; nitrocellulose, micro-crystalline cellulose, cellulose sponge, sausage casings and moulding powders.

Sappi proposes to increase the capacity of the dam to ensure water security during dry season for their production processes at the Mill. Whilst the Comrie Dam's primary function is to supply water to the Saiccor Mill, it has a number of secondary functions. Comrie Dam provides a source of water during firefighting operations. During emergencies, it is open for use by surrounding land users and any Fire Protection Agency (FPA). In addition, Sappi has an existing water services agreement with Sisonke District Municipality for future abstraction of 3600m^2 of water per day from the dam (once they have all environmental licences in place). The Sisonke District Municipality is a designated Water Services Authority in terms of the Municipal Structures Act

(Act No. 117 of 1998) for this region.

Locality and Study Area

Comrie Dam is located on Sappi owned land approximately 7km north east of Donnybrook on the Ngudwini River, in the Ingwe Local Municipality, KwaZulu-Natal (**Figure 1; Appendix A3 - Hydrology Map and Appendix A4 – Property Descriptions Map**). Ingwe Local Municipality is located within the Mvoti-UMzimkhulu Water Management Area (WMA). The site has the following co-ordinates: Latitude 29°52'17.98"S and Longitude 29°55'27.09"E. The site is zoned agricultural and the natural vegetation falls within the Temperate and Transitional Forest and Scrub. The Ngudwini River catchment is largely influenced by Sappi forestry agricultural activities. Surrounding land use is predominantly timber plantations and the Mingay private farm situated to the north and north east of the site (**Appendix A2 – Topographical Map**).

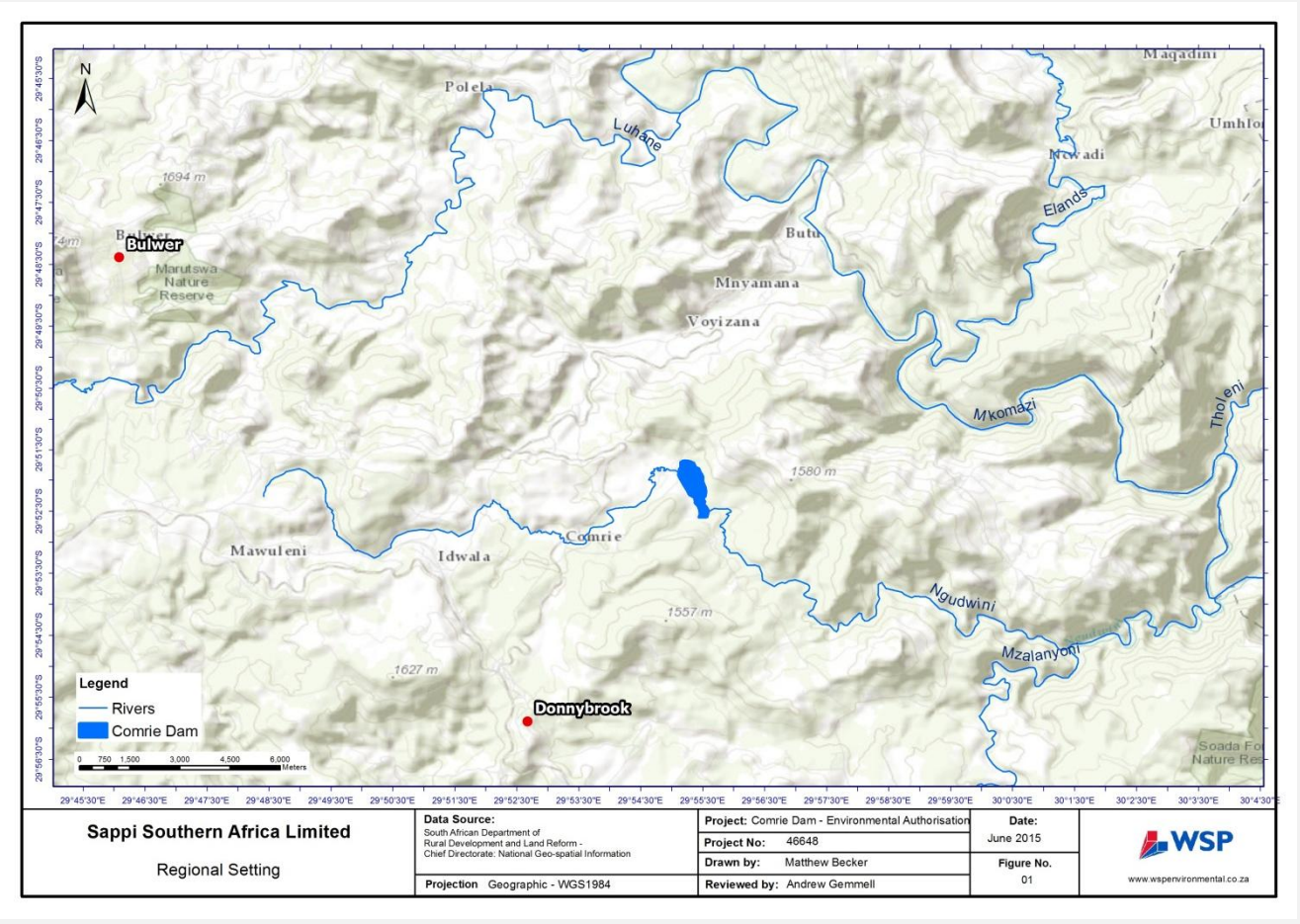

Figure 1 Site Locality Map

Project Description

The current dam full supply capacity is 1 920 000m^3 and the associated surface area is 71 ha. Sappi proposes to raise the dam wall height by a total of 4m to increase the storage capacity. The expansion of the dam will result in the inundation of an additional area of approximately 79.2 hectares in extent, including both the banks and the headwater area. This will result in a proposed total area of inundation of 150.2 ha and a total dam capacity of 6 500 000m^3. Floodplain and wetland vegetation established in the headwater area of the dam will become inundated **(Figure 2)**. A Hydrological Impact Assessment has been conducted by WSP to identify the potential impacts on the hydrological environment by the raising of the dam wall **(Appendix D1).** This study was conducted to also support a Water Use Licence Application (WULA) required for the proposed development.

The proposed development also entails the construction of three new roads required to access the dam and associated infrastructure and replace the existing haulage routes as the existing Plantation Road will be inundated.

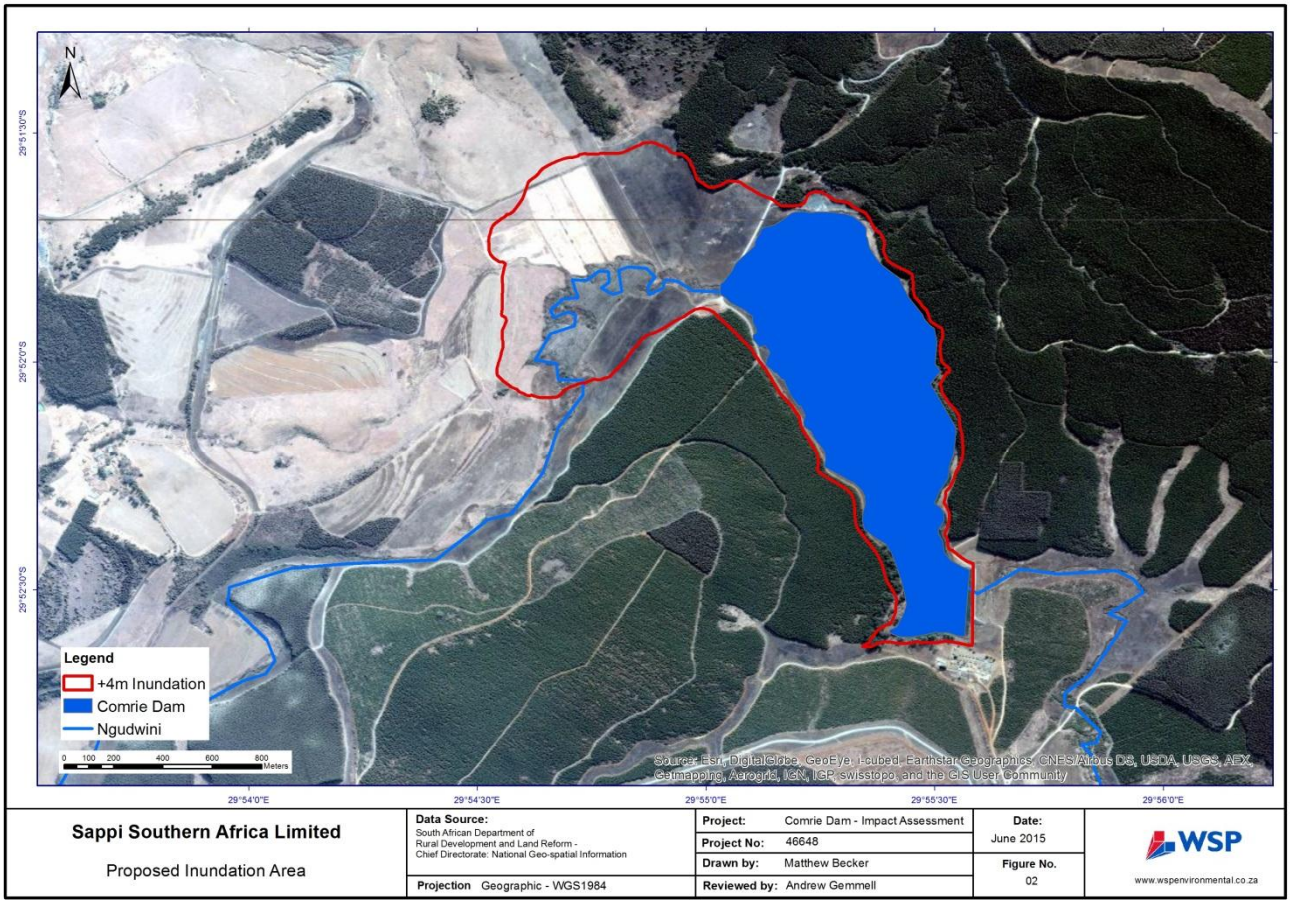

Figure 2 Inundation Area Map

Dam Expansion

- Dam Wall

The proposed expansion will raise the crest of the dam wall to 1217.3m. A new cut-off and chimney filter which is approximately 1/3 of wall height is planned for drainage, tying into a blanket drain and toe drain which will daylight into the river **(Figure 3)**.

- Spillway

The existing side channel spillway will be closed off with the raising and extension of the dam wall. A new 100m wide spillway will be excavated into the right side at a level of 1213.9m **(Figure 3)**. The existing 900mm outlet steel pipe will be extended through raised embankment and used as a perennial flow pipe. The height from the top of inlet box to 900mm outlet pipe is 1213.6m (300mm below spillway). This is designed to absorb minor increased flows, reduce stress on the spillway and to help with erosion control. The trickle flow will have a capacity of about 4m³/s before the spillway starts to work. A sluice valve will be installed at the base of the inlet box (approximately 6.3m below the top of the box) to allow the pipe to be used for large and emergency releases.

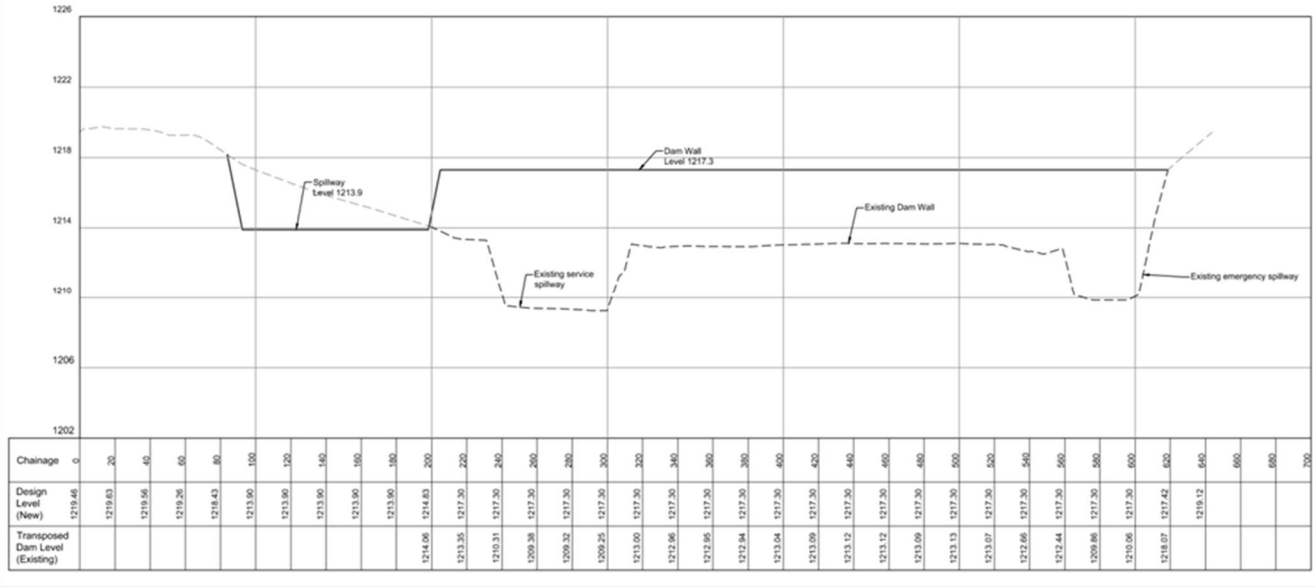

Figure 3 Longitudinal Section of Proposed Dam and Spillway

- Gauging Weir

A gauging weir below the dam wall to be used during discharge periods is proposed. A stream gauge or gauging weir is used by hydrologists or environmental scientists to monitor and test terrestrial bodies of water. Hydrometric measurements of water level surface elevation ("stage") and/or volumetric discharge (flow) are generally taken and observations of biota and water quality may also be made.

The type of weir proposed for Comrie Dam is a stepped sharp crested weir with an approximate footprint area of 65m² (**Figure 4**). The gauging weir will be located approximately 350m from the downstream toe (where the embankment meets the streambed on the downstream side) of the dam wall. The final location of the weir will be confirmed during construction, the position is not expected to move by more than 25m up or down stream of the site indicated in **Appendix C7**.

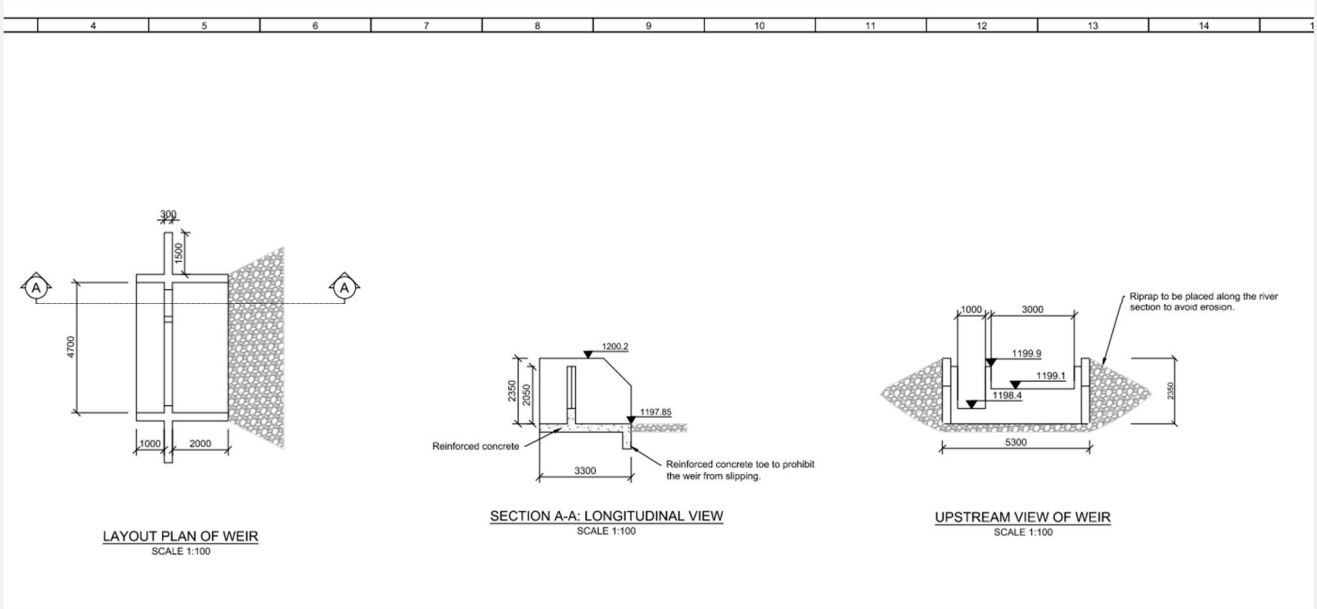

Figure 4 Layout and Longitudinal View of Weir

Construction Methodology

The proposed dam expansion is expected to be completed within a three to four month timeframe. It is planned that bulk earthworks (including excavation) will be undertaken within three months. Minor works such as minor earthworks for shaping and installation of the weir may only be constructed in the fourth month (after the dam

has been completed sufficiently far enough to store water). The weir installation will require excavation and other earthworks which will be localised at the weir site.

Construction activities within the first three months entail the raising of the dam wall (embankment) and expansion of the existing new spillway. Majority of the material required for construction will be obtained from the site (i.e. reuse of insitu material) – primarily from the existing spillway location.

The dam solum, spillway, burrow areas and topsoil will be cleared and stripped. Trenches will be excavated and dewatered for the extension of the outlet pipe. Outlet pipes with concrete encasement will be positioned and fitted as specified with clay rich backfill. Materials will be placed and compacted to embankments with drains and filters as specified by approved designs. Spillways, earth channels and completed embankments will be trimmed to line and levelled. Concrete sills will be placed in the spillway to assist with erosion control. Rehabilitation of the exposed topsoil with runner grass will be established to prevent topsoil loss.

Heavy machinery expected to be used on site is outlined in **Table 1**:

Table 1 Site Machinery During Construction

Dam Wall	Roads
■ Excavator x 1	■ Excavator 25 ton x 1
■ Compact Roller x 1	■ Compact Roller x 1
■ Water Bowser x 1	■ Water Bowsers x 2
■ Bulldozer x 1	■ Grader x 1
■ Dump Trucks x 3	■ $10m^3$ Tippers x 6
■ Front End Loaders x 2	■ Tractor-Loader-Backhoe (TLB) x 1

- Construction Material

The geotechnical assessment indicates that the proposed spillway alignments are underlain by dolerite bedrock **(Appendix G1).** The weathered dolerite excavated from the spillway will be used for the construction of the dam wall. Should there be a shortfall; clayey material will be obtained from the right flank upstream of the wall in the position of the current "picnic site". It is however unlikely that it will be necessary to source material from the picnic site as an excess of cut from the spillway is expected. Material will only be excavated from the picnic site if the material from the spillway is unsuitable for any reason (e.g. too much plant matter). Approximately 150 000m³ of cut is expected from the spillway and approximately 115 000m³ of fill is expected to be needed for the dam wall / embankment, wing walls on the spillway, and use as shaping and levelling of the work sites. Other, gravelly, material will be obtained from the existing quarry on the left bank upstream of the wall **(Appendix A1- Site Plan)**. Filter material will be imported to the construction site from a dolerite quarry in Ixopo or river sand obtained from Ixopo.

- Dewatering

Dewatering is expected to be required in the cut-off trench excavation, and in the stream bed for the placement of earthworks in the widening of the dam footprint and extensions of the outlet pipe. Seepage of groundwater is not expected to be significant; it is therefore anticipated that the quantum of dewatering will be less than 50m³/day.

Proposed New Roads

The existing Plantation Road will be inundated with the expansion of the Comrie Dam. Three new roads will be developed to enable access and to accommodate the Sappi forestry activities. These comprise the following (**Figure 5**):

- **Class A** (New Road) - This road will accommodate long haul vehicles and will be approximately 4.5km long. The road will be 8m in width with 6m gravel wearing course and a full complement of drainage. The road will fall within Sappi and in the proposed subdivision on Clive Mingay's farm.
- **Class B** (Existing road that need to be re-routed) - This road is 1.5km in length and designed to accommodate short haul vehicles, firefighting purposes and access. The road will be 7m in width with 6m gravel wearing course. It will have no drainage and the road is mono-cambered. The entire road will fall within Sappi property.

- **Class C** (Existing road that needs to be re-routed) - This road is designed to accommodate short haul vehicles, firefighting and access to the dam. It is 1.5km in length and 6m in width. There is no wearing course, no drainage and the road is mono-cambered. The entire road will fall within Sappi property.

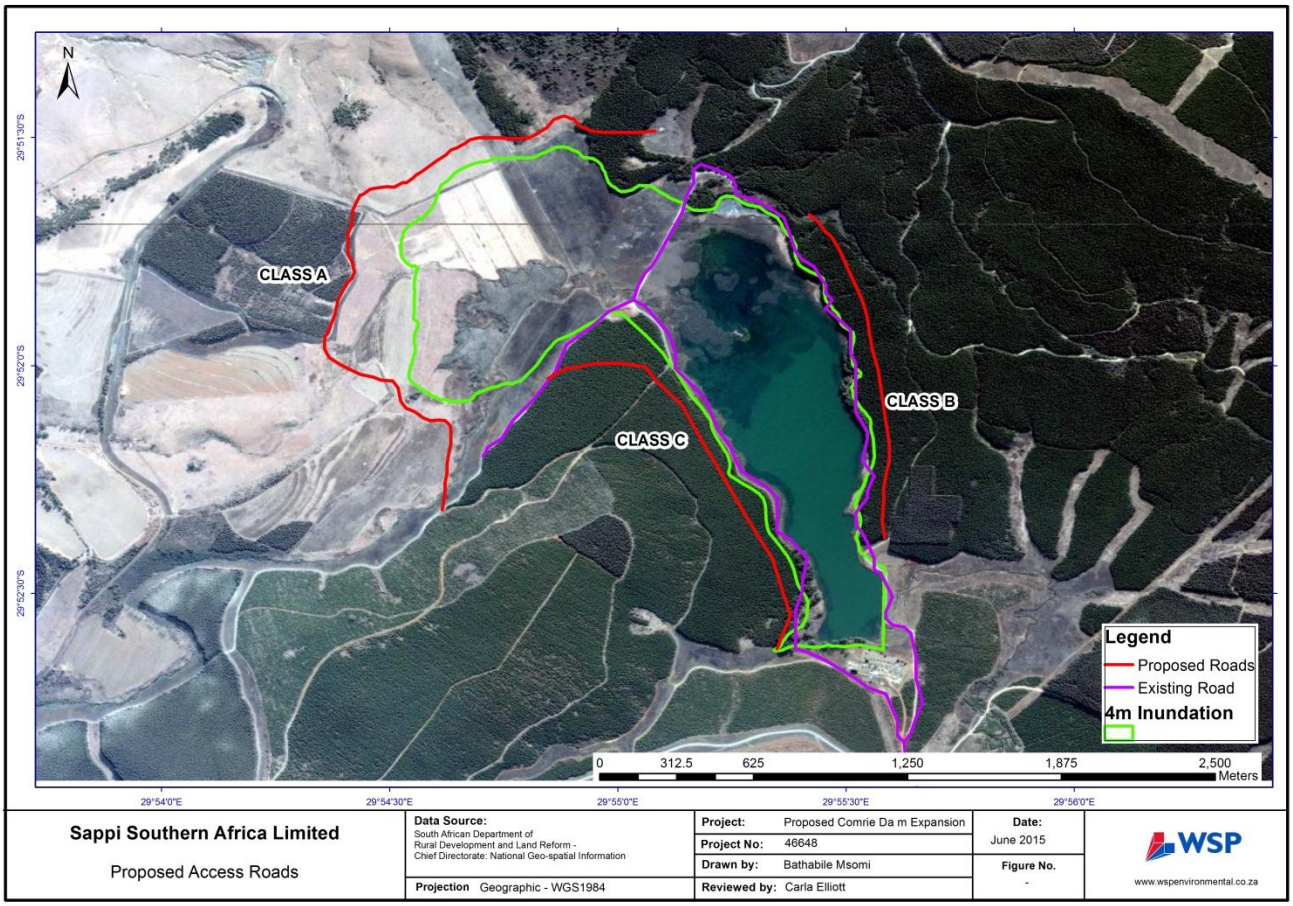

Figure 5 Proposed Routing of New Access / Haul Roads

3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GN R 544, 18 June2010), Listing Notice 3 (GNR 546, 18June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

Activity Number	Description of Listed Activity	Project Relevance
Listing Notice 1 (12), 2014	The development of – (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs – (c) if no development setback exists, within 32 metres of a water-course, measured from the edge of a watercourse. excluding – (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads or road reserves.	The proposed roads will have a footprint in excess of 100m^2 with majority of alignment located within 32 meters of a watercourse (wetland). Comrie Dam is not located within an urban area and the proposed road route does not follow an existing road or road reserve for the entire planned length, as such exclusions do not apply.
Listing Notice 1 (19),	The infilling or depositing of any material	"Watercourse" is defined by NEMA as "a

2014	of more than 5 cubic metres into, or dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 5 cubic metres from – (i) A watercourse	wetland, pan, lake or dam into which, or from which water flows". To increase the dam wall height, material in excess of $5m^3$ will be excavated from the spillway and used to construct the dam wall within Comrie Dam.
Listing Notice 1 (24), 2014	The development of – (ii) A road with a reserve wider than 13.5 metres, or where no reserve exists, where the road is wider than 8 metres; but excluding – (ii) Roads where the entire road falls within an urban area.	The proposed Class A road will have a minimum width of 8m. Comrie Dam is not located within an urban area.
Listing Notice 1 (27), 2014	The clearance of vegetation of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The raising of the dam wall will result in the inundation of surrounding land and vegetation with a potential loss of more than 1 hectare of indigenous vegetation. The Vegetation Study (**Appendix D3**) confirms that the proposed raising of the dam wall will inundate more than 1 ha of semi-natural vegetation.
Listing Notice 1 (48), 2014	The expansion of – (iv) dams, where the dam, including infrastructure and water surface area, is expanded by 100 square metres or more in size Where such an expansion or expansion and related operation occurs (a) within a watercourse.	The expansion of Comrie Dam will result in a potential additional area of inundation of ~79.2 hectares.
Listing Notice 1 (49), 2014	The expansion of – (i) slipways by more than 100 square metres; and (ii) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion or expansion and related operations occurs - (d) within a watercourse; or (c) if no development setback exists, within 32 metres of a water-course, measured from the edge of a watercourse.	The dam wall located within the Ngudwini River as well as the planned alteration to the existing slipway will result in an increased footprint in excess of $100m^2$.
Listing Notice 1 (66), 2014	The expansion of a dam where – (i) the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, was originally 5 metres or higher or where the height of the wall is in-creased by 2.5 metres or more; or (ii) where the high-water mark of the dam will be increased with 10 hec-tares or more.	It is proposed to raise the existing dam wall (of 12m) by 4m in height. The exceedance of the existing high water mark will exceed 10 hectares.

4. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;

(b) the type of activity to be undertaken;

(c) the design or layout of the activity;

(d) the technology to be used in the activity;

(e) the operational aspects of the activity; and

(f) the option of not implementing the activity.

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Sappi has previously considered other alternatives other than the proposed Comrie Dam expansion to improve water security to support its operations. These include a combination of site and technology alternatives, design and layout alternatives and the no-go alternative.

Site and Technology Alternatives

Site and technology alternatives identified at the project outset are outlined in Table 2. Table 2 Site and Technology Alternatives

Option	Factors of unfeasibility
Comrie Dam (Preferred Alternative)	Environmental authorisation (EA) is being applied for the Comrie Dam site as it is considered most feasible. Comrie Dam is an existing dam and which will be expanded to meet the water requirements at the Saiccor Mill during dry periods.
In-river temporary storage structure (Goodenough's weir) within Umkomaas River	This activity was not supported by the Department of Economic Development, Tourism and Environmental Affairs (EDTEA) and Department of Water and Sanitation (DWS).
Off-river storage at Ngwadini River	This option was designed and land lease obtained but the capex required by Sappi was excessive and not financially feasible. The detailed design and concept has been shared with Umgeni Water for their future plans.
Bulk Water Scheme (BWS) from eThekwini Municipality	This option is not favoured by Sappi as Sappi would be limited to the amount of available water accessed as communities would have first preference to water availability. The alternative could result in continued backlog for Sappi and is not financially viable.

None of the alternatives considered were found to be feasible due to reasons outlined below. They are therefore not considered further in the draft Basic Assessment Report (BAR).

Comrie Dam – Design Alternatives

Sappi has considered raising the Comrie Dam wall by varying heights of 1m, 2m, 3m and 4m as design alternatives. Varying wall heights would result in varying areas of inundation as depicted in **Figure 6**. Raising the wall by 4m was determined to be the most feasible option. Less than 4m would result in inadequate additional water storage to justify the project spend. The Geotechnical Assessment **(Appendix G1)** also found that the downstream factor of safety improves with the raised height due to the progressively wider dry shell effected by the chimney filter and toe drainage which will be incorporated into the raising. Raising of the dam without such drainage would produce unacceptably low factors of safety. In addition, an increased dam wall height would result in more than 79.2ha of additional inundation potentially affecting more private properties

and resulting in a loss of plantation land.

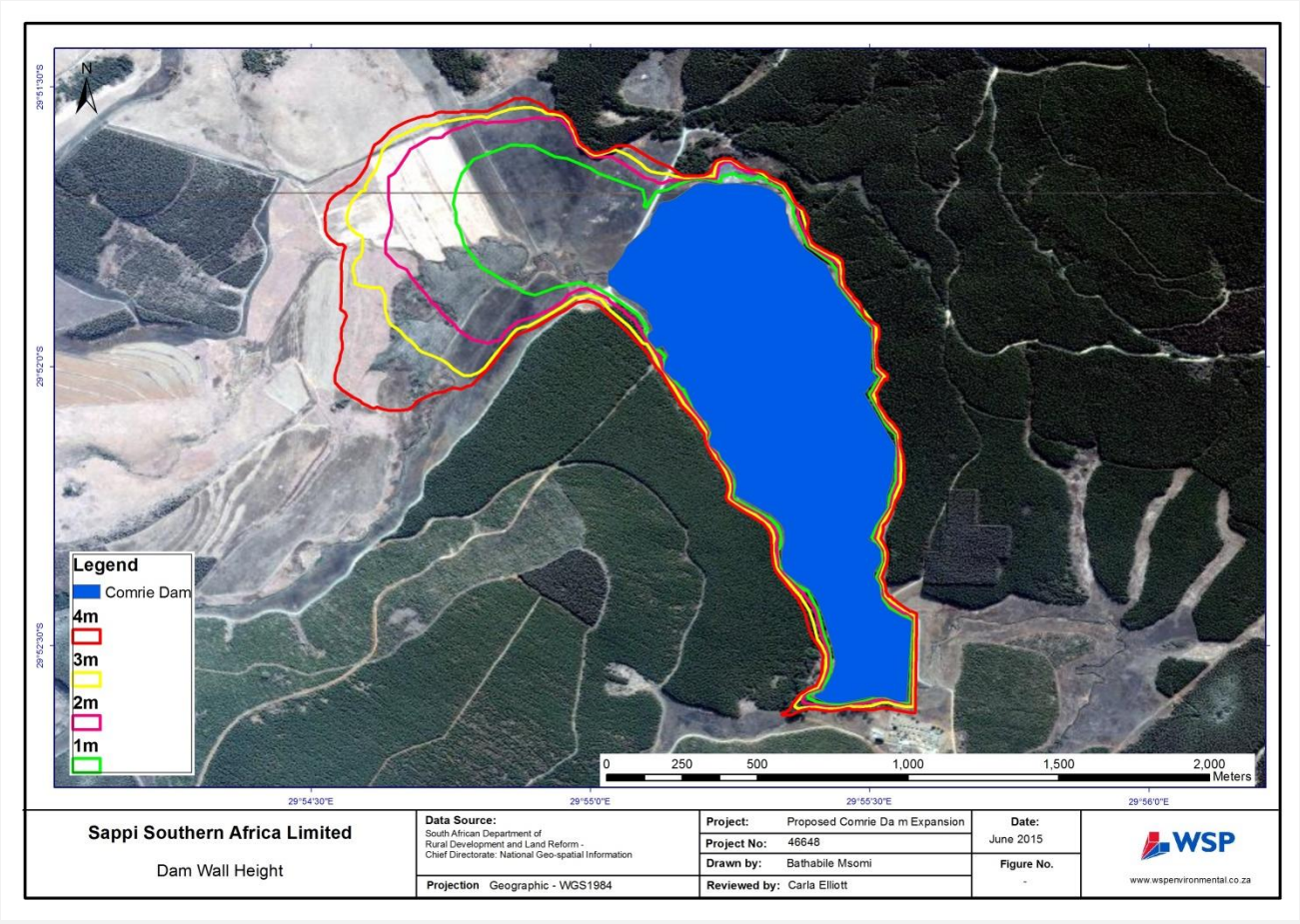

Figure 6 Dam wall height and resultant inundation

No-go Alternative

The no- go alternative will result in the continued operation as status quo. The motivation for this project is based on long term water security for the Mill. The Mill requires an emergency supply during dry periods. A water shortage without the dam expansion being implemented will result in the Mill restricting operations and taking commercial downtime. This will result in affecting the following socio-economic factors:

- The Mill contributes approximately R4.7 billion to the KZN economy with almost 99% of its product being exported. Two billion Rands is spent on raw materials, of which just under R1 billion is from sourcing timber locally - the balance of which is chemicals and packaging.
- Sappi also supports Eskom and local mines by spending approximately R425 million per annum on electricity and coal.
- Sappi Saiccor employs approximately 1200 permanent staff and majority of the employees are from the local areas surrounding uMkomazi. On an annual basis, Saiccor interacts with +/-10 000 indirect contractors, service suppliers, and hauliers.

To increase the height of the Comrie dam wall by 4m is the most feasible option. This will ensure water security for Sappi Saiccor's production processes, as well as local communities in the Ingwe Local Municipality.

Sections B 5 – 15 below should be completed for each alternative.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1[1] (preferred or only site alternative)	29° 52' 17.98"S	29° 55' 27.09"E

In the case of linear activities:

Alternative:	Latitude (S):	Longitude (E):
Class A Road		
• Starting point of the activity	29°52'18.71"S	29°54'36.29"E
• 500m point of the activity	29°52'6.43"S	29°54'32.38"E
• 1000m point of the activity	29°51'55.80"S	29°54'21.39"E
• 1500m point of the activity	29°51'40.71"S	29°54'24.68"E
• 2000m point of the activity	29°51'30.84"S	29°54'37.84"E
• 2500m point of the activity	29°51'28.19"S	29°54'55.36"E
• 3000m point of the activity	29°51'30.50"S	29°55'4.35"E
Class B Road		
• Starting point of the activity	29° 52‘ 22.84" S	29° 55‘ 35.99" E
• Middle point of the activity	29° 55‘ 33.74" S	29° 55‘ 33.74" E
• End point of the activity	29° 51‘ 40.49" S	29° 55‘ 23.59" E
Class C Road		
• Starting point of the activity	29° 52‘ 39.62" S	29° 55‘ 18.48" E
• Middle point of the activity	29 ° 52‘ 15.74“S	29° 55’ 13.63" E
• End point of the activity	29 ° 51‘ 59.32“S	29° 54’ 52.66" E

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment. See above 9 points of Class A Road (4.5km in length)

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	Size of the activity:
Alternative A1[2] (preferred activity alternative)	
■ Additional inundation of land	792 000 m^2
■ Expansion of Spillway	80 000 m^2
■ Expansion of Dam Wall	15 000 m^2
■ Gauging Weir	65 m^2
■ Class A Road	36 000 m^2
■ Class B Road	10 500 m^2
■ Class C Road	9 000 m^2
Alternative A2 (if any)	m2
Alternative A3 (if any)	m^2

or, for linear activities:

Alternative:	Length of the activity:
Alternative A1 (preferred activity alternative)	m
Alternative A2 (if any)	m
Alternative A3 (if any)	m

[1] “Alternative S..” refer to site alternatives.

[2] “Alternative A..” refer to activity, process, technology or other alternatives.

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1 (preferred activity alternative)	m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2

7. SITE ACCESS

Does ready access to the site exist? Yes but the existing Plantation / Haul road will become inundated	**YES X**	~~NO~~
If NO, what is the distance over which a new access road will be built	~7.5km	

See description of proposed access roads and Figure 5 in Section 2: Project Description

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

8. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

8.1. the scale of the plan which must be at least a scale of 1:500;
8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;
8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
8.4. the exact position of each element of the application as well as any other structures on the site;
8.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, bore-holes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
8.6. walls and fencing including details of the height and construction material;
8.7. servitudes indicating the purpose of the servitude;
8.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- rivers, streams, drainage lines or wetlands;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);

8.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
8.10. the positions from where photographs of the site were taken.

9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as Appendix C. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1. Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R1million	
What is the expected yearly income that will be generated by or as a result of the activity?	N/A.	
Will the activity contribute to service infrastructure?	~~YES~~	**NO X**

Is the activity a public amenity?	~~YES~~	**NO X**
How many new employment opportunities will be created in the development phase of the activity?	1 skilled contractor supported by 10 - 15 semi-skilled workers	
What is the expected value of the employment opportunities during the development phase?	R100 000	
What percentage of this will accrue to previously disadvantaged individuals?	80%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	The work would be of an ad hoc nature. Estimate: 5 persons working for 1 week every 2 months – R60k/year	
What is the expected current value of the employment opportunities during the first 10 years?	R500k	
What percentage of this will accrue to previously disadvantaged individuals?	80%	

11.2. Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

South Africa is facing water shortages after the worst drought since 1992 cut dam levels by 12% from a year earlier as most of the country enters its four-month dry season. The country's dams are currently 79% full, down from 90% a year earlier (DWS, May 2015).

The primary motivation for the Comrie Dam expansion is based on long term water security for the Sappi Saiccor Mill. A water shortage without the dam expansion being implemented will result in the Mill restricting operations and taking commercial downtime. This will result in affecting the following socio-economic factors:

- The Mill contributes approximately R4.7 billion to the KZN economy with almost 99% of its product being exported. Two billion Rands is spent on raw materials, of which just under R1 billion is from sourcing timber locally - the balance of which is chemicals and packaging.
- Sappi also supports Eskom and local mines by spending approximately R425 million per annum on electricity and coal.
- Sappi Saiccor employs approximately 1200 permanent staff and majority of the employees are from the local areas surrounding uMkomazi. On an annual basis, Saiccor interacts with +/-10 000 indirect contractors, service suppliers, and hauliers.

Therefore the need and desirability of the proposed expansion is from a development and economic growth perspective. The proposed expansion of Comrie Dam will help secure employment and maintain economic growth.

Other project benefits include:

- Provision of fire-fighting water for Sappi Forests and other surrounding land parcels during an emergency.
- There is a vast need for potable water in the Greater Mbulelweni Corridor in the upper reaches of the Mkomazi River, where there are some 30 000 people requiring water. The Ingwe Local Municipality has a backlog of water services infrastructure. Sappi has an agreement with Harry Gwala District Municipality which will allow the Municipality to abstract water for the provision of water to local communities.

Indicate any benefits that the activity will have for society in general:

The objective of the National Water Act is to provide for the rights of access to basic water supply and basic sanitation by setting national standards and norms. The increase in demand and need for the provision of water and sanitation places a greater burden on water supply infrastructure. By expanding the Comrie Dam, local communities will have improved access to water services. The proposed development will ensure that the Mill is able to prevent job loss for communities in the Umkomaas area, by securing water availability for the Mill

production processes during dry periods.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The Harry Gwala District Municipality as the Water Services Authority is responsible for ensuring consumers within the district have access to water services in accordance with the Constitution of South Africa (1997), the Water Services Act (1997) and the Municipal Structures Act (1998). The Harry Gwala District Municipality have entered into a waters services agreement to abstract water from the dam for supply to local communities. This will enable the district municipality to perform their functions of water service provision. The Municipality is currently applying for a Water Use Licence.

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

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

Title of legislation, policy or guideline:	**Administering authority:**	**Date:**
National Environmental Management Act (No. 107 of 1998)	Department of Environmental Affairs	1998
National Forest Act (Act 84 of 1998)	Department of Environmental Affairs	1998
Hazardous Substances Act (No. 15 of 1973)	Department of Environmental Affairs	1973
National Environmental Management: Air Quality Act (No. 39 of 2004)	Department of Environmental Affairs	2004
National Water Act (No. 36 of 1998)	Department of Water Affairs	1998
National Environmental Management: Waste Act (No. 59 of 2008)	Department of Environmental Affairs	2008
Occupational Health and Safety Act (No. 85 of 1993)	Department of Labour	1993
South African National Standards (SANS): 10103 - The Measurement and Assessment of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication.	South African Bureau of Standards	2003
National Heritage Resources Act (No. 25 of 1999)	South African Heritage Resources Agency	1999
KwaZulu-Natal Heritage Act (No. 4 of 2008)	Amafa KwaZulu-Natal	2008

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

13.1. Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES X**	~~NO~~

If yes, what estimated quantity will be produced per month?

■ Surplus excavated material / spoil from spillway	~11 600m^3
■ General Solid Waste (rubble, cement bags, general domestic waste etc.)	~5-8m^3
■ Hazardous Solid Waste (empty chemical containers, oil rags, spent solvents etc.)	~0.5-1.5m^3

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

- Excavated material from spillway that is not suitable as construction material for dam wall and spillway wing wall will be used to level and landscape the working areas wherever possible. Material removed during earthworks that is not suitable for construction is intended to be spoiled. Spoil material will be placed in the existing spillways (which will become redundant) or in the dam basin and engineered to avoid sedimentation of surface water.
- General domestic waste will be temporarily stored in on-site waste receptacles/ skips and removed by the contractor for disposal at the closest permitted landfill.
- Hazardous waste will be disposed by contractor at closest permitted landfill.

Where will the construction solid waste be disposed of? (provide details of landfill site)

- Excavated Material – on site as described above.
- General Solid Waste - It will be taken to the nearest permitted landfill site.
- Hazardous Waste - Will be collected in a container and returned to the Mill for disposal via Sappi appointed contractor Enviro Serve and disposed of at the Shongweni landfill site.

Will the activity produce solid waste during its operational phase?	~~YES~~	**NO X**

If yes, what estimated quantity will be produced per month? m^3

How will the solid waste be disposed of? (provide details of landfill site)

Not Applicable

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

Not Applicable

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	NO

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Is the activity that is being applied for a solid waste handling or treatment facility?	~~YES~~	**NO X**

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

13.2. Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	~~YES~~	**NO X**

If yes, what estimated quantity will be produced per month? ~~m3~~

Will the activity produce any effluent that will be treated and/or disposed of on-site?	~~YES~~	**NO X**

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	~~YES~~	**NO X**

If yes, provide the particulars of the facility:

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

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

Not Applicable

13.3. Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	**YES X**	~~NO~~
If yes, is it controlled by any legislation of any sphere of government?	~~YES~~	**NO X**

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

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

There is the potential for dust generation during the construction phase. This may result from wind blowing over excavated and exposed areas; and movement of heavy machinery and vehicles on unpaved roads. Dust can be relatively easily prevented through the implementation of air pollution mitigation measures contained in the Environmental Management Programme (EMPr) (**Appendix F**) e.g. wet suppression.

Air Quality guidelines are provided by the ambient dust concentration limits prescribed by SANS 1929:2005. Whilst these guidelines are currently not enforceable they do serve as recommendations for good practice (**Table 4**). SANS 1929:2005 sets out dust deposition rates, expressed in units of mg.m-2.day-1 over a typical 30-day averaging period. Dust deposition is evaluated against the four-band evaluation criteria as below.

Table 3 Air Quality Guidelines for Dust Generation

Band Description Label	Dust Fallout Rate, D (mg.m^{-2}.day^{-1})	Comment
Residential	D < 600	Permissible for residential and light commercial
Industrial	600 < D < 1 200	Permissible for heavy commercial and industrial
Action	1 200< D < 2 400	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year
Alert	2 400 < D	Immediate action and remediation required following the first incidence of dust fall rate being exceeded. Incident report to be submitted to relevant authority

13.4. Generation of noise

Will the activity generate noise?	**YES X** / ~~NO~~
If yes, is it controlled by any legislation of any sphere of government?	~~YES~~ / **NO X**

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

If no, describe the noise in terms of type and level:

The activity is most likely to produce noise during the construction process as a result of general construction and excavation activities. Acceptable levels are prescribed by SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication). It is the most relevant code of practice for environmental noise impact assessment in South Africa. The rating levels for rural areas are applicable to the project. Typical rating levels for noise in different types of districts are presented in **Table 5** below. These values should be viewed as guidelines of typical noise levels that should not be exceeded outdoors in the various district levels. Guidelines highlighted in red are applicable to the noise assessment undertaken for proposed project. Noise levels within a one kilometre radius of Comrie are assessed against the Suburban (B) Rating Level.

Table 4 Typical rating levels for noise in districts (adapted from SANS 10103:2008)

Type of District	**12. Equivalent Continuous Rating Level for Noise ($L_{Req,T}$) (dBA)**		
	13. Outdoors		
	Day-Night ($L_{R,dn}$)	**Daytime ($L_{req,d}$)**	**Night-time ($L_{req,n}$)**
a) Rural	45	45	35
b) Suburban (with little road traffic)	50	50	40
c) Urban	55	55	45
d) Urban (with one or more of the following: workshops; business premises; and main roads)	60	60	50
e) Central Business Districts	65	65	55
f) Industrial District	70	70	60

Table 2: Categories of community/ group response (adapted from SANS 10103:2008)

• **Excess** ($\Delta L_{Req,T}$)[a] dBA	• **Estimated Community Group Response**	
	Category	**Description**
0 – 10	Little	Sporadic Complaints
5 – 15	Medium	Widespread Complaints
10 – 20	Strong	Threats of community or group action
>15	Very Strong	Vigorous community or group action

Noise generated during the construction phase will unlikely result in community complaints due to the surrounding land use being agriculture. The closest receptors are located in the "Contractors "Village" located adjacent Comrie Dam's south bank (~160m away). Contractors work off site during the day and construction will not take place at night when the Village is occupied, hence minimal disturbance is anticipated.

14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

~~Municipal~~	~~water board~~	~~groundwater~~	**river, stream, dam or lake X**	~~other~~	~~the activity will not use water~~

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	**30 000m^3**

Does the activity require a water use permit from the Department of Water Affairs?	**YES X**	~~NO~~

The construction methodology at the dam involves the dewatering of groundwater and use of dam water to supply construction activities. In terms of the National Water Act (Act No. 36 of 1998) the following activities require a General Authorisation (GA).

- *Section 21 Activity J*: Dewatering is expected to be required in the cut-off trench excavation, and in the stream bed for the placement of earthworks in the widening of the dam footprint and extensions of the outlet pipe. Seepage of groundwater is not expected to be significant; it is therefore anticipated that the quantum of dewatering will be less than 50m³/day.
- *Section 21 Activity A*: The maximum amount of water allowed to be abstracted is 80 000m^3 / annum at a maximum rate of 16 litres per second. The major water use during construction will be for approximately three months and approximately 30 000m^3 of water will be abstracted from Comrie Dam. Thereafter, water will be accessed from Comrie Dam for minor items such as watering of grass to ensure germination during rehabilitation.

Other Section 21 activities will be applied for and discussed in detail within the Integrated Waste and Water Management Plan (IWWMP) to be submitted to the Department of Water and Sanitation (DWS) as part of the Integrated Water Use Licence Application (IWULA) – these include:

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

If YES, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this report.

15. ENERGY EFFICIENCY

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

There is no significant scope for energy efficiency measures as the project is an expansion of a dam.

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

Not applicable

SECTION C: SITE/ AREA/ PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):

- Subsections 1 - 6 below must be completed for each alternative.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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

Alternative S2 (if any):

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

Alternative S3 (if any):

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

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site (Please cross the appropriate box).

Alternative S1 (preferred site):

~~Ridgeline~~	~~Plateau~~	~~Side slope of hill/mountain~~	~~Closed valley~~	**Open valley X**	**Plain X**	~~Undulating plain/low hills~~	~~Dune~~	~~Sea-front~~

Alternative S2 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front

Alternative S3 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Has a specialist been consulted for the completion of this section?

YES X	~~NO~~

If YES, please complete the following:

Name of the specialist:	Michael Cooper at Drennan and Maud (Pty) Ltd		
Qualification(s) of the specialist:	Pr. Sci. Nat. (Bsc Honours)		
Postal address:	PO Box 30464 Mayville		
Postal code:	4058		
Telephone:	031 201 8992	Cell:	072 699 6943
E-mail:	michael@drennanmaud.com	Fax:	031 201 7920

Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	**YES X**	~~NO~~	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	**NO X**	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	**YES X**	~~NO~~	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	~~YES~~	**NO X**	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	~~YES~~	**NO X**	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	**YES X**	~~NO~~	YES	NO	YES	NO
Any other unstable soil or geological feature	~~YES~~	**NO X**	YES	NO	YES	NO
An area sensitive to erosion	**YES X**	~~NO~~	YES	NO	YES	NO

The area underlying the existing embankment dam and spillways appears to comprise in its entirety, dolerite bedrock (Jurassic age) and the associated clayey, silty subsoils deriving from the in-situ weathering thereof, as well as the similarly clayey and silty colluvial mantle. The log-haul road (existing Plantation Road), has a wearing course of shale rock material derived from the local borrow pit. **(Appendix G1: Geotechnical Assessment Comrie Dam).**

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Has a specialist been consulted for the completion of this section?	**YES X**	~~NO~~

If YES, please complete the following:

Name of the specialist:	Jake Alletson		
Qualification(s) of the specialist:	■ Bachelor of Science, Biological Sciences, University of Natal, Durban. ■ Bachelor of Science Honours (Zoology), Rhodes University		
Postal address:	PO box 1129 Hilton		
Postal code:	3245		
Telephone:	033 343 6700	Cell:	083 787 1584
E-mail:	AlletsonJ@jgi.co.za	Fax:	033 343 6701

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?	~~YES~~	**NO X**

If YES, specify and explain:

The primary focus of the vegetation assessment was the woody vegetation found on the proposed site / anticipated area of inundation. The study revealed that the woody trees mainly consisted of alien poplar species which would be harvested as a routine silvicultural activity. Indigenous grassy vegetation was identified between the road and the water's edge. The grassy vegetation will be inundated with the proposed dam expansion resulting in a loss of terrestrial vegetation. The trees are of very common species which are not protected in terms of the National Forests Act (Act 84 of 1998) and are not included in the lists of Critically Endangered, Endangered, Vulnerable and protected Species (TOPS list) under the National Environmental Management: Biodiversity Act (Act 10 of 2004). Therefore no permitting is required for loss of vegetation / tree species **(Appendix D3: Study on the Indigenous Vegetation in the Vicinity of Sappi Comrie Dam).**

Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	~~YES~~	**NO X**
If YES, specify and explain:		
Are any further specialist studies recommended by the specialist?	YES	**NO X**
If YES, specify:		
If YES, is such a report(s) attached in Appendix D?	YES	NO

Signature of specialist: _____ Date: _____

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

~~Natural veld - good condition~~[E]	**Natural veld with scattered aliens**[E]	~~Natural veld with heavy alien~~	~~Veld dominated by alien species~~[E]	~~Gardens~~

		~~infestation~~E		
~~Sport field~~	**Cultivated land X**	~~Paved surface~~	**Building or other structure X**	~~Bare soil~~

If any of the boxes marked with an "E "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Land use character			Description
Natural area	**YES X**	~~NO~~	Small patches of natural / indigenous vegetation exist between plantations and cultivated land.
Low density residential	**YES X**	~~NO~~	A "Contractor's Village" is located ~160m from the south bank of the dam.
Medium density residential	~~YES~~	**NO X**	
High density residential	~~YES~~	**NO X**	
Informal residential	~~YES~~	**NO X**	
Retail commercial & warehousing	~~YES~~	**NO X**	
Light industrial	**YES X**	~~NO~~	Contractor's workshop facility is situated 720m from the dam.
Medium industrial	~~YES~~	**NO X**	
Heavy industrial	~~YES~~	**NO X**	
Power station	~~YES~~	**NO X**	
Office/consulting room	~~YES~~	**NO X**	
Military or police base/station/compound	~~YES~~	**NO X**	
Spoil heap or slimes dam	~~YES~~	**NO X**	
Quarry, sand or borrow pit	**YES X**	~~NO~~	Quarry located on the northern boundary of Comrie Dam (approximately 610m). This existing borrow pit is predominantly shale bedrock of the Volksrust Formation, which is in turn overlain by a transported (gravity deposit) sandy clay hillwash.
Dam or reservoir	**YES X**	~~NO~~	Comrie Dam
Hospital/medical centre	~~YES~~	**NO X**	
School/ creche	~~YES~~	**NO X**	
Tertiary education facility	~~YES~~	**NO X**	
Church	~~YES~~	**NO X**	
Old age home	~~YES~~	**NO X**	
Sewage treatment plant	~~YES~~	**NO X**	
Train station or shunting yard	~~YES~~	**NO X**	
Railway line	~~YES~~	**NO X**	
Major road (4 lanes or more)	~~YES~~	**NO X**	
Airport	~~YES~~	**NO X**	
Harbour	~~YES~~	**NO X**	
Sport facilities	~~YES~~	**NO X**	

Golf course	~~YES~~	**NO X**	
Polo fields	~~YES~~	**NO X**	
Filling station	YES	**NO X**	
Landfill or waste treatment site	YES	**NO X**	
Plantation	**YES X**	~~NO~~	Comrie Dam is surrounded by Sappi timber plantations (Pine and Eucalyptus)
Agriculture	**YES X**	~~NO~~	Sappi Timber Forestry and private agriculture to the north-east.
River, stream or wetland	**YES X**	~~NO~~	The Ngudwini River flows from the upper Drakensburg through Comrie Dam. Wetlands are found on the floodplains of the dam.
Nature conservation area	~~YES~~	**NO X**	
Mountain, hill or ridge	**YES X**	~~NO~~	
Museum	~~YES~~	**NO X**	
Historical building	~~YES~~	**NO X**	
Protected Area	~~YES~~	**NO X**	
Graveyard	~~YES~~	**NO X**	
Archaeological site	~~YES~~	**NO X**	
Other land uses (describe)	~~YES~~	**NO X**	

6. CULTURAL/ HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?	~~YES~~	**NO X**

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

Briefly explain the recommendations of the specialist:	A Phase 1 Heritage Impact Assessment (HIA) Exemption Request was submitted to Amafa (5 June 2015) by Ethembeni Cultural Heritage Management and a site inspection carried out on 15 May. This revealed that the proposed development site has been subject to decades of severe environmental disturbance, including periodic flooding of the Ngudwini River and surrounding land has been previously transformed from a natural state to timber plantations and cropland. Potential disturbance to cultural resources are therefore not anticipated during ground clearing and earthworks.

Will any building or structure older than 60 years be affected in any way?	~~YES~~	**NO X**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	**YES X**	~~NO~~

If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

A project profile was uploaded on the South African Heritage Resources Information System (SAHRIS) for review and comment by the provincial heritage body, Amafa. This has been undertaken to comply with the South Africa Heritage Resources Act (No. 25 of 1999) Section 38: "(1)…any person who intends to undertake a development categorised as – (a) the construction of a road exceeding 300m in length; and (i) exceeding 5 000m^2 in extent…must at the earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. (2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1) ….notify the person who intends to undertake the development to submit an impact assessment report….or (b) notify the person concerned that this section does not apply".

While the administration fee was paid on 26 July 2015 (**Appendix G2**), a response from Amafa has not yet been received. This will be included in the final BAR.

SECTION D: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;
(b) giving written notice to—
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the local and district municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
  (vii) any other party as required by the competent authority;
(c) placing an advertisement in—
  (i) one local newspaper; or
  (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
  (i) illiteracy;
  (ii) disability; or
  (iii) any other disadvantage.

Refer to Stakeholder Engagement Report- Appendix E

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:
(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that an application for environmental authorization has been submitted to the KZN Department of Economic Development, Tourism & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
  (iii) a brief project description that includes the nature and location of the activity to which the application relates;
  (iv) where further information on the application can be obtained; and
  (iv) the manner in which and the person to whom representations in respect of the application may be made.

Refer to Stakeholder Engagement Report- Appendix E

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations. Advertisements and notices must make provision for all alternatives.

Refer to Stakeholder Engagement Report- Appendix E

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Economic Development, Tourism & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

Refer to Stakeholder Engagement Report- Appendix E

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

No comments have been received in response to the proposed project to date. Comments in respect of the Draft BAR will be addressed and included in the Final BAR.

Refer to Stakeholder Engagement Report- Appendix E

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

Has any comment been received from the district municipality?	~~YES~~	**NO X**

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

Has any comment been received from the local municipality?	~~YES~~	**NO X**

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

Has any comment been received from a traditional authority?	~~YES~~	**NO X**

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

7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?	**YES X**	~~NO~~

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

Received a call from a contractor seeking employment opportunities from the proposed activity. Provided him with Sappi's project representative's contact details.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

No comments have been received to date. Comments are anticipated after the distribution of the Draft BAR and will be incorporated into the Final BAR.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

None required

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

Planning and design involves limited, non-intrusive site survey and desktop design work. Accordingly, no direct, indirect or cumulative 'site' related impacts are anticipated with this process.

Alternative S2 (if any)

Direct impacts:
Indirect impacts:
Cumulative impacts:

No-go alternative (compulsory)

The no- go alternative will result in no planning or design therefore resulting in no direct, indirect or cumulative 'site' related impacts in the planning and design phase.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	~~Alternative S2~~
None required	Not applicable

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Planning and design entails limited intrusive site survey and desktop design work. Accordingly, no direct,

indirect or cumulative 'process / technology / layout' related impacts are anticipated.

Alternative A2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

The no-go alternative would result in no planning or design related activities. This would result in no direct, indirect or cumulative 'process / technology / layout' related impacts in the planning and design phase.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:	~~Alternative A2:~~
None required	

2.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Alternative S1 (preferred site)

The project involves the expansion of the existing Comrie Dam and realignment of access roads to avoid inundated areas. No site alternatives exist hence impacts have been assessed below as process, technology, layout related impacts.

Alternative S2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Should the proposed project not commence, the site, existing dam and road will be left intact and therefore no impacts would occur.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	~~Alternative S2~~
None required	

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

The social, physical and bio-physical aspects associated with the proposed Comrie Dam expansion have been considered. Whilst not all will result in "likely environmental impacts", they have been documented for purposes of completeness.

Social Environment

- ***Disruption to Sense of Place***

There is a possibility of change in the overall nature of the area during the construction period. Factors contributing to this will include a change in aesthetics, construction noise and an increase in traffic associated with the construction activities. This change in the sense of place has the potential to affect dam users seeking relaxation and recreational uses. However it was reported by residents in Creighton that Comrie Dam is no longer frequently used for recreational purposes, in addition impacts will be transient in nature as it will be limited to the construction period (3-4 months). Potential changes to the sense of place will be insignificant in extent off-site as the closest surrounding receptors (e.g. neighbouring communities) are located 2.8 km away.

- ***Increased Local Traffic***

An increase in traffic associated with the construction phase activities (delivery of construction materials and equipment) is anticipated. This may include large equipment such as excavators, dozers, compactor rollers, tip or dump trucks, TLBs, front end loaders, and water carts. An increased traffic volume has the potential to result in increased congestion and public safety risks. Traffic volumes are expected to be relatively low and the existing roads are not frequently used other than by Sappi staff and contractors. The probability of traffic impacts is low and can be easily managed to decrease risks.

- ***Employment Opportunities***

The construction phase will provide a positive impact by providing employment opportunities to contract workers over this period (proposed 10-15 job opportunities over a 3-4 month period). This employment will have a positive impact on the socio-economic context of the local area for a short duration.

- ***Disturbance to Heritage Resources***

According to the KwaZulu-Natal Heritage Act (No.10 of 1997), the following activities trigger the need for a HIA: In accordance with the Act, any person wishing to undertake an activity described below must provide the Heritage Agency with an application prior to commencing with the desired activity: 27. (1 a) "construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length ... " and 27. (1c) "any development, or other activity which will change the character of an area of land or water (i) exceeding 10 000 m^2 in extent.

A Phase 1 HIA Exemption Request was submitted to Amafa (5 June 2015) by Ethembeni Cultural Heritage Management and a site inspection carried out on 15 May. This revealed that the proposed development site has been subject to decades of severe environmental disturbance, including periodic flooding of the Ngudwini River and surrounding land has been previously transformed from a natural state to timber plantations and cropland. Potential disturbance to cultural resources are therefore not anticipated during ground clearing and earthworks.

Physical Environment

- ***Change in Ambient Air Quality***

During the construction phase there will be a likely increase in dust (particulate matter) generated from activities such due to excavation activities, transport on unpaved road and storage of excavated materials. Dust emissions have the potential to deteriorate local air quality which may result in a nuisance factor. Potential impacts to residential receptors are limited in extent (closest residential receptors over 2.8km away) and will be short term (i.e. limited to the construction period of 3-4 year). Provided that dust control measures are implemented, it is unlikely that there will be any significant impacts.

- ***Change in Ambient Noise***

Elevated noise levels have the potential to cause disruption to sensitive receptors. Since the surrounding area is mainly agricultural land there are very few sensitive receptors. The closest residential receptors are located 2.8 km away. It is noted that work along the dam and open areas does not allow for sound propagation.

- ***Soils, Erosion and Sedimentation***

Earth moving activities will increase the potential for localised soil erosion to occur. Increased traffic on the unpaved roads also increases airborne dust. Potential indirect impacts relate to the contribution of dust as a nuisance factor. In addition, sediment laden surface water / stormwater contamination has the potential to lead to the deterioration of downstream water quality due to increased turbidity. The large amount of excavated

material needs to be adequately managed. The magnitude and extent of soil erosion will be minimised through the implementation of stringent soil erosion and sediment control measures stipulated in the EMPr (**Appendix F**).

The construction methodology proposes the placement of unsuitable construction material within the dam basin as a spoil management approach. If not carried out correctly, this could lead to impacts of increased sedimentation and turbidity leading to decreased surface water quality and ecological affects. The material will not be dumped into the water; it will be placed on dry ground and will be shaped to allow for drainage. When the dam is full it will be inundated. Spoil material will not be placed in the new spillway but will be placed in the existing spillways which will be closed off by the raising and extension of the wall; thus water will not be flowing through them. Significant sedimentation and turbidity effects are therefore not anticipated.

- ***Hazardous Substances and Waste Management***

During the construction phase the storage and handling of hazardous substances (such as fuel and oil) can result in accidental or negligent small scale spills. This has the potential to lead to soil, surface water, and groundwater contamination resulting in a deterioration of downstream water quality rendering it dangerous for ecological and human use.

The construction phase has the potential to generate both general waste (building rubble, domestic waste etc.) and potentially small amounts of hazardous waste (oils, spent solvents etc.).

The adherence to measures outlined within the EMPr will ensure that the impacts associated with generation, storage, use and disposal of hazardous substances, and general and hazardous waste will be appropriately mitigated.

- ***Stability Risks***

Excavation below the base of channels (e.g. for dam wall outlet pipe) introduces a groundwater management issue and the requirement for dewatering. Dewatering may cause the lowering of groundwater in the area around the excavation, which will result in an increase in effective stress of soil and hence settlement of the ground. Compliance with GNR 655 General Authorisation requirements for Activity J will reduce subsistence risks and associated impacts to surrounding infrastructure / land uses.

The expansion of dam structures on unknown ground conditions could lead to bank instability and eventual collapse of infrastructure. The probability of potential impacts associated with instability has been reduced through a Geotechnical Assessment (**Appendix G1**) including a stability assessment being conducted. The assessment concluded that the spillway alignments under consideration are all underlain by extensive thicknesses of unconsolidated silty clay subsoil, with only localised patches of shallower hard material being encountered in the vicinity of the existing dam embankment. The spillway design will need to take account of the potential erosion associated with these materials. Regarding the proposed dam embankment raising, the residual dolerite excavated during construction of the new spillway will be suitable for this purpose. Stability analyses have been carried out for the proposed raising incorporating a new chimney filter to just 5m height, and shows that the stability of the raised dam wall will not be compromised provided the drainage is ensured to function adequately.

Biotic Environment

- ***Loss of Fauna and Flora***

Direct impacts on terrestrial flora and fauna (e.g. habitat loss) associated with removal of vegetation during ground clearing and excavation is not anticipated. The natural state of vegetation has been previously transformed. Proposed new roads (Class B and Class C) routes are located on land supporting timber plantations and cropland.

Indirect ecological impacts on aquatic flora and fauna associated with decreased water quality are discussed above: Soils, Erosion and Sedimentation; and Hazardous Substances and Waste Management.

- ***Loss of Wetland Functionality***

Areas within 32m of the channelled valley bottom wetlands located north / north-west of the dam will be cleared of soil and vegetation to allow for the construction of the Class A road. Through some reduction in vegetative cover, there is expected to be a slight increase in runoff. The marginal increase in runoff has the potential to increase erosion within the downstream catchment, leading to sedimentation of the wetlands. This will result both in a reduction in the storage capacity of the wetland/s, as well as a reduction in water quality due to an

increase in turbidity.

During the construction of the road there is the potential for the spillage of concrete, and oil and grease which will lead to direct impacts on water quality (i.e. increased pH, suspended solids and pollutants) through runoff of these sediments originating in these areas.

Other construction impacts relate to the potential damage of wetlands by workers and pedestrians during construction and the potential for alien species to colonise should the water level be altered.

Alternative A2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

In the event that the proposed construction does not go ahead, the status quo will remain from an environmental perspective. From a social impact perspective, there will be a loss of employment opportunities for 10-15 workers.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:	~~Alternative A2:~~
Social Environment ■ Sense of Place - Traffic management measures contained in EMPr **(Appendix F)** - Dust suppression measures contained in EMPr - Noise control measures contained in EMPr - Rehabilitation measures contained in EMPr The Draft EMPr includes mitigation measures required during the construction phase. Refer to **Appendix F.** ■ Increased Local Traffic - Traffic management measures contained in Draft EMPr (**Appendix F**) ■ Employment Opportunities - Sappi to apply their existing employment policies to the benefit of potential new employees with preference to local labour. ■ Disturbance to Heritage Resources - Ensure that employees and contractors are aware of requirements for heritage resource protection and communicate any findings immediately. - In the event that items of potential heritage or archaeological importance are discovered, activities should be halted, AMAFA should be notified and a HIA undertaken to determine the necessary mitigation measures. - Should the contractor be unsure of the any of the above aspects, the Environmental Control Officer (ECO) should be contacted immediately.	

Physical Environment ■ Change in Ambient Air Quality - Dust suppression measures (wet suppression or chemical stabilisation of dust on haul and unpaved roads) - Vegetation clearing should be kept minimum - Early vegetation and stabilising of disturbed areas - Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment ■ Change in Ambient Noise - Construction activities should be limited to a day time hours (07:00 – 17:00) - All construction vehicles and equipment should be kept in a good condition ■ Soils, Erosion and Sedimentation - Soil erosion and sediment control measures contained in the EMPr **(Appendix F)** - Spoil Management Plan - Suitable engineering of material placed within dam and below spillway ■ Hazardous Substances and Waste Management - Spill management measures contained within EMPr (Appendix F) - Waste management measures contained within EMPr - Development of a Stormwater Management Plan (SWMP) ■ Stability Risks - General Authorisation requirements for Activity J Volume of water taken must be measured and recorded each day - The dewatering and storage may only be exercised once the water use has been registered Continuous Monitoring Required - Implementation of Geotechnical Assessment recommendations **Biotic Environment** ■ Loss of Fauna and Flora - The clearing of vegetation should be kept to a minimum and should be limited to the areas where infrastructure will be established - Cleared vegetation must be disposed of appropriately and not burned - Use of endemic and indigenous species to	

rehabilitate and landscape affected areas ■ Loss of Wetland Functionality - Spill management measures contained within EMPr **(Appendix F)** - Development of a Stormwater Management Plan (SWMP) - Runoff from development areas must be controlled so that no water quality impacts occur to these systems (including increased sediment load and hydrocarbon spills (e.g. oil leaks) from construction machinery). - Construction equipment and personnel shall not unnecessarily disturb areas of the wetland not required in the construction process. - Sufficient drainage must be allowed through the road structures to maintain the current state of water flow through the wetland. - Development of a Wetland Rehabilitation Plan	

2.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Alternative S1 (preferred alternative)

The project involves the expansion of the existing Comrie Dam and construction of three of access roads to a result of inundated areas. No site alternatives exist hence impacts have been assessed below as process, technology, layout related impacts.

Alternative S2 (if any)

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

No-go alternative (compulsory)

Should the proposed project not commence, the site and existing dam would be left intact and therefore no impacts would occur.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1 ~~Alternative S2~~

None required	

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

The social, physical and bio-physical aspects associated with the proposed Comrie Dam expansion have been considered. Whilst not all will result in “likely environmental impacts”, they have been documented for purposes of completeness.

Social Environment

- ***Disruption to Contractor's Village***

The expansion of the dam will result in an increased flood risk to the adjacent Contractors Village as the dam level rises. Potential safety risks will be avoided as Sappi will provide new a settlement structure for the contractors at a safer distance from the Comrie Dam.

- ***Water Availability at Sappi Saiccor Mill***

The expansion of the dam will result in additional water storage and improve water security the Sappi Saiccor Mill. This will increase water availability and secure production during dry seasons at the Mill. Water security will assist the Mill to avoid commercial downtime and resultant negative socio-economic implications (e.g. job loss).

- ***Water Availability to Surrounding Communities***

The expansion of the dam will result in additional water storage and improved water security for the local communities. This will help improve water provision backlog within the Ingwe Municipality and alleviate socio-economic problems.

- ***Water Availability to Downstream Users***

The greater uMkomazi River catchment is fairly underdeveloped with the majority of the catchment being made up of rural development with some areas used for commercial forestry and local subsistence farming.

Information on water use in the U10H quaternary catchment was sourced from the DWS list of registered water users from the Water Authorisation Registration and Management System (WARMS) system. The registered net water use throughout U10H is 21 122 235m^3/a. The key water users within U10H are irrigation and commercial forestry.

- Water use for irrigation within the catchment is 6.61 mil m^3/annum from dams and run of river.
- Commercial forestry is the dominant water user within the catchment (9.78 mil m^3/annum).
- The remaining 4.73 mil m^3/annum is for domestic or industrial users or currently not charged.

Changes in the hydrological regime through increased storage and changes to the flow regime of the river have the potential to affect the assurance of supply and amount of water available to downstream users. The increase in storage capacity of the dam will allow more water to be released for use at the Saiccor Mill when necessary. Release volumes will be within the limits set out in the ecological reserve determination but frequency will change in order to meet the downstream requirements. Based on a survey of surface water users, potential negative affects to downstream users are considered to be minimal provided the limits set by the environmental reserve are adhered to. The risks associated with reduced water availability, in this instance, lie with Saiccor Mill as an end user. Although a greater volume of water is being stored by the Comrie Dam the reticulation of this water from storage facility to end user provides downstream users with the opportunity to increase their assurance of supply. As the Saiccor Mill is not increasing the volume of water to be abstracted, water releases during water stress times to augment their own assurance of supply will potentially positively benefit downstream users.

- ***Increased Local Traffic***

The construction of the new roads will not result in any additional traffic but will only improve the condition of the access / haul roads. The roads will be constructed to preserve access to the timber plantations as the existing road will be inundated by the dam expansion. The status quo will remain as the number of timber haulage vehicles moving in the area will not increase.

- ***Disturbance to Heritage Resources***

No impacts associated with the loss of cultural and heritage resources are anticipated as the area of proposed inundation lies entirely within an existing wetland and the immediate land use surrounding the dam site comprises long term commercial afforestation, which has fundamentally transformed the previous mist-belt grasslands and attendant landscape.

Physical Environment

- ***Decreased Flood Risk***

Downstream infrastructure that may be at risk from a flood event includes three low level bridge crossings 1.6km, 4.2km and 13.2km downstream of the dam wall. A small dam (approximately 0.2ha) is located 6.9km downstream. Forestry and subsistence agriculture is located within 10m of the watercourse prior to the confluence with the uMkomazi River.

It is anticipated that the attenuation capacity of the dam will increase with the increased surface area and cross-sectional area profile of the dam. The topography surrounding the dam is also expected to increase the sinuosity of the dam thereby further increasing the dam flood attenuation potential. As a result, provided that the spillway is appropriately designed, the increased height of the dam wall is expected to attenuate flood peaks and thereby reduce the flooding potential downstream of the dam.

- ***Change in Hydrogeological Conditions***

A qualitative hydrogeological assessment was undertaken as part of the **Hydrological Impact Assessment (Appendix D1)** to determine the potential impacts of the proposed project on the groundwater quantity. As the site develops with the inundation of the additional dam area and the increased depth, this is expected to lead to an increase in recharge of the underlying aquifer system due to an increase in the hydraulic head. The land use within the catchment includes forestry, recognised as a stream flow reduction activity and thus is likely to reduce aquifer recharge. As a result, the dam is expected to have a positive impact to the associated aquifer system.

Biotic Environment

- ***Flora - Loss of Indigenous Vegetation***

This impact description has been prepared with direct reference to the **Study on the Indigenous Vegetation in the Vicinity of Sappi Comrie Dam prepared by Jake Alletson (June 2015) (Appendix D3).** The area around the dam that will be inundated, including both the banks and the headwater areas, is very largely transformed from the natural state. Closely surrounding two sides of the dam are timber plantations which consist of either pine or Eucalypt species. Between the road, which marks the edge of the plantation compartments, and the water's edge is a strip of largely indigenous grassy vegetation which is typically about 30 m wide. As a part of this would be inundated, there would be some loss of terrestrial indigenous plants there. The total area that would be inundated would exceed 1 hectare. However, the aquatic and water margin plant communities would soon re-establish themselves at the new full supply level.

The headwater will be inundated and result in the loss of vegetation. Almost the entire area shows signs of past cultivation. A stand of poplar trees which were planted as a harvestable crop is also located within the headwater area and will be lost to inundation. The largest portion of the plantation is Match Poplar (*Populus deltoides*) and these trees have been managed and pruned into shape for commercial use. At the western end of the plantation is a stand of Silver Poplar (*Populus x canescens*). Both of the poplar species are aliens and the Silver Poplar often becomes an invasive weed.

The area around the trees is covered by species-poor grassland which has pioneer grass species including Thatch Grass and Three Awn Grass but which also has dense growths of weeds with bramble being dominant.

While there are a few indigenous trees which have grown amongst the taller trees, they are of very common species which are not protected in terms of the National Forests Act (Act 84 of 1998) and are not included in the lists of Critically Endangered, Endangered, Vulnerable and protected Species (TOPS list) under the National Environmental Management: Biodiversity Act (Act 10 of 2004). Therefore the inundation of the area will have no secondary requirements in terms of felling permits or the need to replace the trees.

- ***Disturbance to Avifauna***

A large bird nest near the southern side of the poplar trees stand is evident. A Black Sparrowhawk was spotted leaving the area. The species is documented as regularly nesting in poplar trees. It is also known that there is a pair of Fish Eagles (Haliaetus vocifer) nesting in these trees (D. Deppe. SAPPI 2015. Pers Comm). While the eagles were seen, a nest which would be typical of the species was not observed at the time of the site visit. Since the poplar trees would be in the newly inundated area when the dam wall is raised, it is the intention of Sappi to fell the trees and to harvest the timber. Although poplars can survive inundation of their root systems for a while, it is probable that the trees will eventually die off. The raptors will then probably abandon the site in

their own time but other birds, including Hamerkops, Egyptian Geese, cormorants, herons, and egrets will almost certainly also make use of the standing structure for as long as it lasts. **Study on the Indigenous Vegetation in the Vicinity of Sappi Comrie Dam prepared by Jake Alletson (June 2015) (Appendix D3).**

It is noted that the additional inundation and larger surface area of the dam has the potential to attract more bird species to the area allowing for activities such as bird watching.

- ***Disruption to Water Quantity and Flow***

This impact description has been prepared with direct reference to the **Rapid Ecological Reserve Determination Study for the Ngudwini River (Appendix D2)**. The reserve determination aims to determine the reserve for the relevant ecological component of the resource that will be impacted by the proposed raising of the Comrie Dam wall which requires the implementation of Resource Directed Measures (RDM).

Modifications to stream flow as a result of water attenuation and releases to supplement the Mkomazi River for Mill abstraction have the potential to result in indirect negative impacts to aquatic species. Should dam releases not be maintained, there is a potential to result in insufficient cues for fish movement and spawning. Both the Natal Mountain Catfish and Kwa-Zulu Natal Yellow fish are intolerant / moderately intolerant of zero / low flows; and macroinvertebrates are relatively sensitive to flow. It is critical that Ecological Water Requirements (EWR) quantities are maintained, especially during dry periods. However, if flow releases are made from the dam to supplement the Mkomazi flow, the increased flow may sustain critical habitats for fish.

The report concluded that the present state of the Ngudwini River, downstream of the dam, is in a largely natural state. Post dam wall alterations, the flows in the river downstream of the dam, will remain less than natural once the capacity of the dam is increased and the increased flow releases to the Saiccor Mill will not have a significant impact on the system.

- ***Maintenance of Mkomazi River Substrate***

Releases from dam and increased flow will inundate marginal vegetation along Mkomazi River has the potential to result in the maintenance of suitable substrate providing habitat for fish species and facilitation of upstream migrations of Longfin Eel.

- ***Wetland Direct Loss and Loss of Functionality***

Valley bottom wetlands with artificial and natural channels and floodplain wetlands were identified and delineated within a 500m radius of the proposed inundation extent of the dam after raising the wall by 4m. Both the channelled valley bottom and floodplain wetlands have a moderately high functionality for sediment trapping and toxicant removal respectively. The floodplain wetlands fall within the footprint of the proposed new dam level and will thus be lost, leading to a loss of the functioning (primarily streamflow regulation and assimilation of nutrients and toxicants) that they contribute to the receiving environment. The loss of wetland will result in the indirect impact of habitat loss for specialised wetland dependent species. Anticipated inundation of wetlands includes 39ha of floodplain wetland and approximately 3ha of channelled valley bottom wetlands.

An increase in impervious surface area associated with the Class A Road is expected to increase flow volumes into the channelled valley bottom wetlands situated north / north-west of the dam. Any increase in flow from the roads has the potential to lead to an increased potential for erosion and increase suspended solids load into wetland/s. This will result both in a reduction in the storage capacity of the wetland/s, as well as a reduction in water quality due to an increase in turbidity.

The most western wetland and most northern wetland will be dissected by the Class A road which will lead to potential impacts associated with impedance of water flow through the wetland affecting the natural flow through the wetlands. Potential also exists for the wetland upstream of the proposed road to become flooded and the area below the road to dry out or become channelled thereby losing its functionality.

Alternative A2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

In the event that the proposed project does not go ahead, the status quo will remain from an environmental

(physical and biotic environment) perspective.

From a socio-economic perspective there will be an impact on employment for the Umkomaas area and the greater KZN province. With water shortages during the dry season, the Mill will be unable to maintain operations. This will result in job losses and impact businesses which are part of the Sappi Saiccor supply and product distribution chain. The no-go alternative may also result in a negative impact on water security for communities of within the Sisonke District Municipality.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1	~~Alternative A2~~
Social Environment ■ Disruption to Contractor's Village - Sappi to provide alternative residential settlement for the affected contractors. ■ Disturbance to Heritage Resources - Ensure that employees and contractors are aware of requirements for heritage resource protection and communicate any findings immediately. - In the event that items of potential heritage or archaeological importance are discovered, activities should be halted, AMAFA should be notified and a HIA undertaken to determine the necessary mitigation measures. - Should the contractor be unsure of the any of the above aspects, the ECO should be contacted immediately. - **Physical Environment** ■ Decreased Flood Risk - Spillway design for the new dam is for a return interval flood no shorter than it is currently designed for. - Ecological Water Requirements (EWR) releases to the downstream environment do not increase from the current regime. ■ Change in Hydrogeological Conditions - None required **Biotic Environment** ■ Disturbance to Avifauna - Trees which hold nests should be left standing and a small copse should be left in place around each of them to provide continued cover for the birds until poplar trees die off. ■ Disruption to Water Quantity and Flow - Ecological Water Requirements (EWR) must be maintained and recommendations of the Rapid Ecological Reserve Determination Study for the Ngudwini River implemented:	

- Ecospecs and Monitoring required - It is recommended that benthic diatoms be sampled annually to provide ancillary information on integrated water quality in the river. ■ Maintenance of Mkomazi River Substrate - Recommendations in the Ecological Water Requirements (EWR) and the Rapid Ecological Reserve Determination Study for the Ngudwini River must be maintained **(Refer to Appendix D2).** ■ Wetland Direct Loss and Loss of Functionality - Offset for loss of floodplain wetland - A Wetland Rehabilitation Plan should be developed to ensure that post-construction the site is rehabilitated to a suitable degree so as to limit the impacts. This will include the return of vegetation and soils to conditions representing baseline conditions as closely as practically achievable.	

2.4. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

No potential environmental impacts are applicable to the decommissioning stage as the proposed Comrie Dam expansion is a long term development. The potential issues are most likely to be construction related.

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

Alternative S1 (preferred alternative)

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

Alternative S2

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

No-go alternative (compulsory)

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	Alternative S2

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the decommissioning or closure phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

Alternative A2

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

No-go alternative (compulsory)

Direct impacts: ***Indirect impacts:*** ***Cumulative impacts:***

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1	Alternative A2

2.5. PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative S1 (preferred site)	Alternative S2

Alternative A1 (preferred alternative)	Alternative A2

3. ENVIRONMENTAL IMPACT STATEMENT

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

Alternative S1 (preferred site)

Alternative S2

Alternative A1 (preferred alternative)

Impact Assessment Methodology:

The following section comprises a summary table of potential environmental impact identified in the preceding sections. Refer to the EMPr in Appendix F for details of mitigation measures proposed (recommendations for minimising or eliminating negative impacts).

Environmental issues and potential impacts identified will be assessed using recognised quantitative impact assessment methodology **(Table 3).** This methodology is based on impact significance criteria determined by the Department of Environmental Affairs and Tourism, 1998.

Table 3: Impact Assessment Matrix Rating

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low	Low	Medium	High	Very high
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probably	Definite
ENVIRONMENTAL SIGNIFICANCE = (MAGNITUDE + EXTENT + REVERSIBILITY + DURATION) x PROBABILITY					
TOTAL SCORE	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
ENVIRONMENTAL SIGNIFICANCE RATING	Very low	Low	Moderate	High	Very High

The significance can be determined by the following equation:

ENVIRONMENTAL SIGNIFICANCE = (MAGNITUDE + EXTENT + REVERSIBILITY + DURATION) x PROBABILITY

An environmental issue can therefore have a maximum significance rating of 100 (S = [5+5+5+5] x 5) and a minimum rating of 4 (S = [1+1+1+1] x 1). Therefore the significance rating is as tabulated below **(Table 4).**

Table 4 5: Significance Rating

Total Score	Environmental Significance Rating
4 to 15	**Very low**
16 to 30	**Low**
31 to 60	**Moderate**
61 to 80	**High**
81 to 100	**Very high**

No-go alternative (compulsory)

Potential negative impacts of the continued status quo were assessed to have **low to medium significance**. Water shortage at the Sappi Saiccor Mill leading to a loss of employment opportunities and broader socio-economic benefits (GDP) is deemed to be an impact of high significance. A shortage in water availability for communities within Ingwe Municipality is deemed to be an impact of moderate significance.

Summary of Construction and Operational Phase Impact Significance Ratings:

This assessment has found that both the construction and operational phases of the proposed Comrie Dam expansion project will involve activities which will lead to direct and indirect impacts on the environment of variable character (i.e. positive and negative), magnitude and overall significance.

Where appropriate, mitigation measures to ameliorate negative impacts have been proposed. Both the initial and residual (post-mitigation) significance of impacts have been presented throughout, so as to obtain an indication of the effectiveness of the mitigation measures.

Potential impacts associated with the proposed project have been assessed and the significance of these evaluated with consideration of proposed mitigation measures (i.e. post-mitigation):

- Construction Phase Impacts: The majority of the potential impacts which are negative in nature (social, physical and biotic) are expected to be of **low and very low significance post-mitigation**. The potential loss of wetland functionality as a result of increased sedimentation from the Class A road construction is deemed to be a negative impact of **moderate significance** post mitigation.
- Operational Phase Impacts: The majority of the potential impacts which are negative in nature (social, physical and biotic) are expected to be of **low significance post-mitigation**. Potential negative impacts associated with the loss of channelled valley bottom wetlands (due to road construction) and floodplain wetlands (due increased dam inundation) are deemed to be of **high significance** post-mitigation. Although the probability or extent of this impact cannot be reduced with mitigation measures this impact will be required to be offset through the rehabilitation or conservation of wetland systems elsewhere within the catchment. Appropriate offset requirements will need to be recommended by the Department of Water and sanitation (DWS) based on the area of loss (~33ha) and functionality of wetlands. A number of **positive impacts** of have been identified – these range from low to high significance. Potential positive impacts of **low significance** include: increased water availability to downstream users; and improved dam access and haulage routes. Potential positive impacts of **moderate significance** include: reduced flood risk downstream of Comrie Dam; increase in recharge of underlying aquifer system; and maintenance of Mkomazi River Substrate. Water availability at the Sappi Saiccor Mill and to surrounding communities is identified as a potential positive impact of **high significance**.

Table 5: Impact Assessment Table

Activity & Aspect	Impact	Character	Ease of Mitigation	Pre-Mitigation						Post-Mitigation (Residual Impact)					
				(M+	E+	R+	D)x	P=	S	(M+	E+	R+	D)x	P=	S
CONSTRUCTION PHASE IMPACTS															
SOCIAL ENVIRONMENT															
Excavation and clearing of site (increased traffic and noise) will change the nature of the site	Disruption to sense of place for recreational user	Negative	Moderate	1	2	1	2	3	**18**	1	1	1	2	2	**10**
Significance				**Low**						**Very Low**					
Construction vehicles and equipment	Increased congestion and public safety risks	Negative	Moderate	2	2	2	2	2	**16**	1	2	1	2	1	**6**
Significance				**Low**						**Very Low**					
Construction workforce	Employment Opportunities	Positive	Easy	2	2	1	2	3	**21**	2	2	1	1	3	**18**
Significance				**Low**						**Low**					
Excavations and earthworks for road construction	Disturbance to heritage resources	Negative	Moderate	3	1	2	2	2	**16**	2	1	2	2	2	**14**
Significance				**Low**						**Very Low**					
PHYSICAL ENVIRONMENT															
Dust emissions resulting from excavation activities and vehicles moving along unpaved roads	Decreased local air quality and nuisance factor to receptors	Negative	Easy	2	2	2	2	3	**24**	1	2	1	2	2	**12**

Significance				**Low**						**Very Low**							
Construction activities, machinery/equipment	Elevated noise levels resulting in disruption to receptors	Negative	Moderate	2	2	2	2	2	**16**	1	2	1	2	2	**12**		
Significance				**Low**						**Very Low**							
Earth moving activities and vehicles on unpaved roads	Increased soil erosion and sedimentation / stormwater contamination leading to potential increased turbidity and associated ecological deterioration	Negative	Moderate	3	3	3	2	3	**33**	3	2	3	2	2	**20**		
Significance				**Moderate**						**Low**							
Placement of spoil material within dam basin	Increased turbidity leading to decreased surface water quality and ecological disturbance	Negative	Moderate	3	3	3	2	4	**44**	2	1	4	2	2	**18**		
Significance				**Moderate**						**Very Low**							
Accidental spillage of hazardous substances and waste	Potential spillage leading to soil, surface and groundwater contamination and secondary impacts on downstream water quality	Negative	Moderate	3	3	3	2	3	**33**	2	2	2	2	1	**8**		
Significance				**Moderate**						**Very Low**							
Heightening dam wall and expanding spillway on unknown ground conditions	Stability risks and potential collapse of infrastructure	Negative	Moderate	4	2	3	2	4	44	3	2	2	1	2	16		
Significance				**Moderate**						**Low**							

BIOTIC ENVIRONMENT															
Excavation and clearing of terrestrial vegetation	Loss of natural habitats for fauna and flora	Negative	Easy	1	1	3	2	2	14	1	1	3	2	2	14
Significance				**Very Low**						**Very Low**					
Construction of Class A Road in close proximity / through channelled valley bottom wetlands	Increased sedimentation into wetlands and decreased functionality (sediment trapping and toxicant removal)	Negative	Moderate	4	3	3	2	4	**48**	3	2	2	3	3	**30**
Significance				**Moderate**						**Moderate**					
	Potential spillage of hazardous substances (concrete, oil and grease) resulting in reduced water quality within channelled valley bottom wetlands	Negative	Moderate	3	2	3	3	3	33	2	2	3	2	2	18
Significance				**Moderate**						**Low**					
	Direct damage to wetlands by workforce; potential for alien species to colonise thereby reducing functionality (sediment trapping and toxicant removal)	Negative	Moderate	3	2	3	2	3	**30**	**2**	**2**	**3**	**2**	**2**	**18**
Significance				**Moderate**						**Low**					
OPERATIONAL PHASE IMPACTS															
SOCIAL ENVIRONMENT															
Dam expansion and	Increased flood risk to Contractors	Negative	Moderate	2	1	3	4	3	**30**	2	1	2	3	2	**16**

increased flood level	Village to due to location adjacent the dam																
Significance				**Low**						**Low**							
Inundation to increase dam storage	Increased water availability for continuation of Sappi Saiccor operations during dry months	Positive	Not applicable	4	3	2	4	5	**65**	4	3	2	4	5	**65**		
Significance				**High**						**High**							
Inundation to increase dam storage	Increased water availability for the provision of water to local communities	Positive	Not applicable	4	3	4	4	5	**75**	4	3	4	4	5	**75**		
				High						**High**							
Modification to stream flow as a result of attenuation and water releases to supplement Mkomazi River.	Water availability to Downstream Users	Positive	Not applicable	1	3	1	4	3	**27**	1	3	1	4	3	**27**		
Significance				**Low**						**Low**							
Three new access roads for haulage and maintenance vehicles	Improved access	Positive	Not applicable	1	1	1	4	4	**28**	1	1	1	4	4	**28**		
Significance				**Low**						**Low**							
Inundation of area (79ha) around the dam	Disturbance to heritage resources	Negative	Difficult	3	1	4	5	2	**26**	1	1	3	5	1	**10**		
Significance				**Low**						**Very Low**							
PHYSICAL ENVIRONMENT																	
Increased surface area will increase dam attenuation	Reduced flood risk of downstream infrastructure	Positive	Easy	2	3	3	4	3	**36**	3	3	3	4	4	**52**		

Significance				**Moderate**						**Moderate**							
Increase in dam area and depth as a result of the inundation	Increase in recharge of underlying aquifer system	Positive	Not applicable	3	3	2	4	3	**36**	3	3	2	4	3	**36**		
Significance				**Moderate**						**Moderate**							
BIOTIC ENVIRONMENT																	
Inundation of banks and headwater areas	Loss of indigenous vegetation	Negative	Difficult	2	2	3	3	4	**40**	1	2	3	2	3	**24**		
Significance				**Moderate**						**Low**							
Increased dam surface area as a result of inundation	Disturbance to avifauna (Black Sparrowhawk nests)	Negative	Easy	3	2	4	4	4	**52**	1	2	1	2	3	**18**		
Significance				**Moderate**						**Low**							
Modification to stream flow as a result of attenuation and water releases to supplement Mkomazi River	Impacts on the movement and spawning of aquatic species	Negative	Moderate *(maintain flow)*	3	3	4	4	3	**42**	2	3	3	4	2	**24**		
Significance				**Moderate**						**Low**							
Releases from dam and increased flow will inundate marginal vegetation along Mkomazi River	Maintenance of suitable substrate providing habitat for fish species and facilitation of upstream migrations of Longfin Eel	Positive	Moderate *(maintain flow)*	3	3	2	4	4	**48**	3	3	2	4	4	**48**		
Significance				**Moderate**						**Moderate**							
Location of Class A Road in close proximity to / through channelled valley bottom wetlands	Direct loss of portions of wetlands	Negative	Difficult (*offset*)	4	3	4	5	4	**64**	3	3	4	5	4	**60**		

Significance				***High***						***Moderate***							
	Increased run off from roads resulting in potential sedimentation of wetlands and reduced functionality	Negative	Easy	4	3	3	3	3	**39**	3	3	3	3	2	**24**		
Significance				***Moderate***						***Low***							
Inundation of floodplain wetland	Direct loss of floodplain wetland and services (streamflow regulation and assimilation of nutrients and toxicants; habitat for wetland dependant species)	Negative	Difficult	5	3	4	5	5	**85**	4	3	4	5	5	**80**		
Significance				***Very High***						***High***							
NO-GO ALETRNATIVE																	
Maintenance of status quo – water shortage during dry periods	Water shortage at the Sappi Saiccor Mill will lead to a loss of employment opportunities and broader socio-economic benefits (GDP)	Negative	Difficult	5	3	3	4	5	**75**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		
Significance				***High***													
Maintenance of status quo – insufficient water storage within dam	A shortage in water availability for communities within Ingwe Municipality	Negative	Moderate	**4**	**3**	**3**	**3**	**4**	**52**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		
Significance				***Moderate***													

SECTION F: RECOMMENDATION OF EAP

Is the information contained in this report and the documentation attached hereto in the view of the EAP sufficient to make a decision in respect of this report?	**YES X**	~~NO~~
If "NO", please contact the KZN Department of Economic Development, Tourism & Environmental Affairs regarding the further requirements for your report.		

If "YES", please attach the draft EMPr as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

The overall objective of the BA process is to provide sufficient transparent and technically-robust information to enable informed decision-making by the authorities. This has been undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

Stakeholder engagement is an integral part of the Environmental Authorisation process. Stakeholder comments are being sought through the distribution of this report for a 30 day comment period. It is the opinion of WSP that the information contained in this document is sufficient for DEDTEA to make an informed decision for the EA being applied for in respect of this project. It is further recommended that the EA should be issued in accordance with the current legal requirements under the NEMA and subject to adherence to mitigation measures outlined in this report and the accompanying EMPr (**Appendix F**).

SECTION G: APPENDIXES

The following appendixes must be attached as appropriate:

- Appendix A: Site plan(s)
- Appendix B: Photographs
- Appendix C: Facility illustration
- Appendix D: Specialist reports
- Appendix E: Stakeholder Engagement Report
- Appendix F: Draft Environmental Management Programme (EMPr)
- Appendix G: Other information

Appendix A. Site Plans

A1 – Site Plan

A2 – Topographical Map

A3 – Hydrology Map

A4 – Property Description Map

Appendix B. Photographs

Plate 1: View of Comrie Dam from the South Bank

Plate 2: View of the Comrie dam from the South East bank

Plate 3: Vegetation on the South East bank of the dam

Plate 4: Timber plantation and gravel plantation road found along the East bank of Comrie Dam

Plate 5: Floodplain and wetland area situated on the North bank of the dam

Plate 6: Quarry located behind the Northern boundary of the Dam

Plate 7: View of Comrie Dams East bank

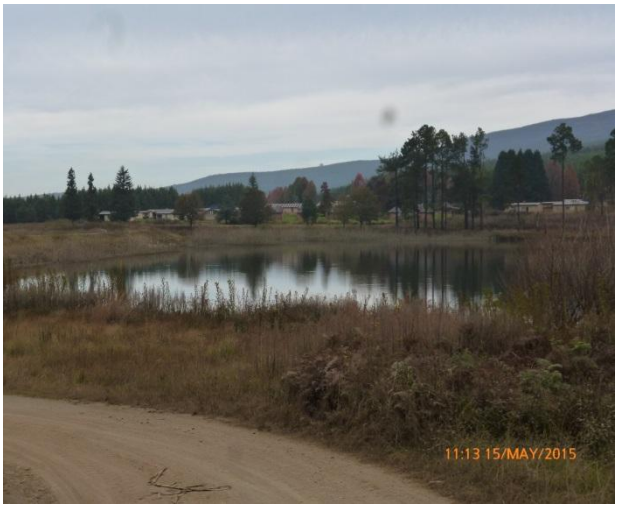

Plate 8: View of Compounds from the South West bank

Plate 9: View of Ngudwini River and Sappi plantation from the South West bank

Plate 10: Timber logging area situated within Sappi plantation

Plate 11: View of Compounds from the West bank

Plate 12: Existing Comrie Dam Slipway viewed from the South West bank

Appendix C.Facility Illustrations

C1 - Comrie Dam Basin Plan

C2 - Existing Embankment and Spillway Plan

C3 - Embankment and Spillway Plan – Existing Design with New Features

C4 - Embankment and Spillway Plan – New Design

C5 - Longitudinal Section – Comrie Dam

C6 - Typical Cross Section on Existing Embankment

C7 – Stepped Sharp Crested Weir Location Plan and Longitudinal View

Appendix D.Specialist Reports

D1 - Hydrology Impact Assessment (include Wetland Delineation and Functional Assessment)

D2 - Rapid Ecological Reserve Determination Study for Ngudwini River

D3 - Study on the Indigenous Vegetation in the Vicinity of Sappi Comrie Dam

Appendix E. Stakeholder Engagement Report

Appendix F. Draft Environmental Management Programme

Appendix G.Other Information

G1 - Geotechnical Report Comrie Dam

G2 – Amafa Proof of Payment

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