DRAFT INTEGRATED WATER AND WASTE MANAGEMENT PLAN (IWWMP) 2024	BUNDU MINING RIETVALEI
SEPT 2024	FOR COMMENT

PROJECT NAME	**Bundu Mining Rietvalei**
LICENSEE	**Bundu Mining (Pty) Ltd** PO Box 31159 Kyalami 1684
PROPERTIES	Portions 18, 91, 94, 95 and 100 of Uitzicht Alias Rietvalei 314 JR.
CONSULTANT	AQUASTRAT SOLUTIONS Marli Burger (EAP No. 220/2019; Pr. Sci. Nat 115534; MSc Aquatic Health) P O Box 72194, Lynnwood Ridge, 0040 Cell: +27 72 284 9332 Email: oryxsolutionsafrica@gmail.com Website: www.aquastratsolutions.co.za

DECLARATION OF INDEPENDENCE

I, Marli Burger (820903 0245 087) declare that I:

- am subcontracted as specialist consultant for the project described in this report
- am committed to a balanced socio-economic and environmental approach to environmental management and recognize the principles of sustainable resource utilization
- abide by the Code of Ethics of the S.A. Council for Natural Scientific Professions
- abide by the Code of Ethics of the Environmental Assessment Practitioners Association of South Africa
- have no financial interest in the proposed development other than remuneration for work performed
- have or will not have any vested or conflicting interests in the proposed development
- undertake to disclose to the project manager and client as well as the competent authority any material information regarding impacts, mitigation measures, non-compliance with the relevant authorizations and any other duty or function required in terms of the National Environmental Management Act (Act 107 of 1998), the Environmental Impact Assessment Regulations, 2014 (as amended 2017), the National Water Act (Act 36 of 1998) and relevant regulations and guidelines.

Marli Burger

SACNASP Reg. No: 115534

EAPASA Reg. No: 220/2019

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ABBREVIATIONS

BEE	Black Economic Empowerment
DWAF	Department of Water Affairs and Forestry (now known as DWS)
DWS	Department of Water and Sanitation
EA	Environmental Authorisations
EE	Employment Equity
EIS	Ecological Importance and Sensitivity
ELU	Existing Lawful Use
EMPr	Environmental Management Programme report
GNR	Government Notice Regulation
HDSA	Historically Disadvantaged South Africans
HRD	Human Resources Development
HRU	Hydrological Resource Unit
I&AP	Interested and Affected Parties
IWWMP	Integrated Water and Waste Management Plan
LED	Local Economic Development
MAE	Mean Annual Evaporation
mamsl	meters above mean sea level
mbgl	meters below ground level
MAP	Mean Annual Precipitation
MAR	Mean Annual Run-off
MPRSA	Mineral and Petroleum Resources Development Act (Act 28 of 2002)
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM;WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
RQO	Resource Quality Objectives
RSIP	Rehabilitation Strategy and Implementation Programme
SACNASP	South African Council of Natural Scientific Professionals
SAWIC	South African Waste Information Centre
SLP	Social and Labour Plan
SMME	Small, Micro and Medium Enterprises
SSC	Shared Service Canter
SWM	Storm Water Management
SWMP	Storm Water Management Plan
TSF	Tailings Storage Facility
TWQR	Target Water Quality Range
WBD	Water Balance Diagram
WC/WDM	Water Conservation and Water Demand Management
WMA	Water Management Area
WUE	Water Use Efficiency
WUL	Water Use License

This document serves as the Integrated Water and Waste Management Plan (IWWMP), as prescribed by GN 267 of 2017, for the Water Use License Application for the **Bundu Sand** operation on behalf of **Bundu Minining (Pty) Ltd**, the licensee for the activities on **Portions 18, 91, 94, 95 and 100 of Uitzicht Alias Rietvalei 314 JR.**

1 Chapter 1: Introduction

1.1 Activity Background

Bundu Sand is applying for a WUL for abstraction and waste related water uses, and the Integrated Water and Waste Management Plan (IWWMP) is required as part of the application. The assessments recently completed for the WULA include the Geohydrology Assessment with hydrocensus, Hydrology Assessment and Waste Classification Assessment. These reports will also form part of the submission for the WULA.

Sebastiao Farms (Pty) Ltd purchased the properties in 2007/8 from Holcim, who mined the quarry and sand, and disposed of slurry from the wash plant into the settlement dams. A Return Water Dam (RWD) collects water from settlement dams and water is returned to the wash plant for reuse.

The applicant intends to restart operations at an old aggregate quarry. The proposed operation will include the drilling and blasting of weathered quartzite material, starting at the existing pit and expanding using benches of 10m x 10m. Blasted material will be loaded and hauled from within the mining right area and either transported directly to a processing plant or stockpiled as Run of Mine for later processing. Processing will include primary and secondary crushing of rock to make aggregate and sand products, as well as washing of certain products. Large portions of the study and application area footprints are characterised by past & ongoing sand and quartz mining activities with extensive stockpiling, trenching and quarrying remains throughout the area. Existing infrastructure includes office buildings, workshops & industrial-related infrastructures, access roads, fences and other infrastructure associated with past and current mining activities.

The proposed operation will include the drilling and blasting of competent material from within the mining right area that will then be transported to a processing plant. Processing will include primary and secondary crushing of rock to make aggregate and sand products, as well as washing of certain products. The pit will be mined using excavators and dump trucks. The material will be blasted first to loosen it up. Benches of 10m high x 10m wide are proposed and the pit boundary will extend up to the MR area boundary, as there will be no waste product. The mining will start in the existing pit and will then expand to the west, at a rate of 240 000tpm.

Bundu Mining is currently applying for a mining permit renewal to continue mining sand and for a mining right for the quarry. Activities associated with the proposed MR are the addition of a proposed wash plant, settlement dams and RWD. The opencast quarry into the ridge will be subject to blasting, hauling and crushing. Groundwater and surface water will be used for dust suppression and to provide water to the sand wash plant.

The mine will be an open cast mining operation where quartzite is processed into various types of sand and aggregates which is then used in the local Ready-mix and construction industry (Mine works programme, 2023).

Mining takes place through open cast mining methods, whereby sand and quartzite is excavated and processed through plants to generate sand products. Rock in the quarry is loosened by conventional drilling and blasting, followed by loading onto haul trucks for transportation to on-site crushing, screening and washing plants.

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1.2 Regional Setting and Location of Activity

The site is located west of the Hartbeespoort Dam in the Kameeldrift West area, south of Van Der Hoff Road, City of Tshwane Municipality.

1.3 Property Description

The water use activities are operated and located on Portions 18, 91, 94, 95 and 100 of Uitzicht Alias Rietvalei 314 JR.

1.4 Purpose of IWWMP

“The Integrated Water and Waste Management Plan (IWWMP) must supply the Department of Water Affairs (DWS) with a very clear management commitment to ensure the implementation of the IWWMP action plan. The completed IWWMP needs to be endorsed and implemented by the water user, and it will be captured as a water use licence condition. The implementation of an IWWMP is therefore enforced through the water use licence conditions in the water use authorisation process” (DWA, 2010).

An IWWMP is a simple, feasible, implementable plan for the site activity that considers the National Water Resource Strategy (NWRS), the relevant Catchment Management Strategy (CMS), any established resource quality objectives (RQOs) and the sensitivity of the receiving water resource. It also considers up- and down-stream cumulative impacts of the water use activities and provides an updated interpretation of monitoring data to enable adaptive management (DWA, 2010).

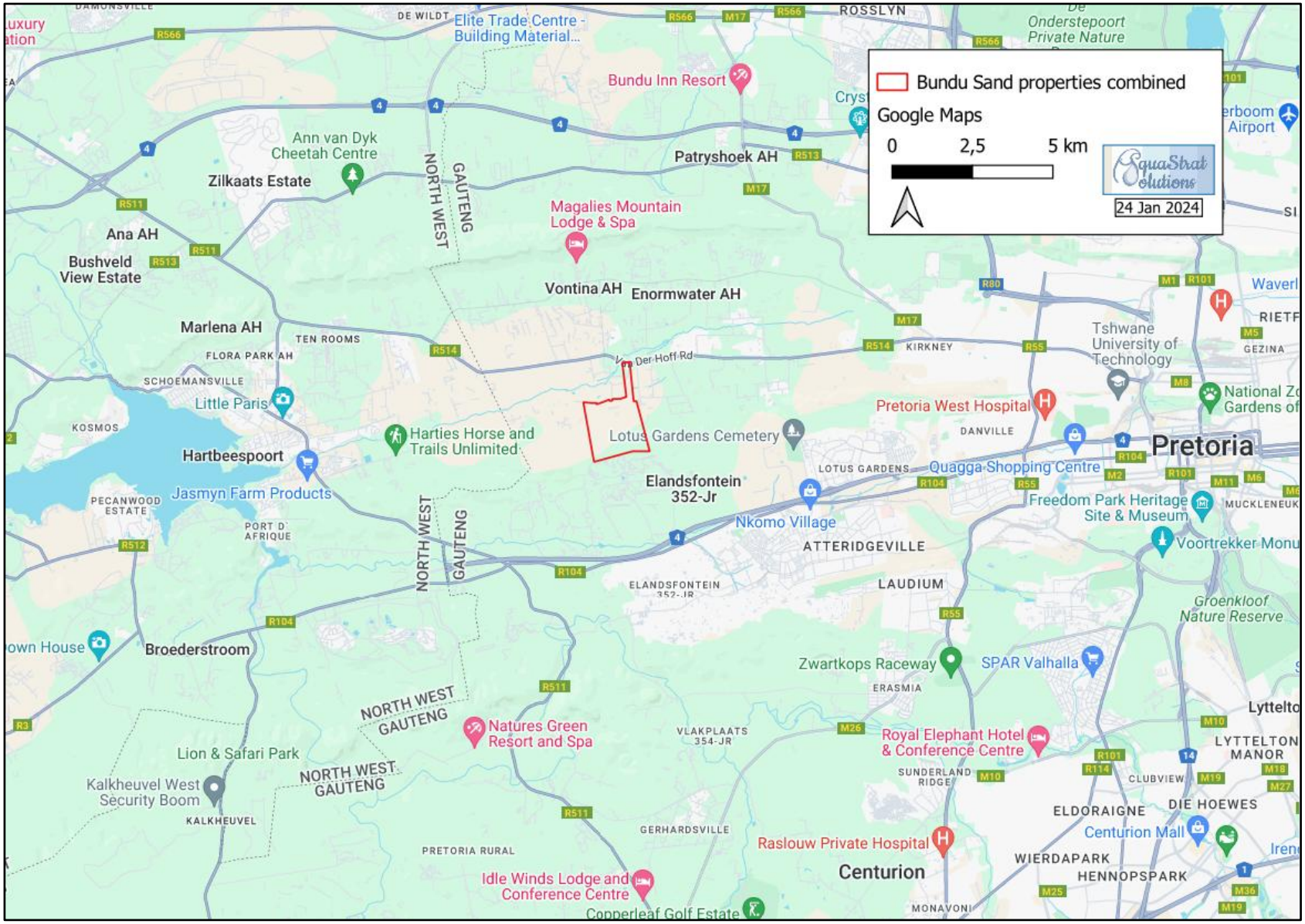


Figure 1. Locality of Bundu Mining Rietvalei.

2 Chapter 2: Conceptualisation of activity

2.1 Description of Activity

Existing infrastructure includes a non-operational plant, one small-scale shovel (TLB and excavator) mining excavation, a stormwater dam and several settlement ponds which have been silted up due to historic mining activities. Rehabilitated sand mining operations that pre-date Bundu mining is evident all over the project area.

Activities associated with the proposed MR are the addition of a proposed washing plant and settlement dams to continue mining and processing the existing opencast quarry into the ridge. Groundwater and surface water will be used for dust suppression and to provide water to the sand-washing plant (GCS Geohydrology, 2023).

2.2 Extent of Activity

Portions 18, 91, 94, 95 and 100 of Uitzicht Alias Rietvalei 314 JR.

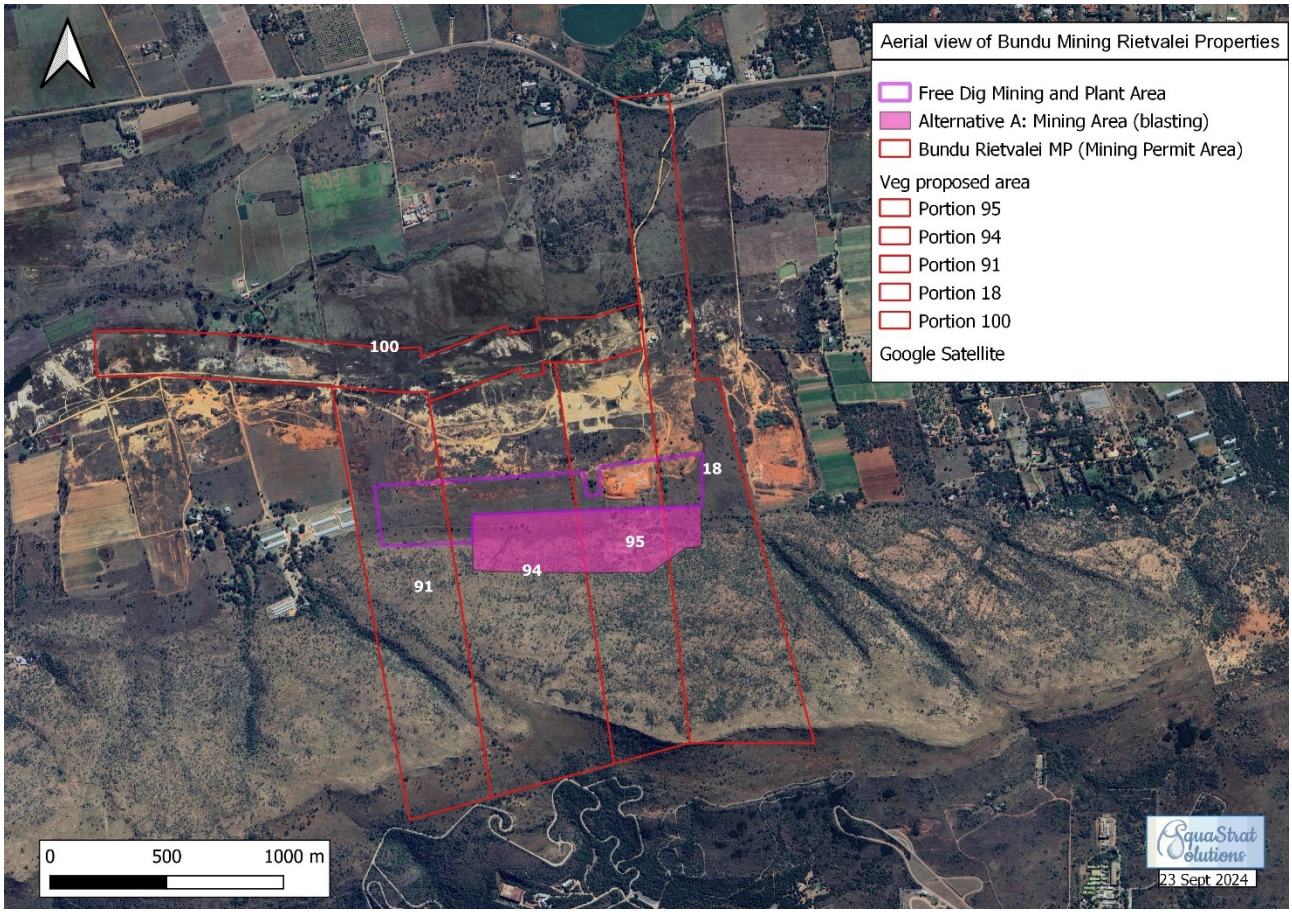


Figure 2. Bundu Mining Rietvalei properties showing MR and MP areas.

2.3 Key Activity Related Processes and Products

Raw water is proposed to be abstracted from an existing borehole for domestic use at the offices and workshop and will be discharged into septic tanks. Raw water is also proposed to be used for dust suppression and processing. Processing plant water will be disposed of into the Settling Dams from where water gravitates to the RWD. Water from the RWD will be reused in the processing plants.

Borehole water: to be used at basins and toilets at the offices and workshop, and for dust suppression and processing [*S21(a): Abstraction of water from borehole;* 57 279m^3/a].

- **Storm water management:** separation of dirty and clean stormwater will be managed by means of compacted earth berms from site material.
- **Process water:** The process water will consist of water from the boreholes and from groundwater flow into the quarry pit, as well as the recycled water from the RWD. Sludge will be pumped from the Processing Plant to the Settling Dams [S21(g): *Disposal of dirty water into Settling Dams 1 & 2; 113 843m^3/a each]* from which settled water gravitates to the RWD [S21(g): *Disposal of dirty water into RWD; 123 196m^3/a].* Water will be used from the RWD for dust suppression [S21(g): *Disposal of dirty water from RWD for dust suppression17 680m^3/a]*and in the processing plant. Water is pumped from the quarry pit to the Washing Plant JoJo tanks [S21(a): *Abstraction of groundwater*; and S21(j): *Removal of pit water for use at Process Plant*; 181 233m^3/a].
- **Waste Management**: All waste generated on-site is removed by registered transporters and disposed at licenced waste management facilities.
    - *2 x Septic tanks* at offices and workshop will be serviced by service provider [S21(g): *Disposal of wastewater into septic tank;* 8m^3/a each; 16m^3 capacity each*]*.
    - *General and non-hazardous waste* will be collected in bins at the offices, workshop and plant.
    - *Hazardous waste* will be stored in demarcated areas prior to disposal. (The type of storage facility and the schedule for disposal is dependent on the waste type being collected).

An overall mining description is provided in Section 2.1.

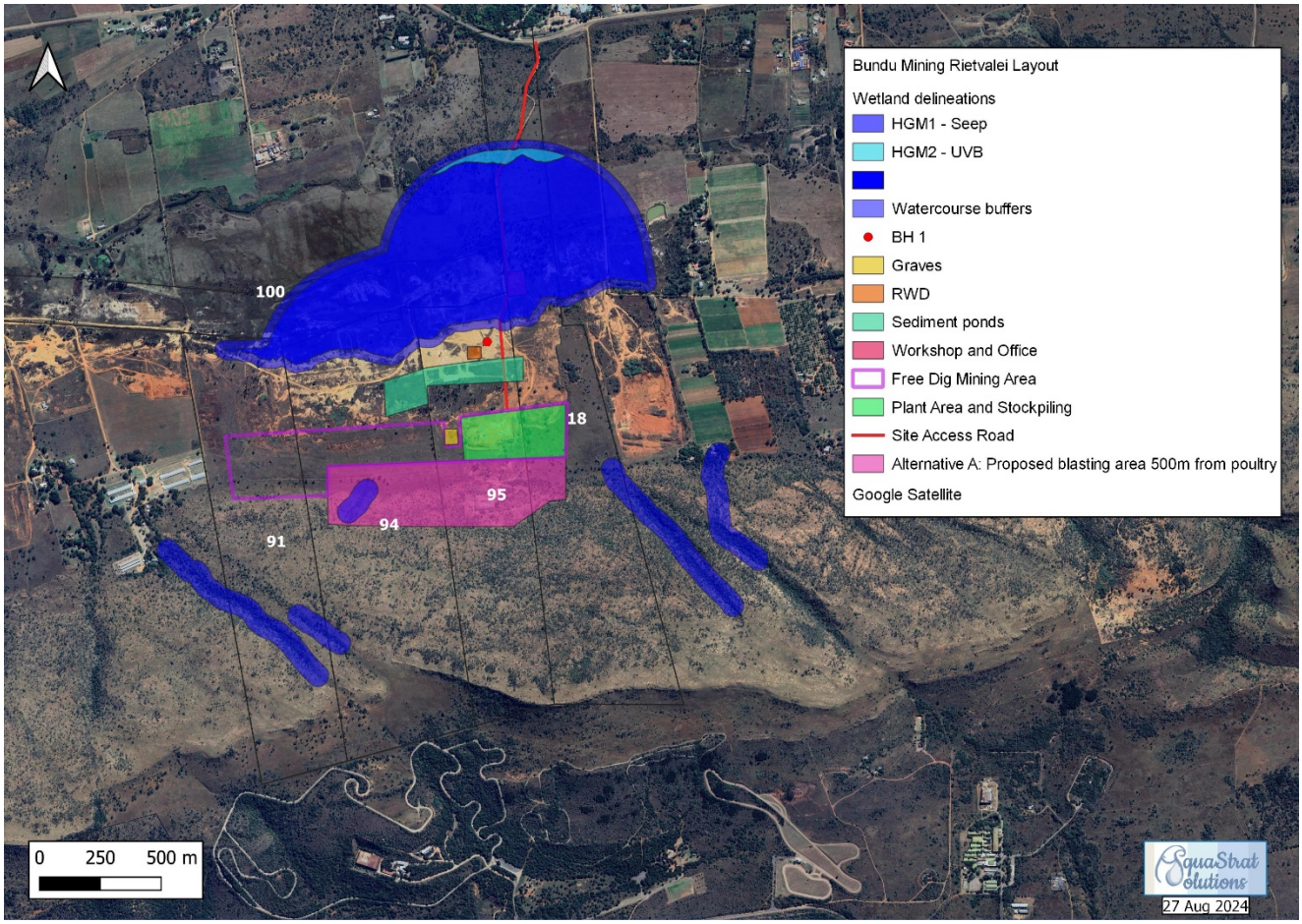


Figure 3. Layout of Bundu Rietvalei.

Table 1. The mining related activities that are associated with the authorised water uses

Water use(s) activities	Purpose	Capacity/ Volume (m^3, tonnes and/or m^3/annum)/ dimension (Area (ha) Length/depth, (m)),	Property Description	Co-ordinates
Section 21 (a)				
BH 1	For domestic	313 m^3/a	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°43'59.59"S 28° 0'30.82"E
BH 1	Process water	56 966 m^3/a	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°43'59.59"S 28° 0'30.82"E
Groundwater inflow into quarry	For process water	181 233 m^3/a	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°44'21.10"S 28° 0'29.95"E
Section 21(c) & (i)				
Mining activities within 500m of wetland	To continue mining	85ha	Portions 18, 91, 94 & 95 of Rietvalei 314 JR	Start: 25°44'14.56"S 28° 0'42.06"E End: 25°44'3.89"S 27°59'48.53"E
Stormwater outlet A	Stormwater management	10m x 10m reno mattress	Portion 18 of Uitzicht Alias Rietvalei 314 JR	25°43'55.30"S 28° 0'41.49"E
Stormwater outlet B	Stormwater management	10m x 10m reno mattress	Portion 91 of Uitzicht Alias Rietvalei 314 JR	25°44'8.65"S 27°59'58.62"E
Stormwater berm in 500m of wetland	Stormwater management	2m (w) x 600m (l) x 0.8 (h)	Portions 94 & 95 of Rietvalei 314 JR	Start: 25°44'1.13"S 28° 0'36.11"E End: 25°44'4.60"S 28° 0'15.40"E
Existing road watercourse crossing	Stormwater management	6m (w) x 25m (l)	Portion 18 of Uitzicht Alias Rietvalei 314 JR	25°43'34.83"S 28° 0'34.09"E
Mining in an isolated drainage line	To continue mining	150m x 50m	Portion 94 of Uitzicht Alias Rietvalei 314 JR	25°44'20.84"S 28° 0'12.22"E
21 (g)				
Disposal of dirty water into the Return Water Dam	To continue mining	123 196 m^3/a (5500 m^3 capacity)	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°44'1.22"S 28° 0'28.71"E

Water use(s) activities	Purpose	Capacity/ Volume (m^3, tonnes and/or m^3/annum)/ dimension (Area (ha) Length/depth, (m)),	Property Description	Co-ordinates
Disposal of dirty water into Settling Dam 1		113 843 m^3/a (5000 m^3 capacity)	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°44'3.53"S 28° 0'29.21"E
Disposal of dirty water from Settling Dam 2		113 843 m^3/a (5000 m^3 capacity)	Portion 94 of Uitzicht Alias Rietvalei 314 JR	25°44'4.48"S 28° 0'21.30"E
Disposal of wastewater into Septic tank 1		16 m^3/a (8 m^3 capacity)	Portion 18 of Uitzicht Alias Rietvalei 314 JR	25°43'52.41"S 28° 0'34.62"E
Disposal of wastewater into Septic tank 2		16 m^3/a (8 m^3 capacity)	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°43'59.82"S 28° 0'30.28"E
Stockpile A		40 000 tons/a	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°44'11.21"S 28° 0'33.66"E
Stockpile B		200 000 tons/a	Portion 94 of Uitzicht Alias Rietvalei 314 JR	25°44'4.56"S 28° 0'8.10"E
Dust suppression		17 680m^3/a	Portions 18, 91, 94 & 95 of Rietvalei 314 JR	25°44'0.91"S 28° 0'35.14"E
21(j)				
Removal of water found underground	To use in washing plant	181 233 m^3/a	Portion 95 of Uitzicht Alias Rietvalei 314 JR	25°44'21.18"S 28° 0'30.26"E

2.4 Activity Life Description

At the current rate of production, the life-of-mine for Bundu Rietvalei is estimated to exceed 30 years.

- Bundu Mining is currently applying for a mining right to continue mining sand and to continue restart mining activities in the quarry. Activities associated with the proposed MR are the addition of a proposed wash plant, reusing the Settling dams and RWD, abstraction of groundwater from a Borehole for domestic and use at the washing plant, and reusing groundwater inflow from the quarry pit in the washing process. The opencast quarry into the ridge will be subject to blasting, hauling and crushing. Groundwater and process water will be used for dust suppression.
- The Life of Mine is >30 years.
- The WUL validity period is requested to be issued for 20 years.

2.5 Activity Infrastructure Description

The locations of the proposed water uses are presented in Figure 4.

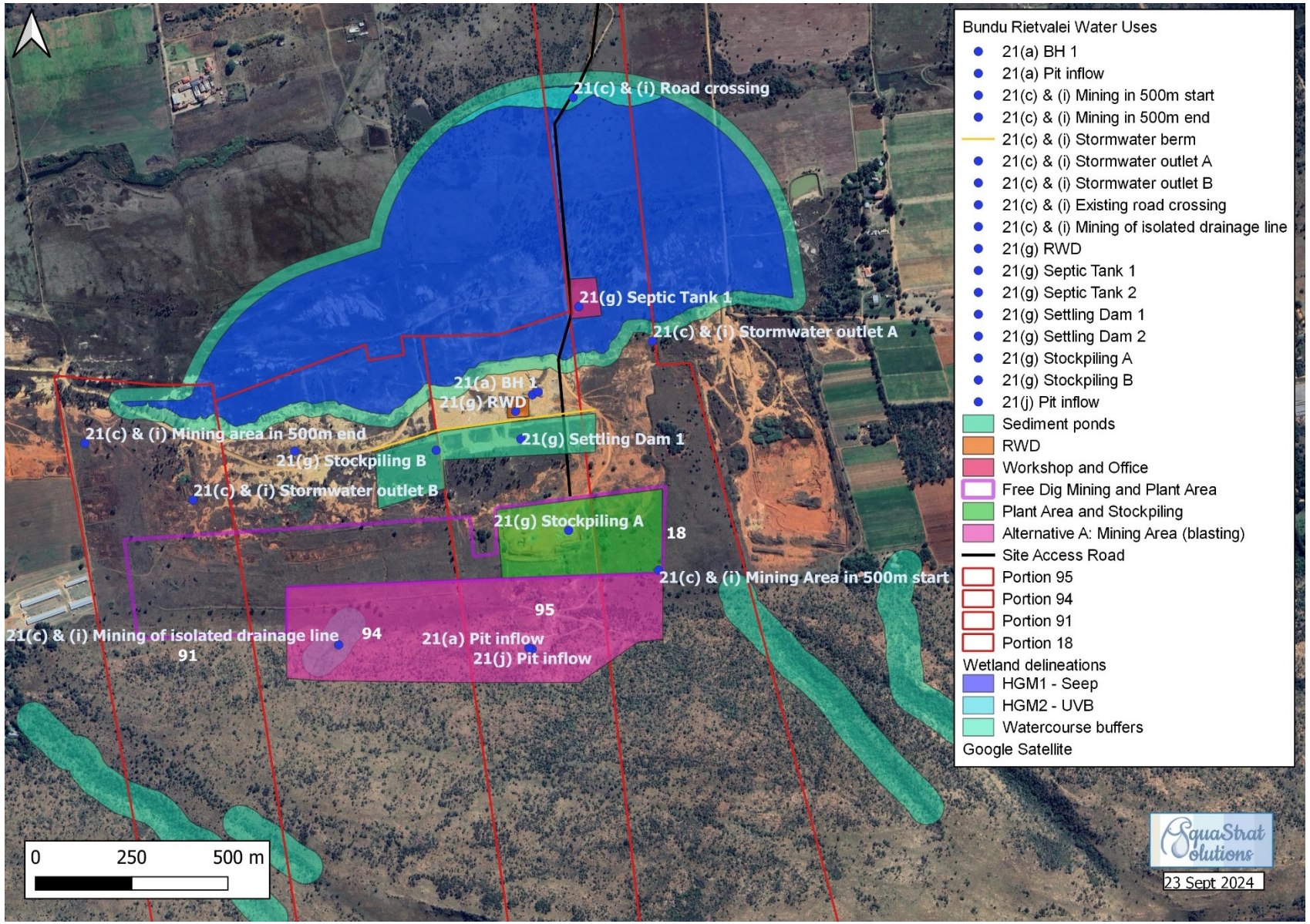


Figure 4. Site layout showing water use activities.

2.6 Key Water Uses and Waste Streams

Water Uses:

- Consumptive Water use / potable water
- Domestic Water use (including sanitation)
- Process Water use: Washing plant and dust suppression

Waste Streams:

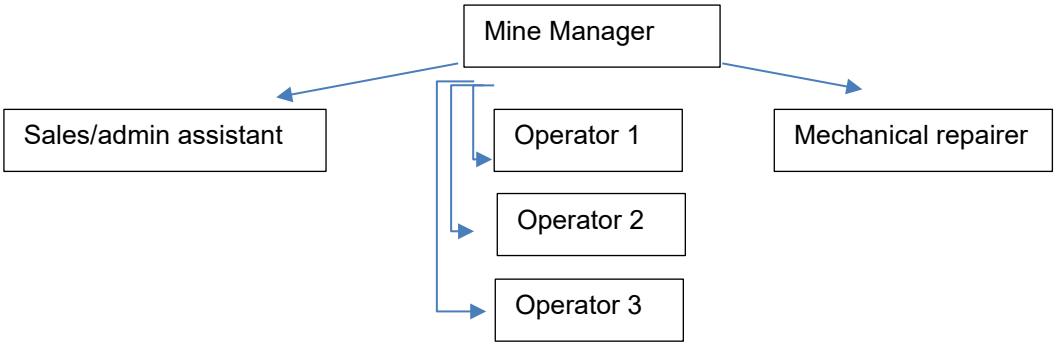
- General waste:
  - Administration waste
  - Domestic waste
  - Sewage
  - Scrap metal
  - Tyres (used)

- Mining residue:
  Sediment (from settlement dams)

- Hazardous waste:
  - Batteries (used)
  - Brake fluid
  - Hydrocarbon contaminated waste
  - Degreaser
  - Engine coolant
  - Fluorescent tubes
  - Oil filters
  - Oil separator sludge
  - Vehicle parts

2.7 Organisational Structure of Activity

The personnel and designations relevant to mining and water use activities are listed in Section 5.7 of this report and the management organogram is shown below.



2.8 Business and Corporate Policies

The environment corporate policies related to the environmental and water use management (e.g. SHECQ policy) are attached in Appendix A.

3 Chapter 3: Regulatory water and waste management framework

3.1 Summary of all Water Uses

Refer to Table 1 for the water uses that are being applied for. Map references are provided in relation to Figure 4.

3.2 Existing Lawful Water Uses

There are no ELU registrations on the property.

3.3 Relevant Exemptions

None for Bundu Mining Rietvalei.

No application is required in terms of Regulation 3 of Government Notice (GN) 704 of 4 June 1999 for the exemption from Regulations of the same.

3.4 Generally Authorised Water Uses

None for Bundu Mining Rietvalei.

3.5 New Water Uses to be Licenced

All water uses as per Table 1 must are newly applied for.

3.6 Waste Management Activity (NEM:WA)

Bundu Mining Rietvalei will not undertake any “waste management activities” as outlined in GNR 921. Residue stockpiles and residue deposits (destined to be used/sold) have been excluded from NEM:WA by the NEMLA, Act 2 of 2022, and are therefore currently not regarded as waste for which a waste management licence is required.

Based on TCT0 and/or LCT0 exceedances, the ‘Bundu Rietvlei Sand’ stream could be categorised into the Type 3 (low risk) waste category (GNR 635, 2013) requiring a Class C liner (pollution barrier). It should however be noted that the GNR 636 (2013) also states, (see Section 5(1)(b), Waste Disposal Restrictions), that waste streams with a pH level of pH < 6.0 or pH > 12.0, are prohibited from being disposed. Such streams should be treated and re-assessed (GCS, 2024).

3.7 Waste Related Authorisations

Bundu Mining Rietvalei does not hold any waste related authorisation. There is no need to register with the South African Waste Information Centre (SAWIC) as less than 100m^3 of general waste and less than 80m^3 of hazardous waste is stored on site at any one time.

3.8 Other Authorisations (EIAs, EMPs, RODs, Regulations)

Mining Right: The Mining Right application for the quarry mining is currently underway and the Scoping report public participation process of the MR application will run concurrently with the WULA consultation process.

EMPR: The EMPr forms part of the MR application.

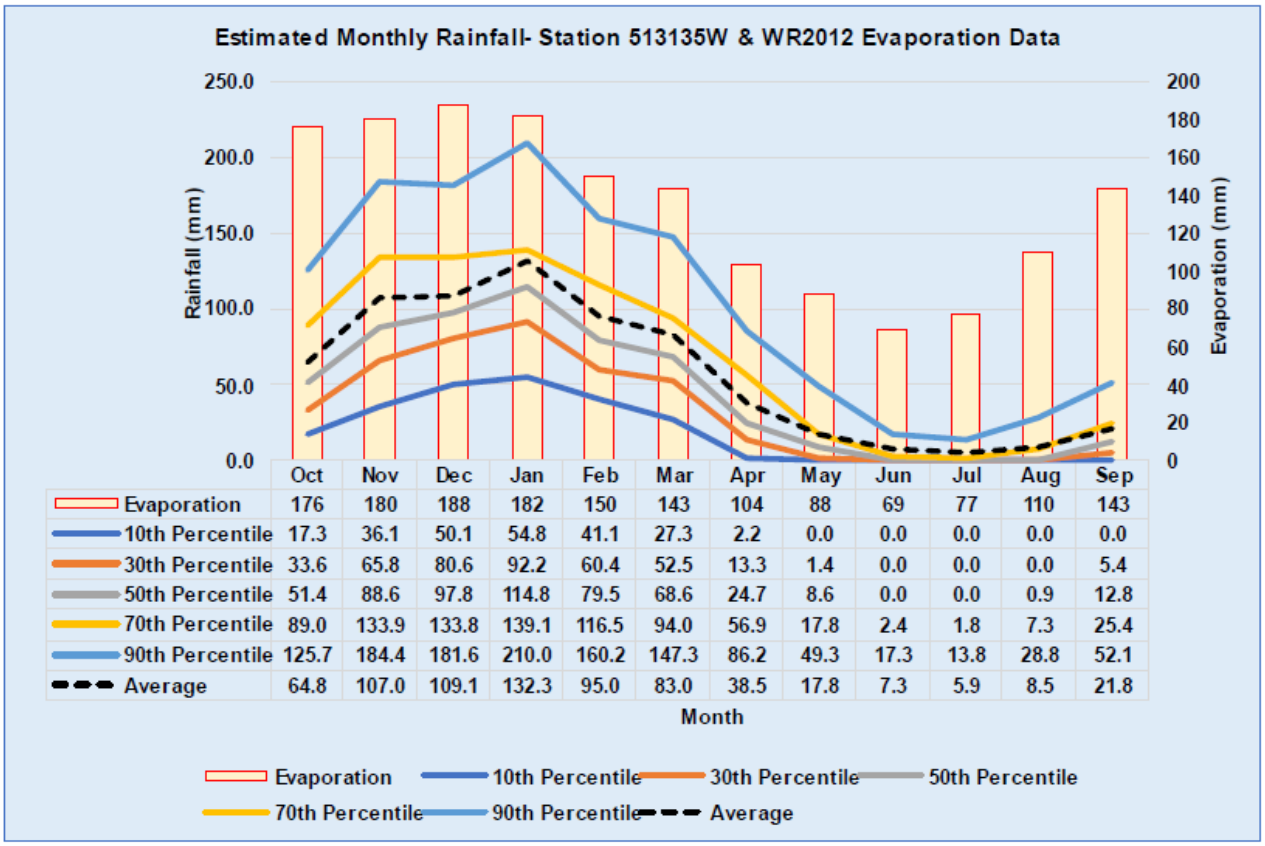
4 Chapter 4: Present Environmental Situation

4.1 Climate

The average yearly temperaturefor the project area ranges from 20 to 35°C (high) and -5 to 3°C (Low). The study area is situated in a subtropical monsoon climate (Köppen: Cwa) with long hot rainy summers, and short, dry and mild winters, as per the Köppen Climate Classification (Kottek, et al., 2006). The area is subjected to summer rainfall. Wind generally blows from W, N and E and more often from the direction between N and ENE at velocities > 19 km/h (GCS Hydrology, 2023).

4.2 Regional Climate/Rainfall

Available rainfall data suggest a MAP ranging from 405 (30th percentile) to 1258 (90th percentile) mm/yr. The average rainfall is in the order of 690 mm/yr (GCS Hydrology, 2023).



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Evaporation	176	180	188	182	150	143	104	88	69	77	110	143
10th Percentile	17.3	36.1	50.1	54.8	41.1	27.3	2.2	0.0	0.0	0.0	0.0	0.0
30th Percentile	33.6	65.8	80.6	92.2	60.4	52.5	13.3	1.4	0.0	0.0	0.0	5.4
50th Percentile	51.4	88.6	97.8	114.8	79.5	68.6	24.7	8.6	0.0	0.0	0.9	12.8
70th Percentile	89.0	133.9	133.8	139.1	116.5	94.0	56.9	17.8	2.4	1.8	7.3	25.4
90th Percentile	125.7	184.4	181.6	210.0	160.2	147.3	86.2	49.3	17.3	13.8	28.8	52.1
Average	64.8	107.0	109.1	132.3	95.0	83.0	38.5	17.8	7.3	5.9	8.5	21.8

Figure 5. Average monthly rainfall for Wylies Farm station and evaporation (GCS Hydrology, 2024).

4.3 Evaporation

The project area falls within evaporation zone 3A, of which Mean Annual Evaporation (MAE) ranges from 1 500 to 1 600 mm/yr. The MAE far exceeds the MAP for the site, which implies greater evaporative losses when compared to incident rainfall. Runoff from natural (unmodified) catchments for the quaternary A21A is simulated in WR2012 (WRC, 2015) as being equivalent to 96.5 mm/yr (or 14% of the MAP) (GCS Hydrology, 2024).

4.4 Surface Water

Information of the section below is obtained from the Hydrology Assessment (GCS, 2024).

4.4.1 River systems

The Swartspruit River is situated about 1.04 km downgradient of the site and flows towards the west to the Hartbeespoort Dam.

4.4.2 Wetlands

The site is bound to the south by a steep hilltop and two (2) dominant drainage lines exist, one towards the east and one towards the west of the hilltop, where valleys have been carved by erosion.

For the majority of the site, there are no recognised drainage lines or streams/rivers. The proposed MR area falls between the two drainage lines and based on the topography and HRUs delineated the activity will likely not impact the western drainage line and will further have a limited impact on the eastern drainage stream. From the site investigation, it is clear that free drainage takes place for the entire site, with occasional depressions where surface water collects shortly after rainfall events. (GCS Hydrology, 2024)

The following is a summary of the findings of the **aquatic assessment:**

PES & EIS:

Ecosystem services: Moderate to High; sediment trapping, toxicant, nitrate and phosphate assimilation, maintenance of biodiversity, food for livestock. The wetland's capacity for carbon storage, though indicated as likely, is in fact low due to the shallow nature of the soils.

Buffer: 35m for wetland and 30m for drainage lines

Risk Matrix: Low risk with implementation of mitigation measures (Tate, 2024).

4.5 Water Management Area

The site falls within the quaternary catchment A21H, which forms part of the primary drainage region of the Crocodile-West and Marico WMA.

4.6 Surface Water Hydrology

The site is bound to the south by a steep hilltop and two (2) dominant drainage lines exist, one towards the east and one towards the west of the hilltop, where valleys have been carved by erosion. For the majority of the site, there are no recognised drainage lines or streams/rivers. The proposed MR area falls between the two drainage lines and based on the topography and HRUs delineated the activity will likely not impact the western drainage line and will further have a limited impact on the eastern drainage stream. From the site investigation, it is clear that free drainage takes place for the entire site, with occasional depressions where surface water collects shortly after rainfall events.

It is clear from the site walkover assessment that historic mining has changed the surface water flow paths, and micro-catchment style free drainage from higher to lower elevations takes place. The overall drainage direction is towards the north of the Swartspruit River. The Swartspruit River is situated about 1.04km downstream of the site and flows towards the west to the Hartbeespoort Dam (GCS Hydrology, 2024).

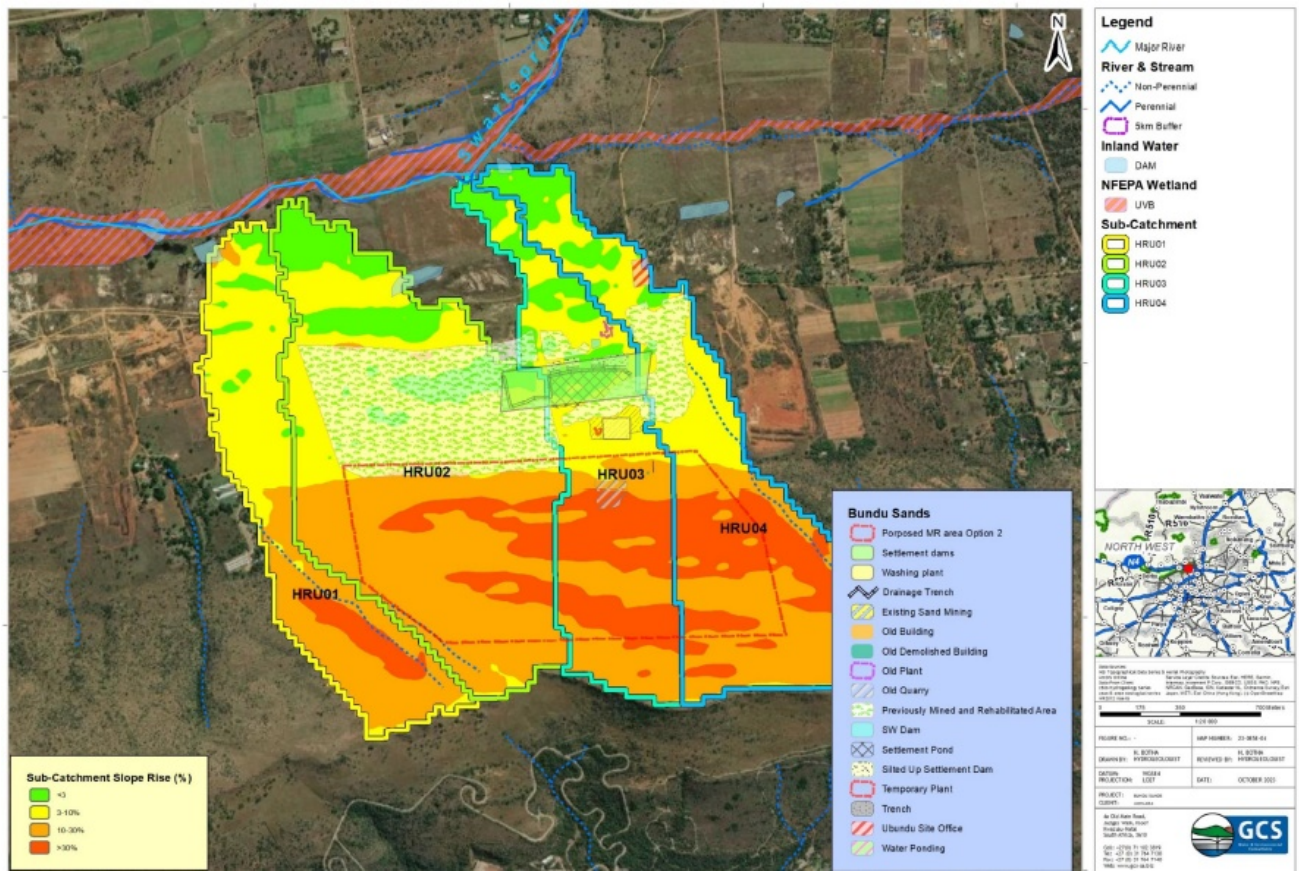


Figure 6. Topography and stormwater catchments associated with the Bundu Mining Rietvalei site.

4.7 Surface Water Quality

A surface water sample was collected from the stormwater dam near the existing Bundu Mining Rietvalei plant to characterise the surface water quality for the site. The sample was submitted to Aquatic Laboratories (SANS T0685) for analytical screening (GCS Hydrology, 2024).

Table 2: Surface Water Quality analysis of Stormwater Dam.

Constituent	Unit	SW-Dam	DWAF 1996 Domestic Use - TWQR
pH in water at 25°C	-	7.84	4 - 9
Conductivity in mS/m @ 25°C	mS/m	12	0 - 70
TDS	mg/l	90	450
Total Alkalinity as CaCO3	mg/l	71.3	ns
Calcium	mg/l	15.3	0 - 32
Magnesium	mg/l	7.74	0 - 30
Potassium	mg/l	2.53	0 - 50
Sodium	mg/l	4.21	0 - 100
Chloride	mg/l	1.01	0 - 100
Fluoride	mg/l	0.351	0 - 1
Nitrate	mg/l	0.303	0 - 6
Sulphate	mg/l	<0.1	0 - 200
Aluminium	mg/l	0.035	0 - 0.15
Copper	mg/l	<0.002	<1
Iron	mg/l	<0.002	<0.1
Manganese	mg/l	<0.002	<0.05
Sodium Adsorption Ratio (SAR)	Calculated	0.22	>8
ns = No Quality Range in Reference Guideline, Orange = Above DWAF (1996) Ideal Water Quality Ranges			

4.8 Mean Annual Runoff (MAR)

This quaternary catchment falls within hydrological zone A2C and runoff from natural (unmodified) catchments for the quaternary A21H is simulated in WR2012 (WRC, 2015) as being equivalent to 96.5 mm/yr (or 14% of the MAP) (GCS Hydrology, 2024).

4.9 Resources Class and River Health Receiving Water Quality Objectives and Reserve

The Resource Quality Objectives (RQOs) for the A21H catchment (Swartspruit to Hartbeespoort Dam), as according to GN 562 of 2019, is includes the PES as category D and no RQOs have been set for the Swartspruit to Hartbeespoort Dam resource unit. No reserve determination is available for this resource unit either.

4.10 Surface Water User Survey

According to the Water Allocation Registration Management System (WARMS, 2019), there are only twenty-eight (28) WARMS users within a 5km buffer of the project area, of which none of them fall within the HRUs. A review of SADAC GIP groundwater database boreholes further suggests several boreholes within a 5 km radius of the site with groundwater data available (GCS Hydrology, 2024).

4.11 Sensitive Areas Survey

Faunal Habitat

If possible, the development must not encroach on the crest of the mountain range. This part of the mountain will ensure a corridor for migration of all biota in the area, i.e. between populations and adjacent habitats (BioAsset, 2024).

Avifauna

Lanner Falcon has been recorded in the broader area during the 15-year SABAP2 survey period, but in relatively low abundances (n=4). A site sensitivity verification was conducted through the use of a desktop analysis and a field survey of the application area, the results of which determine the sensitivity to be MEDIUM within the proposed application area (Feathers, 2024).

Mammals

No suitable habitat for the two species listed in the STR is present in the project footprint. For the other species listed in Table 3.1, suitable habitat is present once the vegetation has recovered to ensure cover and food resources. Most of the vulnerable species are not endemic to the area and are not currently present on site (BioAsset, 2024).

Amphibians

The mountain slope has no suitable habitat for the amphibians and therefore it is assumed that it will not result in a direct loss of habitat (BioAsset, 2024).

Reptiles

Only one (1) reptile species is listed in the STR. As mentioned, there was no evidence of the presence of any specimens on the study site (BioAsset, 2024)

Vegetation

The regional vegetation type in the study area is the Gold Reef Mountain Bushveld. According to the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), this vegetation type is considered “Least Concern”. According to the Gauteng Conservation Plan, most of the remaining natural areas on site are mapped as "Ecological Support Area. Six plant species have been flagged as of concern for the area, of which only “Sensitive species 1248” has been indicated as having a moderate chance of occurring on site. No other SCCs were found on site (David Hoare, 2023).

Wetlands

The hydrological setting of the project was within the A21H quaternary catchment of the Limpopo Water Management Area. The nearest Sub Quaternary Reach associated with the project includes A21H-01069 of the Swartspruit, a tributary that flows into the Crocodile River within the Hartbeespoort Dam. The watercourses were derived to range from seriously modified (class E) to largely modified (class D) Present Ecological Status (PES). The watercourses were classified as having Very High and High Ecological Importance and Sensitivity (EIS) ratings. A scientific buffer was calculated for the watercourses, where a

35m buffer for wetlands and a 30m buffer for drainage lines was utilised to protect these sensitive environments. The outcomes of the risk assessment indicate minor impacts from the proposed activities. The minor impacts can be attributed to the use of the existing disturbed areas as well as the relative minor scale of the project. Implementation of sediment and stormwater controls is expected to minimize impacts on wetlands (Tate, 2024).

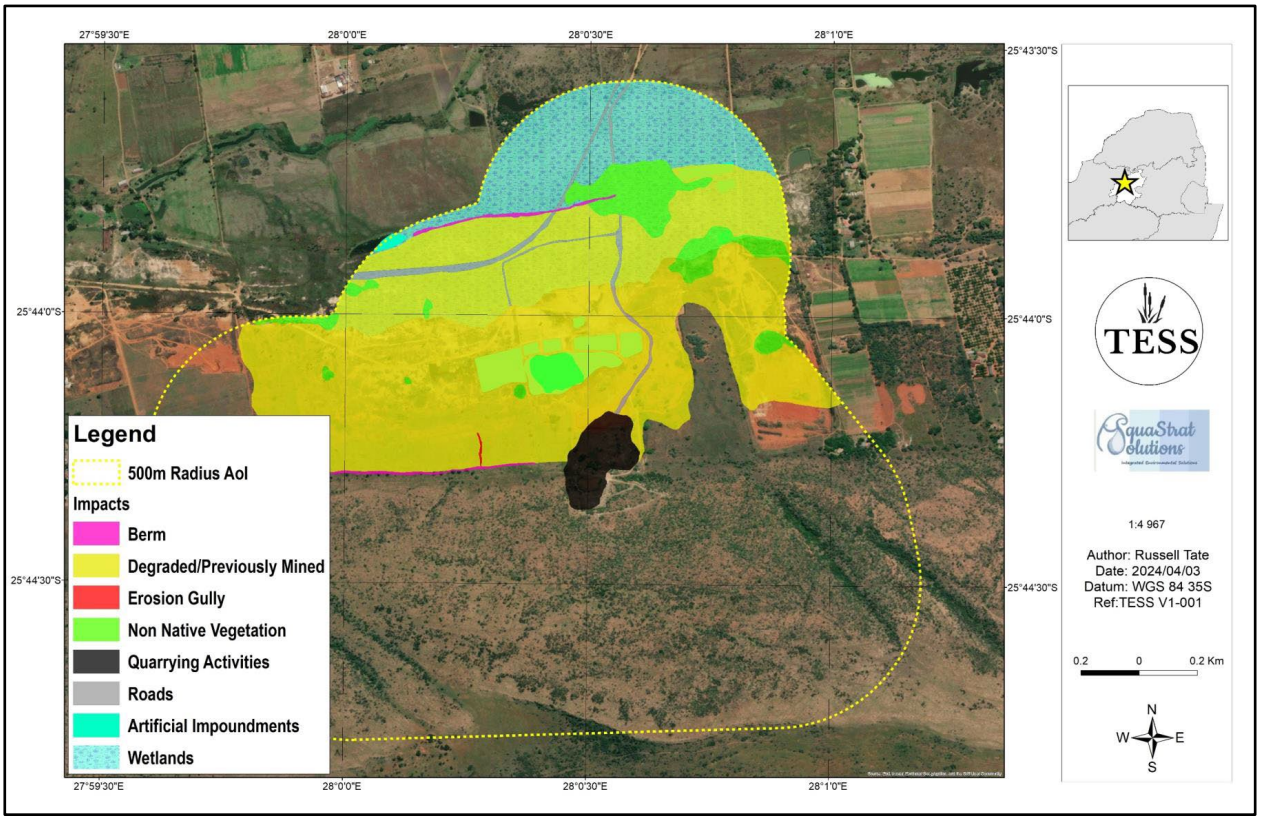


Figure 7. Wetland delineation within 500m radius around the Bundu Mining Rietvalei site (Tate, 2024).

4.12 Groundwater

A site conceptual geohydrological model (SCM) was developed for the site, and based thereon the following three (3) aquifer systems were identified in the project area:

A shallow unconfined aquifer system associated with the quaternary sand deposits.

A semi-confined / perched aquifer system associated with both fractured and intergranular weathered rock of the Pretoria Group; and

A deeper confined fractured aquifer network is associated with older basement rocks.

4.13 Aquifer Characterisation

The aquifers underlying the study area is considered low-yielding aquifer (median yields of 0.5 to 2 l/sec – Class d3 aquifer and b2 aquifers). Based on extrapolated groundwater level data, it is estimated that the groundwater table is in the order of 13 mbgl at the site, which indicates that mining will take place above the regional groundwater table (expected maximum mining depth is about 10 m). Available data suggest that the groundwater table mimics the topography and groundwater flows from high-lying areas (water divides) to low-lying areas. Previously conducted aquifer tests suggest the hydraulic conductivity to be in the range of 0.01 m/d, an approximation of recharge is estimated at ~4.50% of MAP (WESST, 2018) (GCS Geohydrology, 2024).

Groundwater quality

The groundwater quality for the region will be variable and will depend on the underlying geology and hydrogeology characteristics associated with groundwater recharge (i.e., older rock and aquifers with ion exchange will have higher EC, and recently recharged more permeable younger rocks will have lower EC). Literature and available hydrogeology maps for the area (refer to Figure 5-6) suggest that the electrical conductivity (EC) for the underlying aquifers generally ranges from 0 to 70 mS/m (milli Siemens/metre). The pH for the region ranges from 6 to 8. This means that groundwater abstracted from the aquifer can generally be used for domestic and recreational use (DWAF, 1996b). Where groundwater contributes to baseflow, similar water quality is expected (GCS, 2024).

4.14

(Note – Numbering as published in original Gazette)

4.15 Hydro-census

Available desktop hydrocensus and DWS WARMS data suggest that there are about twenty-eight (28) WARMS users within a 5 km buffer of the project area, of which none of them fall within the HRUs. A review of SADAC GIP groundwater database boreholes further suggests several boreholes within a 5 km radius of the site with groundwater data available. 98% of the WARMS users are boreholes amounting to a total allocation in the order of 0.7 Mm^3/yr, followed by 1 registered spring user and 1 surface water stream user. 1 groundwater user (WARMS ID: 26075176) is associated with the HRU of the site.

During the hydrocensus field investigation 35 boreholes were visited by the geohydrology specialist.

4.16 Potential Pollution Source Identification

As there is a borehole on site (Bundu BH1) that will be used for groundwater supply, there may be an impact on the groundwater reserve (if overproduction takes place). Any poor-quality seepage from facilities at the site could also migrate to the borehole and compromise water quality, as the borehole is situated downstream of the mining and settlement dam areas.

In terms of the preparation and operational phase, there are expected cumulative impacts on the soils associated with the site. The impact is predicted to improve at the closure of the mine, and if rehabilitation is rolled out. The sub-catchments in which the mining will take place are isolated from other mines and activities in the area, and hence cumulative impacts on a larger scale will be limited (GCS Geohydrology, 2024).

4.17 Groundwater Model

The flow model indicates groundwater flow velocities ranging from 0.01 (min) to 5 (max) m/day. Groundwater movement in the weathered zone is greater than that of the deeper aquifer zones, as well as several orders greater in the alluvium zones when compared to the host rock.

The predicted transport movement [so-called zone of impact - ZOIp] from the proposed plant and settlement dams' area suggests that if a source with a TDS in the order of 1000 mg/l percolates into the aquifer, the concentration gradient will be very low. Diffuse concentration gradients are < 50 mg/l and the 50Y plume is predicted to not intercept the major surface water receptor in the project area (the Swar spruit River). Mining will likely cease long before any significant salt buildup or transport to the river system. It is noted that the TDS of the source terms, the sand mined and stockpiled, is very low (GCS Waste Classification, 2023). The introduction of the 1000 mg/l TDS was incorporated to simulate a "worst case" scenario where site pollution takes place and to simulate how far such pollution would migrate within 50 years.

Both 10-year and 50-year concurrent pumping drawdown areas were simulated for Bundu BH [so-called zone of influence -ZOIf]. The predicted maximum aquifer drawdown for the workings and abstraction activities at LOM is in the order of 32m for the deeper workings (extending to 50m below surface level) and gradually decreases to 1m towards the east and west of the operations. It is observed that drawdown is limited to the meta-argillaceous rocs towards the north of the hilltop (where the workings are) and that the hilltop with the meta-arenaceous rocks (quartzite) acts as an aquiclude. This is due to the low recharge and low permeability associated with the quarzitic rock. The predicted aquifer drawdown does not reach any of the identified groundwater users in the GHRU or SOIF.

The predicted initial dewatering volume for the proposed mining works (up to an assumed maximum depth of 10m for the shallow operations and 50m for the deeper operations) is 496.53 m³/day. The dewatering rate is estimated to increase to 820.76 m³/day, approaching the maximum depth of blasting pit after 30 years of mining. Water level rebound is expected within 1-2 years after mining ceases (GCS Geohydrology, 2024).

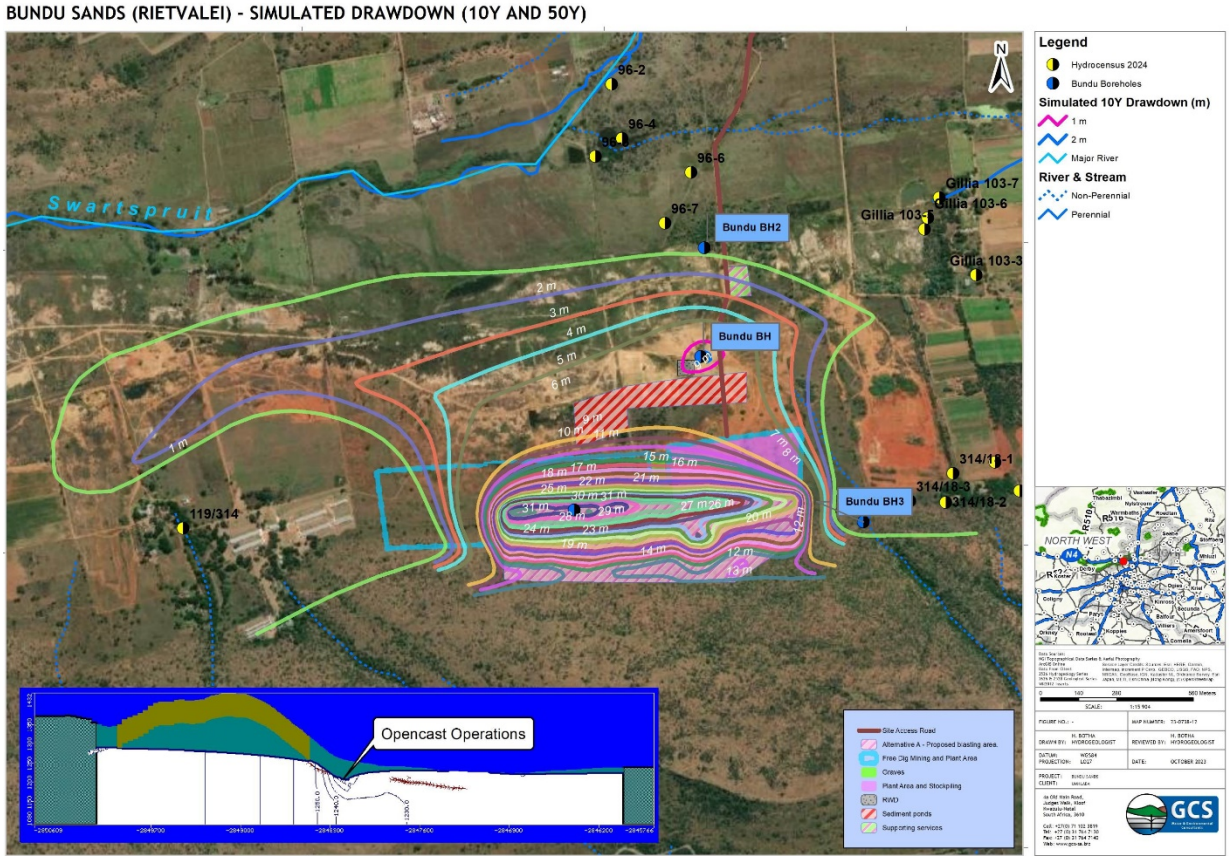


Figure 8. Predicted aquifer drawdown for pumping Bundu BH1 (GCS, 2024).

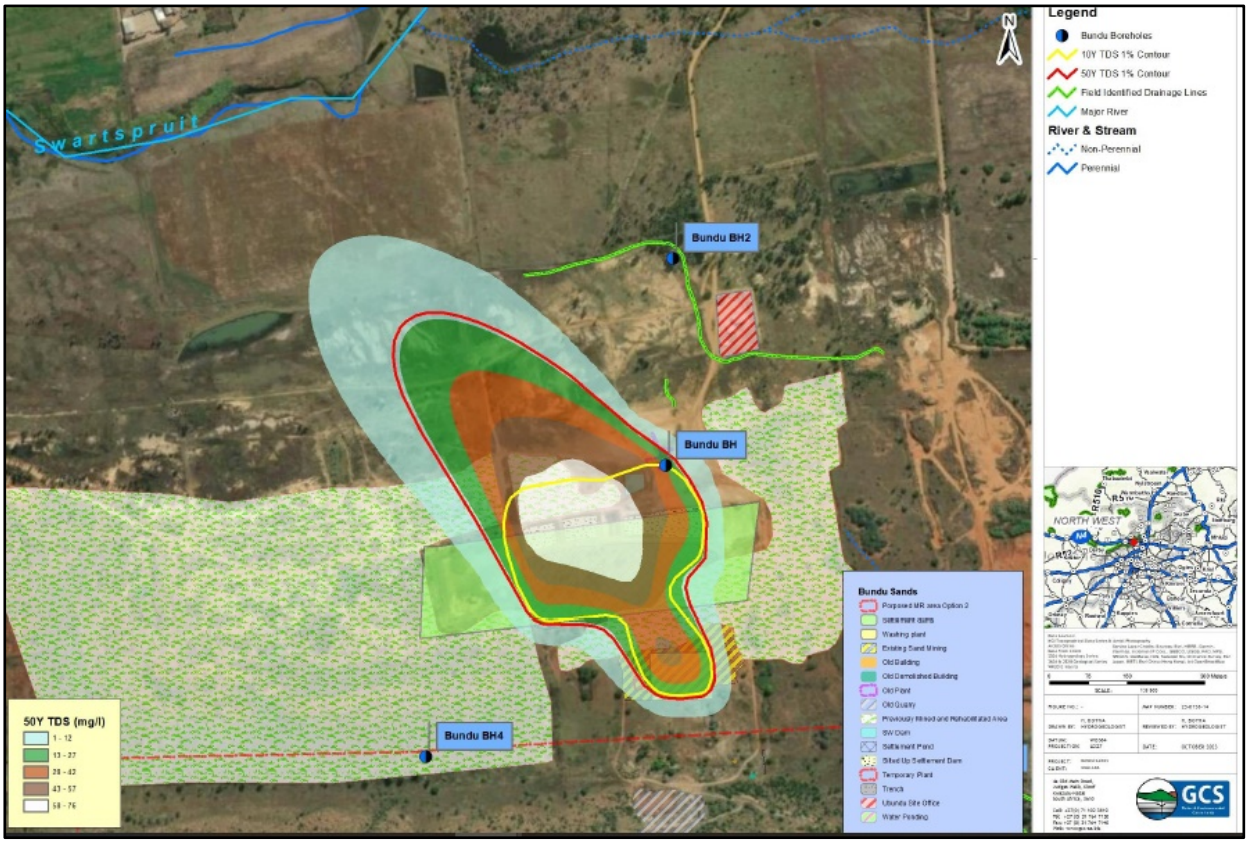


Figure 9. Simulated dominant pollution migration direction for plant and settlement dams.

4.18 Socio-economic environment

The site is located in Ward 55 of Region 3 of City of Tshwane. Region 3 is bordered by the Magaliesberg mountain range to the north and the N4 freeway to the east, including a small part of East Lynne and Silverton. The region includes the Pretoria CBD, the Brooklyn and Hatfield metropolitan nodes, as well as the western area of Tshwane (commonly known as Pretoria West). To the south-west, the region borders on the jurisdiction of Mogale City and to the west is Madibeng in the North West Province.

This region is host to the national government offices and forms the administrative heart of government, and as such has capital city status. It is centrally located within the metropolitan area and contains the Pretoria CBD, which is the largest job opportunity zone in the metro (CoT website).

A summary of the demographic of Ward 55 as taken from the Census 2011 is as follows:

- Population of 28 461 (36% Black African, 61% White, 1% Indian or Asian & 2% Coloured)
- Approximately 9 071 households
- From a spatial development planning point of view, the application area lies within a rural area which has been classified as being in a management zone and a critical biodiversity area both of which do not support mining activities.
- There are extensive plans for continued extensive development

Region 3 of Tshwane Municipality.

The information presented below concerning Region 3 of Tshwane Municipality has been extracted from the The Spatial Development Framework 2022-26

Region 3 had the lowest average annual GDP growth rate of 0.93% between 2011 and 2021. The greatest contributor to the City of Tshwane Metropolitan Municipality economy is the Region 3 with a share of 30.17% or R 185 billion, increasing from R 105 billion in 2011. it is expected that from 2021 to 2026 the Region 3 will achieve the highest average annual growth rate of 1.78%.

Region 3 had the highest literacy rate, with a total of 96.7%.

Region 3 Is planning 4 Integrated Residential Development Programme projects of 168.5 ha in total.

5 Chapter 5: Analysis and characterization of the water use activity

5.1 Site Delineation for Characterisation

The site is located west of the Hartbeespoort Dam in the Kameeldrift West area, south of Van Der Hoff Road, City of Tshwane Municipality.

The mining related and water use activities are illustrated by Figure 4

A more detailed explanation is provided in Section 2.1.

5.2 Water and Waste Management

Water Management:

- Consumptive water use: borehole abstraction at offices, workshop and plant.
- Sanitation Water Use: water for basins and toilets provided by groundwater from the borehole.
- Process Water Use: Washing sand and dust suppression. Water will be abstracted from the borehole and mixed with RWD water, and used at the Processing Plant. The wastewater containing sediment sludge will be disposed into the Settling Dam. Dust suppression will be done on the internal haul roads and access road. Processing Plant wastewater is discharged into the RWD for re-used in the process.
- Storm Water Management: Diversion berms separate clean and dirty storm water on site.

Waste Management:

Although limited liquid waste is generated on-site, all waste has the potential to impact water resources and is presented here. Waste is managed as follows.

- General waste: transported to the local municipal domestic waste site and includes: administration waste and domestic waste
- Returned / Re-use / Recycling: The following items are returned to the supplier or recycled - batteries, tyres, used oil and scrap metal
- **Hazardous waste**: stored separately at the workshop and disposed of at licensed facilities, transported by registered contractors and includes (but is not limited to);
    - Batteries – returned
    - Brake fluid
    - Cleaned hydrocarbon spills
    - Degreaser
    - Domestic waste
    - Engine coolant
    - Fluorescent tubes
    - Oil and oil contaminated waste
    - Oil filters
    - Paint tins
    - Rubber
    - Scrap metal – recycled
    - Tyres (used) – returned
    - Vehicle parts
- **Sewage**: Septic tanks will be emptied by a contractor as and when required.

    Sewage from the toilet and kitchen facilities in the offices and workshop, and near the plant, flow to septic tanks which will be inspected monthly and serviced when required, and disposed by a contractor.

5.3 Process water

Water supply for process water includes water abstracted from the borehole, “dirty” stormwater runoff and direct rainfall in the RWD, direct rainfall in the quarry pit, return water from the Settlement Dams.

Water balance: With regards to the hydrological cycle for the combined sub-catchment area, the following are estimated:

- Average rainfall accounts for a volume in the order of 2.63 Mm³/yr (50% of the total water budget);
- Average runoff accounts for a volume in the order of 0.37 Mm³/yr (7% of the total water budget);
- The average groundwater contribution to baseflow to rivers/wetlands/streams is in the order of 0.02 Mm³/yr (0.3% of the total water budget).
- Evaporation accounts for a volume in the order of 2.02 Mm³/yr (38.4% of the total water budget);
- Groundwater use is estimated in the order of 0.00003 Mm³/yr (0.01% of the total water budget); and
- WARMS surface water use is in the order of 0 Mm³/yr (0% of the total water budget).

Refer to the Hydrology Assessment (GCS, 2024) for more information.

Reuse and Recycling: Recycled wash water from the Settlement Dams will be pumped from the RWD and reused in the plant.

Water conservation and demand management: Water conservation is achieved by recycling of water as described above. Water demand is managed by metering of use from boreholes and comparing to production volumes to identify wasteful use. All staff members will attend training relating to water use.

The initial 5-year WC/WDM plan will be submitted by the mine if required as a WUL condition. Future updates (when site/operational changes take place) of the WC/WDM plan will be incorporated into and synchronised with updates to the mine’s IWWMP.

Point source discharges: There are no proposed discharge related water uses, and water disposed into the Settlement Dams will be reused from the RWD in a closed-loop system.

Table 3. Water in- and outflows from containment structures

Dirty water containment structures	Flows	
	In (from)	Out (to)
Settlement Dams	Processing Plant	RWD
Return Water Dam (RWD)	Settling facilities; quarry pit	Processing Plant, Dust suppression
Quarry pit	Rainfall	JoJo Tanks at Washing Plant

5.4 Stormwater

Existing stormwater on site:

- Earth berms along the sides of the existing plan, as well as small diameter (< 225 mm) drains that discharge water accumulated at the plant to the downstream environment.
- Earth trenches downstream of the sedimentation dams, as well as several berms along the dams to control runoff. It appears as though the sedimentation dams have been compartmentalised.

Proposed stormwater management measures:

Based on the proposed activities, and considering the runoff patterns associated with the site, temporary stormwater management is proposed as an overall stormwater management strategy. This would involve

using temporary berms, sandbags, gabion walls, revegetation of eroded areas, silt fences and temporary drainage trenches to convey stormwater around active mining areas and to the downstream environment. The proposed settlement dams are also situated downstream of the mining operations and will likely capture sediment runoff from the site, with little additional stormwater management required.

Long-term / Permanent stormwater management includes:

- Install a temporary earth-filled berm (0.8 m high, base 2 m) upstream of the MR area to divert any runoff along the potential mine workings towards the eastern and western drainage lines in the project area. Similarly, earth-filled berms can be considered upstream of the plant (similar to what is observed at the existing plant).
- Downstream of the plant and MR area earth trenches (about 0.8m to 1.2m and 0.6m across) can be considered to channel any runoff from the work areas to the downstream environment. For the MR area a stabilised outfall, gabion wall or a reno mattress would need to be considered to manage flow velocities and act as sediment barriers.
    - The proposed plant is upstream of the settlement dams and can discharge directly into the dams. The outfall would need to be stabilised with vegetation or rock cladding to prevent erosion.
    - Any overflow from the settlement dams would need to be captured in the proposed trench and conveyed to the downstream environment via a silt trap and outfall system. The outfall would need to be stabilised with vegetation or rock cladding to prevent erosion.
    - Optionally, and if sediment yield is very high, trenched silt traps would need to be considered.

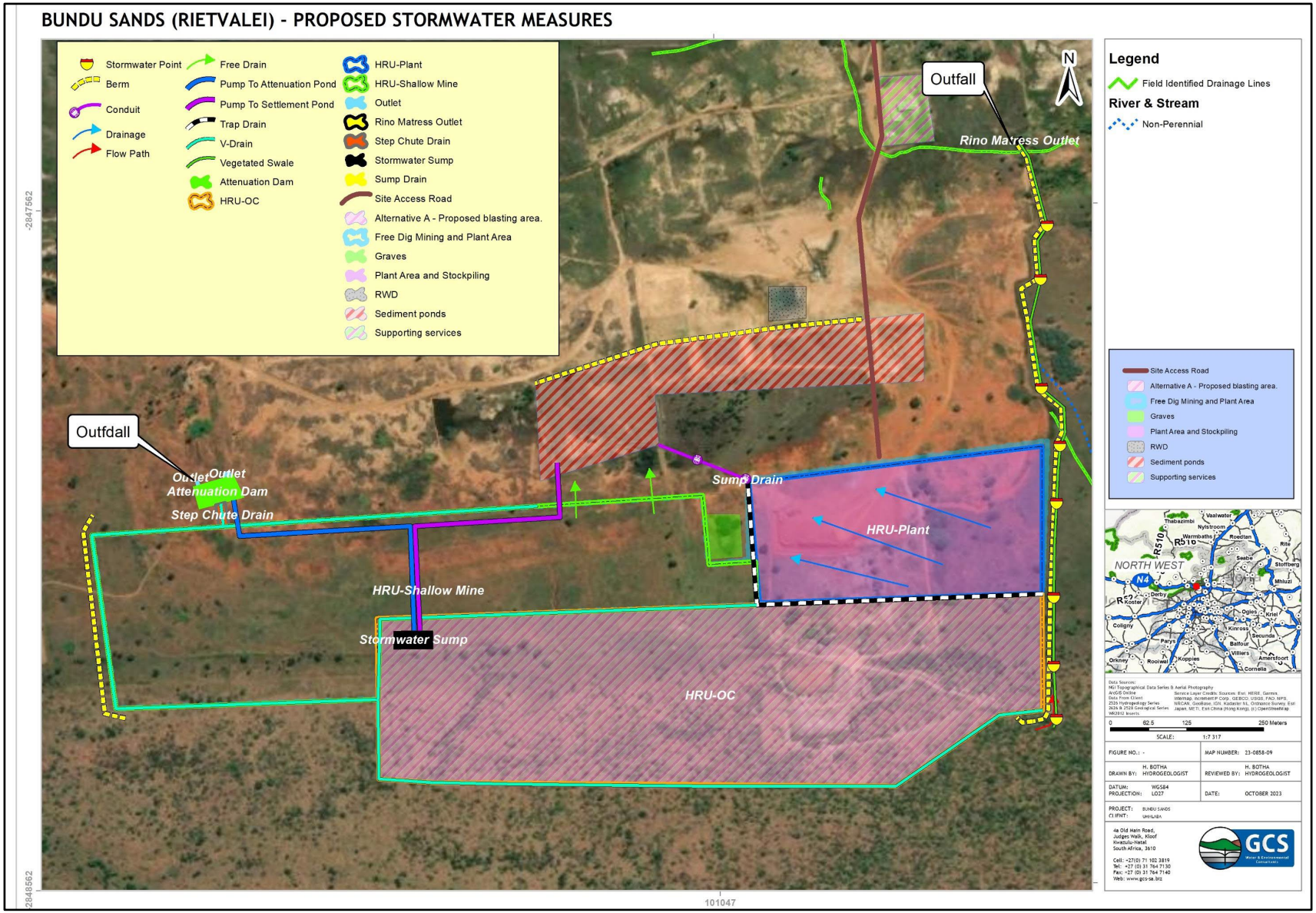


Figure 10. Bundu Rietvalei proposed stormwater measures (GCS, 2024).

5.5 Groundwater

The aquifers underlying the study area is considered low-yielding aquifer (median yields of 0.5 to 2 l/sec – Class d3 aquifer and b2 aquifers). Based on extrapolated groundwater level data, it is estimated that the groundwater table is in the order of 13 mbgl at the site, which indicates that mining will take place above the regional groundwater table (expected maximum mining depth is about 10 m). Available data suggest that the groundwater table mimics the topography and groundwater flows from high-lying areas (water divides) to low-lying areas.

In the SCM, the main source of groundwater recharge is rainfall. The rainfall infiltrates into the ground to become groundwater through the Vadose Zone. The water then moves both vertically and horizontally in the quaternary sand deposits and weathered zone of the Pretoria Group sediments, with greater interflow in a horizontal direction within the weathered zone matrix. Where shallow hard rock outcrops or intrusive dolerite outcrops occur, there may be the formation of springs and subsequently, where shallow quaternary sand depots accumulate on shallow hard rock there may be water logging. Shallow and deep groundwater movement will likely be towards the north, towards the valley where the Swartspruit River is situated (GCS, 2024).

5.6 Waste

No “waste management activities” as per the Regulations to the NEM:WA are applicable to Bundu Mining Rietvalei.

WUL S21(g) “waste” related water uses include:

- Water used for dust suppression will be taken from the quarry groundwater inflow and borehole.
- Collection and storage of water in the Settlement Dams.
- Collection and storage of water in the RWD.
- Stockpiling
- Septic tanks at office/workshop and plant area.

5.7 Operational Management

The overall responsibility to ensure the implementation of the IWWMP (and all authorisations) lies with the Mine Manager.

Table 4. Operational management of Bundu Mining Rietvalei

Employee name	Role	Contact No	Email address
Gabriel	Gabriel Gomes-Sebastiao	072 355 9111	gabriel@gomes.co.za
To be appointed	Admin officer	TBC	miningadmin@gomes.co.za

5.8 Organisational Structure

See Section 2.7 in this report.

5.9 Resources and competence

Specialists and consultants were appointed to assist with the relevant authorisations and specialist studies that have been undertaken as part of these authorisation applications. As well as on-going monitoring.

Table 5. Professional Registration / Qualifications of personnel involved with Reports completed for and / or monitoring for Bundu Mining Rietvalei.

Specialist report	Specialist	Qualifications and Professional Registration
Geohydrology Assessment 2024	Lisa Botha Henri Botha GCS	Pr.Sci.Nat. - Geohydrology
Hydrology Assessment 2024	Lisa Botha Henri Botha GCS	Pr.Sci.Nat. - Geohydrology
Waste Classification Assessment 2023	Lisa Botha Henri Botha GCS	Pr.Sci.Nat. - Geohydrology
MR Scoping Report 2024 MR EIA Report (in process)	Greg Coates & Mfundo Zondani Umhlaba Environmental Marli Burger AquaStrat Solutions	MSc. Zoology N.Dip. Environmental Management M.Sc. Aquatic Health Pr.Sci.Nat – Nature Conservation
Blasting Assessment 2024	JD Zeeman Blast Management and Consulting	ISO9001:2015 Accredited
IWWMP 2024	Marli Burger AquaStrat Solutions	M.Sc. Aquatic Health Pr.Sci.Nat – Nature Conservation

5.10 Education and Training

The Skills Development Plan for Bundu Mining Rietvalei will be specifically geared to ensure that all quarry employees have the necessary skills and competencies to meet required performance standards; and to address training and development needs that will enhance present job competence and prepare employees for career growth and portable skills. The core job activities on site are washing and screening; materials handling; product quality control and plant maintenance with special attention to health, safety and environmental issues.

Full details provided in the Social and Labour Plan (provided on request, to be circulated with the EIR).

5.11 Internal and External Communication

Internal communication regarding the WUL (for which there is a written record) is undertaken by means of

- Work order instruction issued by the Mine Manager (details in Table 13),
- E-mail communication between the management team (details in Table 13) and personnel on-site responsible for implementation of tasks.
- Incident record maintained.
- Telephone communications between on-site personnel is also used (but no record is kept).

When specialists or environmental consultants are required to undertake specialist investigations or tasks where independent personnel are required, this is co-ordinated by the Mine Manager (details in Table 13).

External communication regarding the WUL will involve the following (but is not limited to):

- E-mail communication between the management team (details in Table 13) and external personnel appointed to undertake specialist tasks. Current communication channels are listed in Table 15.
- Communications with the neighbouring occupiers of land is ad hoc (as and when necessary) and typically telephone communications (no record is kept).
- Communications with competent authorities is typically via letter and e-mail. Contact persons within the various departments is included in Table 16.

Table 6. External communication:

Specialist name	Role	Emergency Contact No	Email address
Umhlaba Environmental	Surface & Ground Water Quality Monitoring	067 241 3131	mfundo@umhlaba.co.za
Drizit	Hazardous spill	0800 202 202	drizitgt@iafrica.com

Table 7. Departmental / Competent Authority communication:

Competent Authority	Post / Contact person	Contact No	Email address
DMRE	Nkosinathi Mahlaba	(011) 358 9700	Nkosinathi.Mahlaba@dmre.gov.za
DWS	Helen Mathedimosa	082 819 1246	MathedimosaH@dws.gov.za
Tshwane Municipality	Kemmone Molefa	012 358 7334	KemmoneM@tshwane.gov.za
Ward Councillor	Cllr Kwena Yvonne Dzumba	0713417068	yvonne.kwena@gmail.com

5.12 Awareness raising

Awareness of the WUL and environmental matters in general is achieve through the following media:

- **Annual Induction –** All full-time staff, and any person performing long-term work, or any person who works unaccompanied on site, are required to attend an annual induction session conducted by the mine internally. Annual induction includes the following topics which relate to aspects applicable to the WUL:
    - Management of hazardous chemicals (including management of spillages),
    - Littering
    - Waste management
    - Saving water
    - Water pollution
    - Ground pollution
    - Alien and invasive species
    - Rehabilitation
- **Weekly Safety Meetings** – for Management and employees
    - Periodic water related aspects are also raised at weekly safety meetings.
- **Daily meetings / Tool box talks** – works manager shares applicable information with members of their team.

5.13 Monitoring and control

Monitoring is proposed at Bundu Mining Rietvalei based on the specialist recommendations, as described in the table below. Surface water monitoring locations are illustrated in Figure 11.

Table 8. Bundu Mining Rietvalei Proposed Monitoring type and frequency

Monitoring	Details	Frequency	Reporting & submit to DWS
Abstraction Volume	Volume from BHs	Monthly readings	Annually
	Volume from RWD and Quarry Pit		
Surface Water Quality	Two surface water sample points (upstream to downstream): pH, EC, Total Dissolved Solids, Turbidity, Oil and Grease, Biological oxygen demand (BOD), and chemical oxygen demand (COD). Ca, Mg, Na, K, Cl, F, NO3, SO4, Fe, Mn, Al	Annually	Annually
Ground Water	Water quality: Borehole	Quarterly	Annually
	Depth: Boreholes	Monthly	
Wastewater storage structures	Water quality: RWD	Annually	Annually
Bio-Monitoring	None	Not required	Not required
Waste disposal	Septic tanks inspection	Monthly	Records kept at office

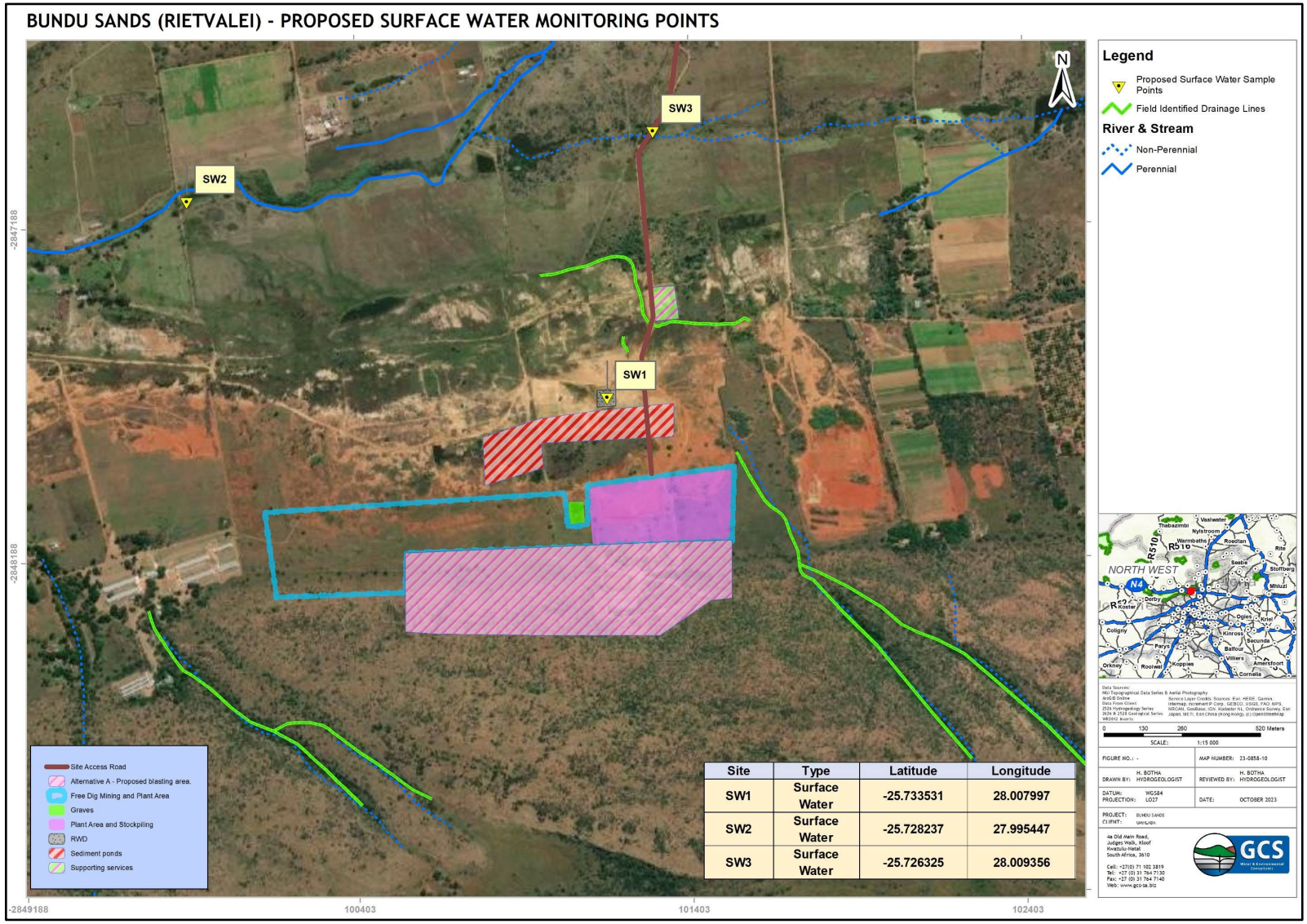


Figure 11. Bundu Rietvalei Surface water sampling localities (GCS, 2024).

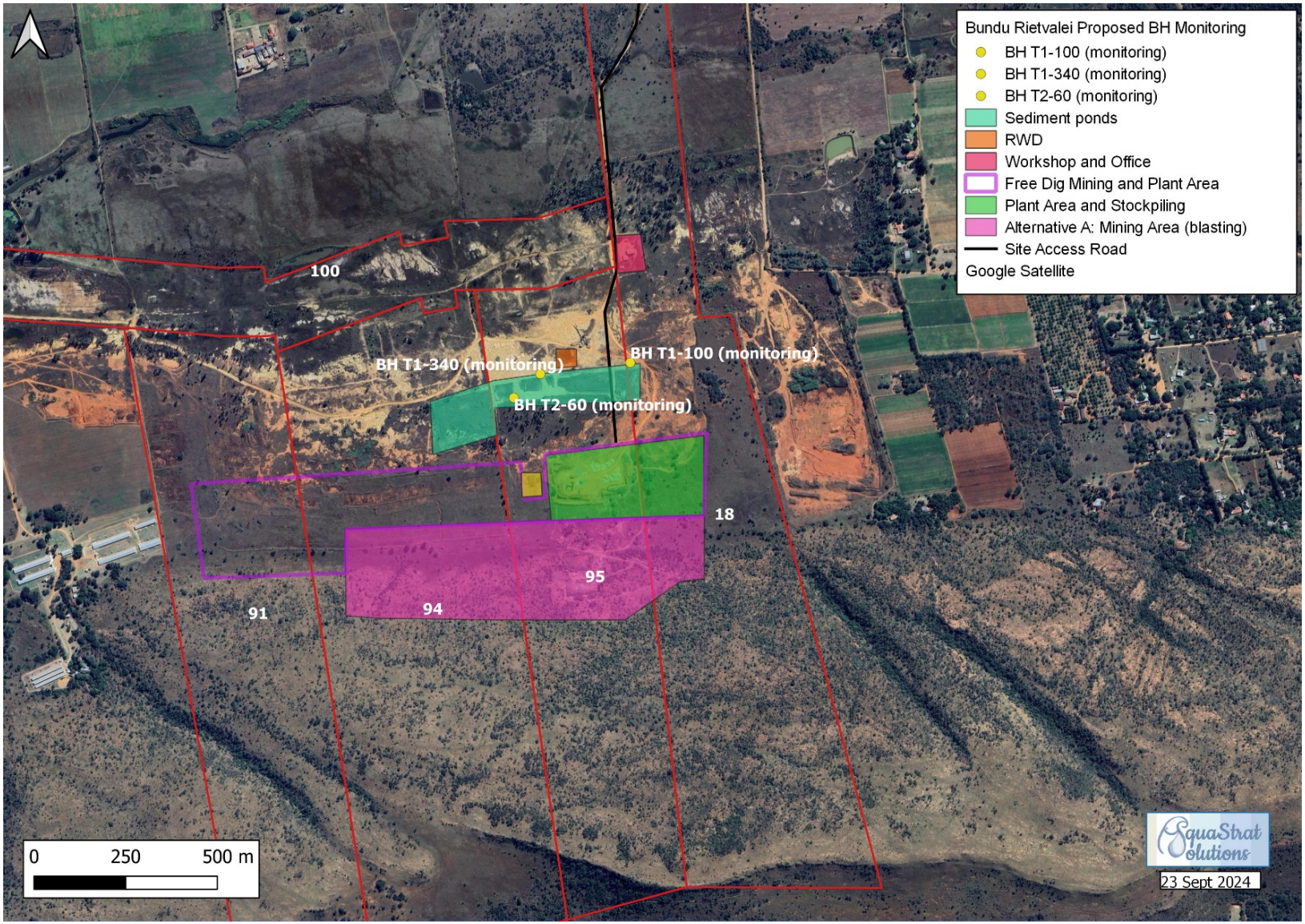


Figure 12. Bundu Rietvalei ground water sampling localities (GCS, 2024).

5.14 Surface Water Monitoring

It is proposed (GCS Hydrology, 2024) that water quality monitoring be done annually at an upstream and downstream point in the Swartspruit, as well as on site at the RWD.

Laboratory analysis of the following variables is proposed:

pH, EC, Total Dissolved Solids, Turbidity, Oil and Grease, Biological oxygen demand (BOD), and chemical oxygen demand (COD)

Ca, Mg, Na, K, Cl, F, NO3, SO4, Fe, Mn, Al.

5.15 Ground Water Monitoring

It is recommended that 3 additional boreholes be drilled and integrated into the existing groundwater monitoring network, additional to BH 1 that is proposed for use on site.

Monthly abstraction volumes should be taken and kept on record.

Monitoring for all new groundwater points should be **bi-annually** and constituents on minimum for laboratory screening should be:

pH in water at 25ºC

Conductivity in mS/m @ 25ºC

TDS

Bicarbonate Alkalinity as CaCO3

Bicarbonate as CaCO3

Total Alkalinity as CaCO3

Calcium

Magnesium

Potassium

Sodium

Chloride

Fluoride

Nitrate

Sulphate

Aluminium

Iron

Manganese

Groundwater levels

Monthly water level monitoring of the abstraction borehole should take place.

5.16 Bio monitoring

No aquatic habitat on site.

5.17 Waste monitoring

Waste collection records for removal of general and hazardous waste, including septic tanks, will be kept at the office.

5.18 Risk assessment/Best Practice Assessment

Risks for Bundu Mining Rietvalei include the following aspects that are addressed in the strategies and objectives in Section 6 of this report:

- Stormwater separation
- Stormwater containment
- Surface water pollution prevention/minimization
- Groundwater pollution prevention/minimization

5.19 Issues and Responses from Public Consultation Process

The Public Participation process is being undertaken as part of the WUL and MR applications. The Public Participation Reports for the applications will be completed at the end of the public participation period, and will be submitted with the Final Reports for each respective application.

5.20 Matters Requiring Attention/Problem Statement

Stormwater management needs to be implemented as recommended in the Hydrology Report (2024).

Groundwater quality monitoring must be implemented as recommended in the Geohydrology Report (2024).

5.21 Assessment of Level and Confidence of Information

The information in this report is the findings and recommendations of specialists involved.

Refer to **Table 14** in this report for Professional registration of specialists who compiled the reports for the WULA or that have compiled reports for other purposes and have been referred to in the IWWMP.

6 Chapter 6: Water and Waste Management

6.1 Water and Waste Management Philosophy (Process water, Stormwater, Groundwater and Waste)

Bundu Mining Rietvalei recognizes that water is a scarce resource and should be protected as set out by the relevant legislations. Therefore, all management and maintenance actions aim to:

- Philosophy 1: Use water sustainably
- Philosophy 2: Prevent pollution to and degradation of the watercourses and water resources

6.2 Strategies (Process Water, Stormwater, Groundwater and Waste)

Strategy A: Soil, surface and groundwater pollution prevention

Strategy B: Minimize impacts on stormwater

Strategy C: Adaptive management

Strategy D: Re-use and conservation of water

6.3 Performance Objectives /Goals

Goals are related to each strategy under the two main philosophies and are included in the table below in Section 6.8 of this report.

6.4 Measures to Achieve and Sustain Performance Objectives

Bundu Mining Rietvalei sustainability objectives are set through their Environmental Policy (included in Appendix A) and managed through the weekly and monthly Inspection sheets and monitoring records.

6.5 Option Analyses and Motivation for Implementation of Preferred Options (optional)

Alternatives were not considered for the activities on site, as the existing Stormwater Dams, RWD and offices will be used for the proposed activities.

6.6 IWWMP Action Plan

The table in 6.8 below outlines actions to be undertaken, with these being ranked in terms of implementation time frames (defined below) under the heading of “Action Plan”.

Priority actions (P) – actions that must be consistently implemented without failure / actions to be implemented within six months and must take precedence over operational activities when required to prevent pollution or degradation of the environment and natural resources.

Short-term actions (S) – include the actions to be implemented in response to an incident on site or to a rainfall event, where remediation can be completed in a short time period, such as spills on site, monitoring of waste management actions and damage to stormwater structures.

Medium-term actions (M) – include actions undertaken periodically, but repeatedly over the life-of-mine following routine inspection of structures and activities.

Long term actions (L) – include planned actions to be implemented consistently for the life-of-mine, applicable to a specific season or financial year, i.e. alien vegetation eradication.

6.7 Control and Monitoring

Tasks undertaken to ensure that the Actions described are implemented.

6.8 Monitoring of Change in Baseline (Environment) Information (Surface water, Groundwater and Bio-monitoring)

Means of determining if there is a change in conditions over time. At Bundu Mining Rietvalei this is achieved through routine evaluation of information collected as described in the table below, under Control and Monitoring.

Table 9. Performance objectives of Bundu Mining Rietvalei

6.1 Philosophy / 6.2 Strategy	6.3 Performance objectives / goals	6.4 Measures to achieve and sustain performance objectives	6.6 Action Plan #	6.7 Control and Monitoring	6.8 Monitoring of Change in Baseline
Philosophy 2: Pollution & Degradation Prevention of wetlands and water resources **Strategy C:** Adaptive management	Control velocity of stormflow, prevent erosion and promote settling of sediments	Implement SWMP Maintain SWM structures: indigenous vegetation cover and integrity	P	Inspect and repair after every medium – large rainfall event. If damage is noted, repair work to be implemented within a week.	Visual observations. Environmental Planning Meeting (EPM) minutes
		Amend / update SWM structures as mining progresses	M	Visual inspection of SWM structures during internal inspection walk-abouts.	Visual observations. EPM minutes SWMP (record major changes)
		Evaluate SWMP and SWM structures	P	Annual WUL audit to note erosion, sedimentation and integrity of SWM structures.	Comparison of WUL Audit scores year on year – specifically the sections relating to SWM control
		Remove sediments from RWD for storage capacity and freeboard	P	Bi-annual monitoring of sediment load buildup.	EPM minutes
Philosophy 1: Sustainability **Strategy D:** Re-use and conservation of water	Maintain water use volumes (per ton produced) in line with historic use	Minimise waste from leaks by means of weekly walkabout along pipes and reporting of leaks on the day they are identified, and repairing of leaks within as short a time period as possible (depending on availability of parts); promote reuse on site	S/M	Monthly water consumption figures (flow readings)	Resource Consumption reporting / Water Balance
				Report leaks in Incidents register.	Biannual evaluation of incidents relating to frequency of water leaks.

6.1 Philosophy / 6.2 Strategy	6.3 Performance objectives / goals	6.4 Measures to achieve and sustain performance objectives	6.6 Action Plan #	6.7 Control and Monitoring	6.8 Monitoring of Change in Baseline
	Implement reuse of water	Water from settling dams to be reused in process Groundwater abstraction from borehole must remain within proposed volume	S/M	Water balance to reflect source of water used Monthly water consumption figures (flow readings) Keep weekly flow meter records and tally monthly	Resource Consumption reporting weekly and monthly Inspection sheets and monitoring records) Water Balance (comparison year on year) Submit flow meter records to DWS bi-annually or as WUL requires
Philosophy 2: Pollution & Degradation Prevention of wetlands and water resources **Strategy A:** Soil, surface and groundwater pollution prevention	No hydrocarbon spills to reach a water resource or pollute soil or groundwater resources	Install a berm at Workshop area that will drain towards an oil separator	S/M	Monthly bund and berm condition monitoring.	Biannual evaluation of incidents – determine frequency of problems (if any).
		Spill kits to be kept in all areas where there is the potential for a hydrocarbon spill (excluding haul vehicles)	S/M	Monthly kit maintenance (inspection of content and ensuring replacement of used stock).	Biannual evaluation of frequency of replacement of stock – used to determine frequency of spill clean ups required – compared with incident records.
				Reporting incidents in register.	Biannual evaluation of incidents – determine frequency of spills. (Also compare frequency changes with replacement of stock.)
		Manage levels of sludge in oil trap to prevent overflow to the receiving environment	S/M S/M	Monthly visual inspection of levels of sludge.	Frequency of removal of sludge from oil trap. (Increased frequency may be due to sediments flowing into separator.)

6.1 Philosophy / 6.2 Strategy	6.3 Performance objectives / goals	6.4 Measures to achieve and sustain performance objectives	6.6 Action Plan #		6.7 Control and Monitoring	6.8 Monitoring of Change in Baseline
		Hazardous waste, specifically hydrocarbons, to be stored in designated areas	S/M		Visual inspection of hazardous waste storage areas – report incident of incorrect storage / storage capacity exceeded in register. MSDS limits to be included in training info.	Visual observations Biannual evaluation of incidents – determine frequency of incorrect storage / storage capacity exceeded.
			S/M		Removal of hydrocarbon waste before the capacity of the waste area is exceeded.	Monthly evaluation of waste volumes – reporting for the monthly monitoring records.
	No deterioration of ground water quality	See Management Actions above – relating to the management of potential hydrocarbon pollutants.	S	L	Bi-annual quality monitoring ground water quality monitoring and annual monitoring of surface water quality.	Monitoring reports: Comparison of recent and historic data (as applicable to monitoring frequency) – comparing mine water and ground water quality.
Philosophy 2: Pollution & Degradation Prevention of wetlands and water resources **Strategy B:** Minimize impacts on wetlands	Reduced impact on stormwater	Maintenance of SWM structures	S/M		Inspect and repair berms and containment structures as soon as practically possible GN 655 limits will apply if discharge takes place.	Visual observations. EPM minutes Water quality monitoring

Notes: # P = Priority Actions S/M = Short- and Medium-term Actions L = Long-term Actions

6.9 Audit and Report on Performance Measures

The applicant must appoint an independent, duly qualified and competent professional to conduct Environmental Audits and Water monitoring assessments as prescribed in the conditions of the EMPR and WUL.

6.10 Audit and Report on Relevance of IWWMP Action Plan

To be captured in annual WUL audit report.

7 Chapter 7: Conclusion

7.1 Regulatory Status of Activity

Authorisations for existing activities:

- Mining permit for sand mining: GP10396MP

The WULA is currently being applied for Section 21 water uses, and MR and EA is currently being applied for in terms of the NEMA and MPRDA.

7.2 Statement of Water Uses Requiring Authorisation, Dispensing with Licencing Requirement and Possible Exemption from Regulation

All water uses of Table 1 are applied for as part of the WULA.

8 Chapter 8: References

BioAssets, 2024. Faunal Assessment for the proposed Bundu Mining Quarry Site.

Blast Management and Consulting, 2023. Blast Impact Assessment Bundu Mining (Pty) Ltd Rietvalei Mining Right Application Project.

David Hoare Consulting, 2023. Terrestrial Biodiversity and Plant Species Assessment for the Proposed expansion at Bundu Mining on the Farm Uitzicht alias Rietvalei 314-JR, east of Hartbeespoort, Gauteng Province.

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GCS Hydrology, 2024. Hydrology Assessment for the Bundu Sands (Rietvalei) Mining Permit.

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9 Chapter 9: Appendices

9.1 A: SHEQ Policy

9.2 B: Water Balance