



Inyanda Coal Wash Plant Water Use Licence Renewal Application

Integrated Water and
Waste Management Plan

INYANDA
— MINING HOLDINGS —

Niara Environmental Consultants (Pty) Ltd

Registration no.: 2012/018290/07

Cell: +27827672786; Fax: 0865314434

www.niara.co.za

info@niara.co.za

KwaZulu Natal Office:

59 Beaumont Road,
Bluff, Durban, 4052

Gauteng Office:

Office 1
Palm Place Office Park
22 Bram Fischer Drive,
Linden, Johannesburg

Mpumalanga Office:

16 Birkholtz Avenue,
Witbank Ext 16,
eMalahleni, 1034



ENVIRONMENTAL & ENGINEERING

REPORT

INYANDA MINING (PTY) LTD – INYANDA WASHPLANT

INTEGRATED WATER AND WASTE MANAGEMENT PLAN UPDATE - 2020

WATER USE LICENSE REF NO: (08/B20G/ACGI/4245)

REPORT REF:20-1149-SPS INYANDA WASH PLANT IWWMP UPDATE

(ANNUAL IWWMP UPDATE FOR THE INYANDA MINING (PTY) LTD
INYANDA WASH PLANT)

VERSION 00



Updated- 13/3/2021

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Nature of Signoff:	Responsible Person:	Role / Responsibility	Qualification
Author	Kelebone Sekonyela	Environmental Consultant / EAP	MSc Environmental Management
Technical Review	Riana Panaino	Environmental Consultant / EAP	BSc Hons (Biodiversity & Conservation) BSc (Botany and Zoology)
Quality Reviewer	Leoni le Roux	Administrator	Professional Secretary and Personal Assistant
Client	Tshifaro Nemekundani	Environmental Officer	

DISCLAIMER:

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EAP - was independent and performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application; have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity; ensure compliance with these Regulations;

Take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-

The findings, results, observations, conclusions and recommendations provided in this report are based solely on the information provided to Eco Elementum (Pty) Ltd by the Client and other external sources (including previous site investigation data and external scientific studies). The opinions expressed herein apply to the site conditions and features which existed at the time of commencement of the investigations and production of this report.

The author has utilised his/her best scientific and professional knowledge in preparing this report and the content herein contained is and remains confidential in nature, save where otherwise ordered by a Court of law.

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DECLARATION OF INDEPENDENCE

I, Kelebone Sekonyela, declare that;

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing:

any decision to be taken with respect to the application by the competent authority; and

the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature

Date

Ms. Kelebone Sekonyela



EXECUTIVE SUMMARY

BACKGROUND

Inyanda Mining Holdings purchased the Inyanda Coal Mine from Exxaro Coal (Pty) Ltd on 23 November 2015. Notification of the sale was given to the Department of Water and Sanitation on 12 May 2016. Inyanda Mining Holdings requested that the water use license be transferred from Exxaro Coal (Pty) Ltd to Inyanda Mining Holdings on 13 January 2017. The Inyanda Coal Mine is an existing coal mine on Portion 21 of the Farm Kalbasfontein 284JS, located roughly 10km north of Emalahleni in the Mpumalanga. The Mine involved coal extraction via open pit roll-over mining methods, a coal beneficiation plant (Wash Plant) and co-disposal dump. Mining has been ceased and only wash plant and associated mineral waste disposal facilities are currently operational.

Inyanda Coal Mine has an approved Mining Right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) (Reference Number MP 30/5/1/2/2/34MR). The Mining Right extends over Portions 21, 22 and the remaining extent of Portion 20 of the Farm Kalbasfontein 284JS. The Mining Right was originally granted in 2006 (based on the original Environmental Management Plan (Clean Stream, April 2005).

The Inyanda Coal Mine operates under a water use licence (16/2/7/B100/C203) that was granted on 19 February 2011 which is valid for ten years: The license may be reviewed every 2 years.

Coal is delivered by truck to Inyanda Coal Mine. Inyanda Coal Mine is an opencast coal mine that has ceased its mining operation and is currently only operating a washing plant. The opencast pit has been fully rehabilitated and vegetated. Inyanda Coal Mine operates a filter press.

Inyanda Coal Mine operated a co-disposal facility (discards and slurry). Disposal is taking place at the co-disposal facility as an interim measure, slurry will also be disposed into the co-disposal facility while the RWD is dredged. The co-disposal area will be rehabilitated in future. There are two workshop areas, each with its own wash bay, waste management area and oil separators.

Currently, there is only coal washing taking place at Inyanda coal mine simply referred to as Inyanda washplant.

This IWWMP has been updated where necessary where mining, rehabilitation, infrastructure, new data became available or methods used have changed.

PURPOSE OF REPORT

The purpose of this Integrated Water and Waste Management Plan (IWWMP) is to comply with the annual IWWMP update as stipulated in Condition 12 of Appendix I of the WUL (License Nr 16/2/7/B100/C203) issued by the (DWS) for the Inyanda Coal Mine, and also to support the amendment of the Water Use Licence and Environmental Management Plan (EMP). The main goal of integrated mine water and waste management planning is to optimise waste and water management by maximising efficiency, and minimising associated environmental impacts and financial costs.

The overall purpose of the IWWMP is as follows;

- Compilation of a site specific, implementable, management plan addressing all the identified water use and waste management related aspects (e.g. process water balances, storm water management, groundwater management, water reuse and reclamation, water conservation and demand management, waste minimization and recycling) of a specific activity, in order to meet set goals and objectives, in accordance with IWRM principles;
- Provision of management plan to guide a water user regarding the water and waste related measures which must be implemented on site in a progressive, structured manner in the short, medium and long term;
- Documentation of all the relevant information to enable DWS to make the decision regarding the authorisation of a water use;



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- Clarification of the content of the IWWMP for DWS officials and the water users, as the various regional offices of DWS might have different interpretations regarding the content of an IWWMP; and
- Standardisation of the format of the supporting documentation which DWS requires during submission of a Water Use License Application (WULA);

LOCATION

Inyanda Colliery is situated about 10km north of Emalahleni in the Magisterial district of Witbank, the Emalahleni Local Municipality of the Nkangala District Municipality, Mpumalanga Province. The Inyanda Coal mine (now Wash plant) is situated approximately 11 km north of Witbank in the Mpumalanga Province. Access to the mine is via the R544 Provincial Road.

Locality	Portions 2, 20, and 21 of Farm Kalbasfontein 284 JS & Portion 4 of the Farm Mooifontein in Mpumalanga Province.
Province & Municipality:	Magisterial district of Witbank, Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province
General activities	Operational washplant & co-disposal facility. The mining operation has ceased and the opencast rehabilitated.
Mineral	Coal.
Catchment	Quaternary drainage region B 11 K & B11J - Olifants Water Management Area

PROJECT DESCRIPTION

The mine targeted coal from the No 1 and No 2 seams of the Vryheid Formation, via open pit roll-over mining. The Mine was originally designed to supply 1,200,000 tons per annum of 15% ash coal for the export market. A maximum annual production rate of 1,800,000 tons of coal was envisaged (Clean Stream, April 2005). Inyanda Coal Mine has ceased its mining operation and is currently only operating a washing plant. The opencast pit has been fully rehabilitated and vegetated. The Mine also involves on-site processing via a wash plant, with discard being disposed of on the co-disposal dump, which is still operational. Coal is received, for processing, from Leeuwfontein/ Driefontein, T&DB and Blesbok Mines.

Inyanda Coal Mine operated a co-disposal facility (discards and slurry). Disposal is taking place at the co-disposal facility as an interim measure, slurry will also be disposed into the co-disposal facility while the RWD is dredged. The co-disposal area will be rehabilitated in future. There are two workshop areas, each with its own wash bay, waste management area and oil separators.

Currently, there is only coal washing taking place at Inyanda coal mine simply referred to as Inyanda washplant.

WATER USE LICENSE ACTIVITIES:

Water Use No.	Property	NWA, 1998 Section 21	Activity Name	Description / purpose	Volume / Capacity (m ³)	Annual abstraction quantity (m ³)	Authorisation status
1.	Portion 21 of Kalbasfontein 284 JS	A	WB01	Abstracting water from borehole (WB01) for domestic use.	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011
2.		A	WB02	Abstracting water from borehole	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011



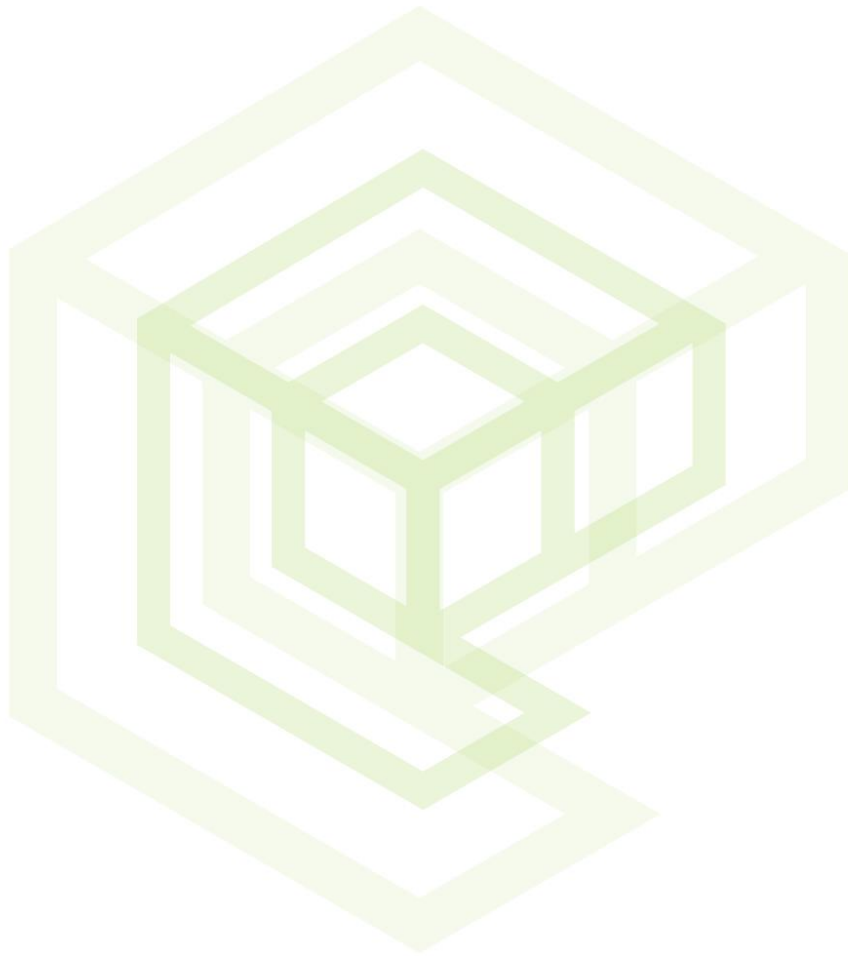
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				(WB02) for domestic use			
3.		A	WB03	Abstracting water from borehole (WB03) for domestic use	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011
4.		A	WB08	Abstracting water from borehole (WB08) for domestic use	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011
5.			Open pit	The use of water for dust suppression from the open pit	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011
6.	Portion 21 of Kalbasfontein 284 JS		Water removed from the underworking	Water removed from the underworking, removed through dewatering in order to be pumped into the return water dam to be reused in the mining process	100 m ³ / day	36500 m ³ / annum	Licensed in 2011
7.	Portion 04 of Moofontein 285 JS.	c & i	Raw water pipeline infrastructure leading to Dam 1 to the washing plant.	Conveyance of abreacting raw water to the mine.	Not Applicable	Not Applicable	Licensed in 2011
8.	Portion 21 of Kalbasfontein 284 JS	G	Return Water Dam	Wastewater disposed into the Return Water Dam.	242 m ³ / day	88 479 m ³ / annum	Licensed in 2011
9.	Portion 21 of Kalbasfontein 284 JS	G	Biofilter dam	Disposing domestic wastewater from Biofilter plant into a Biofilter dam	31 m ³ / day	11 400 m ³ / annum	Licensed in 2011
10.	Portion 21 of Kalbasfontein 284 JS	G	Dust Suppression	Disposing wastewater and using it for dust suppression	299 m ³ / day	109 440 m ³ / annum	Licensed in 2011
11.	Portion 21 of Kalbasfontein 284 JS.	J	Return water dam	Removing underground water from open cast pit. The water disposed into the	399 m ³ / day	145 940 m ³ / annum	Licensed in 2011



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				return water dam.			
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DETAILS OF APPLICANT AND EAP

Table 1: Applicant Details

Applicant Name:	 Inyanda Mining (Pty) Ltd
VAT No.:	4200238873
Contact Person:	Tshifaro Nemekundani
Telephone:	011 589 9000
Fax:	086 725 2966
E-mail:	tshifaro@eyethucoal.com
Postal Address:	90 Rivonia Road, Sandton
Physical Address:	90 Rivonia Road, Sandton

Table 2: Environmental Assessment Practitioner (EAP) Details

EAP:	 Eco Elementum (Pty) Ltd - Environmental and Engineering
Contact Person:	Kelebone Sekonyela (Author) Riana Panaino (Reviewer)
Telephone:	012 807 0383
Fax:	N/A
E-mail:	kele@ecoe.co.za ; riana@ecoe.co.za ; info@ecoe.co.za
Postal Address:	Postnet Suite #252 Private Bag X025 Lynnwood Ridge 0040



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Physical Address:	361 Oberon Ave, Glenfield Office Park, Nikka Building, 1 st Floor, Farerie Glen, Pretoria, 0081
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1. INTRODUCTION

1.1 ACTIVITY BACKGROUND

Inyanda Mining Holdings purchased the Inyanda Coal Mine from Exxaro Coal (Pty) Ltd on 23 November 2015. Notification of the sale was given to the Department of Water and Sanitation on 12 May 2016. Inyanda Mining Holdings requested that the water use license be transferred from Exxaro Coal (Pty) Ltd to Inyanda Mining Holdings on 13 January 2017.

Inyanda Mining Holdings purchased the Inyanda Coal Mine from Exxaro Coal (Pty) Ltd on 23 November 2015. Notification of the sale was given to the Department of Water and Sanitation on 12 May 2016. Inyanda Mining Holdings requested that the water use license be transferred from Exxaro Coal (Pty) Ltd to Inyanda Mining Holdings on 13 January 2017. The Inyanda Coal Mine is an existing coal mine on Portion 21 of the Farm Kalbasfontein 284JS, located roughly 10km north of Emalahleni in the Mpumalanga. The Mine involved coal extraction via open pit roll-over mining methods, a coal beneficiation plant (Wash Plant) and co-disposal dump. Mining has been ceased and only wash plant and associated mineral waste disposal facilities are currently operational.

Inyanda Coal Mine has an approved Mining Right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) (Reference Number MP 30/5/1/2/2/34MR). The Mining Right extends over Portions 21, 22 and the remaining extent of Portion 20 of the Farm Kalbasfontein 284JS. The Mining Right was originally granted in 2006 (based on the original Environmental Management Plan (Clean Stream, April 2005).

The Inyanda Coal Mine operates under a water use licence (16/2/7/B100/C203) that was granted on 19 February 2011 which is valid for ten years: The license may be reviewed every 2 years. The Inyanda Coal Mine is situated approximately 11 km north of Witbank. Access to the mine is via the R544 Provincial Road Figure 1.

Coal is delivered by truck to Inyanda Coal Mine. Inyanda Coal Mine is an opencast coal mine that has ceased its mining operation and is currently only operating a washing plant. The opencast pit has been fully rehabilitated and vegetated. Inyanda Coal Mine operates a filter press.

Inyanda Coal Mine (now washplant) operated a co-disposal facility (discards and slurry). Disposal is taking place at the co-disposal facility as an interim measure, slurry will also be disposed into the co-disposal facility while the RWD is dredged. The co-disposal area will be rehabilitated in future. There are two workshop areas, each with its own wash bay, waste management area and oil separators.

Currently, there is only coal washing taking place at Inyanda coal mine simply referred to as Inyanda washplant.

Mine Infrastructure includes:

- Access road and main entrance gate;
- Security gate and offices;
- Mine offices, car ports and parking facilities;
- Workshop;
- Coal washing plant;
- Coal discard bin;
- Return water dam (3ha in size with capacity of 92MI)
- Return water pipeline;
- Diesel storage facility;
- Opencast pit (rehabilitated)



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This IWWMP has been updated where necessary where mining, rehabilitation, infrastructure, new data became available or methods used have changed.



Figure 1: Site Locality

The operations and associated activities that take place at the Inyanda Inyanda Washplant has an approved Water Use License in terms of Section 21 of the NWA (1998). The current activities are limited to the operational washplant & co-disposal facility. The mining operation has ceased and the opencast rehabilitated.

The predominant Water Uses which take place at the washplant are borehole abstraction, domestic use and coal washing. Additional water uses include the abstraction and temporary storage and use of potable water as well as the temporary storage of liquid effluent (sewage) and domestic waste.

The approved Water Uses as defined in Section 21 of the NWA (1998) include:

- Section 21(a): taking water from a water resource.
- Section 21(c): impeding or diverting the flow of water in a watercourse and Section 21(i): altering the bed, banks, course or characteristics of a water resource.
- Section 21(g): disposing of waste or water containing waste in a manner that may detrimentally affect a water resource.
- Section 21(j): removing, discharging, or disposing water found underground for the safety of people or continuation of mining.

This document serves as the annual update of the IWWMP as required in terms of the approved IWUL (16/2/7/B100/C203).

1.2 REGIONAL SETTING AND LOCATION OF ACTIVITY

The Administrative boundaries associated with the Inyanda washplant are shown in Table 2 and Figure 2.

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Table 2: Administrative boundaries of the Inyanda washplant

ADMINISTRATIVE BOUNDARIES OF THE INYANDA WASHPLANT	
Province	Mpumalanga
District Municipality	Nkangala District Municipality
Local Municipality	Emalahleni Local Municipality
DMR Local Office	Emalahleni Office
DWA Local Office	Bronkhorstspuit Office
Department of Environmental Affairs Local Office	Emalahleni Office
Catchment Zone	Olifants River Catchment (B 11 K & B11J)
Rainfall Zone	B1A, B1C, B2C
Water Management Area	4
Water Forums	Olifants River Catchment Forum

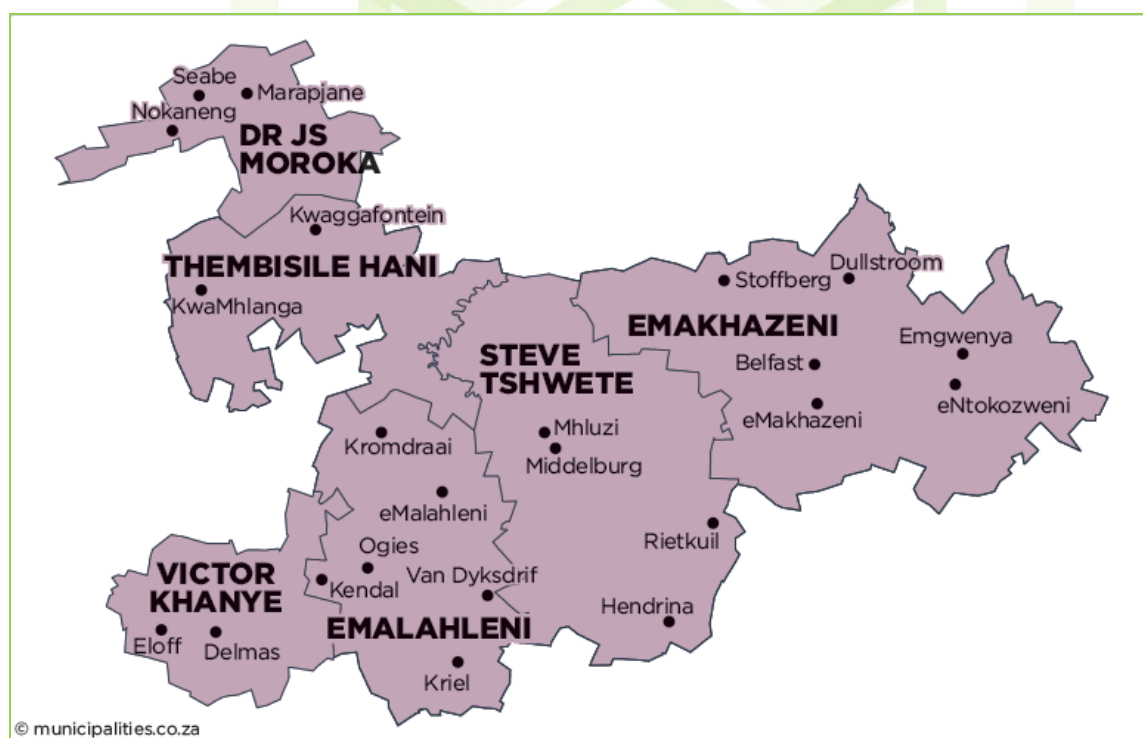


Figure 2: Nkangala District Municipality

The Inyanda Washplant is situated approximately 11 km north of Witbank in the Mpumalanga Province. The plant is also located adjacent to the R544 Provincial Road also used as access to the mine.

The footprint of the Inyanda washplant extends across three properties, Portions 2, 20, and 21 of Farm Kalbasfontein 284 JS & Portion 4 of the Farm Mooifontein in Mpumalanga Province. The washplant & co-disposal facility and associated infrastructure extends across the B 11 K & B11J quaternary catchments (Figure 3).



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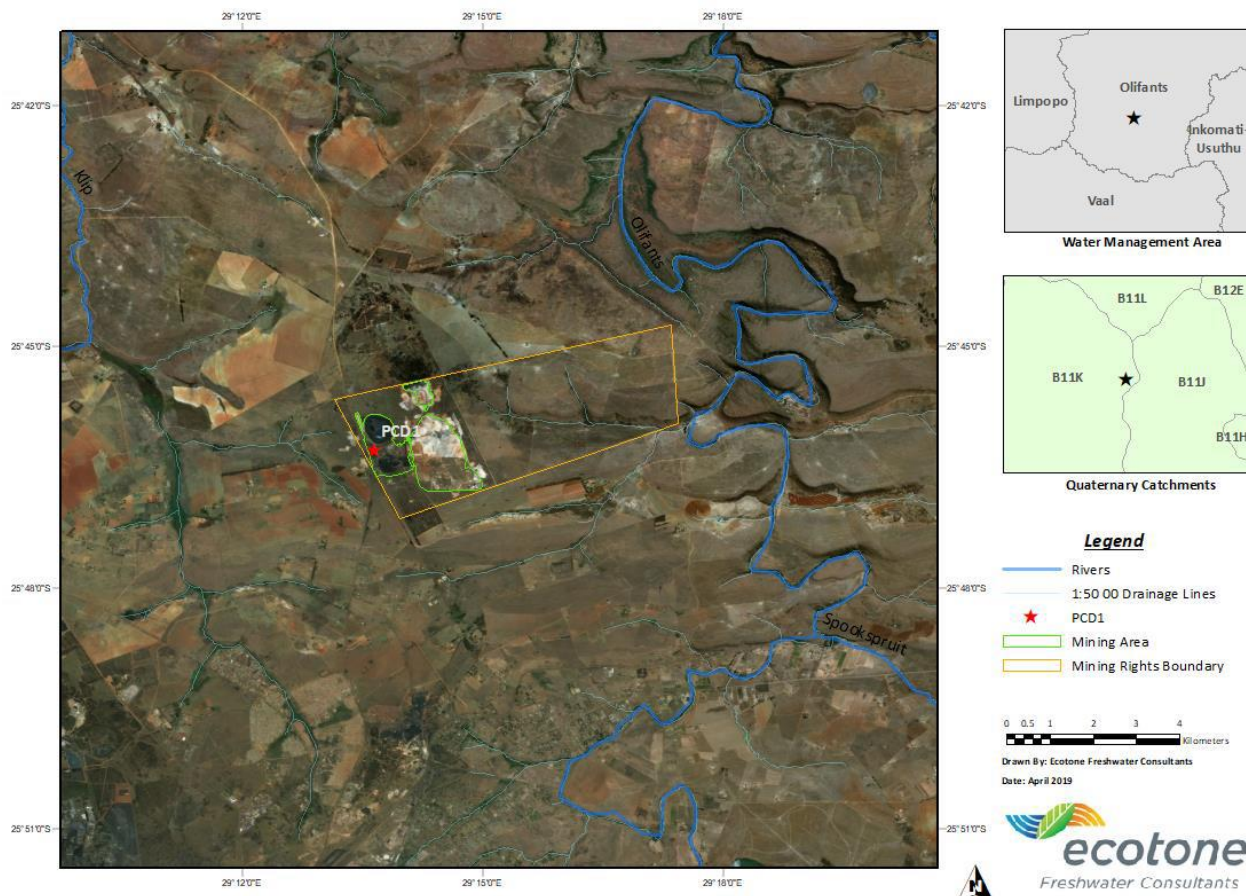


Figure 3: Catchment Boundaries

1.3 PURPOSE OF THE IWWMP

From a legal perspective, the IWWMP fulfils the requirement of the Integrated Water Use Licence Application, providing a plan for implementation of the WUL commitments for the water uses related to the current operations at the mine. From a best management practice perspective, the IWWMP provides the mine with a consolidated approach for implementation of the Department of Water and Sanitation (DWS) Best Practice Guidelines (BPGs) and Inyanda washplant's standards to achieve integrated water management while simultaneously protecting the surrounding water resource.

The IWWMP is an outline of a comprehensive plan for the complete water and water containing waste management cycle at the operation over the lifetime of the operation. It has been devised in collaboration with relevant personnel, to optimise water uses and minimise water-related impacts to achieve and maintain:

- Corporate and regulatory compliance, with emphasis on the water use licence conditions, Regulation 704 and EMPR water commitments;
- Environmental benefits and continued stewardship;
- Close / cordial / constructive community, neighbour and regulatory relationships;
- Significant reductions in operating and remediation costs;
- Major reductions in closure liabilities;
- Enhancements in the technical capacity and personal satisfaction of mine personnel; and
- Enviable company reputation and shareholder approval.

The IWWMP provides a structure that defines the regulatory framework and promotes:

- The setting of clear objectives and targets, aimed at achieving the bulleted benefits above;



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- The development and optimisation of tools such as a water monitoring program, interactive water balances; assessment techniques, troubleshooting measures, reporting structures;
- The formulation of strategies to achieve the objectives; and
- The detailing of plans specifying targets, activities, resources, responsibilities, programs, feedback through monitoring, and modifications for maintenance of successes.

The IWWMP is therefore a living document that will be revised and updated throughout the life of the operations to accommodate additional information and improved technology to ensure that water and waste management is continually optimised and adapted to the changing needs of the water management area thereby reducing the risks of the operation to the environment and humans. The IWWMP is in the format provided for in the **Annexure D of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals, GNR 267, March 2017**. The applicable BPG for Mining (Department of Water and Forestry (DWAF), 2008) have been used as input to the IWWMP and information on the operations has been sourced from the relevant and most current specialist documents.



2. CONTEXTUALISATION OF ACTIVITY

2.1 DESCRIPTION OF ACTIVITY

The mine targeted coal from the No 1 and No 2 seams of the Vryheid Formation, via open pit roll-over mining. The Mine was originally designed to supply 1,200,000 tons per annum of 15% ash coal for the export market. A maximum annual production rate of 1,800,000 tons of coal was envisaged (Clean Stream, April 2005). Inyanda Coal Mine has ceased its mining operation and is currently only operating a washing plant. The opencast pit has been fully rehabilitated and vegetated. The Mine also involves on-site processing via a wash plant, with discard being disposed of on the co-disposal dump, which is still operational. Coal is received, for processing, from Leeuwfontein/ Driefontein, T&DB and Blesbok Mines.

Inyanda Coal Mine operated a co-disposal facility (discards and slurry). Disposal is taking place at the co-disposal facility as an interim measure, slurry will also be disposed into the co-disposal facility while the RWD is dredged. The co-disposal area will be rehabilitated in future. There are two workshop areas, each with its own wash bay, waste management area and oil separators.

The current activities are limited to the operational washplant. The mining operation has ceased and the opencast rehabilitated.

2.2 KEY ACTIVITY RELATED PROCESSES

The Inyanda washplant & co-disposal facility only functions for coal washing and co-disposal area.

2.3 ACTIVITY LIFE DESCRIPTION

The Mining Right commenced on 6 November 2006 and will continue to be in force for a period of 20 years ending on 05 November 2026.

The Inyanda washplant & co-disposal facility is operated indefinitely and thus the activity does not have a perceived finite life expectancy.

2.4 ACTIVITY INFRASTRUCTURE DESCRIPTION

Infrastructure associated with the Inyanda washplant & co-disposal facility includes the following:

2.4.1 Roads, Railway Line, and powerlines

There is a good network of tarred roads and railway lines connecting the mine with surrounding towns. The Inyanda Coal Mine is located within Emalahleni Town in Mpumalanga, next to the Emalahleni railway station.

2.4.2 Electricity Supply

Eskom serves as the sole supplier of electricity to the Inyanda washplant and co-disposal facility.

2.4.3 Water Supply

Potable water for use at the Inyanda washplant and co-disposal facility's administrative office and change house is sourced from a borehole located on site. Water is abstracted from this borehole via a 0.75 kw pump and stored in a 5 000-litre potable tank for daily consumption. Aligned with the stormwater management principles for the Inyanda washplant, contaminated runoff is contained in the PCD and is reused for the sidings operations such as at the workshop area.

Water for dust suppression at the Siding is obtained from the lined Pollution Control Dam on site. Water is not obtained from the local municipality or abstracted from surrounding surface water resources for utilisation at the Siding. Annually an approximate volume of 2 160 m³ /annum water is abstracted from the operational borehole.



2.5 KEY WATER USES AND WASTE STREAMS

2.5.1 Key Water Uses

The key Water Uses for the Inyanda washplant and co-disposal facility are summarised in Table 3 below:

Table 3: Summary of key Water Uses

Section 21 water use	Description of Section 21 water use	Description of key water use	Purpose of activity	Duration of activity
Section 21(a)	Taking water from a water resource.	Groundwater is abstracted and is stored onsite.	The abstracted water is used for domestic consumption and sanitary purposes.	Permanent
Section 21(i)	Altering the bed, banks, course or characteristics of a watercourse.	The mining area is located on a watershed draining to Blesbokspruit and the Olifants river to the east. The washplant and co-disposal facility drain towards an unnamed tributary of the Blesbokspruit.	Activities essential for the operation washplant and co-disposal facility	Permanent
Section 21(g)	Disposing of waste in a manner, which may detrimentally affect a water resource.	The following activities and infrastructure associated with the washplant and co-disposal facility constitutes Section 21(g) water uses: Coal stockpiling area. Return water dam	Activities essential for the operation of the washplant and co-disposal facility	Permanent
Section 21(j)	Removing, discharging or disposing of water found underground.	Removing underground water into return dam.	Water re-used for operations on site.	Permanent

2.5.2 Waste Streams

The following definitions, taken from the Inyanda Coal Mine standard practice instruction (IC-ENV-SPI 001) are used to describe potential waste streams generated at the Inyanda washplant and co-disposal facility:

- **General waste:**
Waste that does not pose an immediate threat to man or the environment i.e. household or garden waste. However, through decomposition or percolation it may produce leachate, which has pollution potential.
- **Domestic waste:**
Waste typically generated at the office and / or change house.
- **Hazardous waste:**
Waste that may, by circumstances of use, quantity, concentration or inherent physical, chemical or infectious characteristics, cause ill-health or increase mortality in humans, flora and fauna, or adversely affect the environment when improperly treated, stored, transported or disposed of.

A number of different waste streams were identified at Inyanda washplant and co-disposal facility. Throughout the Operational Phase of the lifecycle of the washplant, general, domestic and hazardous waste will continue to be generated. The waste streams generated by the washplant are limited to the following:



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- Contaminated run-off from the dirty water management area (especially where coal dust and residue from the stockpiling area comes into contact with surface water).
- Used oil, lubricants, diesel, oil rags and other oil-based wastes mainly generated at the vehicle workshop.
- Domestic waste (generated predominantly from office and change house).
- Domestic wastewater / sewage.

2.5.2.1 Waste Stream Characterisation

Each of the waste streams identified above are described according to characteristics below. The waste classification classes mentioned below is based mainly (but not only) on SABS Code 0228 titled "The Identification and Classification of Dangerous Goods and Substances".

2.5.2.1.1 Contaminated run-off from dirty water management area

Surface water run-off from the isolated dirty water management area (e.g. Coal stockpile area) at the Inyanda washplant is contaminated through contact with the coal dust and residues from the coal stockpiling area. This contaminated dirty water flows (via gradient) into a dirty water channel and eventually drains into the lined Pollution Control Dam (for re-use). This type of waste is classified as a Class 9 (other miscellaneous substances) waste as per the SABS Code 0228.

2.5.2.1.2 Used oil, lubricants, diesel, oil rags and other oil-based wastes mainly generated at the vehicle workshop

All oil based wastes and used lubricants are considered hazardous and must be disposed of in accordance with the mentioned legislative requirements. Due to the nature of this waste, it is classified as a Class 9 waste and should be disposed of at a registered hazardous waste site.

Oil based wastes and used lubricants are collected in appropriately marked containers / bins with the waste being removed by contractors and disposed of at a registered hazardous waste facility (as per Inyanda Coal Mine's Standard Practice on Waste Management)

It is possible to recycle used oil, however, most oil recycling companies will only collect lubrication oil, and not any coolants, cutting fluid, solvents, brake fluid or any other oil that is tainted with ammonia or other contaminants. These non-recyclable oils must be disposed of at a registered licensed hazardous waste facility.

All dirty water as well as any hydrocarbon spills and waste that is generated by the vehicle wash bay is captured in an oil sump to capture oil-based waste and lubricants during the washing process.

2.5.2.1.3 Domestic waste

Domestic waste is not considered to be directly hazardous and can consist of, but is not limited to the following:

- Paper.
- Glass.
- Food (organic) wastes.
- Plastics.
- Metal (tin, aluminium foil).

Domestic waste at the Inyanda washplant is collected in appropriately marked bins / containers (as per Inyanda Coal Mine's Standard Practice on Waste Management) with the waste being removed by contractors and disposed of at a registered domestic landfill site.

2.5.2.1.4 Domestic waste water and sewage



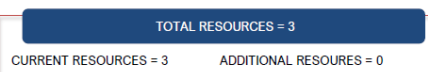
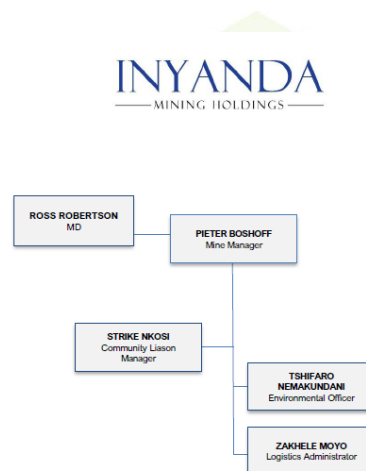
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Domestic wastewater and sewage at Inyanda washplant originates from the administrative office, change house and control room for the weighbridge. This waste contains mostly organic material and is disposed of into five conservancy tanks (located outside the weighbridge control room). A waste contractor removes the accumulated organic waste (sewage) from these tanks once these tanks have reached their individual capacities.

2.5.2.2 Control mechanisms

The main objective of waste management is to control and minimise the quantities of waste that is produced and to ensure that waste is collected and disposed of in an environmentally responsible and legally compliant manner. To achieve this, Inyanda washplant maintains registers of all significant types and quantities of solid waste as well as quantities produced.

2.6 ORGANISATION STRUCTURE



2.7 BUSINESS AND CORPORATE POLICIES

- Be responsible towards the environment in which the organization operates;
- Developing, implementing and maintaining effective Safety, Health and Environmental management systems. Striving for continuous improvement through objective setting and continuous review;
- Complying with relevant national and international Safety, Health and Environmental, laws, industry standards and norms;
- Employee training to improve knowledge of the Safety, Health and Environmental risks;
- Effectively controlling all forms of pollution.



3. REGULATORY WATER AND WASTE MANAGEMENT FRAMEWORK

3.1 SUMMARY OF WATER USES

Eleven (11) Water Uses as defined in Section 21 of the NWA, (1998), are presented in Table 4 to Table 6, below. For ease of reference, the Water Uses are according to the Water Use definition and sequence, in line with Section 21 of the NWA, (1998). Also for ease of reference (especially cross-referencing), the Water Uses have been numbered sequentially.

Table 4: Summary of All Section 21 (A) Water Uses Currently Undertaken at the Inyanda washplant and co-disposal facility

Water Use No.	Property	Activity Name	Description / purpose	Volume / Capacity (m ³)	Annual abstraction quantity (m ³)	Authorisation status
1.	Portion 21 of Kalbasfontein 284 JS	WB01	Abstracting water from borehole (WB01) for domestic use.	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011.
2.		WB02	Abstracting water from borehole (WB02) for domestic use	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011.
3.		WB03	Abstracting water from borehole (WB03) for domestic use	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011.
4.		WB08	Abstracting water from borehole (WB08) for domestic use	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011.
5.		Open pit	The use of water for dust suppression from the open pit	31.23 m ³ / day	11400 m ³ / annum	Licensed in 2011.
6.		Water removed from the underworking	Water removed from the underworking, removed through dewatering in order to be pumped into the return water dam to be reused in the mining process	100 m ³ / day	36500 m ³ / annum	Licensed in 2011.



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Table 5: Summary of all Section 21 (c) & (i) Water Uses currently undertaken at the Inyanda Inyanda washplant and co-disposal facility

Water Use No.	Property	Activity Name	Description / purpose	X-coordinate Latitude (S) Y-coordinate Longitude (E)	Volume / Capacity (m³)	Annual disposal / abstraction /imported quantity (m³)	Authorisation status
7.	Portion 04 of Moofontein 285 JS.	Raw water pipeline infrastructure leading to Dam 1 to the washing plant.	Conveyance of abreacting raw water to the mine.	S25 46 44.3 E29 16 47.6	Not Applicable	Not Applicable	Licensed in 2011.

Table 6: Summary of All Section 21 (G) Water Uses Currently Undertaken at the Inyanda Inyanda washplant and co-disposal facility

Water Use No.	Property	Activity Name	Description / purpose	X-coordinate Latitude (S) Y-coordinate Longitude (E)	Volume / Capacity (m³)	Annual disposal / abstraction /imported quantity (m³)	Authorisation status
8.	Portion 21 of Kalbasfontein 284 JS	Return Water Dam	Wastewater disposed into the Return Water Dam.		242 m³ / day	88 479m³ / year	Licensed in 2011
9.		Biofilter dam	Disposing domestic wastewater from Biofilter plant into a Biofilter dam		299 m³ / day	11 400 m³ / year	Licensed in 2011
10.		Dust Suppression	Disposing wastewater and using it for dust suppression		299 m³ / day	109 440 m³ / year	Licensed in 2011

Table 7: Summary of All Section 21 (J) Water Uses Currently Undertaken at the Inyanda washplant and co-disposal facility



Water Use No.	Property	NWA, 1998 Section 21	Activity Name	Description / purpose	X-coordinate Latitude (S) Y-coordinate Longitude (E)	Volume / Capacity (m3)	Annual storage quantity (m³)	Authorisation status
11.	Portion 21 of J Kalbasfontein 284 JS.		Return water dam	Removing underground water from open cast pit. The water disposed into the return water dam.	S2851048.551 E2851048551	399 m³ / day	145 940 m³ / annum	Licensed in 2011.



3.2 EXISTING LAWFUL WATER USERS

None.

3.3 RELEVANT EXEMPTIONS

. Government Notice 704 (GN 704) was published on 4 June 1999, in Government Gazette No. 20119, Vol. 408, in terms of Section 26 (1) (b), (g) and (i) of the NWA. This section of the NWA makes provision for the Minister to, subject to subsection (4), make regulations:

- Requiring that the use of water from a water resource be monitored, measured and recorded;
- Regulating or prohibiting any activity in order to protect a water resource, or instream or riparian habitat; and
- Prescribing the outcome and or effect which must be achieved through management practices for the treatment of waste, or any class of waste, before it is discharged or deposited into or allowed to enter a water resource.

Sub-section 4 of 26 provides for the Minister to take all relevant considerations into account when making regulations, including the need to:

- Promote the economic and sustainable use of water;
- Conserve and protect water resources or in-stream and riparian habitat;
- Prevent wasteful water use;



- Facilitate the management of water use and waterworks;
- Facilitate the monitoring of water use and water resources; and
- Facilitate the imposition.

Section 3 of GN 704 makes provision for the Minister to authorise, in writing, an exemption from the requirements of regulations 4, 5, 6, 7, 8, 10 or 11 on his or her own initiative or on the application, subject to such conditions as the Minister may determine.

In terms of the linkages of GN704 with other requirements of the NWA, it is stated in Operational Guideline No. M6 that should provide an exemption from any requirements of GN704 implies the necessity for a water use Licence, the person in control of the mine or activity need only apply for a Licence. The Licence has higher authority than the GN704. This Licence application, therefore, serves as a motivation for exemption from GN704, Regulation 4.

GN 704 and Regulation 77 of the NWA (Act 36 of 1998) place restrictions on the mining activities for the protection of water resources. Of relevance to the Applicant is the restrictions placed on locality (Section 4), which states:

“No person in control of mine or activity may –

- (a) locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1: 100-year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor;
- (b) except in relation to a matter contemplated in regulation 10, carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1: 50-year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest;
- (c) place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or
- (d) use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1: 50-year flood-line of any watercourse or estuary.”

LKS Consulting was appointed by Inyanda Mining Holdings (Pty) Ltd to audit the compliance of the Inyanda Coal Mine against GN704 of the National Water Act, Act

36 of 1998 (NWA). Inyanda Coal Mine is situated on the Portions 21 of farm Kalbasfontein 284 JS & portion 4 of farm Mooifontein 285 JS. The main recommendations of the Audit Report were:



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- The water that is being taken from Danie Keets Farm is used as top-up process water on occasion. Even though this water use was included in the IWULA, it was not granted. This water use is unauthorized. There is a need for Inyanda to obtain authorization for water taken from "Danie Keets dam.
- Flowmeter recordings and abstraction amounts are submitted to DWS in line with the approved conditions of the WUL. The necessary flow meters have been installed for all water uses as required except the Biofilter area.
- A desilting program must be implemented on-site. This should ensure all trenches are silt free to be free draining and allow clean or dirty water to report to the designated areas.
- As part of the structural integrity assessment of the RWD; desilting must be undertaken as a matter of urgency if the dam is to be utilised on-site. At present, the RWD is not operated with a minimum freeboard of 0.8 meters.
- Proper record-keeping of malfunctions and stormwater channels and berm inspections and maintenance must be kept on site.

3.4 GENERAL AUTHORISED WATER USES

In terms of Section 22(1) of the NWA, a person may use water without a license if that water use is permissible in terms of a General Authorisation (GA) issued under Section 39 of the Act.

An assessment was done of the General Authorisations under the NWA, namely:

- General Authorisation No. 399, dated 26 March 2004 in terms of Sections 21 (a), (b), (e), (f) (g) and (h) water uses;
- General Authorisation No. 398, dated 26 March 2004 in terms of Section 21 (j) water use;
- General Authorisation No. 1199, dated 18 December 2009 in terms of Sections 21 (c) and (i) water uses; and
- General Authorisation No. 1198, dated 18 December 2009 in terms of Sections 21(c) and (i) for the purpose of rehabilitating a wetland for conservation purposes.

3.5 NEW WATER USES TO BE AUTHORISED / AMENDMENTS REQUIRED

No new Water Uses are required. Some of the volumes need to be verified in order to confirm whether the volumes in the IWUL need to be amended.

Water Use No.	Property	NWA, 1998 Section 21	Activity Name	Description / purpose	Volume / Capacity (m ³)	Annual abstraction quantity (m ³)	Authorisation status
12.	Portion 21 of Kalbasfontein 284 JS	A	WB01	Abstracting water from borehole (WB01) for domestic use.	31.23 m ³ / day	11400 m ³ / annum	No Change
13.		A	WB02	Abstracting water from borehole (WB02) for domestic use	31.23 m ³ / day	11400 m ³ / annum	No Change



14.		A	WB03	Abstracting water from borehole (WB03) for domestic use	31.23 m ³ / day	11400 m ³ / annum	No Change
15.		A	WB08	Abstracting water from borehole (WB08) for domestic use	31.23 m ³ / day	11400 m ³ / annum	No Change.
16.			Open pit	The use of water for dust suppression from the open pit	31.23 m ³ / day	11400 m ³ / annum	No Change
17.	Portion 21 of Kalbasfontein 284 JS		Water removed from the underworking	Water removed from the underworking, removed through dewatering in order to be pumped into the return water dam to be reused in the mining process	100 m ³ / day	36500 m ³ / annum	No Change
18.	Portion 04 of Moofontein 285 JS.	c & i	Raw water pipeline infrastructure leading to Dam 1 to the washing plant.	Conveyance of abstracting raw water to the mine.	Not Applicable	Not Applicable	No Change
19.	Portion 21 of Kalbasfontein 284 JS	G	Return Water Dam	Wastewater disposed into the Return Water Dam.	242 m ³ / day	88 479 m ³ / annum	No Change.
20.	Portion 21 of Kalbasfontein 284 JS	G	Biofilter dam	Disposing domestic wastewater from Biofilter plant into a Biofilter dam	31 m ³ / day	11 400 m ³ / annum	No Change
21.	Portion 21 of Kalbasfontein 284 JS	G	Dust Suppression	Disposing wastewater and using it for dust suppression	299 m ³ / day	109 440 m ³ / annum	No Change
22.	Portion 21 of Kalbasfontein 284 JS.	J	Return water dam	Removing underground water from open cast pit. The water disposed into the return water dam.	399 m ³ / day	145 940 m ³ / annum	No Change



3.6 WASTE MANAGEMENT ACTIVITIES (NEMWA)

Account was taken off all activities at the washplant which results in the generation of waste; the various categories of waste generated, the method of storage and disposal of the various waste types as well.

While the operation of the washplant and co-disposal facility generates waste streams that fall within both hazardous (including used oils, rags contaminated with hydrocarbons as well as containers of hydrocarbons) and general waste (domestic waste including paper, plastic, glass, metals) categories, the combined volumes of waste generated and temporarily stored, were below the thresholds defined in the list of waste management activities (2010) (GN.718) under the NEMWA, (2008) at the time of the application. The waste generated on-site and the management thereof did therefore not constitute as a waste management activity and did not require a Waste License under the NEMWA (2008).

3.7 WASTE RELATED AUTHORISATIONS

N/A.

3.8 OTHER AUTHORISATIONS (EIAs, RMP, ROD, REGULATIONS)

Inyanda Coal Mine/Wash Plant has an approved new order mining right in terms of the MPRDA. The mining right was granted for a period of 20 years – ending on 5 November 2026. The Inyanda Colliery currently operates under their approved Mining Right (MP/30/5/1/2/2 34 MR).



4. PRESENT ENVIRONMENTAL SITUATION

4.1 CLIMATE AND AIR QUALITY

4.1.1 Regional Climate

The Drakensberg Escarpment divides the Mpumalanga Province into the westerly Highveld Grassland Savannah and the eastern subtropical Lowveld region. The climate for each of these areas varies significantly from each other. The Inyanda washplant falls within the Highveld Region of the Mpumalanga Province. The area has a typical Highveld climate characterised by warm summers and cold winters. The highest rainfall period occurs mainly from November to April. The average summer day time temperatures are moderate with an average of 24 °C. Average winter daytime temperatures are moderately low with an average of 19.2 °C (eMalahleni IDP, 2013). Frost in the area is generally experienced on average 30 days per annum as during the winter months the temperature may fall to -11 °C. The prevailing wind directions are northwest and southeast, reaching an average wind speed of 9.6 km/hour (EIR, CSES 2007).

4.1.2 Regional Climate Rainfall

4.1.2.1 Mean Rainfall

The Inyanda washplant and co-disposal facility resides within an area where the Mean Annual Precipitation (MAP) ranges from 660 - 740 mm. Rainfall gauges situated closest to the study area include Kwa-Mthunzi Vilikazi (0515234), Landau (0515386) and Witbank (0515412). The WRC report (No 298/1.1/94) rainfall figures were adopted for the study area. The average annual rainfall recorded at the selected gauges is shown in Table 8. The distribution of rainfall during the year is shown in Table 9.

Table 8: MAP

Weather Bureau Gauge No.	Station name	Latitude		Longitude		Record used	Useable years	MAP (mm)
		D	M	D	M			
0515234	Kwa-Mthunzi Vilikazi	25	54	29	08	1922-1974	53	737
0515386	Landau	25	56	29	13	1950-1989	40	689
0515412	Witbank	25	52	29	14	1956-1989	34	716
Adopted MAP in (mm) with weighted average of 40:40:20								714

Table 9: Average Monthly Rainfall (mm)

Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
% Distribution	9.70	16.80	15.86	17.26	13.20	11.44	6.55	2.51	1.20	1.04	1.02	3.42	100
Monthly rain	69.26	119.95	113.24	123.24	94.25	81.68	46.77	17.92	8.57	7.43	7.28	24.42	714

4.1.2.2 Rainfall intensities

Maximum rainfall intensities recorded at the Kwa-Mthunzi Vilikazi weather station (situated within close proximity to the Inyanda washplant) are shown in Table 10.



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Table 10: Maximum Rainfall Intensities in 24 hours (Kwa-Mthunzi Vilikazi Weather Station)

Years of record	Maximum in 24 hours (mm)	Recurrence Interval (mm)	
		50 years	100 years
52	150	119	136

4.1.2.3 Temperatures

Temperature has a direct effect on all forms of life on earth (Schulze, et al, 1997). Temperature affects a wide range of processes and activities including, human, agricultural and natural. Therefore, the temperature parameters such as diurnal and seasonal maxima and minima, controls the distribution of crops, thus influences agricultural potential of the area.

Table 11 indicates the average daily maximum and minimum temperatures for Mpumalanga Province.

Table 11: Mean daily maximum and minimum temperatures (adapted from Schulze et al 1997)

Month	Average Daily Maximum	Average Daily Minimum
January	26.8	15.3
February	26.5	15.0
March	25.6	13.8
April	23.6	13.5
May	21.7	6.9
June	19.1	3.8
July	19.4	3.7
August	21.7	6.0
September	27.0	9.3
October	28.5	11.7
November	29.3	13.4
December	26.4	14.7
Annual	24.6	10.6

4.1.2.4 Wind direction and speed

As previously mentioned, the wind directions are predominantly northwest and southeast, reaching an average wind speed of 9.6 km / hour (EIR, CSES 2007). The Highest hourly wind speeds recorded in Kwa-Mthunzi Vilikazi over the period of May 1999 to April 2000 was that 39.6 km / hour with average monthly wind speeds ranging from 3.24 km / hour to 12.96 km / hour.

4.1.2.5 Evaporation

An average Mean Annual Evaporation of 1 700 mm (according to Appendix 8 of the WRC Report No. 298/1.1/94) apply to the Inyanda washplant. The area falls within Evaporation Zone 4A. The average monthly lake evaporation is shown with an average Mean Annual Evaporation of 1 700 mm and it is provided in Table 12.



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Table 12: Mean monthly evaporation

1700	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
S Pan %	10.8	10.2	11.2	11	9.2	9.1	7	5.9	4.8	5.2	6.9	8.9	100
S Pan mm	183	173	190	187	156	154	118	100	81	89	117	152	1700
Lake evap (mm)	148	142	158	157	137	136	104	87	69	74	95	123	1430

4.1.2.6 Incidence of extreme weather conditions

According to Schulze et. al. (1997) the area under investigation for the Inyanda washplant is located in a region with between 6 and 7 lightning flashes per kilometre per year. The project area also falls within a region where hail occurs between 1 and 5 times per year.

4.2 SURFACE WATER

The Inyanda washplant and co-disposal facility is also located within the Olifants River Water Management Area and extends over two quaternary catchments (within this Water Management Area) namely B11K & B11J. The mining area is located on a watershed draining to Blesbokspruit and the Olifants river to the east. The washplant and co-disposal facility drain towards an unnamed tributary of the Blesbokspruit. A small gully drains the eastern side of the rise and forms an unnamed tributary to the Olifants River, which flows approximately 5 km to the east across the farm Mooifontein 285 JS.

The surface runoff water that drains to the west of the north-south rise eventually contributes to an unnamed tributary of the Blesbok Spruit that runs approximately 4 km west of the farm Kalbasfontein 284 JS.

No watercourses run through the proposed area of surface disturbance.

The MAP- MAR response behaviour for the B11K and B11J catchment areas is given as Curve 7 in WR90. Applying the adopted MAP of 712 mm to this curve, a MAR of 56mm could be expected. The **majority** of the project area is located in the quaternary catchment B11K which falls within the Olifants Water Management Area (WMA 2) as revised in the 2012 water management area boundary descriptions (government gazette No. 35517). The surface water attributes of the affected quaternary catchment namely Mean Annual Precipitation (MAP), Mean Annual Runoff (MAR), and Mean Annual Evaporation (MAE) were obtained from the Water Resources of South Africa 2012 Study (WR2012).

4.2.1 Water and Salt Balance

4.2.1.1 Water Balance

The updated water balance for the Inyanda Inyanda washplant and co-disposal facility was calculated by Eco Elementum in May 2020. The average, water balances are provided in Figure 4 below. The water balance is intended to quantify the amount of water entering a system (through precipitation and groundwater flows) and the amount leaving a system (through evaporation, surface water flows, sewage, product water loss and groundwater flows). The water balance update was prepared based on the current activities and existing water consumption figures provided by the washplant.



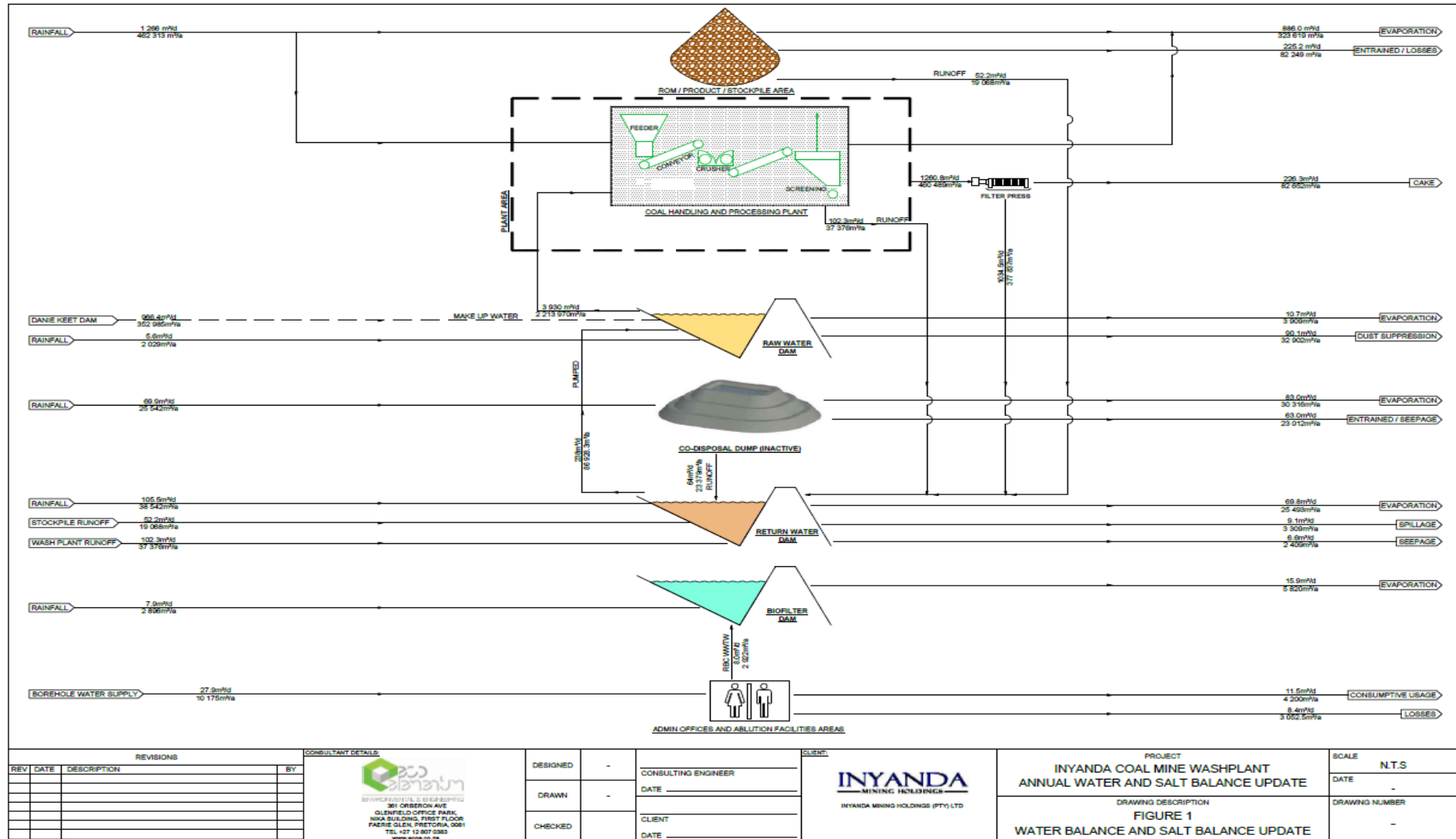


Figure 4: Average water balance for the Inyanda washplant and co-disposal facility washplant and co-disposal facility (m³/month)



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4.2.1.2 Salt balance

Coal mining, and its associated activities, may often lead to degradation in water resource quality. Although the pollutants may often vary the total dissolved salt (TDS) provides a good indication of the extent of water contamination.

The TDS is representative of the total inorganic salt content dissolved in water. High TDS impart a salty or bitter taste to water. Salts such as sulphates are not easily removable from drinking water and advances processes such as ion exchange or membrane processes need to be incorporated in conventional drinking water plants, to remove sulphates.

Please refer to the updated water and salt balance report for the Inyanda washplant calculated by Eco Elementum in May 2020.

4.2.2 Water Management Area

The Inyanda washplant and co-disposal facility falls within quaternary catchments B11K and B11J. As indicated in Aquatic Biomonitoring study titled “*Inyanda Colliery, Mpumalanga Province aquatic biomonitoring assessment*” dated September 2020 and compiled by Ecotone consultants, the ecological importance classification for the two quaternary catchments, the systems in the area can be classified as Critically Endangered and Endangered in terms of ecological importance and sensitivity which, in their present state, are considered to be Class B and E.

4.2.3 Surface Water Hydrology

The site is situated in the Olifants River Catchment on a watershed that drains to the Blesbokspruit in the west and the Olifants River in the east. The open pit areas drained to both these rivers while the wash plant runoff will only drain to the Blesbokspruit west of the Mine. The Mine is located in catchments B11K and B11J (the western portion where the wash plant and dump are).

4.2.3.1 Mean Annual Runoff

Information pertaining to the Mean Annual Runoff for the quaternary catchments B11K and B11J is provided in Table 13 below.

Table 13: Mean annual runoff for the relevant catchment areas

Catchment	Catchment area (km ²)	MAR (106 m ³)	MAR % of total
B11K: Quaternary	683.8	23.0	100.0
B11J: Quaternary	681.1	14.7	100.0

4.2.3.2 Average dry weather flow

The average dry weather flow was calculated as the average expected flow under pristine conditions based on the three driest months of a hydrological year. These months are July to September for the study area during which period 9 % of the MAR occurs.

4.2.4 Surface Water Quality

Inyanda Colliery appointment Geovicon Environmental (Pty) Limited to conduct monthly surface water and quarterly groundwater monitoring activities on the mining site and its surrounds. The overall, the water quality recorded, at all the monitoring points at Inyanda Plant indicate that the water management measures utilised on the mine are effective to prevent contamination of the natural water system. There was an overall decrease in chemical variables as well as decrease in heavy metal concentrations during the current reporting period. Surface monitoring points KF 01 and KF 13 were dry and no sample could be obtained. Monitoring point KF 01a (fountain) indicated water of fair quality with low water quality variables, pH was acidic and not complying with the limits of the WQT for domestic use.

4.2.4.1 Measured data



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Overall, the water quality recorded, at all the monitoring points at Inyanda Plant indicate that the water management measures utilised on the mine are effective to prevent contamination of the natural water system. There was an overall decrease in chemical variables as well as decrease in heavy metal concentrations during the current reporting period. Surface monitoring points KF 01 and KF 13 were dry and no sample could be obtained. Monitoring point KF 01a (fountain) indicated water of fair quality with low water quality variables, pH was acidic and not complying with the limits of the WQT for domestic use. KF02 and KF 03 indicated water of good quality with iron and aluminium slightly exceeding WQT for domestic use. KF 04 and KF 05 are located within the Blesbokspruit, upstream and downstream of the Inyanda Plant, both indicated water of poor quality with heavy metal concentrations exceeding the RQO of the Olifants River Catchment. KF 06 and KF 08 both indicated water of good quality with a general decrease in heavy metal concentrations. KF 10 is a return water dam situated on-site and indicated water of poor quality, and it is expected to have high values (part of dirty water system). Monitoring point KF 11 indicated water of good quality with decrease in chemical variables as well as heavy metal concentrations. Monitoring point KF 12 is located at an unnamed spruit before the confluence with the Blesbokspruit flowing from the Inyanda Plant, indicated water of good quality with only iron slightly exceeding the WQT for domestic use. KF 14 indicated water of good quality with decreasing water quality variables and heavy metal concentrations. KF 18 is the effluent dam situated on-site and it indicated water of good quality with basic pH. The process water dam (KF 19), situated within the Inyanda Plant, indicated water of poor quality with high values of water quality variables and heavy metal concentrations. KF 20 and KF 21 forms part of the dirty water system, hence both indicated water of poor quality with elevated concentrations of chemical variables. Louw 1 and Louw 3 indicated water of good and fair quality respectively.

4.2.5 Resource Class and River Health

4.2.5.1 Resource Class

In South Africa, a river health classification scheme is used to standardise the output of different river systems. The document titled “Resource Directed Measures for Protection of Water Resources: River Ecosystems Version 1.0.24”, dated September 1999, compiled by the DWA, provides the indexes of AEMC as shown in Table 14 below. Each index is calibrated so that its results can be expressed in terms of ecological and management perspectives.

Table 14: Resource classes as set out by the DWA

River Health Class	Ecological perspective	Management perspective
Natural / Excellent (Class A)	No or negligible modification of in-stream and riparian habitats and biota.	Protected rivers; relatively untouched by human hands; no discharges or impoundments allowed.
Good (Class B)	Ecosystems essentially in good state; biodiversity largely intact.	Some human-related disturbance but mostly of low impact potential.
Fair (Class C)	A few sensitive species may be lost; lower abundances of biological populations are likely to occur, or sometimes, higher abundances of tolerant or opportunistic species occur.	Multiple disturbances associated with need for socio-economic development, e.g. impoundment, habitat modification and water quality degradation.
Poor (Class D)	Habitat diversity and availability have declined; mostly only tolerant species present; species present are often diseased; population dynamics have been disrupted (e.g. biota can no longer reproduce or alien species have invaded the ecosystem).	Often characterised by high human densities or extensive resource exploitation. Management intervention is needed to improve river health – e.g. to restore flow patterns, river habitats or water quality.

The Upper reach of this section of the Olifants River Catchment falls into the River Health Class D as defined in Table 14 above.



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4.2.5.2 Ecological Management Class

The receiving Sub-Quaternary Reach (SQR) associated with the study area has a desktop PES that implies a *Seriously* modified state with *Moderate* Ecological Importance (EI) and *High* Ecological Sensitivity (ES) scores. The main catchment uses include mining and agricultural activities.

This is mainly due to the impacts on the system arising from land use activities such as terrestrial vegetation encroachment, flow alterations, water quality modification, topographical alterations, increased silt load and alien floral invasion.

4.2.6 Receiving Water Quality Objectives and the Reserve

The reserve determination as well as the setting of water quality objectives should be carried out by the DWA. The department will however be consulted on a continuous basis in this regard and the IWWMP will be updated accordingly to include the reserve and water quality objective, once they were made available by the DWA.

4.2.7 Surface Water User Survey

The predominant land uses surrounding the Inyanda washplant and co-disposal facility include mining activities as well as agriculture. These sectors are therefore also the main users of water resources in the area in addition to the provision of potable water to surrounding communities. A detailed surface water user survey was not conducted for the washplant.

4.2.8 Sensitive Areas Survey

The study area in relation to the NFEPA, and the MBCP is illustrated in Table 15. The monitoring sites are not situated with a NFEPA (Nel *et al.*, 2011) and are situated within an *Ecosystem Maintenance* aquatic biodiversity sub-catchment (Ferrar & Lötter, 2007).

4.2.8.1 Classification of the wetland system

Table 15: Summary of the literature review and desktop study for the aquatic system associated with the study area.

Conservation Significance	Descriptor
NFEPA Areas (Nel <i>et al.</i> , 2011)	Not situated within an NFEPA.
MBCP (Ferrar & Lötter, 2007) – Aquatic biodiversity sub catchment	Ecosystem Maintenance

4.3 GROUNDWATER

4.3.1 Geology of the Study Area

The Vryheid Formation (Ecca Group) of the Karoo Sequence, which is present throughout the Witbank Area, attains some 140 metres at the thickest point and contains a number of coal seams, of which four are considered to have economic potential. The deposition of the Vryheid Formation sediments is largely controlled by the irregular pre-Karoo platform on which they were deposited. The pre-Karoo rocks, consisting mainly of felsites of the Bushveld Igneous Complex, have been glacially sculptured to give rise to uneven basement topography. The thin veneer sediments of the Dwyka Formation, which overlies the pre-Karoo, are generally not thick enough to ameliorate the irregularities in the placated surface, which therefore affected the deposition of the younger Vryheid Formation sediments.



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4.3.2 Aquifer Characterisation

The study area contains a shallow aquifer in the transitional soil and weathered bedrock zone or sub-outcrop horizon and a fractured Karoo rock-type aquifer that has higher and more heterogenous yields. Groundwater in the area is mostly used for domestic use, livestock watering and irrigation..

4.3.3 Depth of Groundwater Levels

Groundwater level data was collected during the hydrocensus boreholes drilled. Refer to Figure 5 below for the groundwater levels.

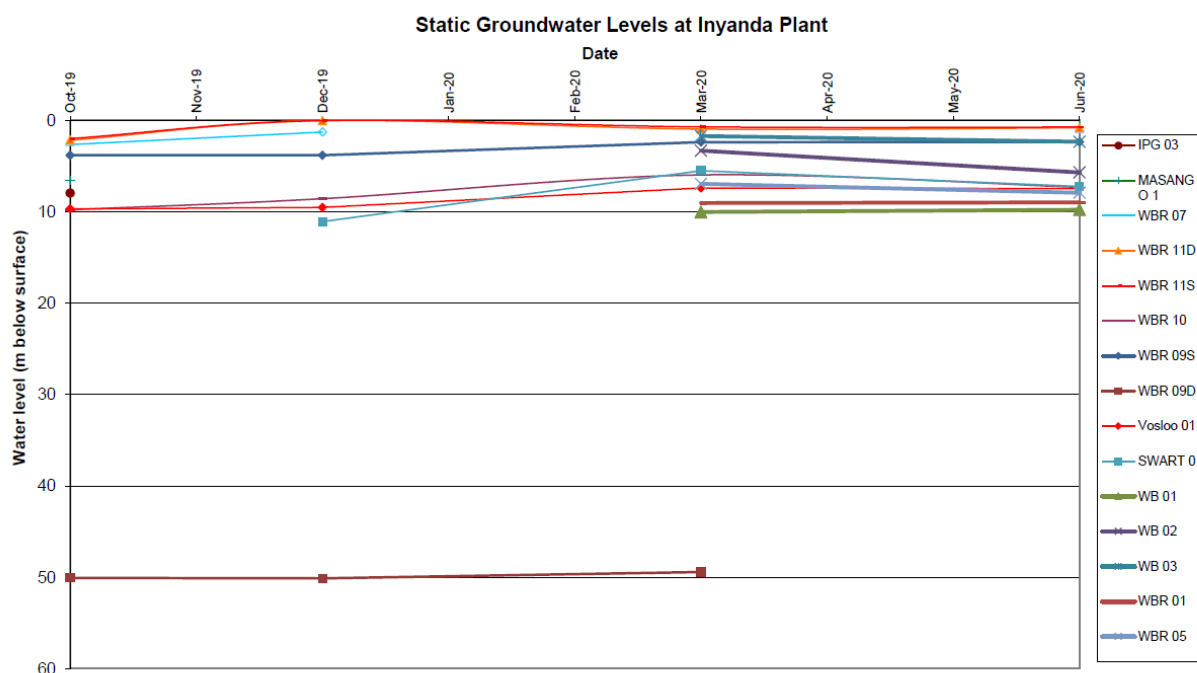


Figure 5: Static Groundwater Levels at Inyanda Plant

4.3.4 Groundwater Quality

Groundwater localities are currently monitored to characterise the groundwater quality on Inyanda washplant, as well as to identify any deterioration of groundwater quality.

4.3.5 Hydro-Census

A detailed hydrogeological investigation undertaken by Geo Pollution Technologies. As part of the investigation, a hydrocensus was conducted. The hydrocensus was done as a site familiarisation exercise and the collection of data from the study area and surrounding environments. It comprised a census of key boreholes, wells, spring and any other groundwater related information. During the hydrocensus, 11 boreholes were found while 5 were available for groundwater level measurement. The groundwater levels obtained from the existing mine monitoring program (17 boreholes) was also assessed. The groundwater levels varied between a minimum of 4.12 m and a maximum of 26.02 m below ground level.

Table 16: Hydrocensus information



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ID	Latitude	Longitude	Elevation	Owner	Casing height (cm)	Static water level (mbgl)	Static water level (mamsl)	Sampled (Y/N)	Use				Comments
									Garden	Livestock	Domestic	Game	
BH01	– 25.79222	29.22639	1518.194	Jack	30.000			No					
BH02	– 25.79306	29.2275	1518.168	Wilbert	30.000	5.9		Yes					No information of the Borehole.
BH03	– 25.79167	29.219999	1514.679	Zwelakhe	0.000	5.07		Yes					Borehole not functional.
BH04	– 25.79361	29.22917	1515.232	Bezuidenhout L.F (Beool)	100.000	6.14		Yes	X	X			~
BH05	– 25.79500	29.23111	1508.542	Kagiso	20.000	6.45		Yes	X	X			Sub pump.
BH06	– 25.79222	29.22778	1519.252	Jacob Mabena	10.000			Yes	X	X	X		Sub pump.
BH07	– 25.78111	29.21722	1490.626	Mr. Jumbo Van Der Merwe	0.300	25.05		Yes			X		Sub pump.
BH08	– 25.78111	29.21806	1490.622	Mr. Jumbo Van Der Merwe				Yes		X	X		No Accessto Borehole.
BH09	– 25.78695	29.216388	1499										No Accessto Borehole.
BH10	– 25.78028	29.21333	1486.714	Vreden				Yes	X		X		Borehole drilled over 27 years ago
BH11	– 25.78472	29.21583	1494.999										No Access to Borehole.



4.3.6 Potential Pollution Source Identification

A number of potential point sources of pollution have been identified for the Inyanda washplant. The identification of point sources of pollution provides the opportunity to formulate mitigation measures which are targeted at preventing the generation of pollution at specific source. The prominent point pollution sources have been identified within the dirty area at the washplant and includes the coal stockpiling area, conservancy tanks, pollution control dam as well as the workshop and washbay areas (Table 17).

Table 17: Possible point pollution sources

Point Source	Description	Pollution Pathway
Conservancy Tanks	Sewage from the change room area, administrative offices and weighbridge control room building are conveyed and temporary stored in conservancy tanks. A contractor routinely empties the conservancy tanks.	The overflowing or leakages from the conservancy tanks may contaminate the groundwater as well as surface water resources.
Pollution Control Dam	Dirty water runoff from the coal stockpiling area as well as runoff generated by ancillary operations of the washplant within the dirty water area is collected in the PCD.	Groundwater contamination through leachate and seepage from the PCD.
Workshop and Wash bay area	The washing and maintenance of vehicles is done at Workshop & Wash bay area.	Spillage of hydrocarbons as well as the failure to contain dirty water run-off may result in soil, groundwater and surface water contamination.
Coal Stockpiling area	Coal received from the Inyanda Coal Mine is temporary stockpiled until it is transported by rail to the Richards Bay Coal Terminal for export.	Leachate and runoff from the coal stockpiling area may contaminate groundwater and surface water resources.
Access roads	Gravel roads are used to gain access to the Inyanda washplant.	Spillage of coal on access roads, upon entering the Inyanda washplant, may cause contamination of surface and groundwater resources.

If appropriate management measures are not implemented at these areas, contamination of the groundwater and surface water may result from leachate from the coal stockpile and conservancy tanks as well as runoff from the workshop and wash bay area.

Chapter 5.8 of this IWWMP describes the potential impacts identified for the operational phase, decommissioning phase, post closure as well as the cumulative impacts that may occur. The possible mitigation measures to these potential impacts are also discussed in detail in Chapter 5.8 of this IWWMP document. The potential impacts discussed were identified and assessed from the following aspects of the environment:

- Surface water
 - Surface water flow.
 - Quantity.
 - Quality.
- Groundwater.
 - Groundwater flow.
 - Quantity.
 - Quality.
- Sensitive landscapes.



4.3.7 Groundwater Model

The hydrogeological investigation, more specifically the hydrocensus, identified the presence of several groundwater users. A total of eight (8) boreholes were identified within the 2 km radius of the investigation (refer to section 4.3.5 above).

Three (3) additional boreholes were also drilled to be added to the groundwater-monitoring programme. Water quality samples were taken from these additional boreholes as well as surrounding boreholes (identified during hydrocensus) that were accessible during the investigation. The analysis of these water samples indicated that the water was of good quality as the cation, anion and metal concentrations of the sample were within the DWAF Water Quality Guidelines for domestic use.

The groundwater level was determined through the boreholes identified during the hydrocensus as well as through the three additional boreholes drilled.

4.3.8 Risk assessment

The groundwater risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk (source term), the pathway along which the risk propagates, and finally the target that experiences the risk (receptor). The risk assessment approach is therefore aimed at describing and defining the relationship between cause and effect. In the absence of any one of the three components, it is possible to conclude that groundwater risk does not exist.

A risk assessment was conducted by Geo Pollution Technologies (2020) as part of the hydrogeological investigation for the Inyanda washplant. The risk assessment concluded that the probability for contamination occurring was low. This was based on the status of the groundwater environment where no contamination of the groundwater resources were evident.



5. ANALYSIS AND CHARACTERIZATION OF THE WATER USE ACTIVITY

5.1 SITE DELINEATION FOR CHARACTERISATION

Refer to Section 1 for detailed information.

5.2 WATER AND WASTE MANAGEMENT

The general principle of water management is the recognition that water is a scarce resource. This, in turn, leads to the other principles such as water use minimisation (water conservation) or re-use of water and pollution prevention or the limitation of pollution of water. All water that can be kept clean will be kept clean, and dirty water areas will be minimised. No water is discharged unless authorised by the DWS, especially water that exceeds the catchments water quality objectives, as set by the DWS, with the exception of emergency conditions if safety should demand so. All the relevant principles contained in DWA's Best Practice Guidelines (BPG) will be utilised for all designs and management practices.

Inyanda understands that their operations have an impact on the environment and is committed to undertaking the necessary impact assessments to develop the necessary systems and practices to mitigate their impact during the entire lifecycle of their operations and associated infrastructure such as the ash slurry transporting pipelines, and to assess their performance on an on-going basis. Inyanda recognises that they operate in an environment of scarce resources and will endeavour to optimise their usage. Inyanda focuses on the preservation of biodiversity and appropriate land use planning, both during and after the period of operation.

The mine Water and Waste Management activities were documented in the approved EMPR, dated April 2005. The relevant information from the approved EMPR, dated April 2005, is included within this revised IWWMP. This section aims to summarise the description of the IWWMP that will be implemented at Inyanda Coal Mine, to mention the investigations which need to be undertaken, to refer to the implementation of the Water and Waste Management measures, and to identify any residual aspects that may require attention in future.

5.2.1 Water Balance

This section of the report describes the water balance for Inyanda washplant and co-disposal facility. The water balance includes all processes/activities or facilities that use water within the mine system, sources and sinks of water for the mine, pathways for water movement in the system. Eco Elementum was appointed to compile the updated water balance for Inyanda washplant and co-disposal facility and a copy of the water balance report is attached as Appendix A.

5.2.2 Salt Balance

Coal mining, and its associated activities, may often lead to degradation in water resource quality. Although the pollutants may often vary the total dissolved salt (TDS) provides a good indication of the extent of water contamination.

The TDS is representative of the total inorganic salt content dissolved in water. High TDS impart a salty or bitter taste to water. Salts such as sulphates are not easily removable from drinking water and advances processes such as ion exchange or membrane processes need to be incorporated in conventional drinking water plants, to remove sulphates.

5.2.3 Reuse and Recycling

All facilities which could contribute to water quality deterioration such as coal stockpiles, the plant, the discard dump, and the mine pit will have berms installed around them to prevent clean water ingressing into these sites and to ensure that dirty water is diverted around them. These measures will be designed such that they do not contribute to erosion.



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Dirty water within these areas will all be contained up to a 1: 50-year design level and having sufficient freeboard as specified in GN 704 and the BPG's. This captured water will be re-used and recycled by pumping it to facilities where it can be utilised in the plant or used for dust suppression.

The use of dust binding agents for haul roads was investigated and was then implemented upon proof of its viability as an alternative to watering for dust suppression.

The development of water re-use and reclamation plan is an essential and fundamental principle of an IWWMP. From a water conservation perspective and given the growing demands for water coupled with the scarcity of this natural resource, it is important for this operation to prove that water utilisation is optimised by the re-use and reclamation of contaminated water. The mine commits itself to regularly reviewing its water use and a re-use strategy to ensure that it is optimising this use based on its current plans and operations.

5.2.4 Water Conservation and Demand Management

Due to the scarcity of water in South Africa, water management will also include water conservation. Water conservation focuses on the effective use of water and the minimisation of evaporative, seepage, and overflow water losses from the water reticulation system.

The water dams exposed to evaporation will be minimised to ensure that evaporation is minimised and water is pumped from these dams as quickly as possible for re-use.

The mine will implement a management program to evaluate leaks and to ensure that water wastage is minimised.

Flow meters will be placed on the abstraction boreholes, the water supply circuit, and the reticulation circuit in order to monitor water usage within the system.

5.3 STORM WATER MANAGEMENT

The stormwater infrastructure systems include a clean water diversion channel and internal berms, dirty water drainage channels, a raw water dam, a process water dam, a bio-filter dam, a return water dam, and a co-disposal tailing dam. There is a large cut-off berm on the northern and eastern boundary of the site.

It must be noted that the dams that do act as stormwater control dams are not fed by natural runoff and are supplied by stormwater channels, be it dirty or clean water - seeing that the existing infrastructure is downstream of the site.

There are five dams on the site of which three acts as stormwater control dams. The raw water dam is part of the internal reticulation system, and the co-disposal tailings dam only receives minimal stormwater inflow. Hence, they are not considered as stormwater control dams. The figure below shows the locality of the dams.

- A water reservoir with an estimated 64kl grounded steel tank is situated to the east of the plant. It is fed by a pumping system from the return water dam downstream. This reservoir has two outlets, one pipeline which is chlorinated and then gravity fed for domestic use at the site offices and the other pipeline which is also gravity fed serves as reused water for the plant area. This dam has no stormwater inflow.
- The return water dam is situated to the west and at the lowest point of the old mining area. The maximum wetted area of the dam was estimated to be 52 000 m. The return water dam is fed by the entire system of concrete-lined stormwater channels which is in excess of 2 km as well as a feeder pipe from a clean water source south of the site.
- The co-disposal tailings dam is situated to the north of the mining area. It is a dirty water reservoir that is predominantly fed by direct precipitation, and stormwater inflow would be minimal as a clean water diversion berm is situated 125 metres upstream the outer rim of the dam that extends 300 metres past the dam. Hence the dam will be excluded from the assessment.



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- The process water dam is also situated to the east of the mining area and just below the raw water reservoir. The dam is fed by a pumping system further south from an unknown tributary of the Olifants River. The maximum wetted dam area was estimated to be 3400 m². It is assumed that the process water is used in the wash plant.
- The bio-filter dam is also situated on the western part of the mine. The maximum estimated wetted area was estimated to be 4200 m².

5.4 GROUNDWATER

Key issues and objectives of groundwater management at the Inyanda washplant and co-disposal facility are the following:

- To prevent contamination of groundwater by infiltration of polluted water.
- To ensure that the required water management infrastructure is constructed.
- To minimise contamination of groundwater from any mining related activities.
- To remove any excess carbonaceous material / spillages during the Operation Phase.
- To remove all carbonaceous and mining related material at the surface land use area during the Decommissioning Phase of the Inyanda washplant.
- To make the surface land use area free draining after rehabilitation.

The infrastructure to be constructed, management principles and actions to be followed will aid in the achievement of the above-mentioned objectives. By effectively managing the dirty water areas and containing the resultant polluted water, impacts to groundwater will also be minimised. These specific actions are detailed as mitigation measures in the risk assessment as well as in the action plan of this IWWMP.

5.5 WASTE

All waste generated by the Inyanda washplant will be managed in accordance with the Inyanda Coal Mine Waste Management SPI (IC-ENV-SPI 001).

Refer also to Chapter 2 of this report that identifies the waste streams that may be applicable to the Inyanda washplant and co-disposal facility and describes how each waste stream will be reused, recycled, treated or disposed.

5.5.1 Waste Stream Identification and Characterization

The various waste streams at the Inyanda Inyanda washplant and co-disposal facility were identified, characterised and listed in Chapter 5.5 of this IWWMP.

5.5.2 Waste Management

Waste is handled in such a way that no intentional spillage thereof that could present a risk to the surface or groundwater regimes will occur. All waste is being stored in containers or areas of which the requirements are determined by the hazardous rating of the type of waste. Domestic waste, oil contaminated waste, hazardous waste, fluorescent tubes, steel, cable, etc. is temporarily stored at the different sections of the workshop area, in clearly demarcated areas, or waste removal containers. All waste storage areas are bunded to contain any accidental spillages. The possible impact of waste generation and disposal will be prevented by establishing effective control of all types of waste and the removal or disposal thereof in accordance with the applicable legislative requirements, as committed to in Part 6 of the approved EMPR, dated April 2005. The proposed rehabilitation strategies for the Co-disposal facility will be verified and implemented.

5.6 OPERATIONAL MANAGEMENT



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The EMP guides management of the mining operations as follows:

5.6.1 Soil Management:

- Minimise the surface disturbance footprint.
- Management of access and service roads.
- Prevention of soil contamination.
- Prevention of stockpile contamination.
- Terrain Stability, Erosion and runoff control.

5.6.2 Surface water management

- Control through monthly surface water monitoring.
- Avoid water resources to ensure no impact.
- Maintain PES and EIS of the wetland system as stipulated in the Reserve for the catchment.
- Compliance with the conditions of the section 21(c) and (i) water use authorisation.
- No activity within the footprint of the delineated high sensitivity wetlands or within their protective buffer zone (32 m).
- Compliance to the NWA Standards and License conditions.
- Continuous monitoring and reporting of results.

5.6.3 Groundwater management

- Prevention of hydrocarbon groundwater contamination.
- Management of infiltration & prevention of contamination.
- Compliance to the NWA Standards and License conditions.
- Quarterly monitoring and reporting of results.

5.6.4 Ecological impact management

- Minimisation of the project footprint.
- Integrity of natural system to be sustained.
- Concurrent rehabilitation with indigenous species.

5.6.5 Organisational Structure

Refer to Section 2.6.

5.6.6 Education and training

Training and awareness is conducted at the Inyanda washplant in line with the Inyanda Coal System Procedure for "Training, Awareness and Competence" (Reference No. IC-SP-SHE-006) dated May 2013. The mentioned System Procedures main objective is to:

- Identify and implement SHEC training that Inyanda Coal will adopt for all personnel, contractors and consultants whose work may create an impact on the IMS within all Inyanda Coal premises.

The Training, Awareness and Competence System Procedure outlines the respective responsibilities of the Head SHEC, Departmental Managers and all staff and contractors. The main responsibilities include:

- All new employees / contractors undergo site-specific induction.



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- All new employees / contractors undergo Induction Training.
- Competency of each employee / contractor is assessed annually.
- Basic environmental training.
- Training conducted to meet any need identified.
- Records of assessments are maintained and stored.
- All employees are re-inducted annually.
- Individual development plans are maintained for each employee.
- Employees absent for extended periods are re-inducted.
- Identification of specific and general training needs.
- All staff to participate in training sessions.

5.6.7 Internal and external communication

5.6.7.1 Internal Communication

Internal environmental communication at the Inyanda washplant and co-disposal facility is conducted in accordance with the Inyanda Coal System Procedure (Reference No. IC-SP-SHE 007), dated May 2013. Meetings and publications are the media utilised to communicate environmental issues at the Inyanda washplant. As mentioned above, the following media is used at the Inyanda washplant:

- Meetings.
 - Personnel information sessions.
 - Production meetings.
 - SHE Forum meeting.
- Publications.
 - Newsletters.
 - Notice boards.

5.6.7.2 External Communication

External communication at the Inyanda Coal Mine is conducted as follows.

5.6.7.2.1 Communication from external parties and employees.

Communication from external interested and affected parties and relevant stakeholders may be received by e-mail, fax, telephonically or by mail. A written response will be sent via the Environmental Coordinator under signature of the BU Manager, to the respective I&AP.

All telephone calls and faxes received, in terms environmental issues, are forwarded to the Environmental Department for action.

All communication received via e-mail is stored, with replies, in the mailbox of the Environmental Coordinator. All e-mail messages regarding Environmental concerns are kept for a maximum of two years, as electronic and filed copies.

All communication received by mail is filed, along with the response (where relevant), within the Environmental Departments filing system for a minimum period of 2 years.

All telephonic queries made to the environmental department is kept by the environmental department, recording the caller's details, date, query made, action taken and response given.



5.6.8 Awareness raising

The applicant shall ensure that employees and contractors are adequately trained with regard to the implementation of the EMP and environmental legal requirements and obligations. It is anticipated that Environmental awareness shall be targeted at all project-involved personnel and part time personnel shall be trained so that they are aware of environmental obligations by the time they visit the site.

The Employer is committed to identifying training needs and ensuring that all personnel whose work may create a significant impact upon the environment receive appropriate training. The Environmental Awareness Plan describes the training available and the manner in which environmental training needs are identified and continually reassessed.

- Objectives and Aims

The Objectives of the Environmental Awareness Plan are to ensure that: -

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training.
- Procedures are established and maintained to make appropriate employees aware of:
 - The importance of conformance with SHEQ policy and procedures and the requirements of the EMS;
 - The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
 - Their roles and responsibilities in achieving conformance with environmental policy, procedures and EMS; and
 - The potential consequences of departure from specified operating procedures.
 - Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and/ or experience.

- The Environmental Awareness Plan Aims at:

- Informing all personnel of environmental policies, procedures and programmes applicable to the mining activities;
- Providing job specific environmental training to ensure the protection of the environment;
- Promoting general environmental awareness amongst all employees; and
- Providing general training on the implementation of environmental actions.

- The Environmental Awareness Training Programme will include:

- Training of the implementation of emergency procedures where necessary;
- Environmental induction for new employees;
- Code of conduct signed by all inducted employees; and
- Identification of environmental risks associated with each job and job specific training on addressing these risks.

- Responsibilities

- The responsibilities in terms of environmental awareness training lie with the Employer / Inyanda washplant.

- Identification of training needs

- The identification of environmental training and development needs are derived from the analysis of role descriptions.
- The following general and specific training needs have been identified at Inyanda washplant.
 - General Training:
 - Environmental awareness training;
 - Awareness of the SHEQ policy; and
 - Awareness of environmental legislation.
 - Specific Training:
 - Awareness of significant environmental aspects associated with work activities;
 - Awareness of environmentally related operational procedures that need to be followed when conducting work activities;



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- Awareness of the potential consequences of not following environmentally related operational procedures; and
 - Environmental legislative requirements of work activities.
 - General Environmental Awareness
 - General environmental awareness training forms part of the induction at Inyanda washplant. An employee will attend induction training and all contractor employees are required to undergo the general induction training should their work at the mine exceed a period of 1 week on site.
 - The training material encompasses information regarding SHE Policy, charter and visions, the description of environmental impacts, namely air pollution, waste management, water management, land management and energy conservation, the importance of environmental legislation, key roles and responsibilities in terms of environmental management and the reporting of non-conformances.
- Evaluation of the Environmental Awareness Plan
 - The effectiveness and efficiency of this plan will be monitored by the performance of annual audits aimed at testing the environmental awareness of employees directly and the analysis of the root causes of environmental incidents, including non-conformance to legal requirements, to determine which incidents were caused by a lack of environmental awareness and training. The evaluation of the Environmental Awareness Plan will be conducted by the Environmental Department. This evaluation will entail the auditing of the operation during the construction and operation phase once the activity has commenced.
 - The Environmental Awareness Plan described above is sufficient to make all those involved with the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks.
- Emergency Response Plan

The EMP and other management options are intended to minimise all environmental risks as far as possible. Should there for some reason / unforeseen circumstances be an event that might lead to unacceptable risks, emergency systems and procedures have been especially designed and is to be adhered to in the case of such emergencies. The environmental emergency contingency plan addresses any reasonably anticipated failure (most probable risk) for the entire washplant and focuses on incidents that could cause environmental emergencies. As with any system, the most important and critical component is the identification and communication with the Responsible person. Consequently, the contact information for these role-players should be available around the facility and be updated on a regular basis. In addition to this, first-party employees (such as security, safety superintendents, overseers, environmental officers) will be trained to respond to the responsible head.

5.7 MONITORING AND CONTROL

The table below details the monitoring details, including Monitoring and reporting frequency; Responsible persons; Time period for implementing impact management actions; and Mechanism for monitoring compliance.

Table 18: Monitoring and Reporting Frequency

Aspect	Requirement
Surface Water	Water quality samples, pollution control samples and water levels are taken on monthly basis
Groundwater	Water samples from Boreholes are taken on a monthly basis.
Waste	Waste storage areas will be visually monitored on a regular basis to ensure that
Bio-monitoring	Upstream and downstream, with monitoring being undertaken bi-annually to also consider seasonal variations.

5.7.1 Surface water Monitoring

Surface water samples are taken at several locations at the Inyanda washplant and co-disposal facility and are presented in Table 19 below:



Table 19: Surface water sampling locations at Inyanda washplant and co-disposal facility

Locality number	x Co-ordinate	y Co-ordinate
KF – 01	25°45'42.23"S	29°12'48.07"E
KF – 01a	25°45'45.67"S	29°12'55.72"E
KF – 02	25°47'4.82"S	29°13'32.67"E
KF – 03	25°46'40.19"S	29°13'8.40"E
KF – 04	25°47'29.86"S	29°11'15.00"E
KF – 05	25°46'9.71"S	29°11'7.43"E
KF – 06	25°46'57.14"S	29°15'0.64"E
KF – 08	25°45'21.15"S	29°14'30.56"E
KF – 10	25°46'13.22"S	29°13'34.59"E
KF – 11	25°47'3.66"S	29°15'32.21"E
KF – 12	25°46'7.97"S	29°10'53.99"E
KF – 13	25°46'45.59"S	29°14'55.61"E
KF – 14	25°46'18.40"S	29°13'55.95"E
KF – 18	25°46'27.49"S	29° 13'39.59"E
KF – 19	25°46'19.29"S	29° 13'51.92"E
KF – 20	25°46'45.37"S	29° 14'54.49"E
KF – 21	25°46'46.55"S	29° 14'54.35"E
KF DW04	25°46'29.87"S	29° 13'41.63"E
Louw 1	25°44'33.50"S	29°12'17.78"E
Louw 3	25°44'26.70"S	29°12'20.20"E

Locality No	Locality Description	Monitoring Frequency	Applicable guidelines and standards		
			Domestic (TWQR)	IWUL Limits	RQO of the catchment
Surface sampling localities within and around Inyanda Plant					
KF – 01	Cement dam within the property.	Monthly	X		X
KF – 01a	Spring on farm Leeuwpoot.	Monthly	X		X
KF – 02	Borrow pit.	Monthly	X		X
KF – 03	Leeufontein irrigation dam.	Monthly	X		X
KF – 04	Blespokspruit, upstream of the plant area.	Monthly	X	X	X
KF – 05	Blespokspruit, downstream of the plant area.	Monthly	X	X	X
KF – 06	Fountain utilized for irrigation.	Monthly	X		X



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KF – 08	Stream, downstream of the historic mining area.	Monthly	X		X
KF – 10	Return water dam located on site.	Monthly	X	X	
KF – 11	New dam upstream of KF07.	Monthly	X		X
KF – 12	Spruit before confluence with the Blespokspruit.	Monthly	X	X	X
KF – 13	Inyanda Mine pit sump.	Monthly	X		
KF – 14	At process water dam, from Danie Keet dam.	Monthly	X		X
KF – 18	Effluent dam at main gate.	Monthly	X	X	
KF – 19	Process water dam.	Monthly	X	X	
KF – 20	Cement tower sump, upstream.	Monthly	X		
KF – 21	Cement tower sump, downstream.	Monthly	X		
KF DW04	Drinking water within workshop.	Monthly	X		
Kitchen	Drinking water within the kitchen.	Monthly	X		
Louw 1	Louw Fountain livestock.	Monthly	X		X
Louw 3	Louw JOJO water sample.	Monthly	X		X

5.7.1.1 Sampling frequency

Water quality samples, pollution control samples and water levels are taken on monthly basis. The latest month for morning was September.

5.7.1.2 Sampling procedure

Surface water is analysed on a monthly basis whilst groundwater is analysed quarterly. This is done to determine seasonal variation in water quality. Surface water samples are obtained by means of grab samples in clean sampling bottles on a monthly basis. Groundwater samples are obtained by means of a baler containing a clean sample bottle. Once a sample is obtained it is clearly labelled and stored in a cooler box or dark box.

Water samples are submitted to an accredited laboratory (Regen Water (Pty) Ltd laboratory) for chemical analyses of the following elements: Total dissolved solids, suspended solids, nitrate & nitrite as N, chlorides (Cl), total alkalinity as CaCO₃, fluoride (F), sulphate (SO₄), total hardness, calcium hardness, magnesium hardness, calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), iron (Fe), manganese (Mn), electrical conductivity (EC), pH value at 25 °C, turbidity (N.T.U) and aluminium (Al).

Static water levels of boreholes are measured with a dip meter on a quarterly basis.

The following considerations will be taken into account when samples are collected for monitoring purposes associated with the Inyanda washplant and co-disposal facility:

- Surface sample should be taken once a month.
- Dip the sample bottle into the water and fill (avoid collecting any floating debris).
- Use this water to rinse the bottle and the lid. Empty the rinsing water out (away from the sampling site). Repeat procedure.



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- Take the sample, filling the bottle to the brim and close the lid underwater if possible to minimise trapping air.
- Close bottle tightly to prevent leakage and contamination.
- Once all samples are collected, they should be returned to the ACCL for analysis.

5.7.1.3 Analyses

All samples collected will be analysed for the following constituents expected to be impacted on by mining related activities:

- Electrical Conductivity.
- pH.
- Total dissolved solids.
- Total Hardness.
- Total alkalinity.
- Calcium.
- Magnesium.
- Sodium.
- Potassium.
- Chloride.
- Sulphate.
- Fluoride.
- Nitrate.
- Ammonia.
- Iron.
- Manganese.
- Aluminium.
- Total chromium.
- Copper.
- Nickel.
- Lead.
- Zinc.
- Turbidity.
- Orthophosphate.
- SOG.



5.7.1.4 Data management, reporting and auditing

The Environmental Coordinator of Inyanda washplant and co-disposal facility utilises a database for data management and will be responsible to validate the data and investigate any anomalies that may occur. The reporting to the relevant authorities will take place according to the authority-reporting schedule.

Monitoring results are entered into an electronic database as soon as results are available, and at no less than one month after analyses have been received, allowing:

- Data presentation in tabular format.
- Time-series graphs with comparison abilities.
- Statistical analysis (minimum, maximum, average, percentile values) in tabular format.
- Graphical presentation of statistics.



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- Linear trend determination.
- Performance analysis in tabular format.
- Presentation of data, statistics and performance on diagrams and maps.
- Comparison and compliance to applicable South African Water Quality Guidelines and any other given objectives.

5.7.2 Groundwater monitoring

The locations of the boreholes at Inyanda washplant and co-disposal facility are provided in Table 20 below.

Table 20: Groundwater Monitoring boreholes at Inyanda washplant and co-disposal facility

Locality number	x Co-ordinate	y Co-ordinate
IPG01	25°44'49.88"S	29°14'8.43"E
IPG03	25°45'11.90"S	29°15'31.06"E
WB01	25°46'44.24"S	29°14'49.30"E
WB02	25°46'52.58"S	29°13'57.74"E
WB03	25°46'9.75"S	29°13'34.98"E
WBR01	25°45'44.29"S	29°14'25.35"E
WBR05	25°46'5.74"S	29°14'3.54"E
WBR07	25°46'0.51"S	29°13'27.67"E
WBR08	25°46'23.56"S	29°13'36.22"E
WBR09D	25°46'47.24"S	29°14'57.95"E
WBR09S	25°46'47.57"S	29°14'57.86"E
WBR10	25°46'35.12"S	29°13'43.46"E
WBR11D	25°46'14.59"S	29°13'29.74"E
WBR11S	25°46'13.82"S	29°13'29.26"E

Locality No	Locality Description	Monitoring Frequency	Applicable guidelines and Standards		
			Domestic (TWQR)	IWUL Limits	RQO of the Catchment
Groundwater monitoring localities within and around the mining area					
IPG01	Pegasus Block Borehole 1	Quarterly	X		
IPG03	Pegasus Block Borehole 3	Quarterly	X		
WB01	Monitoring borehole	Quarterly	X		
WB02	Monitoring borehole	Quarterly	X		
WB03	Monitoring borehole	Quarterly	X		
WBR01	Monitoring borehole	Quarterly	X		
WBR05	Monitoring borehole	Quarterly	X		
WBR07	Monitoring borehole	Quarterly	X		
WBR08	Monitoring borehole	Quarterly	X		
WBR09D	Monitoring borehole	Quarterly	X		



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WBR09S	Monitoring borehole	Quarterly	X		
WBR10	Monitoring borehole	Quarterly	X		
WBR11D	Monitoring borehole	Quarterly	X		
WBR11S	Monitoring borehole	Quarterly	X		

5.7.2.1 Sampling frequency

Surface water is analysed on quarterly. This is done to determine seasonal variation in water quality. Groundwater samples are obtained by means of a baler containing a clean sample bottle. Once a sample is obtained it is clearly labelled and stored in a cooler box or dark box.

5.7.2.2 Analyses

Water samples are submitted to an accredited laboratory (Regen Water (Pty) Ltd laboratory) for chemical analyses.

Samples are analysed for the following chemical and physical constituents normally associated with coal mining activities:

- Electrical Conductivity.
- pH.
- Total dissolved solids.
- Total Hardness.
- Total alkalinity.
- Calcium.
- Magnesium.
- Sodium.
- Potassium.
- Chloride.
- Sulphate.
- Fluoride.
- Nitrate.
- Ammonia.
- Iron.
- Manganese.
- Aluminium.
- Total chromium.
- Copper.
- Nickel.
- Lead.
- Zinc.
- Turbidity.
- Orthophosphate.

Laboratory results are analysed against the target water quality guidelines for domestic use, irrigation (according to the South African Water Quality Guidelines, 1996: DWAF).

5.7.2.3 Data management, reporting and auditing



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The Environmental Coordinator of Inyanda washplant and co-disposal facility utilises a database for data management and will be responsible to validate the data and investigate any anomalies that may occur. The reporting to the relevant authorities will take place according to the authority-reporting schedule.

Monitoring results will be entered into an electronic database as soon as results are available, and at no less than one month after analyses have been received, allowing:

- Data presentation in tabular format.
- Time-series graphs with comparison abilities.
- Statistical analysis (minimum, maximum, average, percentile values) in tabular format.
- Graphical presentation of statistics.
- Linear trend determination.
- Performance analysis in tabular format.
- Presentation of data, statistics and performance on diagrams and maps.
- Comparison and compliance to applicable South African Water Quality Guidelines and any other given objectives.

5.7.3 Waste monitoring

Waste monitoring is currently conducted at the Inyanda Inyanda washplant and co-disposal facility. The temporary storage of the different waste streams (as identified in Chapter 2 of this report) in designated, labelled and / or colour-coded containers are monitored on a continual basis. General and hazardous waste is collected by external contractors and disposed of at licenced facilities.

Waste storage areas will be visually monitored on a regular basis to ensure that:

- Waste is placed within demarcated areas.
- No mixing of waste streams has occurred.
- Waste has been timeously removed from the site, as described in Chapter 2 of this report.

Should it be found during the waste monitoring that waste has not been properly managed; the issue should be recorded and rectified. Record should also be kept of when each waste stream is removed from the site.



5.8 RISK ASSESSMENT / BEST PRACTICE ASSESSMENT

5.8.1 Methodology followed

5.8.1.1 Impact assessment background and guidance

Potential impacts of the washplant and related activities at the Inyanda washplant and co-disposal facility on the surrounding environment, including the surface water and groundwater regimes, were identified as part of the EIA process which has already been completed. Conceptual water balances were used to determine the anticipated effects that the activities could have on the receiving environment. The DWA's *BPG: G4 Impact Prediction (December, 2008)* was used to guide the quantitative risk assessment presented in Table 21 below, in conjunction with impact assessment requirements such as those indicated in Regulation 31(l) of the EIA Regulations R.543 (2010), under the NEMA (1998), as well as other impact assessment guidelines such as the Integrated Environmental Management Information Series as published by the DEAT (2002).

5.8.1.2 Impact identification

The focus of this assessment was to determine the impacts (both current and potential impacts) on the receiving environment of the Water Uses that are undertaken as part of the Inyanda washplant and co-disposal facility project, particularly on the surface water and groundwater regimes. The Water Uses were identified in Chapter 1 of this report and described in detail in Chapter 5. The impact sources, pathways and receptors were all considered for each water use and potential impact and are described individually below. The identification of the impacts was undertaken bearing in mind that the impacts will differ during the various phases of the Inyanda washplant and co-disposal facility because of the expected changes in Water Uses.

5.8.1.3 Impact assessment

Once the impacts were identified, they were characterised by using the following criteria: status, magnitude, extent, duration and probability of occurrence. The characterisation and associated determination of significance then enabled the identification of suitable mitigation measures, which would minimise the significance of the impacts, bringing them to within acceptable limits.

Table 21: Impact assessment criteria

Status of impact		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Positive and negative impact (neutral).
Magnitude		
Minor	2	Bio-physical and/or social functions and/or processes will remain unaltered.
Low	4	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced.
Moderate	6	Bio-physical and/or social functions and/or processes might be notably altered or enhanced.
High	8	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced.
Very high	10	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced.
Extent of impact		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.



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Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.

Duration of impact

Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability of occurrence

Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur regardless of any prevention measures, other than not implementing the activity at all.

5.8.1.4 Impact evaluation

Once the prediction components had been ranked for each impact, the significance of the potential impacts was evaluated (or calculated) using the following formula:

$$\text{Significance} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

For each impact, the extent (spatial scale), magnitude, duration (time scale) and the probability of occurrence were predicted and used to determine the significance of each impact, with and without the implementation of the proposed mitigation measure.

A Significance Rating was calculated by multiplying the Severity Rating with the Probability and is therefore a product of the probability and the severity of the impact. Probability describes the likelihood of the impact occurring and severity was calculated from the sum of the factors given to magnitude, duration and extent. The maximum value that could be reached through the described impact evaluation process is 100 SP. The unmitigated and mitigated scenarios for each environmental impact were rated as High (SP≥60), Moderate (SP 31-60) and Low (SP<30) significance as shown in Table 22

Table 22: Definition of significance rating (positive and negative)

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation.
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated.
High	61-100	Where the impact will definitely influence the environment and must be mitigated, where possible.



Significance of predicted POSITIVE impacts

Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

5.8.1.5 Impact mitigation and monitoring

Once the significance rating of an impact before mitigation has been determined, the reversibility of the impact, 'replaceability' of the affected resources and the mitigatory potential of the impact can also be determined. These factors have been included in the impact assessment tables below and play an important role in the determination of the level and type of mitigation performed or to be implemented. The Table 23 provides the criteria used to assess the above-mentioned factors.

Table 23: Mitigation prediction criteria

Reversibility of impact		
Reversible	1	The impact on natural, cultural and / or social structures, functions and processes is totally reversible.
Partially	2	The impact on natural, cultural and / or social structures, functions and processes is partially reversible.
Irreversible	3	Where natural, cultural and / or social structures, functions or processes are altered to the extent that it will permanently cease, i.e. impact is irreversible.
Irreplaceable loss of resources		
Replaceable	1	The impact will not result in the irreplaceable loss of resources.
Partially	2	The Impact will result / has resulted in a partially irreplaceable loss of resources.
Irreplaceable	3	The impact will result / has resulted in the irreplaceable loss of resources.
Potential of impacts to be further mitigated		
High	1	High potential to mitigate negative impacts to the level of insignificant effects, or to improve management to enhance positive impacts.
Medium	2	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
Low	3	Little or no mechanism exists to mitigate negative impacts.

5.8.2 Possible impacts on the environment

This part of the IWWMP document describes and evaluates the impacts of the activities that constitute a Water Use under Section 21 of the NWA, 1998, which are proposed to be undertaken at the Inyanda washplant and co-disposal facility only. Emphasis is therefore placed on impacts associated with water resources.

For the purpose of this document, the Construction and Decommissioning Phase will not be discussed as the Inyanda washplant and co-disposal facility is currently in the operational phase of its life cycle, and will be operating indefinitely at this stage.

The following mining and mining related activities will be undertaken at the Inyanda washplant:

- Operational Phase:



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- Temporary stockpiling of ROM coal (for transportation).
- Transportation of coal onto site.
- Loading and offloading of coal.

The impacts of these activities as well as the water uses required for the successful completion of these activities are described below for each life-cycle of the mine.

5.8.2.1 Operational Phase

The following mining and related activities and actions are undertaken at the Inyanda washplant during the Operational Phase:

Mining related activities including the following:

- Utilisation / operation of infrastructure.
- Operation of water management infrastructure.
- Disposal of waste.
- Maintenance of all structures and equipment.
- Upkeep of gardens.
- Monitoring and auditing.

Transportation of coal including the following:

- Coal product is trucked to the Inyanda washplant from where it is transported by rail to the Richards Bay Coal Terminal.
- Transportation of coal off-site via Railway (to the Richards Bay Coal Terminal).

For ease of reference, the Water Uses to be undertaken at the Inyanda washplant during the Operational Phase are summarised in Table 24 below.

Table 24: Summary of key Water Uses

Water Use No.	Property	NWA, 1998 Section 21	Activity Name	Description / purpose	Authorisation status
1.	Portion 21 of Kalbasfontein 284 JS	A	WB01	Abstracting water from borehole (WB01) for domestic use.	Temporary
2.		A	WB02	Abstracting water from borehole (WB02) for domestic use	Temporary
3.		A	WB03	Abstracting water from borehole (WB03) for domestic use	Temporary
4.		A	WB08	Abstracting water from borehole (WB08) for domestic use	Temporary
5.		A	Open pit	The use of water for dust suppression from the open pit	Temporary



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6.	Portion 21 of Kalbasfontein 284 JS	A	Water removed from the underworking	Water removed from the underworking, removed through dewatering in order to be pumped into the return water dam to be reused in the mining process	Temporary
7.	Portion 04 of Moofontein 285 JS.	c & i	Raw water pipeline infrastructure leading to Dam 1 to the washing plant.	Conveyance of abreacting raw water to the mine.	Temporary
8.	Portion 21 of Kalbasfontein 284 JS	G	Return Water Dam	Wastewater disposed into the Return Water Dam.	Temporary
9.	Portion 21 of Kalbasfontein 284 JS	G	Biofilter dam	Disposing domestic wastewater from Biofilter plant into a Biofilter dam	Temporary
10.	Portion 21 of Kalbasfontein 284 JS	G	Dust Suppression	Disposing wastewater and using it for dust suppression	Temporary
11.	Portion 21 of Kalbasfontein 284 JS.	J	Return water dam	Removing underground water from open cast pit. The water disposed into the return water dam.	Temporary

The impacts of the mining and related activities to be undertaken during the Operational Phase at the Inyanda washplant (including those activities that are considered to be Water Uses as defined in Section 21 of the National Water Act, 1998 (Act 36 of 1998)), on the receiving environment are described in Table 25. The impacts identified focus on the risks to water aspects; a full impact assessment considering all environmental aspects was compiled as part of the approved EIA for Inyanda washplant.

Table 25: Operational Phase impacts on the receiving environment, focusing on surface water aspects

Action	Predicted Impact	Ext.	Dur.	Int.	Prob.	Sign.
Utilisation of the loading terrace area for the stockpiling of coal products.	In general, the presence of the washplant would continue to impact on the drainage of the area. This could lead to the damming of water on site if the required stormwater measures are not installed.	Site.	Long	Medium	Probable	Medium Negative Medium



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	The stockpiling of coal products on the washplant platform would contaminate the surface water runoff from the washplant area, which would impact on the clean water runoff from the upstream as well as the downstream area if proper storm water control measures are not implemented.	Site	Long	Medium	Highly Probable	Medium Negative High
Utilisation of the rail tracks for the transportation of coal.	Coal spillage could impact on surface water runoff along the transportation route.	Regional.	Long	Low	Probable	Low Negative Low
Utilisation of evaporation pond.	According to the proposed design, all surface water runoff from the coal stockpiling area will drain to the evaporation pond via the concrete lined u-drains. This would prevent contamination of downstream areas.	Site	Long	Medium	High Probable	Medium Positive Medium
Utilisation of concrete lined u-drains.						
Utilisation of access and maintenance road.	The access and maintenance road could lead to an increased yield due to less infiltration into the soil and quicker run-off. This could lead to soil erosion and storm water problems if the correct preventative measures are not taken.	Site	Long	Medium	Probable	Medium Negative Medium
Utilisation of associated infrastructure (Chemical toilet, security kiosk, weighbridge, etc.)	None.					
Utilisation of above-ground diesel tank.	Surface water contamination could take place if diesel spillage occurs or if the bund walls and sump are not constructed according to specifications.	Site	Long	Medium	Probable	Medium Negative Medium

Table 26: Operational Phase impacts on the receiving environment, focussing on groundwater aspects

Action	Predicted Impact	Ext.	Dur.	Int.	Prob.	Sign.
Utilisation of the loading terrace area for the stockpiling of coal products.	The stockpiling of coal on the washplant platform could impact on the groundwater of the area if the platform was not built up using suitable clean soil material, sloped and compacted properly.	Site.	Long	Medium	Highly Probable	Medium Negative Medium
		Long	Long	Medium	Probable	Medium Negative High
Utilisation of the rail tracks for the transportation of coal.	None.					



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Utilisation of evaporation pond.	Utilisation of the evaporation pond could impact the groundwater environment if the sides and bottom of the pond was not compacted properly during construction or if it is ruptured during the operational phase.	Site	Long	Medium	High Probable	Medium Negative Medium
Utilisation of concrete lined u-drains.	None.					
Utilisation of access and maintenance road.	None	Local	Long	Medium	Probable	Medium Negative Medium
Utilisation of associated infrastructure (Chemical toilet, security kiosk, weighbridge, etc.)	None.					
Utilisation of above-ground diesel tank.	Groundwater contamination could take place if diesels spillage occurs continually and mitigation measures are not provided.	Site	Long	Medium	Probable	Medium Negative Medium

Table 27: Operational Phase impacts on the receiving environment, focusing on wetland aspects

Action	Predicted Impact	Ext.	Dur.	Int.	Prob.	Sign.
Utilisation of the loading terrace area for the stockpiling of coal products.	None. No sensitive landscapes (i.e. wetlands, streams, etc.) were noted on site.					
Utilisation of the rail tracks for the transportation of coal.						
Utilisation of evaporation pond.						
Utilisation of concrete lined u-drains.						
Utilisation of access and maintenance road.						
Utilisation of associated infrastructure (Chemical toilet, security kiosk, weighbridge, etc.)						
Utilisation of above-ground diesel tank.						

5.9 ISSUES AND RESPONSES FROM PUBLIC CONSULTATION PROCESS



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The washplant keeps record of issues from interested and affected parties. No issues or concerns have been raised during the last year.

5.10 MATTERS REQUIRING ATTENTION/ PROBLEM STATEMENT

The operational activities within the Inyanda Wash Plant have the potential to impact on the natural surface and groundwater quality and quantity. There is a potential of contamination of surface water runoff that may finally report into the natural rivers and streams and seepage of hydrocarbons into groundwater may impact on the groundwater quality. However, the implementation of the recommended management and mitigation measures in the section above will help to prevent and minimise the identified potential impacts.

Eco Elementum (Pty) Ltd undertook the water use license compliance audit on the Inyanda Coal Mine in 2018. During the IWUL compliance audit, the auditors identified eleven (11) non-compliance findings were made in respect of the applicable IWUL conditions as indicated in table below.

IWUL Condition		Compliance Finding
Appendix I: General Conditions		
14.	Any incident that causes or may cause water pollution must be reported to the Regional Head or his / her designated representative within 24 hours.	There is no proof available that the Return Water Dam overflow incident was reported to the DWS within 24 hours.
Appendix II: Section 21 (a): Taking water from a water resource		
1.	This license authorises the taking of a maximum quantity of 11 400 m ³ /a (eleven thousand four hundred cubic meters of water per annum) from groundwater (Four boreholes: WB01, WB02, WB03 and WB08) located on portion 21 of the farm Kalbasfontein 284 JS, based on an average of thirty one comma twenty three cubic metres per day (31.23 m ³ /d) for domestic use purposes.	Boreholes WB01, WB02 and WB03 are dry and water is abstracted from borehole WB08. The approved maximum quantity of water from borehole WB08 has been exceeded. Inyanda is not authorised in terms of the IWUL to pump water from the Danie Keets Dam.
Appendix II: Section 21 (g): Disposing of waste in a manner which may detrimentally impact on a water resource		
1.1	The Licensee shall carry out and complete all the activities, including the construction and operation of the Raw Water Dam, according to the Report and according to the final plans of the Revised Integrated Water Use License as approved by the Regional Head.	The Return Water Dam is not operating according to the approved plans, as it is silted up, compromising the capacity of the dam and increasing the risk of overflow during a high rainfall event.
1.6	The Return Water Dam shall be operated and maintained to have a minimum freeboard of 0.8 meters above full supply level and all other water systems related thereto shall be operated in such a manner that it is at all times capable of handling the 1:50 year flood-event on top of its mean operating level.	The Return Water Dam is not operated with a freeboard of 0.8 meters. This can be attributed to the Return Water Dam being silted, compromising the capacity of the dam and increasing the risk of overflow during a high rainfall event. However, water was pumped out to prevent overflow and slurry is being removed from the Return Water Dam by an excavator.
2.1	The Licensee is authorised to dispose wastewater of a maximum quantity of eighty eight thousand four hundred and seventy nine cubic meters per annum (88 479 m ³) into the Return Water Dam on the farm Kalbasfontein 284 JS.	The amount of wastewater disposed into the Return Water Dam is currently unknown because there is no device installed to measure the quantity. Only the outflow from the Return Water Dam is recorded.
2.6	Dirty stormwater and seepage dams on the Licensee's premises must be constructed, operated and maintained in such a manner that it is not likely to spill into any clean water system more than once in 50 years.	The Return Water Dam is silted up and spills into clean water systems during rainy season.
2.7	The dirty stormwater and seepage dams must be designed, constructed, maintained and operated to have a	The Return Water Dam is not maintained and operated with a freeboard of 0.8 meters. This can be attributed to the Return



IWUL Condition		Compliance Finding																								
	minimum freeboard of 0.8 metres above full supply level, unless specifically authorised by this license.	Water Dam being silted, compromising the capacity of the dam and increasing the risk of overflow during a high rainfall event																								
3.1	The quality of wastewater disposed of into the raw water dam not exceed the limits as set out in Table 1.	A pumping system is in place to pump water from the Return Water Dam to the Raw Water Dam. Significant exceedances were recorded at monitoring point KF10 (Return Water Dam) in the 2020 Quarterly Surface and Groundwater Monitoring Reports. The quality of wastewater disposed in the Raw Water Dam is therefore not within the limits of the WUL.																								
5.1	<div>The impact of the activities of the mine on the Blesbokspruit shall not exceed the following water quality limits as set out in Table 3.</div> <table><tr><th>VARIABLES</th><th>WATER QUALITY LIMITS</th></tr><tr><td>pH</td><td>6.5 – 9.0</td></tr><tr><td>Total dissolved solids</td><td>420 mg/l</td></tr><tr><td>Sulphate (SO₄)</td><td>250 mg/l</td></tr><tr><td>Chloride (Cl)</td><td>63 mg/l</td></tr><tr><td>Sodium (Na)</td><td>89 mg/l</td></tr><tr><td>Magnesium (Mg)</td><td>51 mg/l</td></tr><tr><td>Iron (Fe)</td><td>0.7 mg/l</td></tr><tr><td>Calcium (Ca)</td><td>108 mg/l</td></tr><tr><td>Nitrate (NO₃)</td><td>6 mg/l</td></tr><tr><td>Dissolved Oxygen</td><td>6.0 mg/l</td></tr><tr><td>Toxics</td><td>*99% ≤ TWQO 99% < CEV 100% < AEV</td></tr></table>	VARIABLES	WATER QUALITY LIMITS	pH	6.5 – 9.0	Total dissolved solids	420 mg/l	Sulphate (SO ₄)	250 mg/l	Chloride (Cl)	63 mg/l	Sodium (Na)	89 mg/l	Magnesium (Mg)	51 mg/l	Iron (Fe)	0.7 mg/l	Calcium (Ca)	108 mg/l	Nitrate (NO ₃)	6 mg/l	Dissolved Oxygen	6.0 mg/l	Toxics	*99% ≤ TWQO 99% < CEV 100% < AEV	<div>Several exceedances of the IWUL water quality limits, as set out in Table 3, were reported within the quarterly water quality monitoring reports for 2020 submitted to the Department.</div> <div>Please note that there is nothing that the mine can do to make the water quality better when the water from upstream is already polluted. However, the mine is not discharging dirty water into the stream.</div>
VARIABLES	WATER QUALITY LIMITS																									
pH	6.5 – 9.0																									
Total dissolved solids	420 mg/l																									
Sulphate (SO ₄)	250 mg/l																									
Chloride (Cl)	63 mg/l																									
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Calcium (Ca)	108 mg/l																									
Nitrate (NO ₃)	6 mg/l																									
Dissolved Oxygen	6.0 mg/l																									
Toxics	*99% ≤ TWQO 99% < CEV 100% < AEV																									
6.1	The Licensee shall update the water balance annually and calculate the loads of waste emanating from the activities. The Licensee shall determine the contribution of their activities to the mass balance for the water resource and must furthermore co-operate with other water users in the catchment to determine the mass balance for the water resource reserve compliance report.	Studies were conducted to update the water balance report, however the report has not been finalised for submission to the Provincial Head.																								
10.2	The Licensee must, within 24 hours, notify the Regional Head of the occurrence or potential occurrence of any incident which has the potential to cause , or has caused water pollution, pollution of the environment, health risks or which is a contravention of the license conditions.	There is no proof available that the Return Water Dam overflow incidents have been reported to the DWS within 24 hours.																								

5.11 ASSESSMENT OF LEVEL AND CONFIDENCE OF INFORMATION

The level of confidence of the information provided in this IWWMP is considered high. Registered professional consultants conducted specialist studies in order to best identify the impacts associated with the proposed activities.



6. WATER AND WASTE MANAGEMENT

The management of water and waste that is currently undertaken at the Inyanda washplant and co-disposal facility was described in detail in Chapter 7 of this IWWMP. This part of the IWWMP is focused on the objectives of the Inyanda washplant and co-disposal facility regarding the alignment of water and waste management with legislative requirements and best practice principles, and the implementation of measures to ensure that the water and waste management objectives, as set out in this Chapter of the IWWMP, are met. Furthermore, this Chapter of the IWWMP describes how the performance of the Inyanda washplant and co-disposal facility regarding the implementation of the IWWMP will be monitored and audited in future.

6.1 WATER AND WASTE MANAGEMENT PHILOSOPHY (PROCESS WATER, STORMWATER, GROUNDWATER AND WASTE)

The Constitution of South Africa, 1996 (Act 108 of 1996), specifies in Section 24 that everyone has the right:

To an environment that is not harmful to their health or well-being.

To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –

- Prevent pollution and ecological degradation.
- Promote conservation.
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The overriding principle of the Constitution, namely to protect human rights, is related to the need for sustainable use of our scarce natural resources, the promotion of conservation and the prevention of pollution and economic degradation, as contained in this Section 24. This section enshrines the principles of the prevention of pollution and ecological degradation and promote conservation, as well as the concepts of sustainable development and use of natural resources while promoting justifiable economic and social development” [Department of Water Affairs and Forestry (DWAF), 2000]. Furthermore, Section 27 of the Constitution of SA, 1996 (Act 108 of 1996) provides for the right of every South African to have access to sufficient water, including that water of sufficient quality, is guaranteed.

The legal basis for water management in the South African mining industry is mainly provided by the NWA (1998) and the Regulations there under (GN 704 (1999), Regulations on dam safety in terms of Chapter 12 of the NWA, 1998.

Other legislation that directly or indirectly guides the water and waste management philosophy of Inyanda washplant and co-disposal facility includes mainly, but is not restricted to, the following:

- Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965).
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- Environment Conservation Act, 1989 (Act 73 of 1989) – Section 20.
- Hazardous Substances Act, 1973 (Act 15 of 1973).
- Health Act, 1977 (Act 63 of 1977).
- Mine Health and Safety Act, 1996 (Act 29 of 1996).
- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).
- Mineral and Petroleum Resources Development Regulations R.527, dated 23 April 2004.
- National Environmental Management Act, 1998 (Act 107 of 1998).
- National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004).
- National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- Nuclear Energy Act, 1999 (Act 46 of 1999).
- Water Services Act, 1997 (Act 108 of 1997).



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It is the intention of the Inyanda washplant and co-disposal facility to comply with all legislative aspects of water usage and water management and to minimise residual negative environmental impacts and resultant closure costs.

Inyanda washplant and co-disposal facility is committed to the Best Practice integrated water management principles, which form the basis of water quality management policies and practices in South Africa. These principles are described in detail in the Best Practice Guideline on Integrated water Management (DWA, 2008) and summarized below:

- Compliance with the water management decision-taking hierarchy: This hierarchy prioritizes pollution prevention and minimization wherever possible. Water should be reused and reclaimed or treated. Only as a last resort should water be discharged or disposed, and then only if the quality thereof is appropriate considering the Olifants River Catchment's water quality objectives or General Limits (GN 1991).
- Life-cycle approach: Water uses, risks to the environment, impacts, management, and mitigation measures have been considered for all Inyanda washplant and co-disposal facility phases (refer to Chapter 6.8). It should be born in mind that while management principles have been outlined for the later life phases, specific measures have allowed for the development of improved technology and knowledge that is more detailed to guide the final mitigation. Closure will be sufficiently planned for throughout the life of the Inyanda washplant and co-disposal facility to minimize the long-term impacts of the coal siding activities on the environment after the activity ceases.
- Cradle to grave principle: water and waste will be managed beyond the site. Where possible water and waste streams will be re-used or recycled, and disposal will only be considered as a final option. Inyanda washplant and co-disposal facility will only dispose of waste at existing licensed sites.
- Precautionary principle: Modelling of water quality has and will continue to consider the worst-case scenario. Inyanda washplant and co-disposal facility will therefore continuously plan to manage water quantity and quality efficiently.
- Risk based approach: A risk assessment has been compiled (refer to Chapter 6.8) for the Inyanda washplant and co-disposal facility. This risk assessment will be assessed as part of each IWWMP Action Plan audit (refer to Chapter 8.10) and amended based on additional known impacts if they are identified.
- Continual improvement: monitoring, research and technological advances may lead to improved management principles and mitigation measures.
- Cumulative and regional impact management: The siding recognizes that their operations may result in impacts outside of the Inyanda washplant and co-disposal facility, whether regional or cumulative. They therefore commit to participate with the surrounding community to mitigate and manage these impacts in a manner that suits all affected parties.
- Public participation: the public participation process in terms of the requirements of the NWA (1998) has been carried as part of this WULA and IWWMP project.

6.2 STRATEGIES

6.2.1 Operational Phase Strategies

As mentioned previously, the water and waste management system that is implemented at Inyanda washplant and co-disposal facility was designed to satisfy the requirements of the applicable legislation, as well as using the criteria and guidelines published by the DWA. Consequently, the non-compliance to Regulation GN 704 as identified during the internal GN 740 audit was due to suboptimal implementation of the purpose-designed water and waste management system. This part of the IWWMP therefore focuses on the measures that will be taken to correct these non-compliances and improve the overall water and waste management at Inyanda washplant and co-disposal facility so that the current impacts on the receiving water environment can be minimised as far as practicable. Since the Inyanda washplant and co-disposal facility is an existing operation, the proposed strategies to address the identified shortcomings of the water and waste management system will be implemented in a phased approach as described below.

6.2.1.1 Water Management Strategy

The compliance of the Inyanda washplant and co-disposal facility's water management strategy to current water supply and quality management best practice principles and policies was assessed in Chapter 7 of this IWWMP. Overall, the water management system at Inyanda washplant and co-disposal facility was designed to comply with best practice principles, but the practical implementation



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and on-going management of those water management tools and infrastructure requires some improvement. Improvements in the application of the existing water management system will be made in accordance with the Inyanda washplant and co-disposal facility's commitment to prevention of pollution by implementing the following principles:

- Minimise volumes of water that are exposed to contaminating materials and substances.
- Minimise volume of clean water entering the dirty water management system.
- Maximise re-use of contaminated water.
- Prevent discharge of contaminated water to the surrounding environment.
- Minimise impacts on groundwater.

6.2.1.2 Waste Management Strategy

Waste at the Inyanda washplant and co-disposal facility will be managed by implementing the following strategies Minimise the generation of waste as far as practicable.

- Separate waste at source.
- All waste is handled accordingly.
- Recycle and re-use waste as far as practicable.
- Dispose of waste to licensed offsite facilities.

6.3 PERFORMANCE OBJECTIVES / GOALS

Table 28: Performance objectives

Aspect	Water management objective	Summary of impact or issue
Surface Water	Minimise impacts on surface water.	<p><i>Surface water management</i></p> <p>Alien invasive species may establish within the Inyanda washplant and co-disposal area. This will lead to a decrease for water available to indigenous plant species as the alien invasive plant species consume more water.</p>
		<p><i>Surface water management</i></p> <p>Areas vulnerable to erosion may lead to an increase in suspended sediments in storm water runoff and consequent sedimentation of the receiving environment.</p>
	Minimise impacts on surface water. To optimise storm water management and minimise impacts on the receiving water environment.	<p><i>Surface water and storm water management</i></p> <p>Surface water that is exposed to carbonaceous material (i.e. coal, coal residue and dust) in the coal stockpile area and access roads will become contaminated.</p>
	To optimise storm water management and minimise impacts on the receiving water environment.	<p><i>Storm water management system</i></p> <p>Reduction in catchment yield over the Operational Phase of the Inyanda washplant and co-disposal facility due to the implementation of a storm water management system.</p>
	To optimise storm water management and minimise	<p><i>Storm water management at the workshop and wash bay area</i></p>



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	impacts on the receiving water environment.	<p><i>Storm water management on access roads</i></p> <p>Carbonaceous material may fall off haul trucks and onto the access roads of the Inyanda washplant and co-disposal facility.</p>
		<p><i>Storm water management at the office block area</i></p> <p>Due to the relatively small size of the Inyanda washplant and co-disposal facility, the office block area forms part of the dirty water management system.</p>
		<p><i>Dirty water management infrastructure</i></p> <p>The Return Water Dam at the Inyanda washplant and co-disposal facility was constructed within for dirty water management. An exemption from Sub regulation 4(a) and 4(b) of Regulation GN 704 is included as part of this IWWMP and WUL Application.</p>
	Maximise the re-use, reclamation and conservation of water.	<p><i>Water and waste management</i></p> <p>The management of water and waste will continue to be undertaken during the remaining life of the Inyanda washplant and co-disposal facility.</p>
		<p>Infiltration of process water through compromised linings of the PCD to the groundwater would likely result in local mounding of groundwater levels directly below and surrounding the PCD.</p>
Groundwater	Prevent the discharge of contaminated water.	Compact temporary coal stockpiling area with impervious layers to prevent groundwater contamination.
	Prevent the discharge of contaminated water.	Ponding of contaminated surface water may result in contaminated groundwater ingress, contaminating the groundwater resources.
	Implement management measures to minimise the Inyanda washplant and co-disposal facility's impacts on and risks to the groundwater, particularly with regard to groundwater contamination and long-term management thereof.	Contaminated vehicle wash water emanating from the wash bay and associated sumps may spill and contaminated groundwater resources through infiltration.
	Implement management measures to minimise the Inyanda washplant and co-disposal facility's impacts on and risks to the groundwater, particularly with regard to groundwater contamination and long-term management thereof.	Water management infrastructure must be maintained to ensure that contaminated water does not infiltrate clean water areas.

6.4 MEASURES TO ACHIEVE AND SUSTAIN PERFORMANCE OBJECTIVES

Table 29: Mechanisms to Monitor Compliance and Performance

Water management objective	Commitments to address impacts or water management issues	Status of commitments	Corrective Action
Minimise impacts on	An alien invasive plant species removal	This has not been	An alien invasive management



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surface water.	programme should be implemented where all invasive plant species are removed from the Inyanda Inyanda washplant and co-disposal facility area.	undertaken	plan should be compiled and implemented at the siding
	Indigenous vegetation should be re-established in areas of bare vegetation.	Undertaken	N/A
Minimise impacts on surface water. To optimise storm water management and minimise impacts on the receiving water environment.	Storm water channels and a PCD have been constructed to detain all contaminated water emanating from the dirty water management system of the Inyanda washplant. The storm water management infrastructure should be inspected on a regular basis to ensure they that the infrastructure is operating in line with their intended purpose and design.	Undertaken	N/A
To optimise storm water management and minimise impacts on the receiving water environment.	The sizes of all dirty water management areas at the Inyanda washplant will be minimised as far as practicable.	Undertaken	N/A
	Any new activities will be assessed in advance to determine their potential impacts on catchment yield as part of the impact assessment study to be done during the planning phase.	Undertaken	N/A
To optimise storm water management and minimise impacts on the receiving water environment.	Since the house GN 704 audit was conducted, Inyanda washplant has designed and implemented several measures to ensure that all dirty water reports to the PCD.	Undertaken	N/A
	The access roads as well as the areas adjacent to the access roads will be regularly inspected for any carbonaceous material which may have fallen off of the haul trucks. All carbonaceous material will be removed immediately.	This is not undertaken	All spills need to be cleaned when an incident occurs.
	The storm water channels will be regularly inspected for and cleared of material, which may impede the free flow of contaminated storm water runoff.	Undertaken	N/A
	All water emanating from all parts of the dirty water management system will flow and be directed to the PCD for containment, evaporation and re-use as dust suppression.	Undertaken	N/A
To optimise storm water management and minimise impacts on the receiving water	The Return Water Dam is a mitigation measure itself and is used to detain contaminated water from the dirty water management system. The capacity of it will be inspected on a regular basis to ensure	Undertaken	N/A



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environment.	sufficient capacity is available. It will also be monitored and inspected on a regular basis for any possible leaks and spillages to the receiving catchment.		
	The water balance needs to be updated on an annual basis and a salt balance needs to be established. This salt balance should be updated on an annual basis in conjunction with the water balance.	Undertaken	N/A
Maximise the re-use, reclamation and conservation of water.	The current Inyanda washplant and co-disposal facility water and waste management system will continually be improved as it becomes necessary.	Undertaken	N/A
Prevent the discharge of contaminated water.	The Return Water Dam will continue to be monitored on a regular basis to ensure that sufficient operating capacity is available to contain the 1:50 year rainfall event.	Undertaken	N/A
Prevent the discharge of contaminated water.	The Return Water Dam will continue to be regularly inspected to ensure that there is no damage to the lining and that sufficient capacity is available.	Undertaken	N/A
Implement management measures to minimise the Inyanda washplant and co-disposal facility's impacts on and risks to the groundwater, particularly with regard to groundwater contamination and long-term management thereof.	Water management infrastructure must be maintained to ensure that contaminated water does not infiltrate clean water areas.	Undertaken	N/A
	The compaction of surface areas is a mitigation in itself to reduce contaminated groundwater ingress. The dirty water management system should be kept as small as practicable in order to prevent the compaction of unnecessary areas.	Undertaken	N/A
	All surface areas should be shaped to be free draining towards the dirty water management infrastructure.	Undertaken	N/A
	The sumps at the wash bay should be monitored and emptied regularly to ensure spills do not occur. Should a spillage occur, it should be reported as soon as possible and the spill cleaned.	Undertaken	N/A
	The conservancy tanks should be regularly emptied, inspected and maintained where necessary to ensure contamination of groundwater resources does not occur.	Undertaken	N/A



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Implement management measures to minimise the Inyanda Inyanda washplant and co-disposal facility's impacts on and risks to the groundwater, particularly with regard to groundwater contamination and long-term management thereof.	Water management infrastructure must be maintained to ensure that contaminated water does not infiltrate clean water areas.	Undertaken	N/A
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6.5 OPTION ANALYSES AND MOTIVATION FOR IMPLEMENTATION OF PREFERRED OPTIONS

This is an update of an approved EMP and current option alternatives are not applicable.

6.6 IWWMP ACTION PLAN

This part of the IWWMP details the actions that will be taken to ensure that the objectives and measures set out above, as well as the commitments made throughout the rest of this IWWMP, are achieved. The main purpose of this section of the IWWMP is to identify the direct actions to be taken by the Inyanda washplant and co-disposal facility, as well as to allocate responsibility for the implementation of these actions and set a target in terms of the timeline(s) within which the actions will be achieved. The action plan included here (see Table 30 below) focuses on the measures that will be implemented during the Operational Phase.



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Table 30: IWWMP Action Plan

Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
1	Improve the operation of the existing clean and dirty water management infrastructure.	Within 6 months. See also timeframes and frequencies below.	Section Heads.	Undertaken	N/A
1.1	Revise inspection and maintenance plans to include more frequent inspections and more timely maintenance of drains, channels, berms, silt traps and oil sumps.	3 months from submission of this IWWMP to the DWA.	Section Heads.	Not undertaken	Keep an inspection and maintenance schedule
1.2	Audit effectiveness of the Section Heads' implementation of the revised water management infrastructure inspection and maintenance plans.	Weekly.	Environmental Coordinator.	Not undertaken	Keep an audit schedule showing compliances and non-compliances
1.3	Report audit results to management, and include in annual water report as well as future revised IWWMPs.	Internal report – monthly. External report – annually.	Environmental Coordinator.	Not undertaken	Implement said action
1.4	Report and record any incidents related to any malfunction of the contaminated water management system leading to the overflow of contaminated water outside of the designated dirty water management system	Within 24 hours of incident occurring.	Section Heads.	Undertaken	There is a file on site that records all the incidents and malfunctions , also for reportable incidents there are proof of submissions to the DWS.
1.5	Report any major incidents to the DWA and provide a plan of action to address the incident and any related environmental impacts.	Within 24 hours of incident occurring.	Environmental Coordinator.	Undertaken	There is a file on site that records all the incidents and malfunctions , also for reportable incidents



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
					there are proof of submissions to the DWS.
1.6	Include any such incidents in the annual water report and future revised IWWMPs.	Annually.	Environmental Coordinator.	Undertaken	There is a file on site that records all the incidents and malfunctions , also for reportable incidents there are proof of submissions to the DWS.
1.7	If improved inspection and maintenance does not adequately improve the performance of the water management infrastructure, appoint a suitably qualified person to conduct a detailed GN 704 audit to determine the adequacy of the designs of the water management infrastructure.	After 6 months of improved inspection and maintenance.	Environmental Coordinator.	Not undertaken	Implement said action
2	Document existing storm water management plan and develop a storm water management improvement plan.	6 months to 1 year.	Environmental Coordinator.	Not undertaken	Implement said action
2.1	Appoint a suitably qualified person to document existing storm water management system according to the requirements of the DWA as set out in their BPG G1.	Within 6 months.	Environmental Coordinator.	Not undertaken	Implement said action
2.2	Test the existing storm water management system using: Visual inspection. Event-sampling – collect water sample during a rainfall event to establish whether the clean and dirty water management systems are effectively separated.	3 months during rainy season.	Environmental Coordinator.	Not undertaken	Implement said action
2.3	Appoint a suitably qualified person to develop a storm water management	9 months to 1 year.	Environmental	Not undertaken	Implement said action



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	improvement plan to ensure that the clean and dirty water separation system consistently complies with the DWA's best practice principles, as set out in BPG:G1.		Coordinator.		
3	Minimise the size of all dirty water management areas as far as practicable.	Ongoing	Section Heads.	Undertaken	N/A
3.1	Confine all activities posing a potential hazard to the receiving environment, including the handling of coal and hydrocarbons such as fuel, oil and grease, to within the existing designated dirty water management areas.	Ongoing.	Environmental Coordinator.	Undertaken	N/A
3.2	Ensure that no expansion of dirty water management areas occurs without the required design and implementation of water management measures, and if applicable, the required environmental authorisations.	On-going.	Environmental Coordinator.	Undertaken	N/A
3.3	Document and report inspection findings to management, and include in annual water report as well as future revised IWWMPs.	Internal report – monthly. External report – annually.	Environmental Coordinator.	Not undertaken	Implement said action
3.4	Report and record any incidents related to the contravention of Actions 3.1 and 3.2.	Within 24 hours of incident occurring.	Environmental Coordinator.	Not undertaken	Implement said action
3.5	Report any major incidents to the DWA and provide a plan of action to address the incident and any related environmental impacts.	Within 24 hours of incident occurring.	Environmental Coordinator.	Not undertaken	Implement said action
3.6	Include any such incidents in the annual water report and future revised IWWMPs.	Annually.	Environmental Coordinator.	Not undertaken	Implement said action
4	Improve drainage around dirty water management system.	Within 2 months.	Section Head.	Undertaken	N/A
4.1	Reshape the surface to ensure free-drainage and to prevent waterlogging.	Within 2 months.	Section Head.	Undertaken	N/A
4.2	Ensure that no carbonaceous material is used to reshape the surface.	N/A.	Section Head, Environmental	Undertaken	N/A



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
			Coordinator.		
4.3	Inspect the surface areas to identify areas where waterlogging may occur, and instigate proactive measures to prevent possible waterlogging during future rainfall events.	Weekly during rainy season, monthly during dry season.	Section Head, Environmental Coordinator.	Undertaken	N/A
5	Improve hydrocarbon management	1 month, on-going	Section Heads, Environmental Coordinator.	Undertaken	N/A
5.1	Inspect hydrocarbon management infrastructure such as bund walls and oil sumps to ensure they are in good working order and continue to be effective. Address any findings detected through these inspections within 24 hours.	Weekly inspections. Address findings within 24 hours.	Environmental Coordinator.	Not undertaken	Keep an inspection and maintenance schedule
5.2	Provide training to improve handling of hydrocarbons:	Within 3 months for initial changes, subsequently followed by on-going training and as applicable / necessary.	Environmental Coordinator.	Undertaken	N/A
5.2.1	Include hydrocarbon management in environmental awareness programmes, and pass changes to the environmental awareness programme on to current employees and contractors.		Environmental Coordinator.	Undertaken	N/A
5.2.2	Include hydrocarbon management in induction programme for employees and contractors, and pass changes on to current employees and contractors (e.g. through refresher courses).		Environmental Coordinator.	Undertaken	N/A
5.2.3	Provide specialist environmental training to those employees and contractors working with hydrocarbons on site. Follow up training with competency assessments, both theoretical and practical to ensure that the knowledge gained through the specialised training is carried through to the day-to-day		Environmental Coordinator.	Not undertaken	Implement said action



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	management of hydrocarbons.				
5.3	Treat hydrocarbon spillages as an environmental emergency.	As soon as possible after a hydrocarbon spill.	Environmental Coordinator.	Not undertaken	Implement said action
5.3.1	Implement Inyanda Coals environmental emergency procedure.	Only applicable when the environmental emergency is triggered.		Not undertaken	Implement said action when required
5.3.2	Carry out the necessary post-spillage monitoring and checks.	As soon as possible after spillage, within 24 hours.	Environmental Coordinator.	Not undertaken	Implement said action
5.3.3	Notify the applicable authorities of a spill within 24 hours, as required by legislation (e.g. Section 20 of the NWA, and Section 30 of the NEMA, amongst others) and specifically Regulation GN 704, dated 1999	Within 24 hours after spillage.	Environmental Coordinator.	Not undertaken	Implement said action
5.4	Remove the soil that has been contaminated with hydrocarbons through spillage.		Environmental Coordinator.	Not undertaken	Implement said action
6	Prevent further spillages of contaminated storm water from the workshops, temporary coal stockpiling area, wash bay and access roads.	Within 6 months. See also timeframes and frequencies of Action 1 in this table.	Section Heads.	Undertaken	N/A
6.1	Remove coal that has spilled into the dirty water channels and drains, and return the retrieved coal to the temporary coal stockpiling area.	On-going	Environmental Coordinator.	Undertaken	N/A
6.1.1	Include clearing of drains and channels in induction programme for employees and contractors, and pass changes on to current employees and contractors (e.g. through refresher courses).	Ongoing	Human Resource	Undertaken	N/A



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Action no.			Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	6.1.2		Provide specialist environmental training to those employees and contractors working on the clearing of drains and channels on site. Follow up training with competency assessments, both theoretical and practical to ensure that the knowledge gained through the specialised training is carried through to the day-to-day management of the dirty water management system.			Not undertaken	Implement said action
	6.2		Remove silts and fines from channels, the PCD and silt trap.	Weekly during rainy season, monthly during dry season.	Environmental Coordinator.	Not undertaken	Implement said action
	6.3		Dry silts and fines removed from the dirty water management infrastructure at the Inyanda washplant.	Within 1 month, on-going thereafter according to maintenance schedule (see Action 1.1 in this table).	Section Heads, Environmental Coordinator and Training Supervisor.	Not undertaken	Implement said action
	6.4		Submit a copy of the groundwater study and pollution plume model to the DWA as part of the annual water monitoring report and as part of the next revision of the IWWMP.			Not undertaken	An updated groundwater model needs to be compiled.
7			Submit the as-built drawings of all dirty water management infrastructure to the DWA.	Within 6 months.	Section Head, Environmental Coordinator.	Status unknown	
	7.1		Determine if as-built drawings exist for the dirty water management Return Water Dam and storm water separation infrastructure.	Within 1 month.	Environmental Coordinator.	Status unknown	Implement said action
	7.2	a	If drawings have been done, make copies (check with the DWA how many copies are required) and submit to the DWA.	Within 6 months.	Environmental Coordinator.	Status unknown	Implement said action
		b	If drawings have not been done, appoint a suitably qualified person to develop	Within 2 months, submit	Section Head and	Status unknown	Implement said action if



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	as-built drawings. Upon completion of the drawings, submit to the DWA (check with DWA how many copies are required).	within 6 months.	Environmental Coordinator.		required
8	Prevent future spillages from the dirty water containment facilities.	On-going.	Section Head, Environmental Coordinator.	Undertaken	N/A
8.1	Keep water levels in the Return Water Dam below the maximum operating level.	On-going.	Environmental Coordinator.	Spills have occurred in the past, the water level is actively managed through bowser collection for dust suppression	N/A
8.2	Ensure that the maximum operating level markers are clearly visible on the PCD and silt trap.	Daily.	Environmental Coordinator.	Undertaken	N/A
8.3	Inspect and record water levels in dirty water containment facilities.	Daily.	Environmental Coordinator.	Not undertaken	Keep a record of water levels.
8.4	During the rainy season, inspect and record water levels in the PCD hourly if the level in the containment facility reaches the maximum operating level.		Environmental Coordinator.	Not undertaken	Implement said action
8.5	If the Return Water Dam still seem likely to overflow, implement Inyanda Coals emergency response plan.	After water level in the Return Water Dam exceeds the maximum operating level, but prior to the overflow of the Return Water Dam	Section Head, Environmental Coordinator.	Spills have occurred in the past, the water level is actively managed through bowser	N/A



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
				collection for dust suppression	
8.6	If future spillages from dirty water containment facilities seem likely to occur despite having implemented the applicable emergency procedure, notify the DWA of the potential overflow of the facility, and keep the DWA informed daily thereafter of events and actions taken to mitigate any impacts, as well as informing them of the post-emergency monitoring results.	After water level in the Return Water Dam exceeds the maximum operating level, but prior to the overflow of the Return Water Dam	Environmental Coordinator.	Not undertaken	Implement said action.
9	Develop a salt balance.	Before the next Water Use Licence audit and IWWMP revision.	Environmental Coordinator.	Undertaken	A Salt Balance is being compiled for this IWWMP update
9.1	Appoint a suitably qualified person to generate a salt balance (that complies with the applicable Best Practice Guideline [BPG:G2] from the DWA) for Inyanda washplant and co-disposal facility based on water quality monitoring results.	Annually.	Environmental Coordinator.	Undertaken	N/A
9.2	Include salt balance and accompanying report in the annual revision of the IWWMP.	Submit to DWA annually as part of IWWMP revision.	Environmental Coordinator.	Undertaken	N/A
10	Review the water re-use strategy at Inyanda washplant and co-disposal facility	Annually.	Water re-use and reclamation committee.	Not undertaken	Implement said action
10.1	Ensure that the Inyanda washplant and co-disposal facility's water re-use remains optimal, from technical, legal and best practice perspectives.	Ongoing	Environmental Coordinator.	Not undertaken	Implement said action
10.2	Hold an annual workshop to review the Inyanda washplant and co-disposal	Annually.	Environmental	Not undertaken	Implement said action



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	facility's water re-use to determine if there are any ways to improve the reclamation of water at the Inyanda washplant and co-disposal facility for re-use.		Coordinator.		
10.3	Generate a report of the workshop findings and action plan moving forward.	Ongoing		Not undertaken	Implement said action
10.4	Include information in annual revision of the IWWMP.	Annually.		Not undertaken	Implement said action
11	Improve the water and waste management system as it becomes necessary.	As it becomes necessary.	Environmental Coordinator.	Undertaken	N/A
12	Revise training curricula and applicable Standard Practice Instruction an annual basis to include / emphasise waste minimisation and separation.	Within 3 months.	Environmental Coordinator.	Not undertaken	Implement said action
13	Implement applicable existing Standard Practice Instructions and Procedures more diligently to reduce waste.	Monthly.	Environmental Coordinator.	Not undertaken	Implement said action
13.1	Audit compliance to the applicable Standard Practice Instructions and Procedure and report any findings as incidents.	Within 1 month of audit.	Environmental Coordinator.	Not undertaken	Implement said action
14	Review waste reduction and waste management at the Inyanda washplant and co-disposal facility.	Annually.	Environmental Coordinator.	Not undertaken	Implement said action
14.1	Ensure that the Inyanda washplant and co-disposal facility's waste management system remains optimal, from technical, legal and best practice perspectives.	Ongoing	Environmental Coordinator.	Undertaken	Implement said action
14.2	Hold an annual workshop to review the Inyanda washplant and co-disposal facility waste management strategy to determine if there are any ways to improve it, and to increase the types of waste that are recycled rather than disposed.	Annually.	Environmental Coordinator.	Not undertaken	Implement said action



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
14.3	Generate a report of the workshop findings and action plan moving forward.	Ongoing	Environmental Coordinator.	Not undertaken	Implement said action
14.4	Include information generated in annual revision of the IWWMP.	Annually.		Not undertaken	Implement said action
15	Hold employees or contractors responsible for environmental degradation.	Within 3 months.	Human Resources manager.	Not undertaken	Implement said action
15.1	Include the non-compliance with Standard Practice Instructions and Procedures and applicable legislation, whether due to negligence or disregard, in the list of punishable offenses for which disciplinary action is taken within the existing HR system.	Ongoing	Human Resources manager.	Not undertaken	Implement said action
15.2	During audits and checks, and in the case of incidents, identify the perpetrator and report to HR.	Ongoing	Human Resources manager.	Not undertaken	Implement said action
16	Update the Inyanda Inyanda washplant and co-disposal facility's water balance.	Within 3 months.	Environmental Coordinator and Section Head.	Undertaken	Eco Elementum has been appointed to undertake the 2020 update
16.1	Appoint a suitably qualified person to update the Inyanda washplant and co-disposal facility 's water balance that it: Reflects the most recent water monitoring information. Complies with the requirements of the DWA as set out in the applicable guideline (BPG:G2).	Within 1 month.	Environmental Coordinator and Section Head.	Undertaken	Eco Elementum has been appointed to undertake the 2020 update
16.2	Submit the updated water balance and accompanying report to the DWA.	Within 3 months.	Environmental Coordinator and Section Head.	Not undertaken	Eco Elementum has been appointed to undertake the 2020 update



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
16.3	Keep water balance updated and report annually to the DWA as part of the revised IWWMP.	Annually.	Environmental Coordinator and Section Head.	Not undertaken	Eco Elementum has been appointed to undertake the 2020 update
17	Utilise the water and salt balances as a day-to-day water management tool at the Inyanda washplant and co-disposal facility	As appropriate.	Section Heads, Inyanda washplant and co-disposal facility Management.	Not undertaken	Implement said action
17.1	Utilise the water balance to assess the quantity, quality and source of all waters at the Inyanda washplant and co-disposal facility	As appropriate.	Section Heads, Inyanda washplant and co-disposal facility Management.	Not undertaken	Implement said action
17.2	Utilise the water balance as a management tool, for example, in simulating the effect of additional water management measures or the effect of possible future expansion projects on the water management system.	As appropriate.	Section Heads, Inyanda washplant and co-disposal facility Management.	Not undertaken	Implement said action
17.3	Use the water balance to identify any possible area of concern with regard to water management at the Inyanda washplant and co-disposal facility, as well as possible non-compliances to Regulations GN 704 and Inyanda washplant's Water Use Licence (once approved).	At water management committee meetings (see also Action 25 in this table).	Section Heads, Inyanda washplant and co-disposal facility Management.	Not undertaken	Implement said action
18	Develop a salt balance.	Within 12 months.	Environmental Coordinator.	Undertaken	Eco Elementum has been appointed to develop the salt balance
18.1	Appoint a suitably qualified specialist to develop a salt balance for Inyanda washplant based on water monitoring information. Include the need to			Not undertaken	Eco Elementum has been appointed to develop the



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	comply with the DWA's best practice guideline (BPG:G2) in the terms of reference for the appointment.				salt balance
18.2	Submit the salt balance and accompanying report to the DWA as part of the next annual revision of the IWWMP.			Not undertaken	Eco Elementum has been appointed to develop the salt balance
18.3	Utilise the information interpreted from the salt balance in the specialist's report to guide management in terms of identifying and potentially implementing mitigation measures to address possible problems resulting from high salt and metal concentrations in contaminated water.	At water management committee meetings (see also Action 25 in this table).	Environmental Coordinator and Section Heads.	Not undertaken	Implement said action
19	Keep the salt balance up to date and refined with data and interpretations of the data as time progresses on a continuous basis when changes in water use and water management occur.	Monthly.	Environmental Coordinator.	Not undertaken	Implement said action
20	Use the water and salt balances for purposes including, but not limited to, the following:		Environmental Coordinator, Section Heads.		
20.1	Audit water usage from various source areas.			undertaken	Internal and external audits
20.2	Identify areas of high water consumption and wastage.			Not undertaken	Implement said action
20.3	Identify and quantify imbalances.			Not undertaken	Implement said action
20.4	Locate and quantify sources of seepage and leakage.			Not undertaken	Implement said action
20.5	Identify and quantify pollution sources, and develop amelioration measures.			Not undertaken	Implement said action
20.6	Identify areas for possible water use savings.			Not undertaken	Implement said action



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
20.7	Assist with the design and verification of storage requirements and minimising the risk of spillage.			Not undertaken	Implement said action
20.8	Assist with the optimisation of the water monitoring system.			Not undertaken	Implement said action
20.9	Assist in decision-making.			Not undertaken	Implement said action
20.10	Define and drive future water and waste management strategies at Inyanda washplant and co-disposal facility.	As appropriate	Section Heads and Environmental Coordinator.	Not undertaken	Implement said action
21	Internally review water and salt balances simultaneously in terms of continued applicability, changes in water management, availability of new technology and change in regulatory and legislative requirements.	Annually.	Environmental Coordinator.	Not undertaken	Implement said action
22	Ensure that the latest policy of the DWA as contained in the best practice guideline BPG:G2 "Water and Salt Balances", dated August 2006 (or any subsequent revision thereof) is reflected in the annual review of the Inyanda washplant and co-disposal facility's water and salt balances.	Annually.	Environmental Coordinator.	Undertaken	2020 W&SB was compiled
22.1	Include the annual revised water and salt balances in the annual IWWMP revision.			Not undertaken	2020 W&SB was compiled
23	Revise the water-monitoring programme.	Within 6 months.	Environmental Coordinator.	Undertaken	N/A
23.1	Appoint a suitably qualified person to revise the water monitoring programme as follows:			Undertaken	N/A
23.1.1	Compare water quality results for the receiving environment with the criteria set out in the Water Use Licence (once approved).			Undertaken	N/A
23.1.2	Expand the variables that are monitored in water samples to include those			Undertaken	N/A



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
	listed in the criteria set out in the Water Use Licence (once approved).				
23.1.3	Assess the adequacy of the water-monitoring programme in terms of providing sufficient information to determine the current impacts of the coal siding activities on the receiving environment, as well as in terms of complying with the applicable conditions of the Water Use Licence (once approved).			Not undertaken	Implement said action
23.1.4	Include identifiable new water monitoring localities in the programme.			Not undertaken	Implement said action
23.1.5	Ensure that the information reported in the monitoring report is consistent and clear, and provides pertinent information on all identified surface water and groundwater pollution sources.			Undertaken	N/A
23.2	<p>Appoint a suitably qualified and experienced person to analyse and interpret the water quality monitoring results to:</p> <p>Provide a clear picture of the pollution sources and pathways.</p> <p>Identify possible reasons for large fluctuations in data or monitoring results that are outside the anticipated range.</p> <p>Report water-monitoring results in a meaningful way, with practical interpretation and discussion of the results.</p> <p>Ensure the water monitoring programme complies with any future changes to the latest policy of the DWA as contained in the Best Practice Guideline BPG:G3, "Water Monitoring Systems", dated July 2007 (or any subsequent updated version thereof).</p>			Undertaken	N/A
23.3	Report water quality monitoring results, analyses and interpretation on a quarterly and annual basis to the DWA.	Quarterly and Annually.		Undertaken	N/A
23.4	Use water quality monitoring to provide feedback as to the continued effectiveness of the Inyanda washplant and co-disposal facility's water and waste management system.			Undertaken	N/A



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Action no.	Action	Timeframe / Frequency	Responsibility	Status	Corrective Action
23.5	Where applicable, use water-monitoring information to update the relevant Standard Practice Instructions and Procedures.	As appropriate.		Undertaken	N/A
23.6	Present the latest water monitoring information and water balance during environmental audits to assist with the assessment of the Inyanda washplant and co-disposal facility's compliance with relevant standards and legislation.	As appropriate.		Undertaken	N/A
23.7	Include the most recent annual water monitoring report in the next annual IWWMP revision.	Annually.		Undertaken	N/A
24	Develop a groundwater pollution plume model.		Environmental Coordinator.	Undertaken	This is part of Geohydrological report.
24.1	Appoint a suitably qualified person to develop a groundwater pollution plume model.	Within 12 months.		Undertaken	This is part of Geohydrological report.
24.2	Use data from the revised groundwater-monitoring programme to input to the pollution plume model.	Quarterly.		Undertaken	Groundwater monitoring.
24.3	Include the most recent groundwater pollution plume model in future annual revisions of the IWWMP, as well as in the annual water monitoring report that is submitted to the DWA.	Annually.		Not undertaken	Implement said action



6.7 CONTROL AND MONITORING

Refer to section 5.7 of this report.

6.7.1 Audit and report on performance measures

All information as required by the various Government Departments should be captured and be readily available for submission when required and for review by the external consultant conducting the performance assessment and audits.

As per NEMA EIA Regulations (GNR982 of 2014), a performance assessment/audit will be conducted by an external consultant throughout the life of mine at intervals stipulated in the EA. It is recommended to complete these audits annually. This is conducted to assess the adequacy and compliance to the EMP and the relevant legislation. As per NEMA, any amendments to the EMP that may be required due to the performance assessment findings will be completed if necessary. The Quantum of the Financial Provision must be reviewed on an annual basis and submitted to the DMR. In addition to the NEMA requirements, the IWUL will be audited as per conditions set out in the IWUL, at which time the site will also be audited against GN704. The IWWMP is updated annually.

6.7.2 Audit and report on relevance of IWWMP action plan

6.7.2.1 Purpose

The main purpose of auditing and reporting on the relevance of the IWWMP Action Plan is to ascertain whether the commitments are still applicable and appropriate to the overall water and waste management objectives of the Inyanda washplant and co-disposal facility, with emphasis on the impacts on the receiving water environment.

6.7.2.2 Relevance of the IWWMP Action Plan

The continued relevance of the Inyanda washplant and co-disposal facility's water and waste management action plan will be evident from the outcome of the performance measurement audit. The continued relevance of the action plan should be assessed by an external, suitably qualified person and recommendations made based on the findings of the assessment.

6.7.2.3 Reporting

The continued relevance of the commitments in the action plan will be reported simultaneously to the findings of the performance measurement audit, and recommendations for improvements or changes to the action plan will be provided. Thus, a single audit report will be generated that assesses both the performance of the Inyanda washplant and co-disposal facility regarding water and waste management commitments, as well as the continued relevance of the action plan.

6.7.2.4 Period

Since the relevance of the IWWMP action plan will be assessed simultaneously to the performance of the Inyanda washplant and co-disposal facility regarding the commitments contained in the IWWMP, the period between audits will be annually.



7. CONCLUSION

This IWWMP contains information on the activities that are undertaken at Inyanda washplant and co-disposal facility, with emphasis on water and waste management. This document also contains information on the current environmental situation, the activities taking place at the Inyanda washplant and co-disposal facility (including Water Use activities as defined in Section 21 of the NWA), and identifies the current and potential risks posed by the operation and Water Uses to the receiving environment, including the water environment and other water users.

Since the Inyanda washplant and co-disposal facility is an existing activity, the IWWMP will be implemented in a phased approach. As such, this document presents the current and proposed management measures that are or will be implemented to minimise the impacts on or risks to the surrounding environment. This IWWMP also demonstrates the Inyanda washplant and co-disposal facility's commitment of continual improvement of the water and waste management system in order to comply with changes in legislative requirements and to keep up to date with new technological advances pertaining to water management in the mining industry.

7.1 REGULATORY STATUS OF ACTIVITY

7.1.1 Regulatory Status With Regard To Water Uses

The Water Uses defined in Chapter 21 of the NWA that are currently taking place at the Inyanda washplant and co-disposal facility were described in Chapter 3 of this IWWMP. Table 31 below, provides a summary of the Inyanda washplant's current Water Uses and their legal status.

Table 31: Summary of the water uses and regulatory statuses for the Inyanda washplant and co-disposal facility.

Water Use No.	Property	NWA, 1998 Section 21	Activity Name	Description / purpose	Authorisation status
1.	Portion 21 of Kalbasfontein 284 JS	A	WB01	Abstracting water from borehole (WB01) for domestic use.	Temporary
2.		A	WB02	Abstracting water from borehole (WB02) for domestic use	Temporary
3.		A	WB03	Abstracting water from borehole (WB03) for domestic use	Temporary
4.		A	WB08	Abstracting water from borehole (WB08) for domestic use	Temporary
5.		A	Open pit	The use of water for dust suppression from the open pit	Temporary



6.	Portion 21 of Kalbasfontein 284 JS	A	Water removed from the underworking	Water removed from the underworking, removed through dewatering in order to be pumped into the return water dam to be reused in the mining process	Temporary
7.	Portion 04 of Moofontein 285 JS.	c & i	Raw water pipeline infrastructure leading to Dam 1 to the washing plant.	Conveyance of abreacting raw water to the mine.	Temporary
8.	Portion 21 of Kalbasfontein 284 JS	G	Return Water Dam	Wastewater disposed into the Return Water Dam.	Temporary
9.	Portion 21 of Kalbasfontein 284 JS	G	Biofilter dam	Disposing domestic wastewater from Biofilter plant into a Biofilter dam	Temporary
10.	Portion 21 of Kalbasfontein 284 JS	G	Dust Suppression	Disposing wastewater and using it for dust suppression	Temporary
11.	Portion 21 of Kalbasfontein 284 JS.	J	Return water dam	Removing underground water from open cast pit. The water disposed into the return water dam.	Temporary

7.1.2 Regulatory Status Of Inyanda washplant Waste Management Activities

Account was taken of all activities at the Inyanda washplant and co-disposal facility, which results in the generation of waste; the various categories of waste generated as well the method of storage and disposal of the various waste types.

While the operations of the siding generates waste streams that fall within both hazardous (including used oils, rags contaminated with hydrocarbons as well as containers of hydrocarbons) and general waste (domestic waste including paper, plastic, glass, metals) categories, the combined volumes of waste generated and temporarily stored are below the thresholds defined in the list of waste management activities (GN.718 , 2009) under the NEMWA , (2008). The waste generated on-site and the management thereof does therefore not constitute as a waste management activity and does not require a Waste License under the NEMWA (2008).

7.2 STATEMENT ON WATER USES



7.2.1 Water Uses To Be Licenced

A total of eleven (11) Water Uses take place as part of the Inyanda washplant and co-disposal facility, of which all were authorised in 2011.

- Section 21 (a) taking water from a water resource
- The abstraction of water from a farm dam located on Portion 2 of the Farm The abstraction of water from a farm dam located on Portion 2 of the Farm

7.2.2 Exemptions

Government Notice 704 (GN 704) was published on 4 June 1999, in Government Gazette No. 20119, Vol. 408, in terms of Section 26 (1) (b), (g) and (i) of the NWA. This section of the NWA makes provision for the Minister to, subject to subsection (4), make regulations:

- Requiring that the use of water from a water resource be monitored, measured and recorded;
- Regulating or prohibiting any activity in order to protect a water resource, or instream or riparian habitat; and
- Prescribing the outcome and or effect which must be achieved through management practices for the treatment of waste, or any class of waste, before it is discharged or deposited into or allowed to enter a water resource.

Sub-section 4 of 26 provides for the Minister to take all relevant considerations into account when making regulations, including the need to:

- Promote the economic and sustainable use of water;
- Conserve and protect water resources or in-stream and riparian habitat;
- Prevent wasteful water use;



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- Facilitate the management of water use and waterworks;
- Facilitate the monitoring of water use and water resources; and
- Facilitate the imposition.

Section 3 of GN 704 makes provision for the Minister to authorise, in writing, an exemption from the requirements of regulations 4, 5, 6, 7, 8, 10 or 11 on his or her own an initiative or on the application, subject to such conditions as the Minister may determine.

In terms of the linkages of GN704 with other requirements of the NWA, it is stated in Operational Guideline No. M6 that should provide an exemption from any requirements of GN704 implies the necessity for a water use Licence, the person in control of the mine or activity need only apply for a Licence. The Licence has higher authority than the GN704. This Licence application, therefore, serves as a motivation for exemption from GN704, Regulation 4.

GN 704 and Regulation 77 of the NWA (Act 36 of 1998) place restrictions on the mining activities for the protection of water resources. Of relevance to the Applicant is the restrictions placed on locality (Section 4), which states:

“No person in control of mine or activity may –

- locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1: 100-year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor;
- except in relation to a matter contemplated in regulation 10, carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1: 50-year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest;
- place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or
- use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1: 50-year flood-line of any watercourse or estuary.”

LKS Consulting was appointed by Inyanda Mining Holdings (Pty) Ltd to audit the compliance of the Inyanda Coal Mine against GN704 of the National Water Act, Act

36 of 1998 (NWA). Inyanda Coal Mine is situated on the Portions 21 of farm Kalbasfontein 284 JS & portion 4 of farm Mooifontein 285 JS. The main recommendations of the Audit Report were:



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- The water that is being taken from Danie Keets Farm is used as top-up process water on occasion. Even though this water use was included in the IWULA, it was not granted. This water use is unauthorized. There is a need for Inyanda to obtain authorization for water taken from "Danie Keets dam."
- Flowmeter recordings and abstraction amounts are submitted to DWS in line with the approved conditions of the WUL. The necessary flow meters have been installed for all water uses as required except the Biofilter area.
- A desilting program must be implemented on-site. This should ensure all trenches are silt free to be free draining and allow clean or dirty water to report to the designated areas.
- As part of the structural integrity assessment of the RWD; desilting must be undertaken as a matter of urgency if the dam is to be utilised on-site. At present, the RWD is not operated with a minimum freeboard of 0.8 meters.
- Proper record-keeping of malfunctions and stormwater channels and berm inspections and maintenance must be kept on site.

7.2.3 Section 27 Motivation

Section 27 of the NWA, 1998 requires that a number of considerations be taken into account by the issuing authority prior to the issuing of General Authorisations and Licences. These include the following relevant factors:

7.2.4 Section 27(1)(A): Existing Lawful Water Uses

None of the Water Uses undertaken at the Inyanda washplant and co-disposal facility are considered to be Existing Lawful Water Uses as defined by Section 32 of the NWA1. This was discussed in more detail in Chapter 3 of this IWWMP.

7.2.5 Section 27(1)(B): The Need To Redress The Results Of Past Racial And Gender Discrimination

The employment equity policy implemented at Inyanda Coal Mine and Inyanda washplant and co-disposal facility is aligned with the Employment Equity Act, 1998 (Act 55 of 1998), and the amendments to the Act in 2018, and is fully implemented by The Inyanda washplant. It is a vital tool for achieving the Mining Charter employment equity targets. It is designed with the following goals:

- No unfair discriminatory practices, implicit or explicit, will exist at the Inyanda washplant and co-disposal facility
- Sexual and racial harassment will not be tolerated.
- No barriers are to exist in the workplace that unfairly restricts employment and promotion opportunities of any person.
- An enhanced representation of currently under represented categories of people, with the emphasis on persons from designated groups, at all levels in the organisation, focused on the long-term objective of reflecting the demographics of the South African population.
- Creation of an organisational culture in which diversity is encouraged and valued, while focusing on shared values, in order: to develop team spirit, promote mutual understanding, optimise potential and achieve organisational goals in serving the community.

7.2.6 Section 27(1)(C): Efficient And Beneficial Use Of Water In The Public Interest

The Water and Waste Management system implemented at the Inyanda washplant and co-disposal facility has been developed in accordance with the DWA's hierarchy of water quality management, i.e. pollution prevention, then water re-use and reclamation.

The use of water for the Inyanda washplant and co-disposal facility (storage and transport of Coal) will enable the Inyanda washplant and co-disposal facility to export Coal generated by neighbouring Coal Mines, resulting in socio-economic gains in the region.



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7.2.7 Section 27(1)(D): The Socio-Economic Impact

- i. of the water use or uses as authorised, or
- ii. of the failure to authorise the water use or uses

The current water uses were approved and implemented at Inyanda washplant and co-disposal facility, enabling coal export to continue having positive financial implications and socio-economic gain for the local municipal area.

7.2.8 Section 27(1)(E): Any Catchment Management Strategy Applicable To The Relevant Water Resource

All requirements of the DWA were taken into consideration during the development of this IWWMP for the Inyanda washplant and co-disposal facility. The catchment management strategy for the Olifants Catchment was available at the time of compilation of the IWULA.

7.2.9 Section 27(1)(F): The Likely Effect Of The Water Use To Be Authorised On The Water Resource And On Other Water Users

The envisaged impacts on the surface water and groundwater components of the environment that will be affected by the Water Use activities engaged in at Inyanda washplant and co-disposal facility are discussed in detail in Chapter 5 of this IWWMP.

7.2.10 Section 27(1)(G): The Class And The Resource Quality Objectives Of The Water Resource

The most recent class and resource quality objectives of the water resource (Olifants Catchment Area) in which the project resides has been published and conditions of this document will be adhered to by the Inyanda washplant and co-disposal facility.

7.2.11 Section 27(1)(H): Investments Already Made And To Be Made By The Water User In Respect Of The Water Use In Question

Inyanda washplant and co-disposal facility has invested towards the development of a sound water use system in order to ensure that the existing water uses are optimised, and the negative effects thereof are minimised.

7.2.12 Section 27(1)(I): The Strategic Importance Of The Water Use To Be Authorised

Without the necessary Water Use authorisations, the Inyanda washplant and co-disposal facility will not be able to export its coal product. As mentioned under section 27 (1) (d), above, the potential benefits of the Inyanda washplant will be lost, and there will be severe financial implications, as well as socio-economic repercussions.

7.2.13 Section 27(1)(J): The Quality Of The Water In The Water Resource Which May Be Required For The Reserve And For Meeting International Requirements

No discharge of contaminated water takes place into the adjacent watercourse during operation at the Inyanda washplant and co-disposal facility. Thus, there is no significant effect on the quality objectives of the relevant water resource because of the storage of coal at the Inyanda washplant and co-disposal facility.

7.2.14 Section 27(1)(K): The Probable Duration Of Any Undertaking For Which A Water Use Is To Be Authorised

Currently, the Inyanda washplant and co-disposal facility does not have an estimated Life of the activity, as Inyanda Coal. will continue to use the Inyanda washplant and co-disposal facility for as long a period as is required.

7.3 KEY COMMITMENTS



Updated- 13/3/2021

The key commitments of the Inyanda washplant and co-disposal facility towards improving the integrated water and waste management system to comply with current legislative and policy requirements as well as best practice were detailed and listed in Chapter 6 and are not repeated here.

7.4 GENERAL CONCLUSION

This document was compiled as the annual update of the technical report as per the conditions of the approved IWUL:

Mitigation measures have been proposed and commitments made in Chapter 6 to improve the effective management of the current and possible future impacts (identified and discussed in Chapter 5).

Inyanda washplant and co-disposal facility has invested in specialist studies as well as designs and other environmental processes (e.g. Monitoring). The information so collated was utilised for the development of this document. This investment was undertaken in order to ensure that the Water Uses are optimised, and the negative effects thereof are minimised. In addition, the Inyanda washplant and co-disposal facility is committed to investing in the improvement of the water and waste management system to achieve the objectives and performance measures set out in Chapter 6 of this IWWMP.

As indicated in this IWWMP, the Inyanda washplant and co-disposal facility is affecting the environment during the Operational Phase. After Closure the possible impacts will change due to the completion of rehabilitation activities such as the removal of buildings and structures and the rehabilitation of disturbed land use areas.

To ensure that any possible unexpected impacts are detected timeously and to ensure that sufficient information is gathered to develop and finalise the long-term water management strategy, monitoring is essential. The monitoring programme was described in detail in Chapters 4 and 5 of this IWWMP, and will continue to be implemented, as committed to in Chapter 6. An annual water report, including an updated water balance as well as reporting on surface water quality and groundwater quality will be submitted to the DWA. Inyanda washplant and co-disposal facility is committed to updating its IWWMP on an annual basis,

The Inyanda washplant and co-disposal facility is committed to a water and waste management system that is guided by the requirements of applicable legislation such as the NWA, 1998, the Regulations GN 704, 1999, there under and the policy requirements of the DWA as contained in the Best Practise Guideline Series.

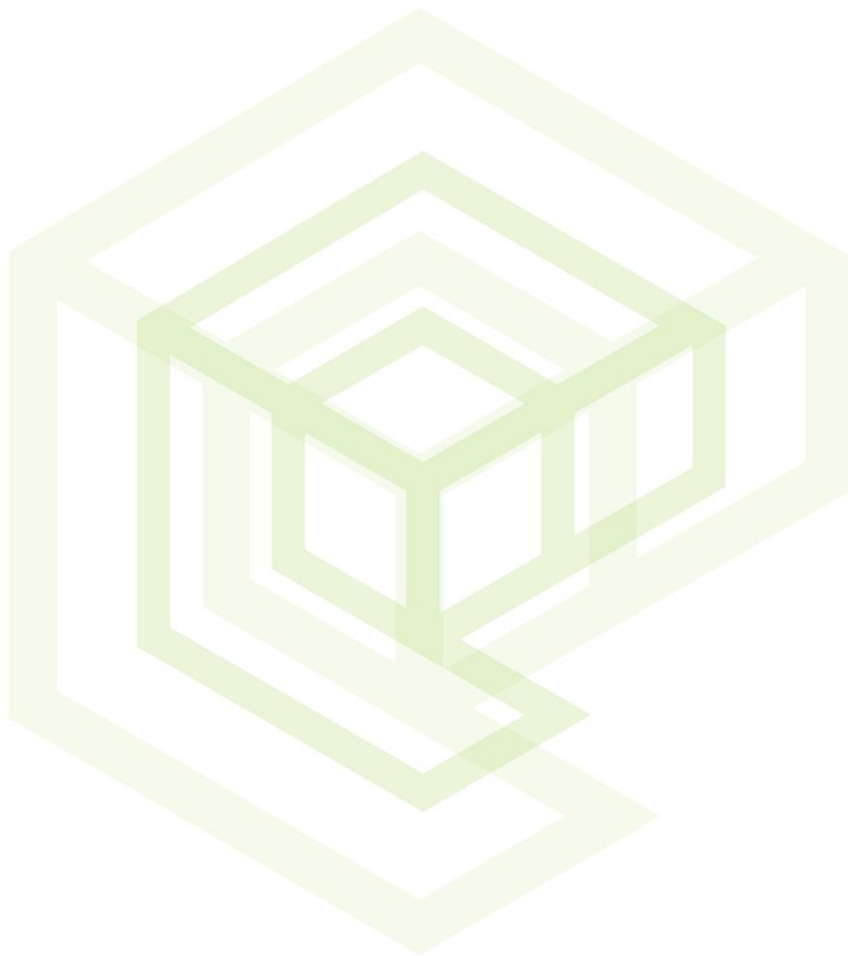
Improvement of water and waste management is crucial to the environmental management philosophy of Inyanda washplant and co-disposal facility and will continue to take place progressively over the remaining life of the activity, ultimately to ensure that the management of contaminated water will be sustainable over the long-term. Implementing the commitments in the IWWMP will enable the Inyanda washplant and co-disposal facility in achieving this goal.

This document is considered a “live” document that needs to be updated on an annual basis and changed accordingly to remain an effective tool for water and waste management decision-making and management implementation. An external, suitably qualified person will review the compliance of the Inyanda washplant and co-disposal facility to the IWWMP performance measures and action plan, annually.

Inyanda washplant and co-disposal facility is committed to the implementation of the IWWMP, and will continue to avail management support, make resources available, and provide technical support with regard to the terms of the Integrated Water and Waste Management Strategy at the Inyanda washplant and co-disposal facility. It is through monitoring and auditing that the effectiveness and continued commitment of the Inyanda washplant to water and waste management will be demonstrated.



8. REFERENCES



Updated- 13/3/2021

LIST OF ANNEXURES

