GN704 Legal Compliance Audit of the Beeshoek Iron Ore Mine – February 2021

Project Number: **AMG001**

Prepared for:

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Auditor & Author Signature	

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ACRONYMS AND ABBREVIATIONS

DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
GN704	Government Notice No. 704
GPS	Geographical Positioning System
IWWMP	Integrated Water and Wastewater Management Plan
LOM	Life of Mine
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
mamsl	metres above mean sea level
mbgl	Metres below ground level
N/A	Not Applicable
NWA	National Water Act, 1998 (Act No. 36 of 1998)
Pr.Sci.Nat.	Professional Natural Scientist
ROM	Run of Mine
SACNASP	South African Council for Natural Scientific Professions
SOP	Standard Operating Procedure
SWMP	Stormwater Management Plan
WRD	Waste Rock Dump
WUL	Water Use Licence

DECLARATION OF INDEPENDENCE

I, Andy Pirie declare that:

- I act as an independent auditor;
- I have performed the work in an objective manner, even if this results in views and findings that are not favourable to the Mine;
- I declare that there are no circumstances that have compromised my objectivity in performing such work;
- I have the expertise in conducting the audit, including knowledge of the various Acts, regulations and any guidelines that have relevance;
- I have complied with the Acts, regulations and all other applicable legislation;
- I have no, and have not engage in any conflicting interests in the undertaking of the audit;
- I undertake to disclose to the competent authority all material information in my possession that reasonably has, or may have the potential of influencing any decision to be taken, as well as the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; and
- All particulars furnished by me in this document are true and correct.

Andy Pirie
Hydrologist
Pr.Sci.Nat. (reg no. 114988)

EXECUTIVE SUMMARY

Hydrospatial (Pty) Ltd was appointed by Beeshoek Iron Ore Mine (Pty) Ltd to undertake a GN704 legal compliance audit of the Beeshoek Iron Ore Mine (hereafter referred to as "Beeshoek" or the "Mine"). The purpose of this report is to summarise the findings of an audit undertaken on 2 February 2021, to assess whether the Mine is compliant with the conditions stipulated in GN704, to provide recommendations for improvement where necessary, and to mention areas where improvements have been observed since the previous audit. It should be noted that the audit was supposed to be undertaken at the end of 2020, however, due to Covid-19 related issues, the audit could only be undertaken in February 2021.

In summary, the Mines compliances outweigh the number of non-compliances with the conditions specified in GN704. Positives included that many of the previous audit (July 2019) recommendations were noted to be implemented and improvements were observed at all previous issue areas (plant and workshops). Furthermore, there has been an improvement in the number of compliances with GN704 since the previous audit. Non-compliances mostly relate to regulation 6 (capacity requirements of clean and dirty water system) and regulation 7 (protection of water resources). The main recommendations from the audit are summarised below:

- No formal lined channels are present within the plant area, and therefore, the potential for dirty water to seep is possible. Formalised lined channels that can convey the 1:50 runoff (as required by GN704) should be investigated within the plant area.
- Some of the inlet culverts at the plant were noted to be old and in a compromised state and require repair or upgrading.
- Silted sumps as well as channels containing silt and vegetation were noted at the bottom of the plant area near the railway loading area. These sumps are cleaned approximately every 3 months. It is recommended that desilting takes place more frequently.
- Desilted material was noted to be stockpiled directly adjacent to the channels and sumps at the plant railway loading area. The stockpiled material has the potential to be washed back into the channel. Desilted material should not be placed directly adjacent to the channels and sumps, but rather at designated lined stockpile areas. If temporarily placed next to the channels and sumps, then the desilted material should be removed on a more frequent basis to designated lined areas, especially during the rainy season.
- The vegetation and debris within the Evaporation Ponds compromises the storage capacity and should be cleared.
- The BN Dam (Tank 26) which receives pit water, overflows into a pipeline which discharges into the veld. As a result, a drainage line has formed which indicates that this happens from time to time. The Mine is in the process of applying to increase their

storage capacity which will assist in preventing overflows from the BN Dam. This process must continue.

- The Stormwater Management and Sediment Control procedure document provides good guidance on the management of stormwater on the Mine and the control of sediment in dirty water systems. This document should be strictly adhered to.
- Job cards for desilting of dirty water systems should be generated at the plant.
- The channel outside of the wash bay at the South Diesel Workshop appeared to be slightly subsided towards the middle and should be repaired.
- According to the Water Conservation and Demand Management Plan 2020 Update (iLEH, 2020), an improvement in the recycling of wastewater was noted over 2019/2020 from 2018. Furthermore, the overall percentage of water recycled at the Mine (74 %) is above the 45 % national benchmark set for the "Other" category. This calculation is based on the large volume of water that is recycled through the Thickener/Clarifier to the plant. This is a positive result for the Mine, indicating that the Mine is recycling dirty water above the specified benchmark standard. The following is recommended in iLEH (2020) as opportunities to avoid and reduce water use at the Mine:
    - Make-up water sourced for the Clarifier/Thickener should be preferentially taken from dirty water dams. Ways in which this can be achieved should be discussed for implementation;
    - The water demand for the Clarifier/Thickener should be investigated and measures to reduce water use from this complex should be evaluated in the short-term for implementation;
    - The use of clean groundwater for dust suppression should be reduced in the short-term and eliminated in the long-term. Measures to achieve this should be discussed for implementation; and
    - The integration of the Storm Water Dam into the overall internal water circuit must be undertaken with the aim of optimising water reuse on site. For example, water from this dam can be used for dust suppression at the plant, instead of using clean water from Dams D90+D91 (Main Reservoir).

1 INTRODUCTION AND BACKGROUND INFORMATION

1.1 Terms of Reference

Hydrospatial (Pty) Ltd was appointed by Beeshoek Iron Ore Mine (Pty) Ltd to undertake a GN704[1] legal compliance audit of the Beeshoek Iron Ore Mine (hereafter referred to as "Beeshoek" or the "Mine"). The purpose of this report is to summarise the findings of an audit undertaken on 2 February 2021, to assess whether the Mine is compliant with the conditions stipulated in GN704, to provide recommendations for improvement where necessary, and to mention areas where improvements have been observed since the previous audit. It should be noted that the audit was supposed to be undertaken at the end of 2020, however, due to Covid-19 related issues, the audit could only be undertaken in February 2021.

1.2 Project Location

Beeshoek is located approximately 8 kilometres (km) north-west of the town of Postmasburg in the Northern Cape (Figure 1-1). The Mine is divided into two areas that are separated by the R385 regional road that runs in a north-westerly direction between the towns of Postmasburg and Olifantshoek. The North Mine is located to the north of the R385, whilst the South Mine is located to the south.

1.3 Mine Operation Description

Assmang (Pty) Ltd is the holder of the new order rights in terms of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) in respect of high-grade hematite iron ore deposits at Beeshoek. Mining was established in 1964 with a basic hand sorting operation. In 1975, a full washing and screening plant was installed. Because of increased production, Beeshoek South, a southern extension of the Mine, was commissioned during 1999. Open pit mining is currently undertaken at Beeshoek. An overview of the Mine layout is indicated on Figure 1-2.

1.4 Hydrological Setting

1.4.1 Climate

Rainfall data for the period of 1920 – 2010 was obtained from the Postmasburg weather station (0321110 W), whilst Symon's Pan (S-Pan) evaporation data was obtained from the Olifantshoek Dam weather station (D4E002), for the period of 1960 – 2000.

[1] Regulations on the use of water for mining and related activities aimed at the protection of water resources (published under Government Notice 704 in Government Gazette 20119, 4 June 1999)

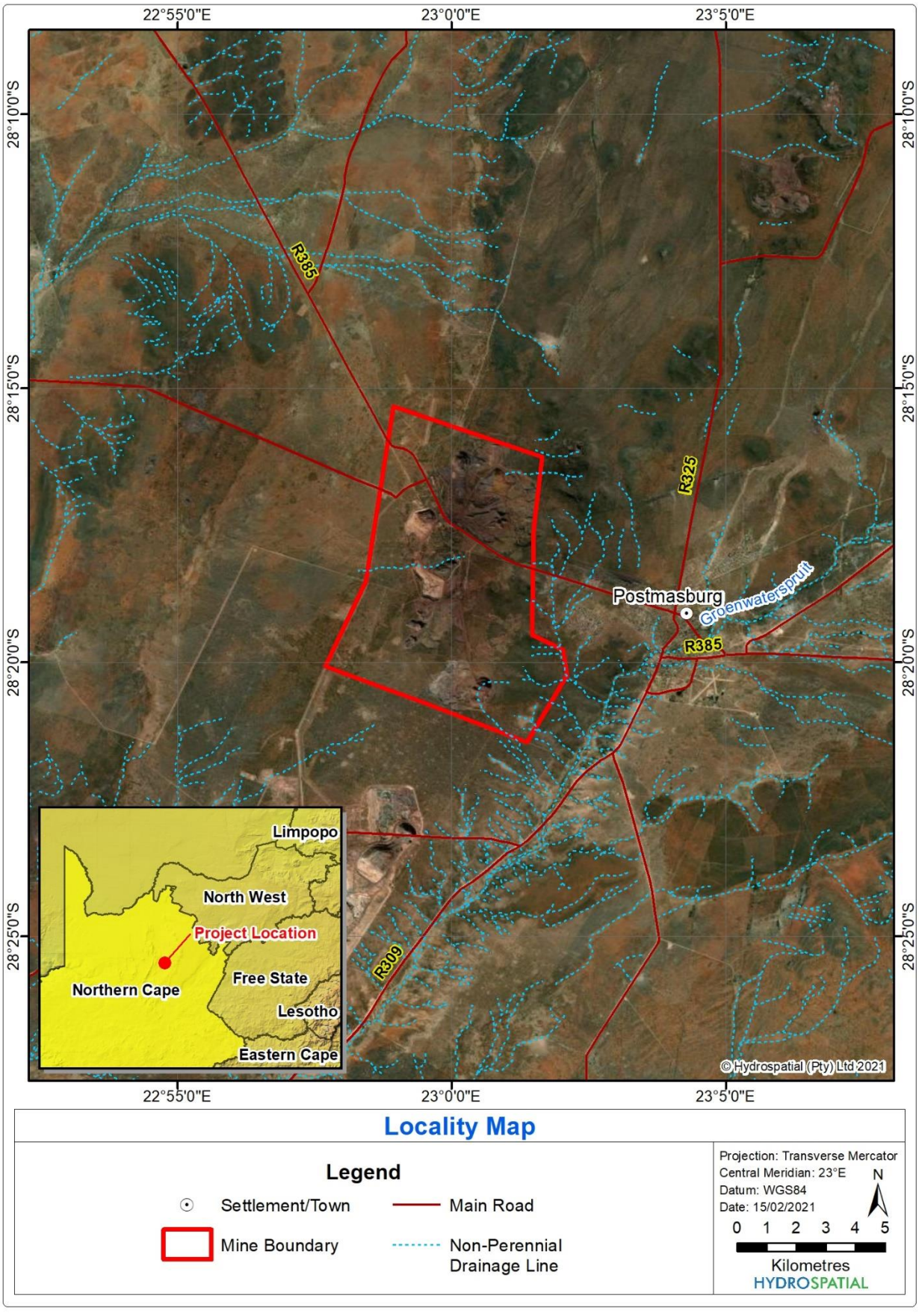


Figure 1-1: Project location

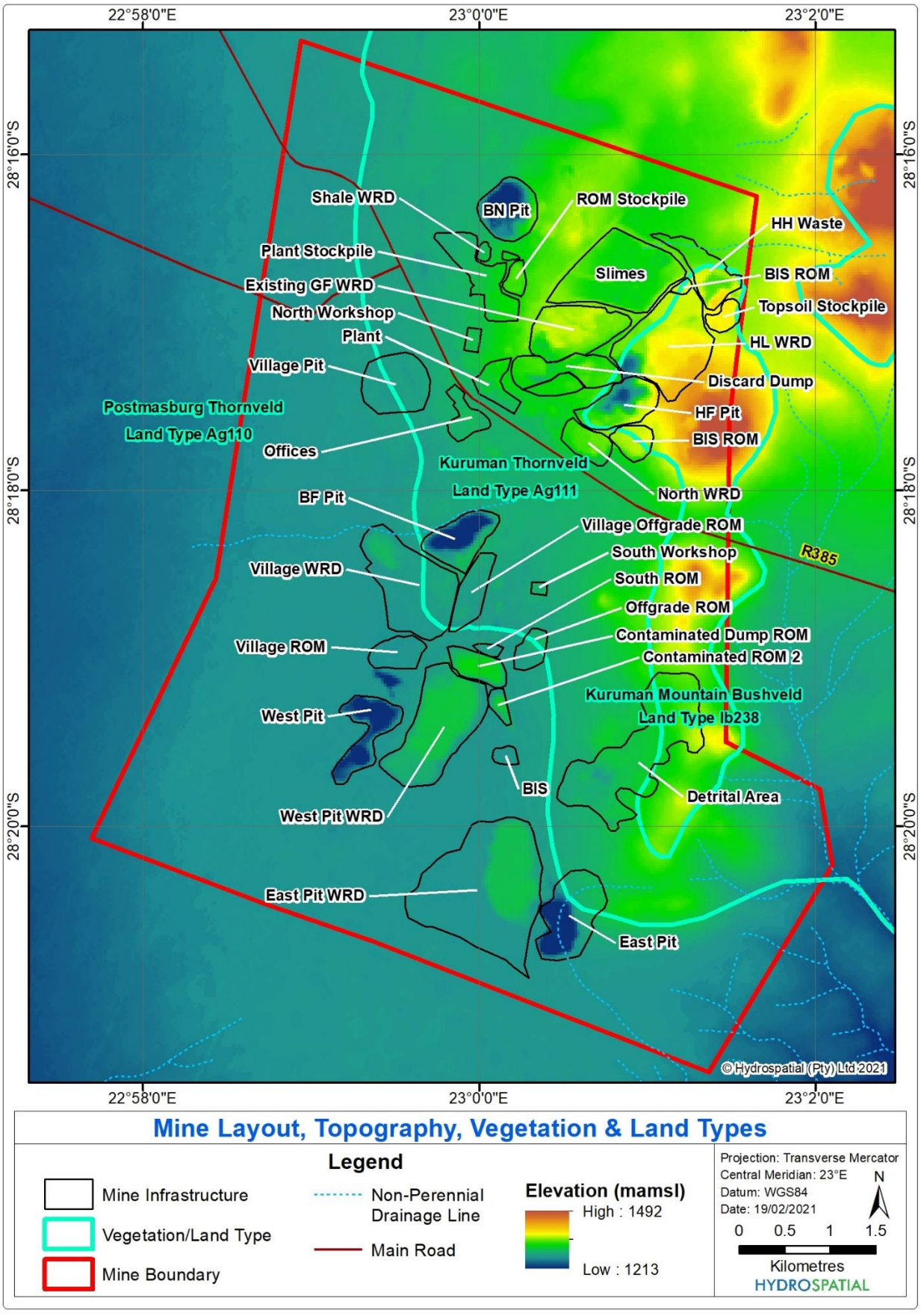


Figure 1-2: Mine Layout, topography, vegetation and Land Types

Figure 1-3 indicates the mean monthly rainfall and evaporation of the area. Majority of the rainfall occurs over the summer months of November to April, with February and March being the highest rainfall months. High rainfall was recorded in the area prior to the audit, with the neighbouring Kolomelo Mine receiving 69.5 mm in December 2020, and 217 mm in January 2021.

Although much higher than rainfall, evaporation follows a similar trend, with the warmer summer months of September to March having the highest evaporation. The Mean Annual Precipitation (MAP) of the area is 317 mm, whilst the Mean Annual Evaporation (MAE) is 2 213 mm. The area can be described as having a semi-arid to arid climate, with evaporation far exceeding rainfall.

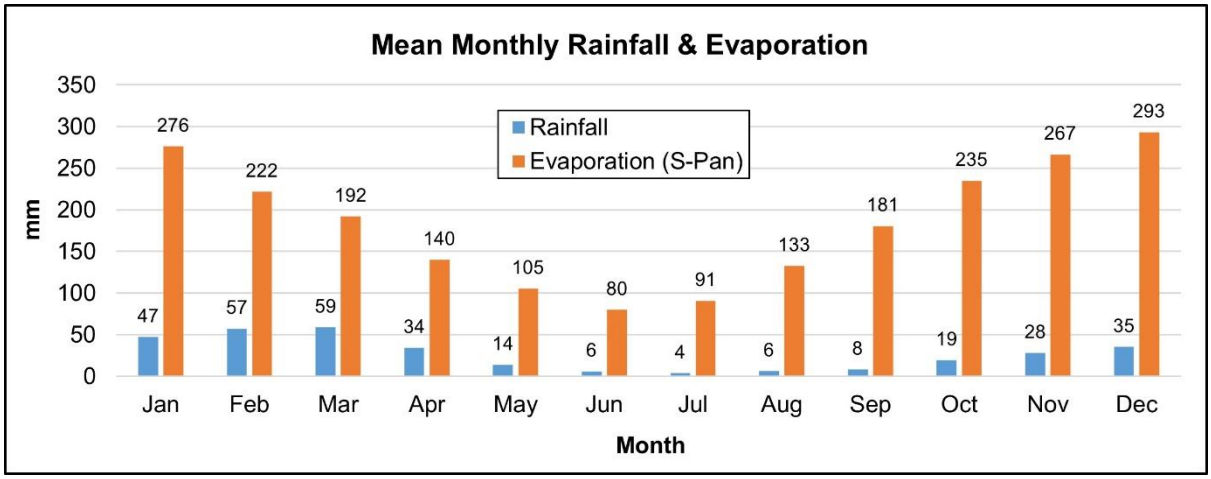


Figure 1-3: Mean annual rainfall and evaporation for the area

1.4.2 Regional Catchments

Beeshoek is located in quaternary catchment D73A within the Vaal Water Management Area. According to the Water Resources of South Africa Study 2012 (WR 2012), quaternary catchment D73A is endoreic, meaning that surface water runoff does not flow out of the catchment, and that water is lost to evaporation and infiltration. This is mostly due to the low rainfall and high evaporation of the area.

1.4.3 Topography and Drainage

An elevated ridge runs along the eastern mine boundary and reaches a maximum height of 1 480 metres above mean sea level (mamsl) near the pits in the north mining area (Figure 1-2). Elevation drops off gradually towards the west, reaching a height of 1 300 mamsl near the western mine boundary. Water to the west of this ridge will drain in a westerly and south-westerly direction, and to the east of this ridge, water drains in an easterly and south-easterly direction. The general topography of the site can be described as flat.

1.4.4 Vegetation and Soils

According to Mucina and Rutherford (2006), three vegetation types occur within the Mine boundary, namely, Postmasburg Thornveld to the west, Kuruman Thornveld to the east, and Kuruman Mountain Bushveld along the elevated ridge on the eastern Mine boundary (Figure 1-2). These vegetation types are characterised by shrubby and grass vegetation. Following the same boundaries as the vegetation, three Land Types occur at Beeshoek, namely, Ag110 to the west, Ag111 to the east, and Ib238 along the eastern elevated ridge. According to the Land Type database (Land Type Survey Staff, 1972 - 2006), Ag110 and Ag111 are dominated by Hutton and Mispah soils, that are generally shallow, and semi-permeable to permeable in nature, whilst Ib238 is dominated by rocky areas, followed by Hutton and Mispah soils.

1.4.5 Surface Water and Groundwater Levels and Qualities

The nearest defined watercourse to the Mine is the Groenwaterspruit (EnviroGistics, 2018), which is located approximately 1.5 km east of the south-eastern Mine boundary. As previously mentioned, Beeshoek falls within an endoreic quaternary catchment, and therefore, very little to no surface water is expected to be generated. According to Aquatico (2021), the general surface water quality during the 2020 period at the dams, pits and pipelines, was classified as being neutral, saline and very hard. Low salt concentrations, metal concentrations and nutrient concentrations were detected at all of the sampling localities. Elevated bacteriological counts occurred at some of the sampling locations.

According to GPT (2021), groundwater levels range between 5 metres below ground level (mbgl) in the unaffected mining areas, to 180 - 200 mbgl in the dewatered areas due to groundwater abstraction for dewatering and water supply. The effect of dewatering is more pronounced to the south of the mine. The direction of groundwater flow is south to south easterly from the mining area. A cone of depression has developed within the active mining area with flow directed towards the mining excavation due to the active mining areas. The general groundwater quality is good, however, elevated nitrate does occur at some of the sampling boreholes due to expected mining related impacts (Aquatico, 2021).

1.5 Clean and Dirty Areas

The Mines clean and dirty areas were delineated by Storm Water Solutions and are indicated on Figure 1-4. The green areas indicate the dirty areas and are associated with areas where the natural surface has been altered by mining activities. The light blue areas indicate the clean areas, which are still natural and in the same state as before mining occurred (SWS, 2016).

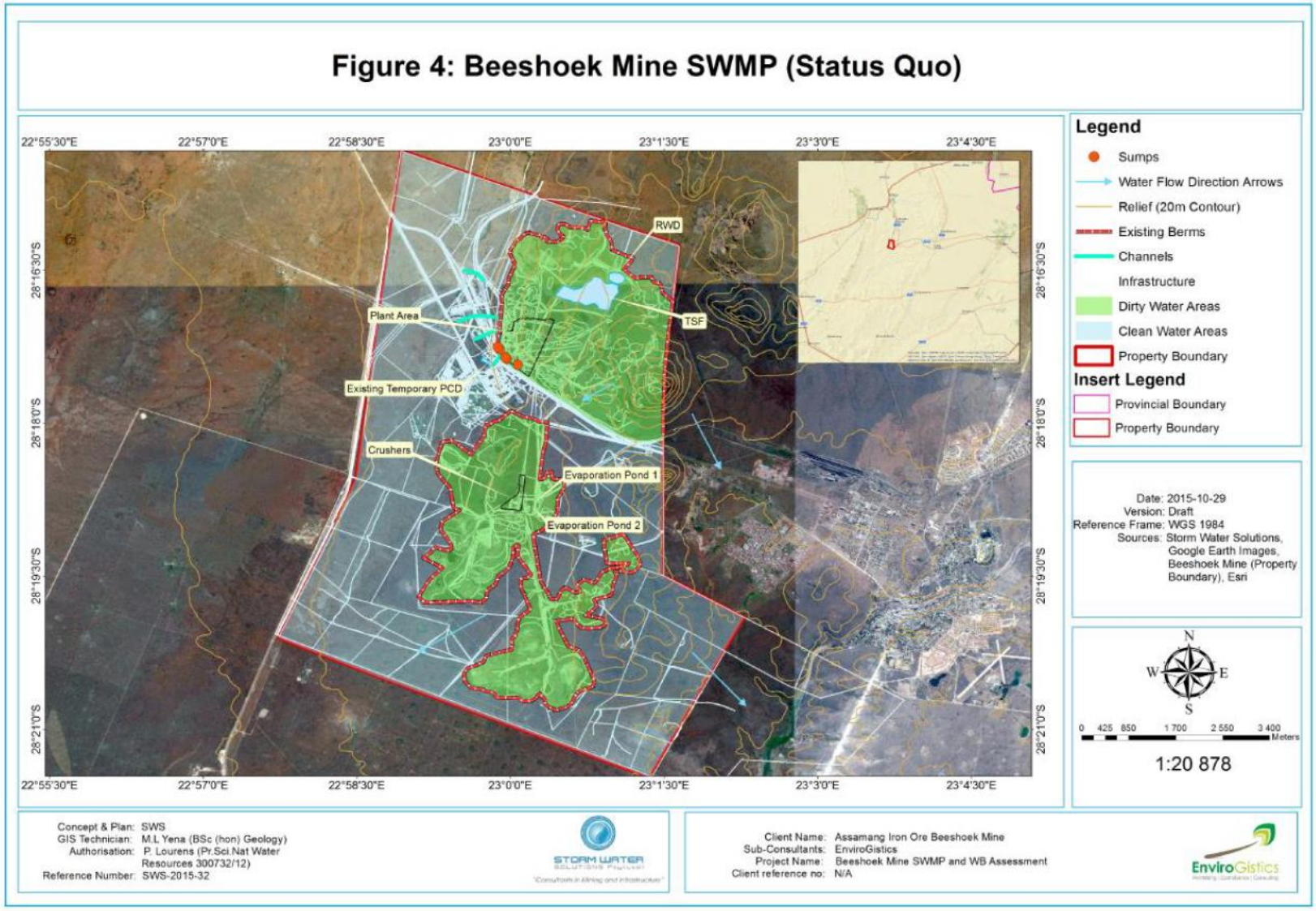


Figure 1-4: Stormwater management plan and clean and dirty areas (SWS, 2016)

1.6 Mine Water Management

According to iLEH (2020), the main Beeshoek water supply is sourced from groundwater, which is abstracted from a number of boreholes. In addition to the groundwater, water is also sourced from pit dewatering at BN and Village Pits as well as from the Sedibeng pipeline. Water is used for domestic purposes, mineral processing and dust suppression. Clean and dirty water is stored, contained and transferred in a number of clean and dirty water dams scattered around the operations.

1.7 Legal Framework

Section 26 (1) of the National Water Act, 1998 (Act 36 of 1998) (hereafter NWA) provides for the development of regulations to, amongst others:

- Require that the use of water from a water resource be monitored, measured and recorded;
- Regulate or prohibit any activity in order to protect a water resource or in-stream or riparian habitat; and
- Prescribe the outcome 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.

According to Section 26 (4) of the NWA, when making regulations, the need for the following must be taken into account:

- Promoting economic and sustainable use of water;
- Conserving and protecting water resources or in-stream and riparian habitat;
- Preventing wasteful water use;
- Facilitating the management of water use; and
- Facilitating the monitoring of water use and water resources.

In terms of the above, the Minister of the Department of Water and Sanitation (DWS) promulgated regulations in respect of use of water for mining and related activities aimed at the protection of water resources on 4 June 1999 (Government Notice No. 704) (hereafter GN704). It should be noted that the conditions stipulated in GN704 are only applicable to Mine infrastructure or activities that have been constructed after 4 June 1999. Appendix A contains a copy of the GN704 regulations.

1.8 Assumptions and Limitations

The following are assumptions and limitations of the audit:

- Although care was taken to audit the Mine as comprehensively as possible, auditing is done on a sample basis, and is based on site conditions during the period of the audit. There could thus be compliances or non-compliances that were not observed; and

- Information provided by Mine personnel during interviews and discussions, were taken as honest and true (where no other information was available for confirmation).

1.9 Details of the Auditor

The GN704 legal compliance audit and reporting was undertaken by Andy Pirie who is a senior hydrologist and owner of Hydrospatial (Pty) Ltd. Andy graduated with a M.Sc. Water Resource Management (cum laude) from the University of Pretoria. He is registered as a Professional Natural Scientist (Pr.Sci.Nat) in Water Resources Science with the South African Council for Natural Scientific Professions (SACNASP). Work experience includes GN704 legal compliance audits, rainfall-runoff modelling, floodline determinations, development of stormwater management plans, water and salt balance modelling, setup of water monitoring networks and programmes, analysis of surface water quality and quantity, and surface water specialist studies for environmental and social impact assessments. He has worked on mining and construction projects in South Africa, Cameroon, Senegal, Mali, Democratic Republic of the Congo (DRC), Botswana, Zambia and Namibia. He has more than 9 years' experience.

2 AIMS AND OBJECTIVES

The aim of the audit was to determine the Mines compliance with conditions stipulated in GN704, and to provide recommendations for improvement on non-compliances.

3 METHODOLOGY

3.1 Pre-Site Visit

A review of reports, documents and plans was undertaken prior to the site visit. Based on the review, an audit plan and checklist were compiled which formed the basis of the audit.

3.2 Site Visit Audit

An opening meeting was held with Mr Msimelelo Silomntu (Superintendent Environmental), Ms Chrystal Vries (Officer Environmental), Mr Francois Steynberg (GES TMM) and Mr Pieter Malan (TMM Engineer). The purpose of the opening meeting was to discuss the plan of the audit. Following the meeting, the audit commenced, and the following Mine personnel accompanied the auditor:

- Schalk Faber – Manager Engineering;
- Harry Feris – Service Engineer;
- Greg Benjamin – Foreman Civils;
- Tebogo Morule – Plant Engineer;
- Francois Steynberg – GES TMM;

- Pieter Malan – TMM Engineer;
- John Langeveldt – Superintendent Plant; and
- Rod Perrin – Supervisor Loading.

During the audit, evidence was collected through site observations and discussions with the Mine personnel. Photographic evidence and Global Positioning System (GPS) points were taken during the audit.

3.3 Post-Site Visit

Post-site visit activities included evaluating evidence against conditions stipulated in GN704 and drafting the report.

3.4 Scoring Assessment

A scoring assessment was undertaken to determine the Mines level of compliance with GN704 and improvement since the previous audit. 45 line items were assessed from Regulation 2 to 13 in Table 4-1. Regulation 1 and Regulation 14 to 16 were not auditable and were therefore not assessed.

4 COMPLIANCE AND NON-COMPLIANCE WITH GN704 REGULATIONS

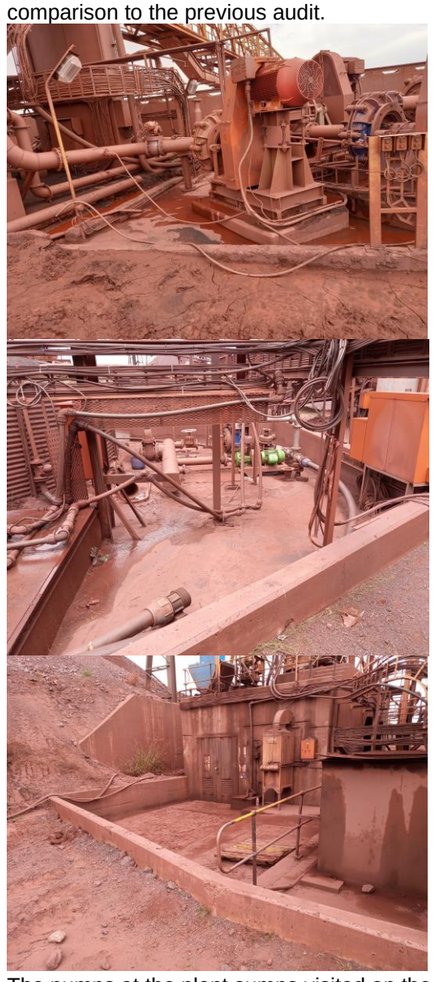
4.1 Summary of Findings

Table 4-1 presents Mines compliance and non-compliance with GN704. The Mine was assessed based on the documents reviewed, site observations and discussions with Mine personnel, and were determined to either be compliant or non-compliant (no partial compliance). Non-compliances are indicated in red, compliances in green, and legal requirements that are Not Applicable (N/A) in blue in Table 4-1.

Table 4-1: Compliance and non-compliance with GN704 regulations

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
Regulation 1: Definitions	–	X			Please refer to Appendix A for definitions provided under section 1 of the regulations.	N/A
Regulation 2: Information and notification	(1) Any person intending to operate a new mine or conduct any new activity must notify the Department of such intention not less than 14 days before the start of such operation or activity		X		The DWS is a commenting authority on relevant new activities undertaken at the Mine. Furthermore, activities are licenced in the Water Use licence (WUL), which was issued to the Mine in April 2005, and recently amended in August 2018. The DWS are therefore aware of the current activities at the Mine.	The Mine must continue to ensure that the DWS is notified timeously before conducting any new activities.
	(2) Any person in control of an existing mine must-					
	(a) submit a copy of all amendments to their EMP to DWS		X		The amended WUL indicates that the DWS has received and reviewed the Mines amended EMP.	The Mine must continue to ensure that all amendments to their EMP are submitted to the DWS for comment.
	(b) notify the DWS in writing 14 days before the temporary or permanent cessation of the operation of a mine or the resumption of such operation	X			The operation of the Mine has not temporarily ceased. According to the Mine Works Programme, the Mine has a potential further 30 years of mining (EnviroGistics, 2018). This requirement is currently N/A.	The Mine must ensure that the DWS is timeously made aware of any temporary or permanent cessations of mining operations.
	(c) notify the DWS by the fastest way possible of any emergency incident or potential emergency incident involving a water resource		X		According to Ms Vries, no reportable incidents have occurred since the previous GN704 audit.	The Mine must ensure that the DWS is notified of any emergency incident or potential emergency incident involving a water resource.
	(d) within 14 days after the date of such incident inform the DWS in writing of measures taken to correct and prevent a recurrence of such incident		X		No reportable incidents have occurred since the previous GN704 audit.	The Mine must ensure that the DWS is notified timeously of the measures taken to correct and prevent the recurrence of an incidence.
Regulation 3: Exemptions from requirements of regulations	The Minister may in writing authorize an exemption from the requirements of regulations 4 – 8, 10 or 11 on own initiative or on application, subject to such conditions as the Minister may determine	X			In July 2017, a GN704 exemption was submitted to the DWS to be exempted from Regulation 5, for the use of waste rock for berms. Exemption was received in the amended WUL (August 2018).	–
Regulation 4: Restrictions on locality	No person in control of a mine may –					
	(a) locate or place any residue deposit, dam, reservoir, together with any associated structure of any other facility within the 1:100 year floodline or within a horizontal distance of 100m from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked		X		The closest defined watercourse to any infrastructure at the Mine is the Groenwaterspruit, located approximately 1.5 km east of the south-eastern border of the Mine boundary.	–

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
	(b) carry on any underground or opencast mining or prospecting or any other operation or activity under or within the 1:50 year floodline or within a horizontal distance of 100m from any watercourse or estuary, whichever is the greatest, except for matters contemplated under regulation 10 (sand winning)		X		See 4 (a) above.	–
	(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.		X		Backfilling of the pits with waste rock has taken place. This has been authorised in the WUL, however, there is no specific exemption from GN704. Because the above-mentioned activities are authorized in the WUL, Beeshoek have been awarded compliance.	–
	(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 floodline of any watercourse.		X		No sanitary convenience, fuel depots, reservoir or depots are located within the 1:50 year floodline.	–
Regulation 5: Restrictions on use of material	No person in control of a mine may use any residue or substance which causes or is likely to cause pollution of a water resource for the construction of any dam or other impoundment or embankment, road or railway, or for any other purpose which is likely to cause pollution of a water resource.		X		In the amended WUL, Beeshoek have been authorized to use waste rock for the construction of berms and on the haul roads.	–
Regulation 6: Capacity requirements of clean and dirty water systems	Every person in control of a mine must –					
	(a) confine any unpolluted water to a clean water system, away from any dirty area		X		Due to the low rainfall, high evaporation, flat topography, and the fact that the quaternary catchment in which the Mine is located is endoreic, it is unlikely that sufficient clean water runoff will be generated to flow into any dirty areas.	–
	(b) design, construct, maintain and operate any clean water system at the mine so that it is not likely to spill into any dirty water system more than once in 50 years		X		See 6 (a) above.	See 6 (a) above.
	(c) collect the water arising within any dirty area, including water seeping from mining operations, into a dirty water system			X	**<u>Plant Area</u>** A general improvement was noted at the plant since the previous audit in July 2019, where a number of non-compliances were observed. Please refer to the 2019 GN704 report for more information. Positive observations at the plant included the following:	**<u>Plant Area</u>** • Formalised lined channels that can convey the 1:50 runoff (as required by GN704) should be investigated within the plant area. • A permanent fix for the hole in the bund wall at the sculpting, buffing and screening area should be sort.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
					• The sumps at the plant were generally noted to be desilted and clean of debris in comparison to the previous audit.  • The pumps at the plant sumps visited on the audit were noted to be in an operational state. • Generally, it was observed that there was a lot less dirty water flowing through the plant despite the high rainfall received prior to the audit. • Although a recent flow from the hole in the bund wall at the sculpting, buffing and screening area was observed, this hole was fixed and the pump was operational at the time of the audit.	• The old inlet culverts should be repaired or upgraded. • Desilting of the sumps and channels at the railway loading area should take place more frequently. • Desilted material should not be placed directly adjacent to the channels and sumps, but rather at designated lined stockpile areas. If temporarily placed next to the channels and sumps, then the desilted material should be removed on a more frequent basis to designated lined areas, especially during the rainy season. **<u>South Diesel Workshop, Wash Bay, South Diesel Storage Area and Oil Storage Area</u>** • The subsided channel outside of the wash bays should be repaired. • The sediment noted between the wash bays and outside channel should be removed. **<u>South Crushers, Evaporation Ponds and Contaminated Soil Sump</u>** • Vegetation and debris should be cleared from the Evaporation Ponds. **<u>Slimes Dam, Stormwater Dam and Other Storage Facilities</u>** • The Mine is in the process of applying to increase their storage capacity which will assist in preventing overflows from the BN Dam into the environment. This process must continue.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No	 • A pipe that had previous issues with being continuously blocked, was being upgraded to an open channel, so that maintenance can more easily be undertaken in future.  • A Stormwater Management and Sediment Control procedure was drafted for the Mine in July 2020. This procedure provides good guidance on the management of stormwater on the mine and the control of sediment in dirty water systems. • According to discussions with Mr Schalk Faber (Manager Engineering), a lot of time and money has been spent on upgrading the water infrastructure at the plant since the previous audit. Non-compliances observed at the plant included the following: • No formal lined channels are present within the plant area, and therefore, the potential for dirty water to seep is possible.	

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No	  • Some of the inlet culverts at the plant were noted to be old and in a compromised state and require repair or upgrading.  • Silted sumps as well as channels containing silt and vegetation were noted at the bottom of the plant area near the railway loading area. These sumps are cleaned approximately every 3 months.	

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No	    • Desilted material was noted to be stockpiled directly adjacent to the channel at the railway loading area. The stockpiled material has the potential to be washed back into the channel.	

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No	 **<u>North Workshops, Wash Bay and Diesel Storage Area</u>** Positive observations included the following: • The North Workshops (Jig Maintenance, Washing and Screening and Main North Diesel Workshop) were observed to be clean and in a good condition. • The inside workshop areas were noted to be lined and sloped towards channels that convey dirty water towards sumps. • No issues were noted at the wash bay or diesel storage area. No non-compliances were observed at the North Workshops, Wash Bay and Diesel Storage Area, however, minor issues included a sump that presumably collects dirty water from the channel inside of Jig Maintenance Workshop was noted to be near full capacity. Furthermore, a silted channel was noted inside the North Main Diesel Workshop towards the civil section side of the workshop. 	

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		

South Diesel Workshop, Wash Bay, South Diesel Storage Area and Oil Storage Area

Positive observations included the following:

- The workshop was noted to be clean and generally in good condition.

- The channel outside of the workshop that collects dirty water runoff from the inside of the workshop was noted to be clean and in good working order.

- According to Mr Francois Steynberg (GES TMM), weekly job cards are generated for channel and sump cleaning at the workshop.
- Additional holes were noted to have been punched into the metal plates covering the channel outside of the wash bays, to improve drainage into the channel.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		

- The wash bay sumps appeared to be in working order and no issues were noted.
- No concerns were noted at the Diesel Storage Area.
- The Oil Storage area was noted to be bunded with no concerns.

No non-compliances were observed at the time of the audit, however, the channel outside of the wash bay appeared to be slightly subsided towards the middle and should be repaired. Furthermore, although not excessive, an accumulation of sediment was noted between the wash bays and outside channel.

South Crushers, Evaporation Ponds and Contaminated Soil Sump

Positive observations include the following:

- Dust suppression runoff from the crushers is collected in sumps and pumped to the Evaporation Ponds. This system appeared to be functional at the time of the audit.
- According to Mine personnel, the Evaporation Ponds rarely contain water and are therefore visually inspected.
- The Evaporation Ponds were noted to contain more water than normal due to the high rainfall received prior to the audit, however, sufficient freeboard was noted.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
					No non-compliances were observed at the above areas, however, a fair amount of debris and vegetation was observed within the Evaporation Ponds which compromises storage capacity.  **<u>Pits, WRDs and ROM Stockpiles</u>** Positive observations include the following: • The pits, Waste Rock Dumps (WRDs) and Run of Mine (ROM) stockpiles were generally observed to be surrounded by safety berms which assists to contain dirty water runoff from these facilities. No non-compliances were observed, however, ponding of water due to much higher than normal rainfall was noted at the Village ROM. This was within the ROM dirty area and is likely to evaporate within two to three weeks.  **<u>Slimes Dam, Stormwater Dam and Other Storage Facilities</u>** Positive observations include the following: • The Slimes Dam and Stormwater Dam were noted to have sufficient capacity and freeboard at the time of the audit. According to Mine personnel, both facilities managed to contain runoff from high rainfall received prior to the audit (over December and January) without any spills. Non-compliances include the following:	

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
					• The BN Dam (Tank 26) which receives pit water, overflows into a pipeline which discharges into the veld. As a result, a drainage line has formed which indicates that this happens from time to time. The Mine is in the process of applying for additional storage capacity.	
	(d) design, construct, maintain and operate any dirty water system at the mine so that it is not likely to spill into any clean water system more than once in 50 years.			X	**Plant Area** • The sumps at the plant were generally observed to be clean, and an improvement since the last audit was evident, however, as mentioned under 6 (c), the sumps at the bottom of the plant near the railway loading area were silted, and the accompanying channel was also silted and contained vegetation. • Some of the inlet culverts at the plant were noted to be old and in a compromised state and require repair or upgrading. • There are no formal lined dirty water channels within the plant area, and therefore, the potential for dirty water to seep and contaminate groundwater is possible. **North Workshops, Wash Bay and Diesel Storage Area** • Issues were minor and included a sump at the JIG Maintenance Workshop that was near full capacity as well as a silted channel at the North Main Diesel Workshop towards the civil section side of the workshop. **South Diesel Workshop, Wash Bay, South Diesel Storage Area and Oil Storage Area** • The channel outside of the wash bay appeared to be slightly subsided towards the middle and should be repaired. Furthermore, although not excessive, an accumulation of sediment was noted between the wash bays and outside channel. **South Crushers, Evaporation Ponds and Contaminated Soil Sump** • Debris and vegetation was observed within the Evaporation Ponds which compromises the storage capacity. **Pits, WRDs and ROM Stockpiles** • No issues. **Slimes Dam, Stormwater Dam and Other Storage Facilities** • The Slimes Dam and Stormwater Dam were noted to have sufficient available capacity.	**Plant Area** • Formalised lined channels that can convey the 1:50 runoff (as required by GN704) should be investigated within the plant area. • The old inlet culverts should be repaired or upgraded. • Desilting of the sumps and channels at the railway loading area should take place more frequently. **South Diesel Workshop, Wash Bay, South Diesel Storage Area and Oil Storage Area** • The subsided channel outside of the wash bays should be repaired. **South Crushers, Evaporation Ponds and Contaminated Soil Sump** • Vegetation and debris should be cleared from the Evaporation Ponds. **Slimes Dam, Stormwater Dam and Other Storage Facilities** • The Mine is in the process of applying to increase their storage capacity which will assist in preventing overflows from the BN Dam into the environment. This process must continue.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
					No spills were reported to have occurred at these facilities. • The BN Dam was noted to overflow from time to time.	
.	(e) design, construct, maintain and operate any dam or tailings dam that forms part of a dirty water system to have a minimum freeboard of 0.8 m above full supply level, unless otherwise specified for Dam Safety purposes			X	Sufficient freeboard was noted at the Slimes Dam, Stormwater Dam and other dams visited, however, the BN Dam (Tank 26) does overflow from time to time.	It is recommended that sufficient freeboard is ensured at all times at all of the dirty dams.
	(f) design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years.			X	See 6 (d) above.	See 6 (d) above.
Regulation 7: Protection of water resources	Every person in control of a mine must take reasonable measures to –					
	(a) prevent water containing waste or any substance which is likely to cause pollution of a water resource from entering any water resource, either by natural flow or seepage, and			X	Not all dirty water systems are lined, specifically within the plant area, where dirty water flows in unlined channels. See 6 (c) and (d) for more details.	The implementation of formal lined channels to control runoff at the plant should be investigated. See 6 (c) and (d) for more details.
	(a) must retain or collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the NWA		X		Due to the arid climate, dirty water is recycled and used for dust suppression, process water and washing of machinery.	The Mine must continue to recycle dirty water as far as possible, and to use clean water sparingly.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
	(b) design, modify, locate, construct and maintain all water systems, including residue deposits so as to prevent the pollution of water resources through the operation or use thereof, and to restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation, etc.			X	See 6 (c) and (d).	See 6 (c) and (d).
	(c) cause effective measures to be taken to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsidised ground, sinkholes, outcrop excavations, adits, entrances or any other openings		X		Berms are placed around pits.	–
	(d) design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the storage or disposal of mineral tailings, slimes, ash or other hydraulic transported substances, so that the water or waste there-in, or falling therein, will not result in the failure thereof or impair their stability		X		Structural stability audits of the Slimes Dam are undertaken on a regular basis. During the audit, no notable structural issues were observed.	The mine must continue to ensure that the structural integrity of the Slimes Dam is ensured at all times.
	(e) prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain materials or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting water resources		X		Some of the WRDs and stockpiles do not have measures (e.g. berms or paddocks) to contain eroded or leached material. However, due to the low rainfall and high evaporation of the area, erosion and leaching is unlikely and was not witnessed on the audit. Furthermore, the stormwater report (SWS, 2016) recommends that no measures are required.	–

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
	(f) ensure that water used in any process at the mine is recycled as far as practicable, and		X		According to the Water Conservation and Demand Management Plan 2020 Update (iLEH, 2020), the overall percentage of water recycled at the Mine (74 %) is above the 45 % national benchmark set for the "Other" category. This calculation is based on the large volume of water that is recycled through the Thickener/Clarifier to the plant. This is a positive result for the Mine, indicating that the Mine is recycling dirty water above the specified benchmark standard.	The Mine must ensure that dirty water is recycled and reused as far as possible, and that clean water is used as sparingly as possible. The following is recommended in iLEH (2020) as opportunities to further avoid and reduce water use at the Mine: • Make-up water sourced for the Clarifier/Thickener should be preferentially taken from dirty water dams. Ways in which this can be achieved should be discussed for implementation; • The water demand for the Clarifier/Thickener should be investigated and measures to reduce water use from this complex should be evaluated in the short-term for implementation; • The use of clean groundwater for dust suppression should be reduced in the short-term and eliminated in the long-term. Measures to achieve this should be discussed for implementation; and • The integration of the Storm Water Dam into the overall internal water circuit must be undertaken with the aim of optimising water reuse on site. For example, water from this dam can be used for dust suppression at the plant, instead of using clean water from Dams D90+D91 (Main Reservoir).
	(f) any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time			X	See 6 (c) and (d) above.	See 6 (c) and (d) above.
	(g) at all times keep any water system free from any matter or obstruction which may affect the efficiency thereof			X	See 6 (c) and (d) above.	See 6 (c) and (d) above.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
	(h) cause all domestic waste, including wash water, which cannot be disposed in a municipal sewage system, to be disposed of under an authorisation under the NWA		X		Domestic waste is disposed of near the salvage yard at an approved landfill site. All water uses are authorized in the Mines WUL.	–
Regulation 8: Security and additional measures	Every person in control of a mine or activity must-					
	(a) Cause any impoundment or dam containing poisonous, toxic or injurious substances to be effectively fenced of so as to restrict access, and must erect warning signs at prominent locations so as to warm persons of the hazardous content		X		All dirty water systems are within the fenced in area of the Mine boundary which is strictly access controlled. Since the previous audit, warning signs were noted to have been erected at the dirty water dams visited.	–
	(b) ensure access control in any area used for the stockpiling or disposal of any residue or substance which causes, has caused or is likely to cause pollution of a water resource so as to protect any measures taken in terms of these regulations		X		All residue dumps and stockpiles are within the fenced in area of the Mine boundary which is strictly access controlled.	–
	(c) not allow the areas contemplated in (a) and (b) to be used for any other purpose if such use causes or is likely to cause pollution of a water resource		X		Areas in 8 (a) and (b) above are not being used for any other purposes.	–
	(d) protect any existing pollution control measures or replace any existing pollution control measures deleteriously affected, damaged or destroyed by the removing or reclaiming of materials from any residue deposit or stockpile, and establish additional measures for the prevention of pollution which might occur, is occurring or has occurred as a result of such operation		X		No dirty water systems were noted to be damaged as a result of the removing or reclaiming of materials from any residue deposit or stockpile.	–

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
Regulation 9: Temporary or permanent cessation of mine or activity	(1) Any person in control of a mine or activity must at either temporary or permanent cessation of operations ensure that all pollution control measures have been designed, modified, constructed and maintained so as to comply with these regulations.	X			According to the Mine Works Programme, the Mine has a potential further 30 years of mining (EnviroGistics, 2018). This requirement is currently N/A.	The Mine must take note of this requirement.
	(2) Any person in control of a mine or activity must ensure that the in stream and riparian habitat of any water resource, which may have been affected or altered by a mine or activity, is remedied so as to comply with these regulations.	X			There are no watercourses near the operational areas of the Mine. This requirement is currently N/A.	–
	(3) On either temporary or permanent cessation of a mine or activity the Minister may request a copy of any surface or underground plans as required in terms of the Minerals Act, 1991.	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
Regulation 10: Additional regulations relating to winning sand and alluvial minerals from watercourse or estuary		X			N/A	N/A
Regulation 11: Additional regulations for rehabilitation of coal residue deposits		X			N/A	N/A
Regulation 12: Technical investigation and monitoring	(1) The Minister of DWS may, after consultation with DMR & DEA, in writing require any person in control of a mine to arrange for a technical investigation or inspection, which may include an independent review, to be conducted on any aspect aimed at preventing pollution of a water resource or damage to the instream or riparian habitat connected with or incidental to the operation of the mine	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(2) Such investigation must be conducted and a report thereon compiled in the manner and within the timeframes that the minister may specify	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
	(3) The person in control of the mine must inform the Minister as to the expertise and qualifications of the persons conducting the investigation prior to the commencement thereof	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(4) The Minister may in writing require any person in control of a mine to submit a programme of implementation to prevent or rectify any pollution of a water resource or damage to the instream or riparian habitat as recommended by the investigation contemplated in Sub-regulation (1)	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(5) The Minister may in writing direct any person in control of a mine to implement a compliance monitoring network to monitor the implementation of the programme in Sub-regulation (4)	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(6) Subject to Chapter 4 of the NWA, any person in control of a mine must submit plans, specifications and design reports approved by a professional engineer to the Minister, no later than 60 days prior to the commencement of activities relating to-					
	(a) The construction of any surface dam for the purpose of impounding waste, water containing waste or slurry, so as to prevent the pollution of a water resource	X			Plans and design reports are submitted to the DWS.	The Mine must continue to ensure that plans and design reports are submitted to the DWS timeously.
	(b) The implementation of any pollution control measures at any residue deposit or stockpile, so as to prevent the pollution of a water resource	X			Plans and design reports are submitted to the DWS.	The Mine must continue to ensure that plans and design reports are submitted to the DWS timeously.
	(c) The implementation of any water control measures at any residue deposit or stockpile, so as to prevent the pollution of a water resource	X			Plans and design reports are submitted to the DWS.	The Mine must continue to ensure that plans and design reports are submitted to the DWS timeously.

Regulation	Legal Requirement	Compliant			Comments	Recommendations
		N/A	Yes	No		
Regulation 13: General	The person in control of a mine must provide the manager with the means and afford him or her every facility required to enable the manager to comply with these regulations	X			It is expected that all means will be provided by the Mine to the relevant manager in order to comply with these regulations.	It is recommended that the Mine provides all means to comply with these regulations.
Regulation 14: Offences and penalties	(1) Any person who contravenes or, subject to regulation 3, fails to comply with regulation 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13 is guilty of an offence and liable on conviction to a fine or to imprisonment for a period not exceeding five years.	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(2) Whenever an act or omission by a manager or employee of a mine or activity-					
	(a) constitutes an offence in terms of these regulations, and takes place with the express or implied permission of the person in control of a mine or activity, that person is, in addition to the manager or employee, liable to conviction for that offence; or	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
	(b) would constitute an offence by the person in control of a mine or activity in terms of these regulations that manager or employee is, in addition to that person, liable to conviction for that offence.	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
Regulation 15: Repeal of regulations	The regulations published under Government Notice No. R.287 of 20 February 1976 are hereby repealed.	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.
Regulation 16: Commencement	These regulations will take effect on the date of publication.	X			The Mine must take note of this requirement.	The Mine must take note of this requirement.

4.2 Assessment of Improvement

4.2.1 Implementation of Previous Audit Recommendations

A number of recommendations were provided in the previous audit undertaken in July 2019. Table 4-2 provides a summary of the main recommendations and whether they were observed to be implemented.

Table 4-2: Implementation of previous audit recommendations

July 2019 Audit Recommendations	Implemented (Y/N)	Comment / Recommendations
The Jig plant, clarifier and screening and washing plant sumps, appear to be overflowing on a regular basis. It is recommended that the integrity and operation of the pumps, as well as the capacity of the sumps are investigated.	Y	Sumps were noted to be clean and pumps operational at the time of the audit.
Runoff within the plant area was noted to be taking place within unlined channels. Formal lined channels to convey dirty water within the plant area should be investigated.	N	–
A number of sumps at the plant were noted to be silted and require desilting.	Y	–
The sumps and channel running below the plant at the railway loading area were noted to be blocked and need to be desilted.	N	An improvement since the last audit was noted here, however, the sumps are only cleaned every 3 months and it appears as though the frequency of desilting needs to be increased.
No formal desilting procedure is in place at the plant. It is recommended that a desilting procedure is designed and implemented.	Y	A Stormwater Management and Sediment Control Procedure has been developed for Beeshoek and must be strictly adhered to.
An accumulation of wash off water from the North Diesel Workshop was noted on the eastern side. This water has the potential to find its way into the lined channel on the periphery, which discharges	–	This area was reassessed on the current audit and it was found that the inside area of the workshop is adequately sloped towards an inside channel. A further channel is therefore not necessary,

July 2019 Audit Recommendations	Implemented (Y/N)	Comment / Recommendations
into the environment near the railway line. A channel that captures wash off water from the workshop is recommended on the eastern side.		provided that washing does not take place directly outside of the workshop, and that drip trays are placed beneath outside stationary machinery.
Dirty water was noted to be discharging from a hole in a bund wall at the sculpting, buffing and screening area, into an unlined channel. This should be investigated.	Y	Although a recent flow from the hole in the bund wall at the sculpting, buffing and screening area was observed, this hole had a temporary fix and the pump was operational at the time of the audit. A permanent fix is required.
The channel outside of the washbay at the South Mine Workshop was noted to be silted. Even if desilted, this channel did not appear to be adequate to contain runoff from the washbay area, as the inlet holes on the metal plates above the channel, were observed to be very small, and likely to be blocked with sediment majority of the time.	Y	Larger inlet holes have been created.
The operation of the pumping system at the washbay sumps at the at the South Mine Workshop should be investigated, as it does not appear as though this system is operating effectively.	Y	This system was noted to be in working order at the time of the audit.
The contaminated soil sump near the crusher at the South Mine, was observed to be at full capacity, with contaminated soil placed on an unlined area adjacent to the sump. It is recommended that the frequency with which contaminated soils are removed, must be investigated, to ensure that there is sufficient capacity available at all times. Alternatively, an additional storage area should be considered.	Y	–

July 2019 Audit Recommendations	Implemented (Y/N)	Comment / Recommendations
A number of silted up channels were noted at the workshops. It is recommended that the frequency with which all dirty water systems are inspected and cleaned, should be reviewed.	Y	The workshop channels were clean barring a minor silted channel at the North Main Diesel Workshop towards the civil section side of the workshop.
Due to the spills at the sumps at the plant, and clean groundwater being used for makeup water and dust suppression, it is not felt that dirty water is being recycled and reused as far as practicably possible as required by GN704.	Y	The sumps at the plant were noted to be clean and in good condition on the audit. According to the Water Conservation and Demand Management Plan 2020 Update (iLEH, 2020), an improvement in the recycling of wastewater was noted over 2019/2020 from 2018. Furthermore, the overall percentage of water recycled at the Mine (74 %) is above the 45 % national benchmark set for the “Other” category. This calculation is based on the large volume of water that is recycled through the Thickener/Clarifier to the plant. This is a positive result for the Mine, indicating that the Mine is recycling dirty water above the specified benchmark standard. Although Beeshoek are still using clean groundwater for dust suppression as well as to top up the clarifier, based on the above, it appears as though Beeshoek are taking steps to improve their reuse and recycling of dirty water. The following is recommended in iLEH (2020) as opportunities to further avoid and reduce water use at the Mine: • Make-up water sourced for the Clarifier/Thickener

July 2019 Audit Recommendations	Implemented (Y/N)	Comment / Recommendations
		should be preferentially taken from dirty water dams. Ways in which this can be achieved should be discussed for implementation; • The water demand for the Clarifier/Thickener should be investigated and measures to reduce water use from this complex should be evaluated in the short-term for implementation; • The use of clean groundwater for dust suppression should be reduced in the short-term and eliminated in the long-term. Measures to achieve this should be discussed for implementation; and • The integration of the Storm Water Dam into the overall internal water circuit must be undertaken with the aim of optimising water reuse on site. For example, water from this dam can be used for dust suppression at the plant, instead of using clean water from Dams D90+D91 (Main Reservoir).
Warning signs in prominent locations were not observed at the Slime Dam, evaporation ponds, clarifier, thickener and plant zinc dam. It is recommended that warning signs are erected in prominent visible locations of the impoundments/dams, such as at their entrances. This should also be done for the stormwater dam which is currently being constructed.	Y	–

4.2.2 Scoring Assessment

An assessment was undertaken to determine the level of improvement between the previous GN704 audit (July 2019) and this audit. 45 line items were assessed from Regulation 2 to 13 in Table 4-1. Regulation 1 and Regulation 14 to 16 were not auditable and were therefore excluded from the assessment. The results are indicated in Table 4-3.

Table 4-3: Level of improvement between the previous and current audit

Compliance Type	July 2019 Audit		February 2021 Audit		Level of Improvement	
	Number	%	Number	%	Number	%
Total number of non-compliances	9	20%	8	18%	1	2%
Total number of compliances	20	44%	21	47%	1	2%
Total number of clauses N/A	16	36%	16	36%	N/A	N/A
Total number line items assessed	45	N/A	45	N/A	N/A	N/A

Table 4-3 indicates that there has been an improvement in the number of compliances since the previous audit. This is due to regulation 7 (f), where an improvement was noted in terms of the Mine recycling and reusing more dirty water.

5 CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the Mines compliances outweigh the number of non-compliances with GN704. Table 4-2 shows that the Mine is taking steps to implement measures to comply with GN704. Table 4-3 indicates that there has been an improvement in the number of compliances since the previous audit undertaken in July 2019. This is due to regulation 7 (f), where an improvement was noted in terms of the Mine recycling and reusing more dirty water. Improvements were noted at all previous issue areas (plant and workshops).

The main recommendations from the audit are summarised below:

- No formal lined channels are present within the plant area, and therefore, the potential for dirty water to seep is possible. Formalised lined channels that can convey the 1:50 runoff (as required by GN704) should be investigated within the plant area.
- Some of the inlet culverts at the plant were noted to be old and in a compromised state and require repair or upgrading.
- Silted sumps as well as channels containing silt and vegetation were noted at the bottom of the plant area near the railway loading area. These sumps are cleaned approximately every 3 months. It is recommended that desilting takes place more frequently.

- Desilted material was noted to be stockpiled directly adjacent to the channels and sumps at the plant railway loading area. The stockpiled material has the potential to be washed back into the channel. Desilted material should not be placed directly adjacent to the channels and sumps, but rather at designated lined stockpile areas. If temporarily placed next to the channels and sumps, then the desilted material should be removed on a more frequent basis to designated lined areas, especially during the rainy season.
- The vegetation and debris within the Evaporation Ponds compromises the storage capacity and should be cleared.
- The BN Dam (Tank 26) which receives pit water, overflows into a pipeline which discharges into the veld. As a result, a drainage line has formed which indicates that this happens from time to time. The Mine is in the process of applying to increase their storage capacity which will assist in preventing overflows from the BN Dam. This process must continue.
- The Stormwater Management and Sediment Control procedure document provides good guidance on the management of stormwater on the Mine and the control of sediment in dirty water systems. This document should be strictly adhered to.
- Job cards for desilting of dirty water systems should be generated at the plant.
- The channel outside of the wash bay at the South Diesel Workshop appeared to be slightly subsided towards the middle and should be repaired.
- According to the Water Conservation and Demand Management Plan 2020 Update (iLEH, 2020), an improvement in the recycling of wastewater was noted over 2019/2020 from 2018. Furthermore, the overall percentage of water recycled at the Mine (74 %) is above the 45 % national benchmark set for the “Other” category. This calculation is based on the large volume of water that is recycled through the Thickener/Clarifier to the plant. This is a positive result for the Mine, indicating that the Mine is recycling dirty water above the specified benchmark standard. The following is recommended in iLEH (2020) as opportunities to avoid and reduce water use at the Mine:
    - Make-up water sourced for the Clarifier/Thickener should be preferentially taken from dirty water dams. Ways in which this can be achieved should be discussed for implementation;
    - The water demand for the Clarifier/Thickener should be investigated and measures to reduce water use from this complex should be evaluated in the short-term for implementation;
    - The use of clean groundwater for dust suppression should be reduced in the short-term and eliminated in the long-term. Measures to achieve this should be discussed for implementation; and
    - The integration of the Storm Water Dam into the overall internal water circuit must be undertaken with the aim of optimising water reuse on site. For

example, water from this dam can be used for dust suppression at the plant, instead of using clean water from Dams D90+D91 (Main Reservoir).

6 REFERENCES

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APPENDIX A: GN704 REGULATIONS

(4 June 1999 - to date)

NATIONAL WATER ACT 36 OF 1998

(Gazette No. 19182, Notice No. 1091. See Act for commencement dates)

REGULATIONS ON USE OF WATER FOR MINING AND RELATED ACTIVITIES AIMED AT THE PROTECTION OF WATER RESOURCES

Published under Government Notice 704 in Government Gazette 20119. Commencement date: 4 June 1999.

The Minister of Water Affairs and Forestry has, under the powers vested in him by 26(1)(b), (g) and (i) of the National Water Act, 1998, (Act No. 36 of 1998), made the regulations contained in the Schedule in respect of use of water for mining and related activities aimed at the protection of water resources.

EXPLANATORY NOTE

The Minister of Water Affairs and Forestry is responsible for the protection, use, development, conservation, management and control of the water resources of South Africa on a sustainable basis. The requirements prescribed in terms of the regulations must be seen as minimum requirements to fulfill this goal.

The Department subscribes to the principles of co-operative governance and recognises the role of the Department of Minerals and Energy to co-ordinate environmental management within the mining industry and the role of the Department of Environmental Affairs and Tourism as the lead agent on matters affecting the environment. The roles of Environmental Management Programme Reports and Environmental Management Programme Performance Assessment Reports required in terms of the Minerals Act, 1991 (Act No. 50 of 1991), and Environmental Impact Assessment Reports required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989) are recognised and supported by the Department. Any information, obligations, programmes, permissions and commitments contained in the above reports, procedures, consultation requirements and decision-making processes will be recognised. by the Department. To promote coordination, copies of relevant exemptions from the requirements of the regulations will be forwarded to the Department of Minerals and Energy and the Department of Environmental Affairs and Tourism.

Implementation of the regulations will be delegated to the appropriate level as soon as the necessary capacity has been created at regional level or catchment level.

1. Definitions

In these regulations any expression to which a meaning has been assigned in the Act, shall have the meaning so assigned, and unless the context indicates otherwise-

"activity", means –

(a) any mining related process on the mine including the operation of washing plants, mineral processing facilities, mineral refineries and extraction plants, and

(b) the operation and the use of mineral loading and off-loading zones, transport facilities and mineral storage yards, whether situated at the mine or not,

(i) in which any substance is stockpiled, stored, accumulated or transported for use in such process; or

(ii) out of which process any residue is derived, stored, stockpiled, accumulated, dumped, disposed of or transported;

"clean water system", includes any dam, other form of impoundment, canal, works, pipeline and any other structure or facility constructed for the retention or conveyance of unpolluted water;

"dam", includes any settling dam, slurry dam, evaporation dam, catchment or barrier dam and any other form of impoundment used for the storage of unpolluted water or water containing waste;

"dirty area", means any area at a mine or activity which causes, has caused or is likely to cause pollution of a water resource;

"dirty water system", includes any dam, other form of impoundment, canal, works, pipeline, residue deposit and any other structure or facility constructed for the retention or conveyance of water containing waste;

"environmental management programme", means an environmental management programme submitted in terms of section 39 of the Minerals Act, 1991 (Act No. 50 of 1991);

"facility", in relation to an activity, includes any installation and appurtenant works for the storage, stockpiling, disposal, handling or processing of any substance;

"manager", **"mine"** and **"mineral"**, have the meanings assigned to them in the Mine Health and Safety Act, 1996 (Act No. 29 of 1996);'

"person in control of a mine or activity", in relation to a particular mine or activity, includes the owner of such mine or activity, the lessee and any other lawful occupier of the mine, activity or any part thereof; a tributer for the working of the mine, activity or any part thereof; the holder of a mining authorisation or prospecting permit and if such authorisation or permit does not exist, the last person who worked the mine or his or her successors-in-title or the owner of such mine or activity; and if such person is not resident in or not

a citizen of the Republic of South Africa, an agent or representative other than the manager of such a mine or activity must be appointed to be responsible on behalf of the person in control of such a mine or activity;

"residue", includes any debris, discard, tailings, slimes, screenings, slurry, waste rock, foundry sand, beneficiation plant waste, ash and any other waste product derived from or incidental to the operation of a mine or activity and which is stockpiled, stored or accumulated for potential re-use or recycling or which is disposed of;

"residue deposit", includes any dump, tailings dam, slimes dam, ash dump, waste rock dump, in-pit deposit and any other heap, pile or accumulation of residue;

"stockpile", includes any heap, pile, slurry pond and accumulation of any substance where such substance is stored as a product or stored for use at any mine or activity;

"the Act", means the National Water Act, 1998 (Act No. 36 of 1998);

"water system", includes any dam, any other form of impoundment, canal, works, pipeline and any other structure or facility constructed for the retention or conveyance of water;

2. Information and notification

(1) Any person intending to operate a new mine or conduct any new activity must notify the Department of such intention not less than 14 days before the start of such operation or activity.

(2) Any person in control of an existing mine or activity must-

(a) submit a copy of all amendments of their environmental management programme to the Department;

(b) notify the Department in writing 14 days before the temporary or permanent cessation of the operation of a mine or the conducting of an activity, or the resumption of such operation or activity;

(c) notify the Department by the fastest possible means of any emergency incident or potential emergency incident involving a water resource at or incidental to the operation of a mine or the conducting of any activity, furnishing information regarding-

(i) the date and time of the incident;

(ii) a description of the incident;

(iii) the source of the pollution or potential pollution;

(iv) the impact or potential impact on the water resource and the relevant water users;

(v) remedial action taken or to be taken by the person in control of the mine or activity to remedy the effects of the incident; and

(d) within 14 days after the date of an incident contemplated in paragraph (c) inform the Department in writing of measures taken to correct and prevent a recurrence of such incident.

3. Exemption from requirements of regulations

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

4. Restrictions on locality

No person in control of a 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 the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked;

(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.

5. Restrictions on use of material

No person in control of a mine or activity may use any residue or substance which causes or is likely to cause pollution of a water resource for the construction of any dam or other impoundment or any embankment, road or railway, or for any other purpose which is likely to cause pollution of a water resource.

6. Capacity requirements of clean and dirty water systems

Every person in control of a mine or activity must-

(a) confine any unpolluted water to a clean water system, away from any dirty area;

(b) design, construct, maintain and operate any clean water system at the mine or activity so that it is not likely to spill into any dirty water system more than once in 50 years;

(c) collect the water arising within any dirty area, including water seeping from mining operations. outcrops or any other activity, into a dirty water system;

(d) design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years; and

(e) design, construct, maintain and operate any dam or tailings dam that forms part of a dirty water system to have a minimum freeboard of 0.8 metres above full supply level, unless otherwise specified in terms of Chapter 12 of the Act.

(f) design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years.

7. Protection of water resources

Every person in control of a mine or activity must take reasonable measures to-

(a) prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage, and must retain or collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the Act;

(b) design, modify, locate, construct and maintain all water systems, including residue deposits, in any area so as to prevent the pollution of any water resource through the operation or use thereof and to restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation, or the disturbance of vegetation, or the alteration of flow characteristics;

(c) cause effective measures to be taken to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings;

(d) design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the disposal or storage of mineral tailings, slimes, ash or other hydraulic transported substances, so that the water or waste therein, or falling therein, will not result in the failure thereof or impair the stability thereof;

(e) prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources;

(f) ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time;

(g) at all times keep any water system free from any matter or obstruction which may affect the efficiency thereof; and

(h) cause all domestic waste, including wash-water, which cannot be disposed of in a municipal sewage system, to be disposed of in terms of an authorisation under the Act.

8. Security and additional measures

Every person in control of a mine or activity must-

(a) cause any impoundment or dam containing any poisonous, toxic or injurious substance to be effectively fenced-off so as to restrict access thereto, and must erect warning notice boards at prominent locations so as to warn persons of the hazardous contents thereof;

(b) ensure access control in any area used for the stockpiling or disposal of any residue or substance which causes, has caused or is likely to cause pollution of a water resource so as to protect any measures taken in terms of these regulations;

(c) not allow the area contemplated in paragraph (a) and (b) to be used for any other purpose, if such use causes or is likely to cause pollution of a water resource; and

(d) protect any existing pollution control measures or replace any existing pollution control measures deleteriously affected, damaged or destroyed by the removing or reclaiming of materials from any residue deposit or stockpile, and establish additional measures for the prevention of pollution of a water resource which might occur, is occurring or has occurred as a result of such operations.

9. Temporary or permanent cessation of mine or activity

(1) Any person in control of a mine or activity must at either temporary or permanent cessation of operations ensure that all pollution control measures have been designed, modified, constructed and maintained so as to comply with these regulations.

(2) Any person in control of a mine or activity must ensure that the in-stream and riparian habitat of any water resource, which may have been affected or altered by a mine or activity, is remedied so as to comply with these regulations.

(3) On either temporary or permanent cessation of a mine or activity the Minister may request a copy of any surface or underground plans as required in terms of the Minerals Act, 1991.

10. Additional regulations relating to winning sand and alluvial minerals from watercourse or estuary

(1) No person may-

(a) extract sand, alluvial minerals or other materials from the channel of a watercourse or estuary, unless reasonable precautions are taken to-

(i) ensure that the stability of the watercourse or estuary is not affected by such operations;

(ii) prevent scouring and erosion of the watercourse or estuary which may result from such operations or work incidental thereto;

(iii) prevent damage to in-stream or riparian habitat through erosion, sedimentation, alteration of vegetation or structure of the watercourse or estuary, or alteration of the flow characteristics of the watercourse or estuary; or

(b) establish any slimes dam or settling pond within the 1:50 year flood-line or within a horizontal distance of 100 metres of any watercourse or estuary.

(2) Every person winning sand, alluvial minerals or other materials from the bed of a watercourse or estuary must-

(a) construct treatment facilities to treat the water to the standard prescribed in Government Notice No. R.991 dated 26 May 1984 as amended or by any subsequent regulation under the Act before returning the water to the watercourse or estuary;

(b) limit stockpiles or sand dumps established on the bank of any watercourse or estuary to that realised in two days of production, and all other production must be stockpiled or dumped

outside of the 1:50 year flood-line or more than a horizontal distance of 100 metres from any watercourse or estuary; and

(c) implement control measures that will prevent the pollution of any water resource by oil, grease, fuel or chemicals.

11. Additional regulations for rehabilitation of coal residue deposits

Any person mining or establishing coal residue deposits must rehabilitate such residue deposits so that-

(a) all residue deposits are compacted to prevent spontaneous combustion and minimise the infiltration of water; and

(b) the rehabilitation of the residue deposits is implemented concurrently with the mining operation. •

12. Technical investigation and monitoring

(1) The Minister may, after consultation with the Department of Minerals and Energy and the Department of Environmental Affairs and Tourism, in writing require any person in control of a mine or activity to arrange for a technical investigation or inspection, which may include an independent review, to be conducted on any aspect aimed at preventing pollution of a water resource or damage to the in-stream or riparian habitat connected with or incidental to the operation or any part of the operation of a mine or activity.

(2) Such investigation must be conducted and a report thereon compiled in the manner and within the time period that the Minister may specify.

(3) The person in control of the mine or activity must inform the Minister as to the expertise and qualifications of the persons who are to conduct an investigation or inspection contemplated in subregulation (1) before the commencement thereof.

(4) The Minister may in writing require any person in control of a mine or activity to submit a programme of implementation to prevent or rectify any pollution of a water resource or damage to the in-stream or riparian habitat as recommended by the investigation contemplated in subregulation (1) within the time period that the Minister may specify.

(5) The Minister may in writing direct any person in control of a mine or activity to implement a compliance monitoring network to monitor the programme of implementation contemplated in subregulation (4), through establishing, operating and maintaining monitoring installations of a type, at the locations and in the manner specified by the Minister and to submit the monitoring information and results to the Minister for evaluation.

(6) Subject to Chapter 4 of the Act, any person in control of a mine or activity must submit plans, specifications and design reports approved by a professional engineer to the Minister, not later than 60 days prior to commencement of activities relating to-

(a) the construction of any surface dam for the purpose of impounding waste, water containing waste or slurry, so as to prevent the pollution of a water resource;

(b) the implementation of any pollution control measures at any residue deposit or stockpile, so as to prevent the pollution of a water resource; and

(c) the implementation of any water control measures at any residue deposit or stockpile, so as to prevent the pollution of a water resource.

13. General

The person in control of a mine or activity must provide the manager with the means and afford him or her every facility required to enable the manager to comply with the provisions of these regulations.

14. Offences and penalties

(1) Any person who contravenes or, subject to regulation 3, fails to comply with regulation 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13 is guilty of an offence and liable on conviction to a fine or to imprisonment for a period not exceeding five years.

(2) Whenever an act or omission by a manager or employee of a mine or activity-

(a) constitutes an offence in terms of these regulations, and takes place with the express or implied permission of the person in control of a mine or activity, that person is, in addition to the manager or employee, liable to conviction for that offence; or

(b) would constitute an offence by the person in control of a mine or activity in terms of these regulations that manager or employee is, in addition to that person, liable to conviction for that offence.

15. Repeal of regulations

The regulations published under Government Notice No. R.287 of 20 February 1976 are hereby repealed.

16. Commencement

These regulations will take effect on the date of publication.