Integrated Environmental Authorisation Process for the Proposed Extension of the Existing Bafokeng Rasimone Platinum Mine (BRPM) Tailings Storage Facility and Associated Infrastructure, North West Province

Environmental Impact Assessment (EIA) and Amendment of the existing Environmental Management Programme (EMPR)

Report Prepared for

Royal Bafokeng Platinum (Pty) Ltd

ROYAL BAFOKENG PLATINUM
MORE THAN MINING

Report Number: 470328/Draft EIAr/EMPR Amendment Report

DMR Reference Number: NW30/5/1/2/3/2/1/(312) EM

Report Prepared by

srk consulting

September 2015

Integrated Environmental Authorisation Process for the Proposed Extension of the Existing Bafokeng Rasimone Platinum Mine (BRPM) Tailings Storage Facility and Associated Infrastructure, North West Province

Environmental Impact Assessment (EIA) and Amendment of the Existing Environmental Management Programme (EMPR)

Royal Bafokeng Platinum (Pty) Ltd

SRK Consulting (South Africa) (Pty) Ltd.
Block A, Menlyn Woods Office Park
291 Sprite Avenue
Faerie Glen
Pretoria 0081
South Africa

e-mail: pretoria@srk.co.za
website: www.srk.co.za
Tel: +27 (0) 12 361 9821
Fax:+27 (0) 12 361 9912

SRK Project Number: 470328/Draft EIAr/EMPR Amendment Report

September 2015

Compiled by:

Toinette van der Merwe
Environmental Scientist

Email: tvandermerwe@srk.co.za

Peer Reviewed by:

Dr Andrew Wood
Partner

Authors:

Ms Toinette Van der Merwe

Executive Summary

The Styldrift Mining Complex (SMC) is a Joint Venture (JV) between Rustenburg Platinum Mines Limited (RPM) and Royal Bafokeng Resources (RBR). Royal Bafokeng Platinum Management Services (Pty) Ltd (RBPlat) is the applicant for the BRPM JV.

Royal Bafokeng Platinum (RBPlat) is responsible for two mining sites which are operated in joint venture. The mining sites are referred to as Bafokeng Rasimone Platinum Mine (BRPM) and Styldrift Mining Complex (SMC). Bafokeng Rasimone Platinum Mine (BRPM) is approximately 30 kilometres (km) north-west of Rustenburg in the North West Province. The RBPlat Styldrift Merensky Phase 1 Mine (referred to as the SMC) is situated on the Farm Styldrift 90 JQ, located approximately 7 km from the existing BRPM Concentrator Plant and 6 km south of Sun City along the R 565. The Farm Styldrift 90 JQ has a common boundary with the Farm Boschkoppie 104 JQ to the south and is adjacent to the Farm Frischgewaagd 96 JQ to the west. The existing BRPM Tailings Storage Facility (TSF), a rectangular in shape is situated on the Farm Boschkoppie 104 JQ with the BRPM mining operations at North and South Shaft. The closest neighbouring villages situated on the mine surface lease area include Chaneng, Rasimone, Mafenya and Robega. Rasimone is the closest village located approximately 2 km north-east of the existing BRPM TSF.

BRPM has an existing EMPR, issued on February 1998, for its BRPM mining operations (Reference Number: RDNW(KL)6/2/2/391) in terms of the Minerals Act (Act No. 50 of 1991). The approved EMPR (1998) included the construction of a TSF (known as the existing BRPM TSF).

The SMC has an existing Environmental Management Programme (EMPR) issued in March 2008, for its Styldrift mining operations (Reference Number: NW30/5/1/2/3/2/1/(312) EM) in terms of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) and an existing Water Use Licence (WUL) No: 26031507 in terms of the National Water Act (Act No. 36 of 1998) (NWA). The approved EMPR (2008) included the extension of the existing BRPM TSF located on the Farm Boschkoppie 104 JQ onto the Farm Uitvalgrond 105 JQ (footprint size of approximately 330 ha) to accommodate additional tailings produced by the modified BRPM Concentrator Plant. However, RBPlat have investigated alternative areas for the extension of the proposed BRPM TSF due to a delay in obtaining the required surface lease agreements associated with the Farm Uitvalgrond 105 JQ.

The Farm Uitvalgrond 103 JQ has always been earmarked to accommodate the tonnage generated from the SMC. It is proposed that the existing Styldrift EMPR be amended for the existing BRPM TSF to be extended on Portion 1 of the Farm Boschkoppie 104 JQ and to construct the additional infrastructure on Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ (hereinafter referred to as the "BRPM TSF Extension Project[1]"), for which the following environmental authorisation/s, amendments and licences are required:

- A Scoping and Environmental Impact Assessment (EIA) in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) EIA Regulations contained in GN R982 of 04 December 2014 (activity item 9, 10, 12, 13, 19, 22, 24, 27, 45 and 46), GN R984 (activity item 6, 15, 16, 17 and 21) and GN R985 (activity item 4 and 12);
- A Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA) for Waste Management Listed Activities contained in GN R921 of 29 November 20132013 – Category A (activity item 1 and 13) and Category B (activity item 8 and 10);

[1] The BRPM TSF Extension Project was previously referred to as the Styldrift Tailings Storage Facility.

- Amendment of Styldrift existing EMPR in terms of the MPRDA; and
- Amendment of the existing Water Use License Application (WULA) and accompanying Integrated Water and Waste Management Plan (IWWMP) under the NWA; (Water uses 21 (c and i), 21 (g)).

The Competent Authorities for the respective authorisation processes are:

- Department of Mineral Resources (DMR) for the listed activities triggered by the NEMA EIA Regulations, the waste management activities triggered by the WML Regulations and amendment of the existing EMPR in terms of the MPRDA; and
- Department of Water and Sanitation (DWS[2]) for the water uses triggered in terms of the NWA.

RBPlat appointed SRK Consulting (Pty) Ltd (SRK) as the independent Environmental Assessment Practitioner (EAP) to undertake an integrated environmental authorisation (EA) process and the associated stakeholder engagement to meet the requirements of the NEMA, the MPRDA and the NWA.

Project Description

The key components of the infrastructure associated with the proposed amendment to the existing approved EMPR that will have to be constructed include:

- **Tailings Storage Facility (TSF)** - Extension of the existing BRPM TSF covering approximately 150 ha on Portion 1 of the Farm Boschkoppie 104 JQ;
- **Return Water Dam (RWD)** - Construction of a RWD covering approximately 12.7 ha on Portion 1 of the Farm Boschkoppie 104 JQ;

The proposed secondary infrastructure and activities associated with the above key infrastructure includes:

- Construction of overland pipelines (covering approximately 3 km in length) for:
  - The transportation of tailings from the BRPM Concentrator Plant to the extended TSF on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The transportation of return water between the extended TSF and the RWD on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The transportation of return water between the RWD and the BRPM Concentrator Plant on Portion 1 of the Farm Boschkoppie 104 JQ, Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The overland pipelines will be placed onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF. The pipelines will cross two wetlands and a riparian habitat areas associated with the Matlopyane tributary and length thereof will be approximately 3 km on Portion 1 of the Farm Boschkoppie 104 JQ;
- Establishment of a topsoil stockpile and service roads and water management infrastructure and stormwater systems; and

[2] The Department of Water and Sanitation, previously the Department of Water Affairs (DWA). Historically the Department of Water Affairs and Forestry (DWAF).

- Relocation of a power line (a separate Basic Assessment application has been submitted to National Department of Environmental Affairs (DEA) (DEA reference number 14/12/16/3/3/2/648, Environmental Authorisation was granted on 31 March 2015).

Specific details relating to the project infrastructure is detailed in Section 5.

Project need and desirability

In order for the SMC to achieve its objective of initially supplementing, and eventually replacing, the production at BRPM, additional TSF capacity is required to accommodate the tailings produced at the BRPM Concentrator Plant. The extension of the BRPM TSF forms a crucial part of the SMC mining operations, hence SMC mining operations will not be able to continue without authorisation for the TSF Expansion Project.

The BRPM TSF Extension Project forms part of the bigger SMC Project which will contribute to the National and North West Provincial economy in terms of an increase in Gross Domestic Product (GDP).

A number of benefits associated with the proposed BRPM TSF Extension Project have been identified by RBPlat which include:

- Exploiting the natural mineral resources as appropriate under the MPRDA;
- Creating employment opportunities during construction phase and decommissioning phase;
- Retaining, and possible creation, of employment opportunities on local and regional scale during operational phase; and
- Continued long term supply of platinum ore for further processing at the existing Concentrator and Smelter Plants.

Further details relating to the project motivation are detailed in Section 6.

Alternatives Considered

Due to the availability of the Farm Uitvalgrond 105 JQ site, alternative TSF sites in line with the mine expansion strategy have been investigated. As part of the original Styldrift Environmental Impact Assessment (EIA)/EMPR (2008), alternative locations for the TSF extension were assessed (see Section 4). Of these sites only two (2) sites were considered during the Impact Assessment Phase.

The following alternatives that were identified during the Scoping Phase of the application were considered in the Impact Assessment Phase of this project:

- Tailings Storage Facility Location/Site Alternatives;
  - Extension of the existing BRPM TSF (Alternative 1); and
  - Construction of the TSF on Farm Uitvalgrond 103 JQ (Alternative 2).
- Tailings Disposal Alternatives;
  - Paste technology for tailings disposal;
  - Thickened technology for tailings disposal; and
  - Conventional technology for tailings disposal (preferred alternative).
- “No-go” Alternative – the option for the proposed development not to take place at all.

Further details relating to alternatives considered are detailed in Section 4.

Summary of the Baseline Environment

The baseline environment associated with the BRPM TSF Extension Project is summarised below with detailed baseline descriptions for each of the environmental aspects discussed in Section 7.

Socio-Economic – The proposed BRPM TSF Extension Project will take place in Ward 1 of the Rustenburg Local Municipality (RLM). In Ward 1 of the RLM, 42% of the population earn no income and 36% of the population earn a low income. The Royal Bafokeng Tribal Authority with four communities (Chaneng, Rasimone, Mafenya and Robega) is located in the vicinity the Project Area[3]. The four communities were included to form part of the public participation process were Chaneng, Rasimone, Mafenya and Robega. It is clear that unemployment remains a critical issue in the project and broader Rustenburg area. An increase in employment is anticipated with the construction and operation of the BRPM TSF Extension Project and associated infrastructure. The BRPM TSF Extension Project is required in order to accommodate the future production from the SMC Project. However, should the BRPM TSF Extension Project not take place it would entail that the bigger SMC Project would not be realised and that this will result in employment losses.

Cultural Heritage – No historical structures were recorded during the baseline assessment in the project area and there is no presence of historical farmhouse/s, and no archaeological structures, features, assemblages or artefacts were recorded.

Vibration & Blasting – No blasting are anticipated to take place and due to the nature of the proposed project infrastructure. The sensitivity map compiled to indicate possible influences of vibration as a result of blasting. No activities are currently taking place within the vibration sensitive areas that would be impacted upon negatively. It is anticipated that no vibration impact is associated with the construction and operation of the BRPM TSF Extension Project.

Visual – The visual character of region can be described as being a degraded/modified, interspersed with mining activities and tourist attractions, thus a modified landscape. Travellers along the R565 are exposed to numerous mining complexes similar to that of the BRPM TSF Extension Project. The sense of place, in the areas surrounding the proposed extension comprises of mining activities.

Noise – The proposed construction activities will take place in an area where the prevailing ambient noise levels are already affected by mine activities and traffic from the feeder roads. The prevailing ambient noise level in the vicinity of the topsoil stockpile, RWD, pipelines and TSF are 47.4 dBA during the day and 44.6 dBA during the night. The noise levels as monitored at existing BRPM TSF are currently in compliance with the Noise Control Regulations.

Air Quality - Contributors to fugitive dust in the Project Area includes existing mining activities, smelter operations, road network, windblown dust, vehicle tailpipe emissions and domestic fuel combustion. The dust fallout concentrations as monitored at existing BRPM TSF are currently in compliance with the National Dust Control Regulations.

Groundwater - Aquifers in the area are classified as minor aquifers and have a 'low' to 'medium' vulnerability to contamination due to the low recharge values, and low hydraulic conductivity. The depth to groundwater ranges from 2 to 30 meters below ground level (mbgl) regionally and between 1.6 to 14 mbgl in the vicinity of the existing BRPM TSF with the average yield of <0.3 L/s. The

[3] The Project Area (which encompasses the SMC and BRPM operations): Comprises of the area where the proposed construction activities will take place and the surrounding environment, namely Portion 1 of the Farm Boschkoppie 104 JQ and Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ.

regional aquifers are classified as having a "low" vulnerability to contamination due to the low recharge values and deep water levels.

Base flow to tributaries was considered to be minimal since tributaries are non-perennial and are generally dry during the dry season.

The primary water supply is from the Magalies Water with *ad hoc* use (unverified) by privately owned boreholes in Rasimone to the north of the area. The available information indicates that the closest boreholes that are potentially in use are 2 boreholes, located within a distance of 2 km from the existing BRPM TSF. The mine monitors the water quality and water levels between the potential community wells and the existing BRPM TSF as part of the existing groundwater monitoring system. Baseline water chemistry is generally good with concentrations reported as below the South African National Standard (SANS) 241:2015 limits for drinking water.

Surface Water - The Project Area falls within the A22F quaternary catchment. The perennial Elands River is located some 10 km to the north of the existing BRPM TSF. The surface water resources in the project do not support formal water abstraction. There are no direct uses of surface water resources for domestic purposes in the Project Area and informal cattle watering occur.

The surface water quality, monitored as part of the existing surface water monitoring programme, indicated that all monitoring points are within Class 0 drinking quality (and hence also below the SANS 241: 2015) and report at concentrations below the WUL surface water reserve limits.

Wetlands – Three wetlands were identified during the specialist studies. The preferred alternative (the proposed BRPM TSF Extension) will not take place on an identified wetland area. The proposed pipelines will cross two wetlands and a riparian feature. These wetlands were delineated and have buffer areas. There are existing pipelines crossing these wetlands and the pipelines associated with this project will be placed adjacent to the existing pipelines.

Biodiversity – The Project Area falls within the Savanna Biome and is situated within the Central Bushveld Bioregion. No red data species were identified. Certain portions of the Project Area were identified as being affected by alien and invasive vegetation species.

Soils and Land Capability - The soil and land types in the Project Area could all be classified into two classes. Because of the restricted soil depth of the Mayo soil form the land capability is mainly grazing on this soil and wilderness on the Witbank soil form.

Land Use - The predominant land use of the Project Area is characterised by existing mining activities and surrounding villages. The effects of the historical land uses are evident in the Project Area, with both erosion and compaction having impacted the soil resource and the capability of the land. Approximately 80% of the Project Area has been altered by the present activities such as mining, grazing and farming, however only small areas of unaffected land exist.

Geology - The proposed BRPM TSF Extension Project is underlain by lithologies in the Critical Zone. The sub-outcrop of the chromitite reefs occurs to the west of the existing BRPM TSF with a chromite seam underlying the western portion of the proposed BRPM TSF, whilst the Upper Group 2 (UG2) and Merensky Reef (MR) occur to the east of the existing BRPM TSF.

Topography – The regional topography comprises of a relatively flat landscape sloping towards the perennial Elands River. The streams originating on the Farm Boschkoppie 104 JQ, are non-perennial and drain northwards to the Elands River and not located within the footprint of the BRPM TSF Extension Project Area.

Climate - The Project Area falls within the Highveld Climatic Zone which is warm temperate, with mild dry winters and hot summers. The warmest month, on average, is January with an average temperature of 23°C. The coolest month on average is June, with an average temperature of 11°C.

Rainfall occurs mostly between November and April with highest rainfall during January. The Mean Annual Precipitation at the existing BRPM TSF is 682.4 mm/a, for the period 2000 – 2013.

Stakeholder Engagement Process

The stakeholder engagement process being undertaken for this project aimed to comply with the relevant legislative requirements of the various EA processes. Details of the stakeholder engagement activities including introductory meetings, announcement of the project, focus group meetings, availability of draft and final reports are included in Section 11.

Summary of key comments raised by stakeholders to date

The Table ES 1 highlights the key Stakeholder groups that raised comments during the application process with relevant Sections in the Report where their comments were addressed. For a detailed ad complete version of the comments raised during the application process are contained in the Comments and Response Report appended in Appendix O.

Table ES 1: Key Comments Raised

Stakeholder group	Relevant section in the Report
Landowners	Sections 2, 7, 10, 11, 12
Potentially Direct and Indirect Affected Parties	Sections 7, 10, 11, 12, Appendix O
Organs of State	Sections 7, 10, 11, 12
Mining and Industry	Sections 0, 2, 5, 6, 7, 8, 10, 11, 12
Business and Commerce	Sections 7, 10, 11, 12
Non-governmental Organisations	Sections 2, 5, 6, 7, 8, 10, 11, 12

Summary of the Impact Assessment

The potential identified impacts were rated in terms of the Spatial Scope, Duration, Severity, Frequency of the Activity and Frequency of the Impact (refer to Section 9).

A summary of the potential impacts identified for each environmental aspect in terms of the different project phases, are shown in Table ES 2, Table ES 3 and Table ES 4 for both pre- and post-mitigation. The cumulative impact associated with the proposed project was assessed and determined to be of a Moderate significance. The detailed impact assessment tables are provided in Section 10.

All impacts identified during the Impact Assessment Phase can adequately be mitigated to acceptable levels that would not result in significant detrimental impacts and all positive impacts will be enhanced. Detailed management and monitoring measures are contained in Section 11 and Section 12 and overall impact significance of the proposed activities can be lowered to Low impact significance rating if the recommended mitigation measures are implemented.

Table ES 2: Summary of Impact Significance during the Construction Phase

Impact	Significance before mitigation	Significance after mitigation
Social Impact (Employment opportunities)	L No Management Required	H Improve Management Required
Noise Assessment	ML Maintain Current Management	L No Management Required
Air Quality Assessment	ML Maintain Current Management	L No Management Required
Groundwater Assessment	MH Maintain Current Management	L No Management Required
Surface Water Assessment	MH Maintain Current Management	L No Management Required
Wetland Assessment	ML Maintain Current Management	L No Management Required
Faunal Assessment	ML Maintain Current Management	L No Management Required
Floral Assessment	MH Maintain Current Management	ML Maintain Current Management
Soils, Land Use and Land Capability	MH Maintain Current Management	L No Management Required
Cumulative impact	MH Maintain Current Management	ML Maintain Current Management

Table ES 3: Summary of Impact Significance during the Operational Phase

Impact	Significance before mitigation	Significance after mitigation
Social Impact (Employment opportunities)	L No Management Required	H Improve Management Required
Visual Assessment	MH Maintain Current Management	ML Maintain Current Management
Noise Assessment	ML Maintain Current Management	L No Management Required
Air Quality	L No Management Required	L No Management Required
Groundwater Assessment	MH Maintain Current Management	ML Maintain Current Management
Surface Water	MH Maintain Current Management	L No Management Required
Wetland Assessment	L No Management Required	L No Management Required
Faunal Assessment	ML Maintain Current Management	L No Management Required
Floral Assessment	MH Maintain Current Management	ML Maintain Current Management
Soil, Land Use and Land Capability	MH Maintain Current Management	L No Management Required
Cumulative impact	MH Maintain Current Management	ML Maintain Current Management

Table ES 4: Summary of Impact Significance during the Decommissioning / Rehabilitation Phase

Impact	Significance before mitigation	Significance after mitigation
Social Impact	MH Maintain Current Management	MH Maintain Current Management
Noise Assessment	ML Maintain Current Management	L No Management Required
Groundwater Assessment	MH Maintain Current Management	L No Management Required
Surface Water Assessment	MH Maintain Current Management	L No Management Required
Wetland Assessment	ML Maintain Current Management	L No Management Required
Soils, Land Use and Land Capability	MH Maintain Current Management	L No Management Required
Cumulative impact	MH Maintain Current Management	ML Maintain Current Management

Closure and Rehabilitation

The main activity that will take place during this phase of the project is the demolition and removal of the infrastructure that can be removed and rehabilitation of the BRPM TSF and RWD. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction phase, other than the positive rehabilitation activities required for the BRPM TSF and RWD. The impacts and mitigation measures have been dealt with during the discussions of the construction activities. Please refer to Section 14 for details relating to closure and rehabilitation.

Post Closure

This is a period of maintenance and monitoring of the areas that would have been associated with the project related structures and infrastructure. The activities are limited to monitoring activities and limited erosion and vegetation repair of rehabilitated areas, as necessary. It is not anticipated that any significant impacts will arise during this period. All negative environmental impacts identified will be managed and mitigated to acceptable levels whilst positive impact will be enhanced. Please refer to Sections 12 and 14 for specific post closure measures relating monitoring and closure objectives.

Environmental Management

In terms of the BRPM TSF Extension Project, all negative environmental impacts identified will be managed and mitigated to acceptable levels whilst positive impact will be enhanced to realise the potential positive impacts through the implementation of the commitments stipulated in the EMPR. RBPlat will be responsible for ensuring that all environmental obligations pertinent to the BRPM TSF Extension Project are met. The implementation of the EMPR and the meeting of the environmental objectives and targets is also the responsibility of RBPlat. RBPlat are currently implementing the existing management procedures for the existing RBPlat operations and will be continuing to do so.

An EMPR specific to the BRPM TSF Extension Project has been prepared and documented in Section 11 Section 12. The EMPR contains specific management measures recommended by the specialists that should be implemented. These measures are additional to those included in the impact assessment tabled to manage the anticipated impacts.

Conclusion

SRK Consulting has undertaken the EA process and subsequent reporting (Scoping as well as the EIAr/EMPR Amendment Report) in terms of the proposed BRPM TSF Extension Project in accordance with the requirements of the NEMA and the MPRDA.

This has included a comprehensive public participation process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Extensive specialist input has been sought for all key environmental aspects.

To date, no serious flaws/aspects that could render this proposed project unfeasible and impractical have been identified. Potential impacts require careful mitigation and monitoring measures.

Although some of the potential impacts identified during the Impact Assessment Phase were rated as a medium-high significant rating, the overall significance of the activity's impact can be lowered through the implementation of the recommended mitigation measures, as listed in Sections 11 and the monitoring measures contained in Section 12.

It is anticipated that it will be possible to successfully mitigate all of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented.

Therefore, from an EAP's perspective based on the current project description and the information obtained through existing and recent site specific studies, there is no reason why the proposed development may not continue subject to the recommended mitigation measures being implemented. The proposed BRPM TSF Extension Project should be allowed to proceed, given the relatively small potential contribution of the project to cumulative impacts (given the implementation of the appropriate recommended environmental management measures) and also considering the positive social and economic benefits associated with the project.

Table of Contents

List of Tables

List of Figures

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by the specialists appointed during the application process and by information supplied by Royal Bafokeng Platinum (Pty) Ltd (RBPlat). SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AEL	Atmospheric Emission Licence
BH	Borehole
BIC	Bushveld Igneous Complex
BID	Background Information Document
BPG	Best Practice Guidelines
BRPM	Bafokeng Rasimone Platinum Mine
CBA	Critical Biodiversity Area
CRR	Comments and Responses Report
dBA	A-weighted Decibels
DEA	Department of Environmental Affairs
DFO	Dust Fall Out
DLA	Department of land Affairs
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPR	Environmental Management Programme
FSE	Foundation for a Sustainable Environment
FSR	Final Scoping Report
GDP	Gross Domestic Product
GN	Government Notice
GPS	Global Positioning System
ha	Hectares
I&APs	Interested and Affected Parties
IWULA	Integrated Water Use License Application
IWWMP	Integrated Waste and Water Management Plan
JV	Joint venture
km	Kilometres
KPC	Knight Piésold Consulting (Pty) Ltd
L/s	Litres per second
m	meters
MAR	Mean Annual Rainfall
mbgl	meters below ground level
mg/l	milligrams per litre
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)
MR	Merensky Reef
NBA	National Biodiversity Assessment
NEM:WA	National Environmental Management Waste Act (Act No. 59 of 2008)

NEMA	National Environmental Management Act (NEMA) (Act No. 107 of 1998)
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act (Act No. 36 of 1998)
NWREAD	North West Department of Rural, Environmental and Agricultural Development
PES	Present Ecological State
PGM	Platinum Group Metals
POS	Plan of Study
PPP	Public Participation Process
QDS	Quarter Degree Square
RBN	Royal Bafokeng Nation
RBPlat	Royal Bafokeng Platinum Management Services (Pty) Ltd
RBR	Royal Bafokeng Resources
REC	Recommended Ecological Category
RLM	Rustenburg Local Municipality
RPM	Rustenburg Platinum Mines Limited
RWD	Return Water Dam
SANBI	South African National Biodiversity Institute
SANS	South African National Standard
SCC	Species of Conservation Concern
SMC	Styldrift Mine Complex
SMS	Short Message Service
SRK	SRK Consulting (Pty) Ltd
SWD	Storm Water Dam
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
UG2	Upper Ground 2 Reef
WMA	Water Management Area
WUL	Water Use License
WULA	Water Use License Application

1 Introduction

The Styldrift Mining Complex (SMC) is a Joint Venture (JV) between Rustenburg Platinum Mines Limited (RPM) and Royal Bafokeng Resources (RBR). Royal Bafokeng Platinum Management Services (Pty) Ltd (RBPlat) is the applicant for the BRPM JV.

Royal Bafokeng Platinum (RBPlat) is responsible for two mining sites which are operated in joint venture. The mining sites are referred to as Bafokeng Rasimone Platinum Mine (BRPM) and Styldrift Mining Complex (SMC). Bafokeng Rasimone Platinum Mine (BRPM) is approximately 30 kilometres (km) north-west of Rustenburg in the North West Province. The RBPlat Styldrift Merensky Phase 1 Mine (referred to as the SMC) is situated on the Farm Styldrift 90 JQ, located approximately 7 km from the existing BRPM Concentrator Plant and 6 km south of Sun City along the R 565. The Farm Styldrift 90 JQ has a common boundary with the Farm Boschkoppie 104 JQ to the south and is adjacent to the Farm Frischgewaagd 96 JQ to the west. The existing BRPM Tailings Storage Facility (TSF), a rectangular in shape is situated on the Farm Boschkoppie 104 JQ with the BRPM mining operations at North and South Shaft. The closest neighbouring villages situated on the mine surface lease area include Chaneng, Rasimone, Mafenya and Robega. Rasimone is the closest village located approximately 2 km north-east of the existing BRPM TSF. The villages in vicinity of the Project Area are presented in Figure 1-2.

BRPM has an existing EMPR, issued on February 1998, for its BRPM mining operations (Reference Number: RDNW(KL)6/2/2/391) in terms of the Minerals Act (Act No. 50 of 1991). The approved EMPR (1998) included the construction of a TSF (known as the existing BRPM TSF).

The SMC has an existing Environmental Management Programme (EMPR) issued in March 2008, for its Styldrift mining operations (Reference Number: NW30/5/1/2/3/2/1/(312) EM) in terms of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) and an existing Water Use Licence (WUL) No: 26031507 in terms of the National Water Act (Act No. 36 of 1998) (NWA). The approved Styldrift EMPR (2008) included the extension of the existing BRPM TSF located on the Farm Boschkoppie 104 JQ onto the Farm Uitvalgrond 105 JQ (footprint size of approximately 330 ha) to accommodate additional tailings produced by the modified BRPM Concentrator Plant. However, RBPlat have investigated alternative areas for the extension of the proposed BRPM TSF due to a delay in obtaining the required surface lease agreements associated with the Farm Uitvalgrond 105 JQ.

The Farm Uitvalgrond 103 JQ has always been earmarked to accommodate the tonnage generated from the SMC. It is proposed that the existing Styldrift EMPR be amended for the existing BRPM TSF to be extended on Portion 1 of the Farm Boschkoppie 104 JQ and to construct the additional infrastructure on Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ (hereinafter referred to as the "BRPM TSF Extension Project[4]"). Figure 1-1 illustrates the locality plan for the proposed BRPM TSF Extension Project.

- **Tailings Storage Facility** - Extension of the existing BRPM TSF covering approximately 150 ha on Portion 1 of the Farm Boschkoppie 104 JQ;
- **Return Water Dam (RWD)** - Construction of a RWD covering approximately 12.7 ha on Portion 1 of the Farm Boschkoppie 104 JQ;

The proposed secondary infrastructure and activities associated with the above key infrastructure includes:

- Construction of overland pipelines (covering approximately 3 km in length) for:

[4] The BRPM TSF Extension Project was previously referred to as the Styldrift Tailings Storage Facility.

- The transportation of tailings from the BRPM Concentrator Plant to the extended TSF on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
- The transportation of return water between the extended TSF and the RWD on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
- The transportation of return water between the RWD and the BRPM Concentrator Plant on Portion 1 of the Farm Boschkoppie 104 JQ, Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
- The overland pipelines will be placed onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF. The pipelines will cross two wetlands and a riparian habitat areas associated with the Matlopyane tributary and length thereof will be approximately 3 km on Portion 1 of the Farm Boschkoppie 104 JQ;

- Establishment of a topsoil stockpile and service roads and water management infrastructure and stormwater systems; and
- Relocation of a power line (a separate Basic Assessment application has been submitted to National Department of Environmental Affairs (DEA) (DEA reference number 14/12/16/3/3/2/648, Environmental Authorisation was granted on 31 March 2015).

Before the proposed project may commence, RBPlat is required to amend its existing Styldrift EMPR to incorporate the above mentioned mining related activities and infrastructure in terms of the MPRDA, the National Environmental Management Act (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of December 2014, the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM:WA), and the NWA.

SRK Consulting (SRK) has been appointed as the independent Environmental Assessment Practitioner (EAP) to conduct the necessary EIA and to prepare the relevant EMPR amendments for the proposed project for submission to the Department of Mineral Resources (DMR). SRK will also undertake the amendment of the existing Integrated Water Use Licence Application (IWULA) in terms of the new water uses associated with the project for submission to the Department of Water and Sanitation (DWS), as well as the associated stakeholder engagement process in compliance with the requirements of NEMA, NEM:WA, MPRDA and NWA.

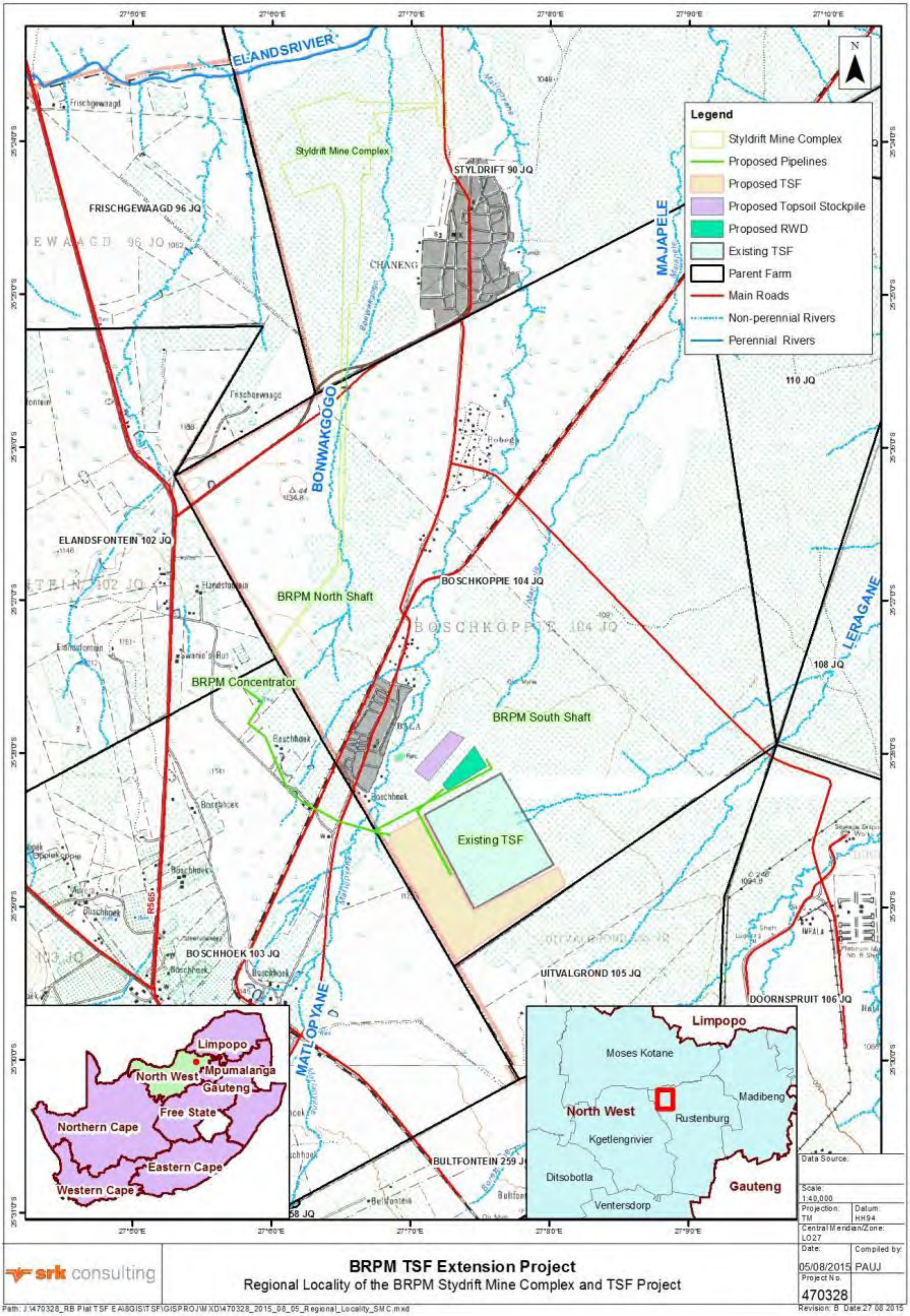


Figure 1-1: Regional Locality of the BRPM Styldrift Mine Complex and TSF Project

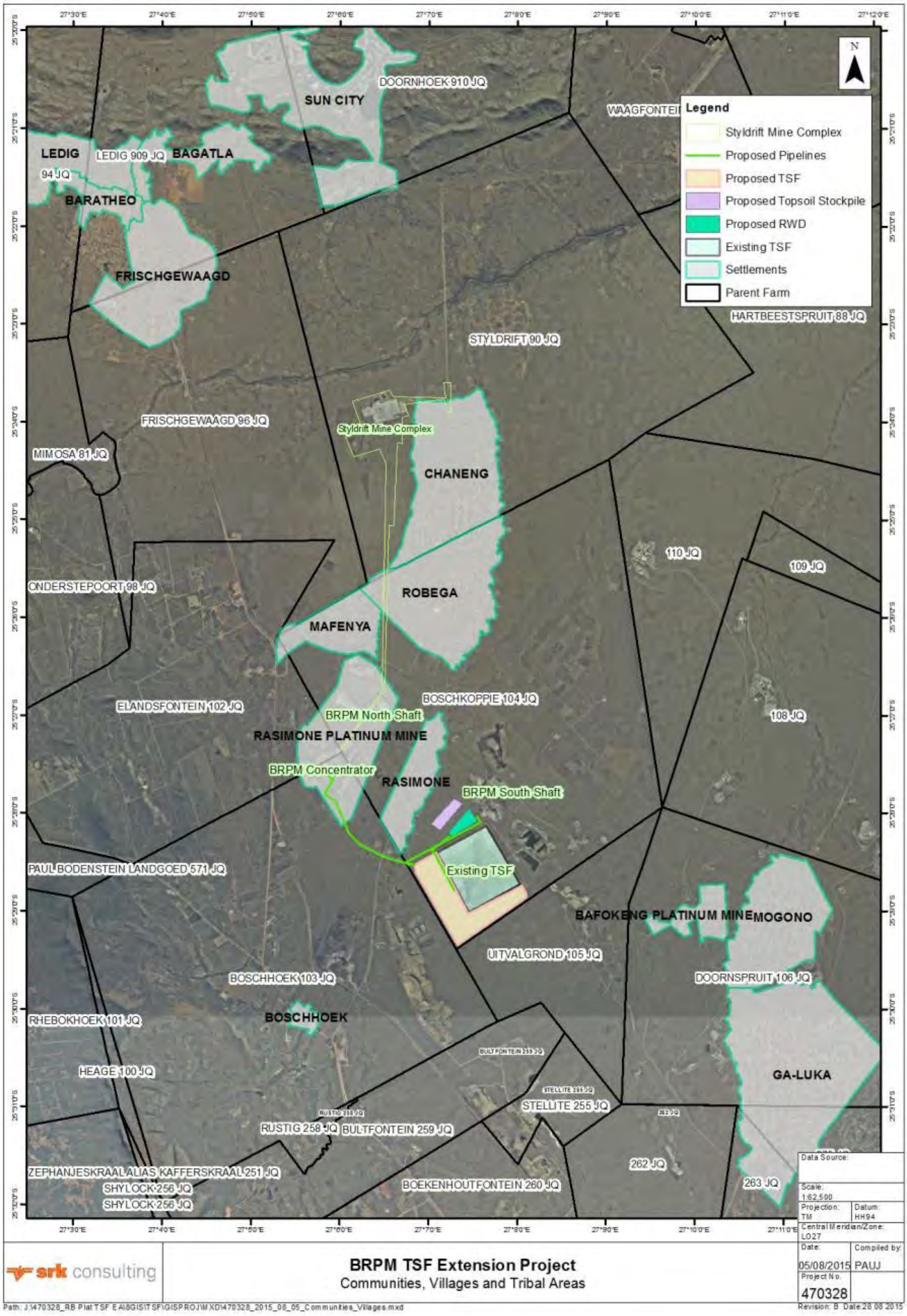


Figure 1-2: Communities/towns/villages in vicinity of the Project Area

1.1 Purpose of the EIAr/EMPR Amendment Report

This report provides a description of the proposed BRPM TSF Extension Project and sets out the scope of the EIA and EMPR that were undertaken.

This EIA/EMPR Amendment Report provides further details on the:

- Proposed BRPM TSF Extension Project including associated activities and infrastructure requirements;
- Range of alternatives that were evaluated for various specific aspects of the BRPM TSF Extension Project;
- Anticipated potential environmental impacts that may be associated with the BRPM TSF Extension Project;
- Specialist studies that were undertaken; and
- Issues raised by stakeholders during the Scoping Phase.

The Draft BRPM TSF Extension Project's EIAr/EMPR Amendment Report was made available for public review for 30 days[5] from 02 September 2015 to 05 October 2015. The Draft EIAr/EMPR Amendment Report has been made available at the following public places as listed in Table 1-1 below as well as on the SRK website (www.srk.co.za):

Table 1-1: Public places where the EIAr/EMPR will be available for public review

Public Place	Locality	Contact person	Tel No
Rustenburg Public Library	Rustenburg	Mr Pieter Louw	(014) 590 3060/3295
Robega Village Community Office	Robega	Bushy Rasebitse	(083) 844 3546
Chaneng Village Community Office	Chaneng	Mr Jacob Setshwane	(083) 729 2989
Rasimone Community Office	Rasimone	Mr Thabo Diale	(078) 398 6190
Mafenya Primary School	Mafenya	Mr Jacob Mzizi	(073) 666 0161

All comments received during the Draft EIAr/EMPR Amendment Report public review period will be captured in the Comments and Response Report (CRR). On the basis of the comments received, the Final EIAr/EMPR Amendment Report will be finalised and submitted to DMR who will consider the findings in consultation with various other authorities.

[5] Refer to the 2014 NEMA EIA Regulations where Regulation 3(8) of GN R982 of 04 December 2014 where it is regulated that the Report must be made available for a 30 day commenting period

2 Project details

The following Sections provide details of parties involved in the BRPM TSF Extension Project.

2.1 Project Proponent

Mining operations are currently in operation at the SMC, but the need was identified for additional tailings disposal in order to effectively and sustainably conducts future mining activities. The existing mining operations at BRPM and Styldrift hold separate Water Use Licenses and separate Mining Rights. Table 2-1 presents the details of the applicant and mine owner. Please refer to Figure 2-1 for the RBPlat mining right area, including the proposed infrastructure associated with this project.

Table 2-1: Applicant and Mine Owner Details

Contact details of the owners of the Mine and holders of the existing Mining Authorisation:	
RBPlat Management Services Pty (Ltd) PO Box 2283 Fourways 2055 Tel: 010 590 4510 Fax: 010 590 1075	
Contact details of the Mine Management Service Provider:	
RBPlat Management Services Pty (Ltd) PO Box 2283 Fourways 2055 Tel: 010 590 4515 Fax: 010 590 1075	
Contact details of the Mine Manager/Responsible Person:	
Mr Leka Monama (Mine Manager SMC) Private Bag 82313 Rustenburg 0300 Tel: (014) 153 0002	
For the purpose of the application process the following people may be contacted at SMC:	
Mr Leka Monama Mine Manager Styldrift Tel: (014) 153 0002 lekam@bafokengplatinum.co.za	Ms Malebabo Tsolo Environmental Manager (Styldrift and BRPM) Tel:(014) 573 1528 MalebaboT@bafokengplatinum.co.za

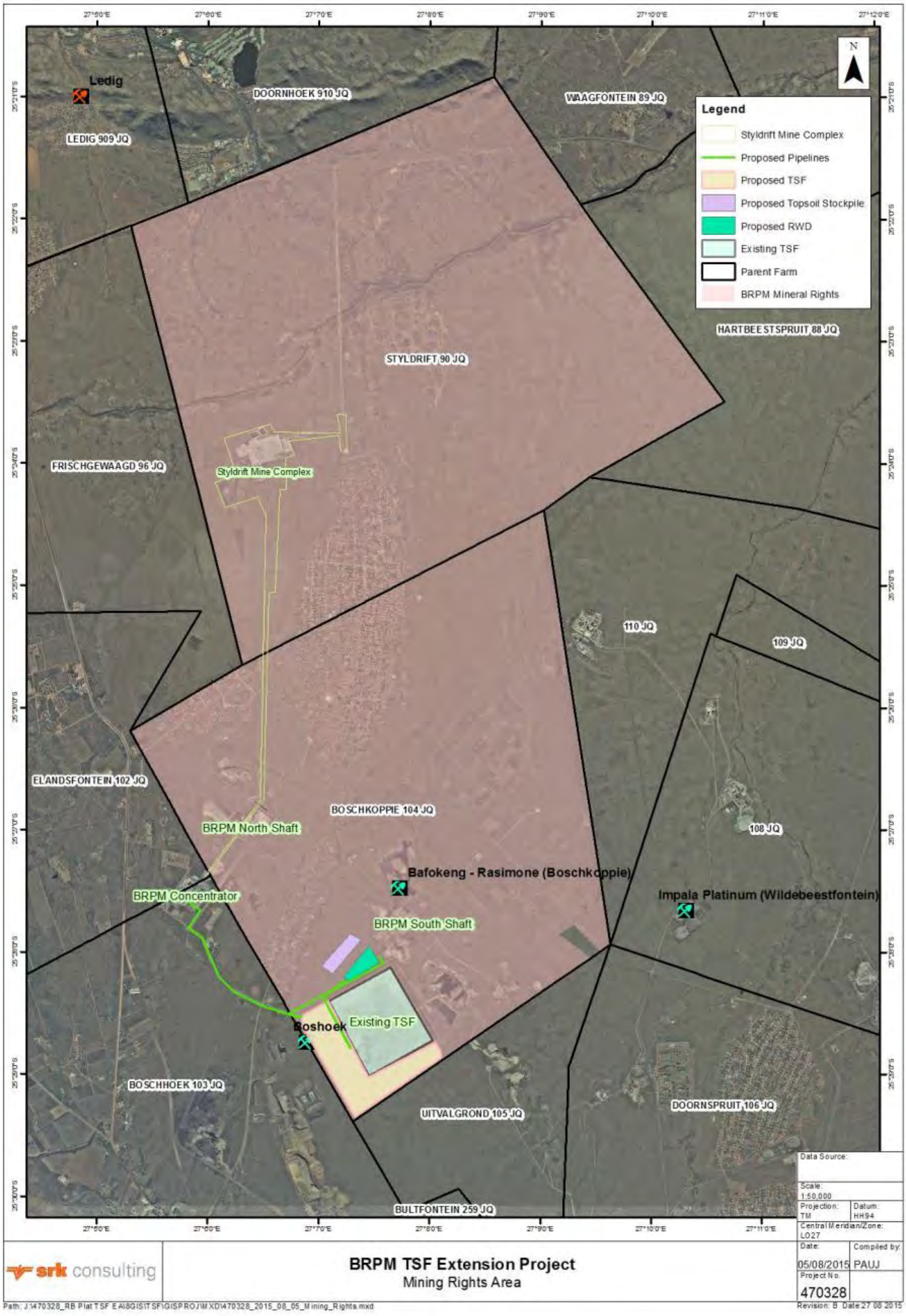


Figure 2-1: Mining rights area

2.2 Details of the Properties Affected by the Proposed Development

Table 2-2 below shows the property ownership relating to the proposed BRPM TSF Extension Project and the farms in relation to the proposed infrastructure is shown in Figure 5-2.

Table 2-2: Properties directly affected by the proposed TSF Extension Project

Farm Name and Number	Surveyor General code	Title deed number	Project related proposed infrastructure/activity	Owner
Boschkoppie 104 JQ - Portion 1	TOJQ00000000010400001	T1712/1929BP	Extension of the existing BRPM TSF (preferred alternative) Topsoil Stockpile RWD Pipelines from TSF to RWD and from the RWD to the Concentrator.	Republic of South Africa (formally Bophuthatswana) and kept in a Trust for the Royal Bafokeng Nation6
Boschhoek 103 JQ – Portion 71	TOJQ00000000010300071	T60685/1997	Pipelines running from the proposed extended TSF to BRPM Concentrator.	Rustenburg Platinum Mines Limited
Boschhoek 103 JQ – Portion 85	TOJQ00000000010300085	T60687/1997	Pipelines running from the proposed extended TSF to BRPM Concentrator.	Rustenburg Platinum Mines Limited
Boschhoek 103 JQ – Portion 103	TOJQ00000000010300103	T60688/1997	Pipelines running from the proposed extended TSF to BRPM Concentrator.	Rustenburg Platinum Mines Limited
Uitvalgrond 105 JQ – Portion 2	TOJQ00000000010500002	T233/1984BP	Construction of a new TSF (alternative site)	Mokgatle Trust

Land ownership has been determined using WINDEED (see Appendix A). Portions 70, 85 and 103 of the Farm Boschhoek 103 JQ are owned by Rustenburg Platinum Mines Limited (RPM). Portion 1 of the Farm Boschkoppie 104 JQ is owned by the Royal Bafokeng Nation (RBN). SRK understands that there is an existing surface lease agreement jointly between Royal Bafokeng Resources (RBR), RPM (Lessees) and RBN (Lessor). SRK's understanding that the surface lease agreement gives the Lessees preference over all other mining activities on the lease area and the Lessor shall accordingly undertake all such other activities subject to the Lessees activities, providing that the Lessees mining activities are at all times carried out in accordance with all applicable laws. The lease agreement is valid for the life of mining operations.

Portion 2 of the Farm Uitvalgrond 105 JQ is owned by the Mogatle Trust. The surface lease agreements for this land have not been successful to date and it has necessitated that RBPlat investigate alternative areas for the extension of the TSF to accommodate the future tailings produced by the BRPM Concentrator Plant. Please refer to Figure 2-2 for the Landownership associated with the Project Area.

[6] The Title Deed search for this Property stated that the Owner is the "Republic of Bophuthatswana" (Bafokeng Tribe), known as the Royal Bafokeng Nation. Thus it is owned by the State but kept in a Trust for the Royal Bafokeng Nation.

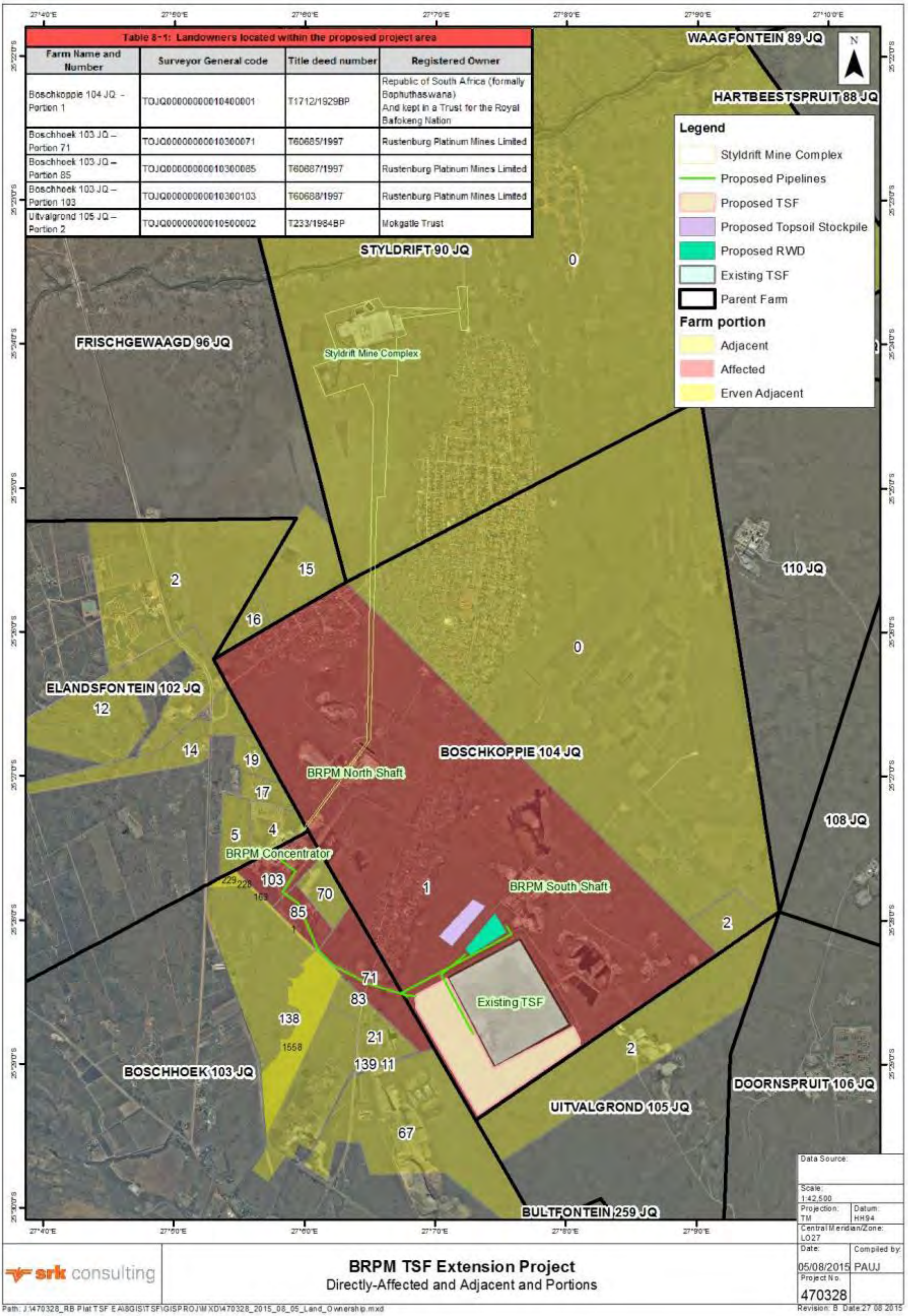


Figure 2-2: Landownership Associated with the Proposed BRPM TSF Extension Project (Direct & Adjacent)

2.3 Details of Environment Assessment Practitioner

SRK has been appointed as the independent EAP by RBPlat to undertake the application processes on behalf of the applicant. SRK is an independent consultancy, specialising in services to the mining industry. SRK's environmental and social team has extensive experience in undertaking studies in support of mining and non-mining environmental authorisations in South Africa and internationally. SRK's Johannesburg and Pretoria offices are staffed with over 300 professional consultants operating in a range of disciplines, mainly related to the water, environmental, social and mining sectors. External specialists are contracted as and when required. Details of the EAP team are provided in Table 2-3. The Curriculum Vitae's of the project team members can be found in Appendix B.

Table 2-3: Details of the Project Team

Details	Name			
	Dr Andrew Wood	**Sarah Sinner**	**Toinette vd Merwe**	**Donne Du Toit**
Designation	Project Partner and Reviewer	Project Manager, Hydrogeologist, water specialist and report review	Project coordinator, public participation and report preparation.	Stakeholder Engagement Officer
Address	PO Box 55291 Northlands 2116	PO Box 55291 Northlands 2116	PO Box 35290 Menlo Park 0081	PO Box 35290 Menlo Park 0081
Telephone	(011) 441 1111	(011) 441 1111	(012) 361 9821	(012) 361 9821
Fax	(011) 880 8086	(011) 880 8086	(012) 361 9912	(012) 361 9912
E Mail	awood@srk.co.za	SSkinner@srk.co.za	tvandermerwe@srk.co.za	ddutoit@srk.co.za

Dr Andrew Wood (Partner) has been with SRK for 26 years and was previously with the CSIR for 5 years. His areas of expertise include specialist advice to Due Diligence, Environmental Compliance Audits and EIAs where natural resources may be affected by developments and infrastructure management scenarios, for a wide variety of industrial, mining and governmental clients.

The project manager and the EAP, Ms Sarah Skinner, is a principal scientist with 17 years of experience with SRK Consulting. Sarah Skinner is registered as a Professional Natural Scientist (Pr Sci.Nat. 400016/01) with the South African Council of Natural Scientific Professions.

The project coordinator, Ms Toinette van der Merwe is a Senior Environmental Scientist at SRK with 13 years' experience in the environmental field. Her experience lies in the field of environmental management and has extensive regulatory, compliance and enforcement experience at Local, Provincial and National Government level. She has experience in compilation, amendment and assessing environmental compliance for a diverse set of EIAs and EMPR's in terms of the NEMA and the MPRDA and coordination and execution of the Public Participation Process (PPP).

The Public Participation Practitioner, Ms Donne du Toit is a Stakeholder Engagement Practitioner and has 4 years' experience in PPP. Her experience includes stakeholder engagement extending managing the PPP process, including one-on-one and electronic communications to focus group meetings, large public meetings, compiling of stakeholder engagement documentation/reports, registers, and notices. Other experience includes the coordination of the ISO 9001 Quality Management System.

2.4 Competent Authority Details

The following Competent Authorities for the respective EA processes applicable and required in terms of the BRPM EIAr/EMPR Amendment Process are:

- Department of Mineral Resources (DMR):
  - In terms of the NEMA for listed activities triggered by the proposed project;
  - In terms of the NEM:WA for waste management activities triggered by the proposed project;
  - In terms of the MPRDA for the amendment of the existing EMPR to include the proposed mining related infrastructure and activities.
- Department of Water and Sanitation (DWS):
  - In terms of the NWA for the amendment to the existing WUL and the compilation of an Integrated Waste and Water Management Plan (IWWMP).

Details of the Competent Authorities are provided in Table 2-4.

Table 2-4: Competent Authority

Department	Contact Person	Contact Details	
DMR (Klerksdorp)	Mr Phumudzo Nethwadzi (Assistant Director)	**Tel:**	(018) 487 9830
		Email:	phumudzo.nethwadzi@dmr.gov.za
	Mr Christopher Tshisevhe (Case Officer)	**Tel:**	(018) 487 4311
		Email:	chris.tshisevhe@dmr.gov.za
DWS (Hartbeespoort Office)	Ms Sebenzile Ntshangase	**Tel:**	082 896 8228
		Email	NtshangaseS@dwa.gov.za

2.5 Municipality Details

The BRPM TSF Extension Project Area is located within Ward 1 (Figure 2-3) of the Rustenburg Local Municipality, which forms part of the greater Bojanala Platinum District Municipality. Details of the relevant municipalities are given in Table 2-5. Please refer to Figure 2-3 for the Municipal Wards in the Project Area.

Table 2-5: District and Local Municipalities and Ward Councillor Details

Municipality	Contact Person	Contact Details	
Bojanala Platinum District Municipality	Mr Innocent Sirovha	**Tel:**	(014) 590 4502
		Email:	innocents@bojanala.gov.za
Rustenburg Local Municipality	Ms Kelebogile Mekgo	**Tel:**	(014) 590 3185
		Email:	kmekgoe@rustenburg.gov.za
Ward 1 Municipal Ward Councilor	Mr Jacob Mzizi	**Tel:**	(073) 666 0161

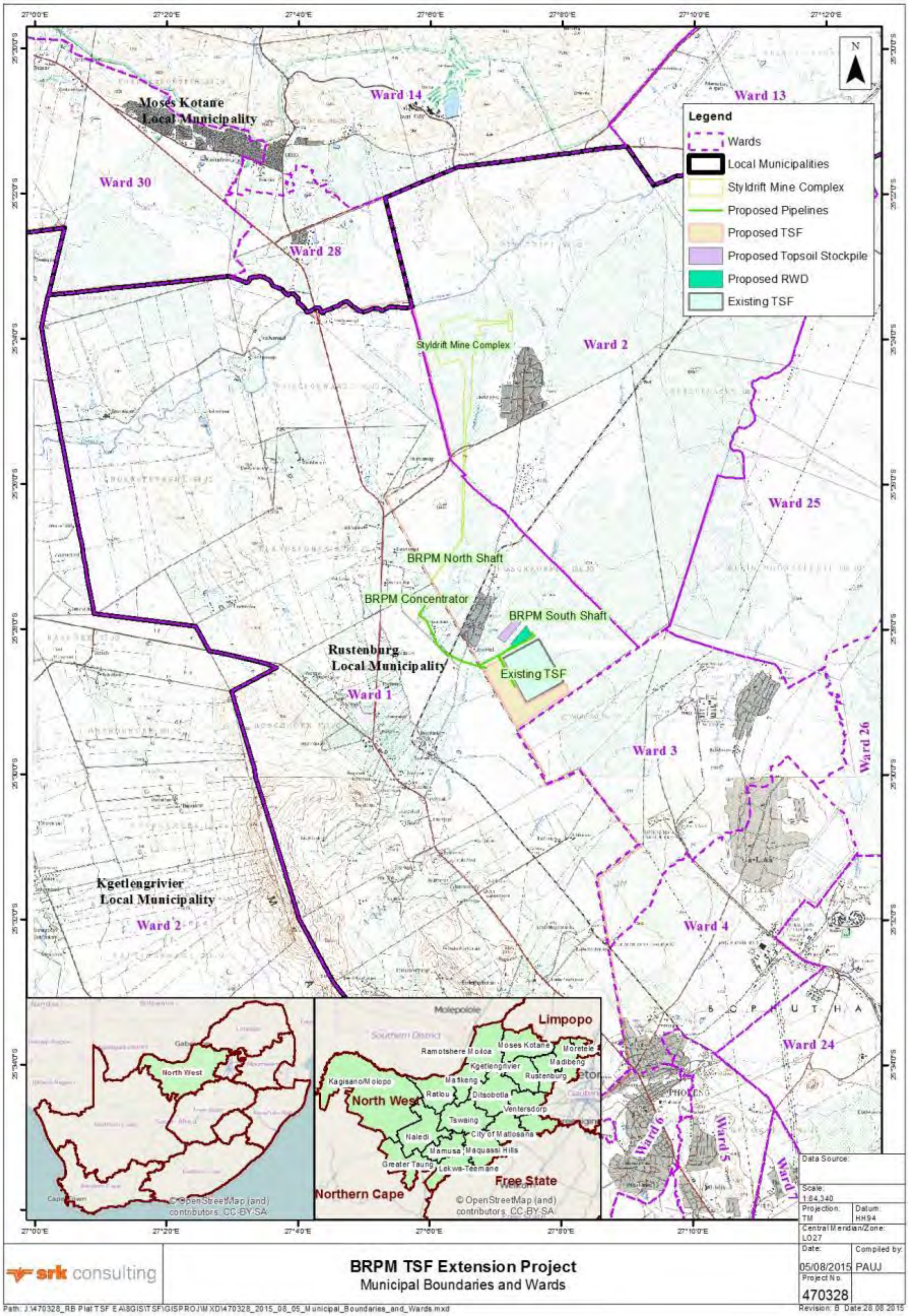


Figure 2-3: Municipal Boundaries and Ward areas

2.6 Report Structure

This EIAr/EMPR Amendment Report has been prepared to meet the legal requirements of Section 3 of Appendix 3 and Section 1 of Appendix 4 of the EIA NEMA Regulations contained in GN R982 of 04 December 2014 read with Section 39(3) of the MPRDA (Regulation 50 and 51 of GN R 23 April 2004).

The proposed project and subsequent documentations complies with the legislative requirements and guidelines issued under the MPRDA and NEMA have been taken into consideration during the compilation of this EIAr/EMPR Amendment Report.

A summary of the information provided in the different section of this EIAr/EMPR Amendment Report is provided in Table 2-6.

Table 2-6: Summary of the information provided in the different Sections

Chapter	**Heading**	**Description**
Chapter 1	Introduction	Provides an overview of what the proposed project will entail including the locality of the project.
Chapter 2	Project details	Presents information regarding the applicant and the EAP involved in the proposed project, provides details of the affected surface areas and describes the EIAr/EMPR Amendment Report structure.
Chapter 3	Methodology Applied to the EIAr/EMPR	Describes the EA process followed to date in terms of the project and information on the various legislative frameworks under which the application is compiled, and details of the process followed. This chapter also describes the public engagement process that was followed for this project in fulfilment of Section (3)(b)(ii) of the MPRDA Act read together with Regulation 50(f).
Chapter 4	Project Alternatives	Details the alternative options that were considered in terms of certain aspects associated with the BRPM TSF Extension Project and provide details on the option.
Chapter 5	Project Description	Presents the need and desirability of the proposed project.
Chapter 6	Project Motivation	Provided detailed information regarding the proposed project and associated required infrastructure and activities of the TSF Extension Project.
Chapter 7	Description of the Baseline Environment	Provides a description of the environment (baseline status) prior to the commencement of the construction, and subsequent operation, of the proposed project, in compliance with Section 39(3)(a) of the MPRDA Act read together with Regulation 50(a).
Chapter 8	Stakeholder Engagement Process	Provides an overview of the Public Participation Process undertaken prior and during the Scoping Phase of the project, and describes the process and activities which will be undertaken during the EIA Phase in terms of public participation.
Chapter 9	Methodology for the Assessment of Impacts	Provides details on the methodology used to assess the anticipated impacts that may be associated with the proposed project.
Chapter 10	Impact Assessment	Describe the anticipated impacts identified during the EIA phase based on the current project description and information provided by the various specialists in fulfilment of Section 39(3)(b)(i)(ii) and (iii) of the MPRDA Act read together with Regulation 50(c) and

Chapter	**Heading**	**Description**
		(e).
Chapter 11	Environmental Management Programme	Provides mitigation / management measures to be implemented in order to mitigate potential negative impacts and enhance potential positive impacts that may be associated with the proposed project. This chapter also provides recommendations on surface water, groundwater, soil and air quality management measures which may be implemented during the preparation, pre-construction, construction and operational phases of the proposed project. This chapter has been compiled in compliance with Section 39(3)(d) of the MPRDA Act, read together with Regulation 50(e), (f) and (i) and Regulation 51(b)(i) and (ii) and Section 39(4)(a)(iii) of the MPRDA Act.
Chapter 12	Monitoring and EMP Performance Assessment	Provides details and commitment of on-going monitoring and performance assessment of the EMPR, in fulfilment of MPRDA Regulation 50(h) and Regulation 51(b)(iv).
Chapter 13	Environmental Goals and Objectives	Describes the environmental and social objectives and goals to be achieved through the implementation of the EMPR should the proposed project be approved and commence, in fulfilment of MPRDA Regulation 51(a).
Chapter 14	Closure Action Plan	Provides details of the closure plan in fulfilment of MPRDA Regulation 51(b)(v) and also provides of the financial provision in compliance with Section 39(4)(a)(ii) read together with Section 41(1) of the MPRDA Act.
Chapter 15	Environmental Emergencies and Remediation Procedure	Provides a summary of the emergencies and remediation procedures, with reference to relevant appendices, applicable to the proposed project, in fulfilment of MPRDA Regulation 51(b)(iii).
Chapter 16	Environmental Awareness Plan	Provides a summary of RBPlat's environmental awareness plan, with reference to relevant appendices, which will be applicable in terms of the proposed project, in compliance with Section 39(3)(c) of the MPRDA Act read together with Regulation 51(vi) and (vii).
Chapter 17	Knowledge, Gaps, Assumptions and Limitations	Provides a summary of knowledge gaps, assumptions and limitations applicable to this report, in fulfilment of MPRDA Regulation 50(g).
Chapter 18	Undertaking to Comply with the Provision of the Act	Provides the commitment of RBPlat to comply with the relevant legislation applicable to the proposed project.
Chapter 19	EAP Declaration	Provides the declaration of the EAP who compiled this EIAr/EMPR Amendment Report EIAr/EMPR Amendment Report.
Chapter 20	Conclusion and Environmental Statement	Provides a summary of the document and the concluding remarks of the EAP.
Chapter 21	Bibliography	Provides details on the bibliography which was consulted during the compilation of the EIAr/EMPR Amendment Report.

3 Methodology Applied to the EIAr/EMPR

3.1 Objective and Approach

The objectives of the EIA for the proposed BRPM TSF Extension Project are to:

- Gain a detailed understanding of the baseline environment at the sites proposed for the development of the BRPM TSF Extension, and associated Infrastructure;
- Determine and assess the impacts to receptors and resources in the vicinity of the sites proposed development of the BRPM TSF Extension, and associated Infrastructure;
- Identify potential weaknesses associated with the sites proposed for the development of the BRPM TSF Extension, and associated Infrastructure;
- Consider and assess project alternatives in terms of environmental impacts;
- Develop environmental management measures to mitigate negative impacts and enhance positive impacts;
- Engage stakeholders to ensure that feedback on the results of the study is provided and that the assessment and management of impacts is identified and concerns considered; and
- Provide sufficient information to the authorities to inform the EA decision.

3.2 Legal Framework

As indicated the proposed BRPM TSF Extension Project requires EA, prior to the commencement of the project, in terms of the following:

- All relevant listed activities triggered by the proposed project in terms of the NEMA EIA Regulations as contained in GN R982 of 04 December 2014 - GN R983 (activity item 9, 10, 12, 13, 19, 22, 24, 27, 45 and 46), GN R984 (activity item 6, 15, 16, 17 and 21) and GN R985 (activity item 4 and 12);
- All waste management listed activities triggered by the proposed project in terms of the NEM:WA Waste Management Regulations contained in GN R921 of 29 November 2013 – Category A (activity item 1 and 13) and Category B (activity item 8 and 10);
- Amendment of RBPlat's existing Styldrift EMPR as required under the MPRDA; and
- Amendment of RBPlat's existing WUL and accompanying IWWMP in terms of the NWA.

The EA (for the NEMA and NEM:WA listed activities), EMPR Amendment and amendment of the existing WUL application processes will be conducted simultaneously as an integrated process complemented by a combined public participation process as indicated in Figure 3-1.

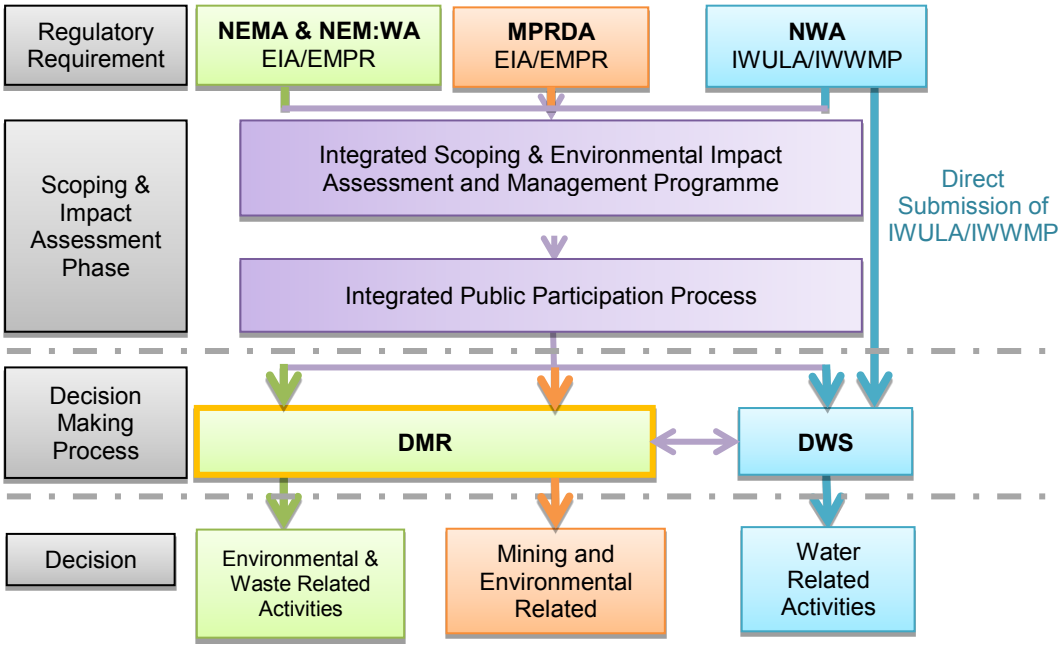


Figure 3-1: Integrated Environmental Authorisation and Decision Making Process

The following Sections provide further details of the legal framework in terms of NEMA, NEM:WA MPRDA and NWA respectively.

3.2.1 National Environmental Management Act (Act No. 107 of 1998)

In terms of the 2014 NEMA EIA Regulations contained in GN R982 of 04 December 2014, a number of listed activities contained in GN R983, GN R984 and GN R985 of 04 December 2014, as summarised in Table 3-1, have been identified that may be triggered by BRPM TSF Extension Project.

The original application for Environmental Authorisation (EA) was submitted on the 19 August 2014 to the North West Department of Rural, Environmental and Agricultural Development (NWREAD), was compiled under the previous NEMA EIA Regulations of June 2010.

The NEMA EIA 2010 Regulations were repealed in December 2014 and the new NEMA EIA Regulations were promulgated on 04 December 2015. Subsequently to the promulgation of the new NEMA EIA Regulations the DMR are now the competent authority for applications for EA where mining projects trigger the NEMA EIA Regulations. The Draft Scoping Report (DSR) including the Plan of Study (POS) for EIA, was made available to the Registered Interested and Affected Parties (I&APs) for a 40-day commenting period[7]. The Final Scoping Report (FSR) including the POS for EIA, was made available for a 21-day public commenting period[8] and it was accepted by the competent authority.

A Meeting was held with the DMR to discuss the regulatory changes that took place. As a result the application lodged with the NWREAD was withdrawn and a new application for EA was lodged with the DMR. The application form and the Scoping Report were accepted on 12 August 2015. Please refer to Appendix C for a copy of this letter. Table 3-1 provides the number and wording of the listed activities applied for in terms of the 2014 NEMA EIA Regulations. The location of where these listed activities will take place is illustrated in Figure 3-2.

[7] Refer to the 2010 NEMA EIA Regulations where Regulation 56 of GN R543 of 18 June 2010 where it is regulated that the Report must be made available for a 40 day commenting period.
[8] Refer to the 2010 NEMA EIA Regulations where Regulation 56 (6) of GN R543 of 18 June 2010 where it is regulated that the Final Report must be made available to the Registered I&APs.

Table 3-1: NEMA Listed Activities for the BRPM TSF Extension Project

Number and Date of the Relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each Activity
GN R983 of 04 December 2014	9	The development of infrastructure exceeding 1000 m in length for the bulk transportation of water or **storm water**- (i) with an internal diameter of 0,36 m or more; or (ii) with a peak throughput of 120 litres per second or more; • *It is proposed to construct a stormwater trench/channel around the TSF to divert stormwater to the RWD. (Dirty water to the RWD and clean water to the natural water course/s).*
GN R983 of 04 December 2014	10	The development and related operation of infrastructure exceeding 1000 m in length for the bulk transportation of sewage, effluent, **process water, waste water, return water**, industrial discharge or slimes- (i) with an internal diameter of 0,36 m or more; or (ii) with a peak throughput of 120 ℓ/s or more; • *The development of overland pipelines for the transportation of tailings containing water via overland pipelines from the BRPM concentrator plant to the Tailings Storage Facility, with a pipeline diameter of between 0.25 m and 0.30 m over a distance of approximately 3 km;* • *The transportation of return water via overland pipelines from the proposed extended BRPM TSF to the proposed Return Water Dam; from the Return Water Dam to the existing BRPM Concentrator Plant; and from the existing BRPM Concentrator Plant to the Tailings Storage Facility (approximately 20 ha); and* • *The peak throughput of the overland pipelines will be approximately 140 litres per second.*
GN R983 of 04 December 2014	12	The development of- (xii) **infrastructure or structures with a physical footprint of 100 m^2 or more;** Where such development occurs – (a) Within a watercourse • *The development of overland pipeline from the Concentrator Plant to the Tailings Storage Facility (approximately 20 ha) that will bisect the Matlopyane stream as well from the unnamed tributary of the Matlopyane stream; and* • *The pipeline will be constructed adjacent to existing pipelines and will be placed on existing trestles.*
GN R983 of 04 December 2014	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 m^3 or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014. • *The development of a TSF and RWD (approximately 12.7ha) with a combined capacity of 50 000 m^3 or more.*
GN R983 of 04 December 2014	19	The **infilling or depositing of any material of more than 5 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 m^3 from**- (i) a watercourse. • *The dredging, excavation and moving of soil, sand and rock from the Matlopyane stream as well from the unnamed tributary of the Matlopyane stream exceeding 5 cubic meters at two wetlands and one riparian crossing to place the overland pipeline adjacent to existing pipelines onto the existing*

Number and Date of the Relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each Activity
		trestles.
GN R983 of 04 December 2014	22	The decommissioning of any activity requiring - (i) a closure certificate in terms of section 43 of the MPRDA (Act No. 28 of 2002); or (ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure. • *The decommissioning of any activity associated with the proposed development where it requiring a closure certificate or a mining right where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure i.e. the TSF; RWD; Topsoil Stockpile of Pipelines.*
GN R983 of 04 December 2014	24	The development of- (i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) a road with a reserve wider than 13.5 m, or where no reserve exists where the road is wider than 8 m; • *The construction of service/maintenance roads around the TSF. The service road does not have a road reserve and will be used for maintenance purposes.*
GN R983 of 04 December 2014	27	The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. • *The clearance of vegetation associated with the construction of a RWD (approximately 12.7ha), the Topsoil Stockpile (approximately 12 ha); and the construction of pipelines from the TSF to the RWD; from the RWD to the Concentrator Plant; and from the existing BRPM Concentrator Plant to the TSF (approximately 20 ha)*
GN R983 of 04 December 2014	45	The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure- (i) has an internal diameter of 0.36 m or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 m in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; • *The construction of infrastructure for the bulk transportation of storm water around the TSF that will have a peak throughput capacity of 120 litres per second or more.*
GN R983 of 04	46	The expansion and related operation of infrastructure for the bulk transportation of

Number and Date of the Relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each Activity
December 2014		sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0.36 m or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 m in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; • *The construction of overland pipelines in from the TSF to the Return Water Dam; from the RWD to the existing BRPM Concentrator Plant; and from the existing BRPM Concentrator Plant to the TSF (approximately 20 ha);* • *The construction of overland pipelines for the transportation of tailings containing water via overland pipelines from the existing BRPM Concentrator Plant to the TSF, with a pipeline diameter of between 0.25 m and 0.30 m over a distance of approximately 3 km. The peak throughput of the pipeline from the existing BRPM Concentrator Plant to the TSF will be approximately 140 L/s.* • *Transportation of return water back to the existing BRPM Concentrator Plant from the RWD via overland pipelines over a distance of approximately 3 km. The peak throughput of the pipeline from the RWD back to the existing BRPM Concentrator Plant will be approximately 140 litres per second*.
GN R984 of 04 December 2014	6	The development of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent. • *The development of TSF and RWD requiring a Water Use License in terms of Section 21 of the National Water Act (Act No. 36 of 1998).*
GN R984 of 04 December 2014	15	The **clearance of an area of 20 ha or more of indigenous vegetation**, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. • *The clearance of land associated with the extension of the existing BRPM TSF (approximately 150 ha); the RWD (approximately 12.7ha); and the construction of pipelines from the TSF to the RWD; from the Return Water Dam to the existing BRPM Concentrator Plant; and from the existing BRPM Concentrator Plant to the TSF (approximately 20 ha)*
GN R984 of 04 December 2014	16	The **development of a dam** where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 m or higher or where the highwater mark of the dam covers an area of 10 ha or more. • *The development of a TSF (approximately 150 ha); and* • *The development of a RWD (cover an area of approximately 12.7ha).*
GN R984 of 04 December 2014	17	Any activity including the operation of that activity which r**equires a mining right as contemplated in section 22 of the MPRDA (Act No. 28 of 2002)**, including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the MPRDA. • *The development of a Tailings Storage Facility (approximately 150 ha);* • *The development of a Return Water Dam (approximately 12.7ha); and*

Number and Date of the Relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each Activity
		• *The development of pipelines from the TSF to the RWD; from the RWD to the existing BRPM Concentrator Plant; and from the existing BRPM Concentrator Plant to the TSF (approximately 20 ha).*
Pipe diameter	21	**Any activity** including the operation of that activity **associated with the primary processing of a mineral resource** including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies. • *The development of a Tailings Storage Facility (approximately 150 ha);* • *The development of a Return Water Dam (approximately 12.7ha); and* • *The development of pipelines from the TSF to the RWD; from the RWD to the existing BRPM Concentrator Plant; and from the existing BRPM Concentrator Plant to the TSF (approximately 20 ha).*
GN R985 of 04 December 2014	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. Outside urban areas in: (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from a biosphere reserve. • *The development service/maintenance roads with a reserve less than 13,5 metres associated with the TSF, RWD, Topsoil Stockpile and Pipelines. The proposed development will take place approximately 10 km from the Pilanesberg National Park border.*
GN R985 of 04 December 2014	12	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (b) Within critical biodiversity areas identified in bioregional plans; Vegetation clearance would be required for the proposed construction of the powerlines and associated servitudes which will be located within an identified Critical Biodiversity Area. • *Vegetation clearance would be required for the proposed development of the TSF and associated infrastructure which will be located within an identified Critical Biodiversity Area. According to the North West Province Biodiversity Conservation Assessment the area falls within the provincial-level biodiversity corridor network aimed at retaining connectivity between all geographic areas in the province.*

3.2.2 National Environmental Management Waste Act (Act No. 59 of 2008)

The NEM:WA was implemented on 1 July 2009 and Section 20 of the Environment Conservation Act (Act No. 73 of 1989), under which waste management was previously governed, was repealed.

The objectives of NEM:WA involve the protection of health, wellbeing and the environment by providing reasonable measures for the minimisation of natural resource consumption, avoiding and minimising the generation of waste, reducing, recycling and recovering waste, and treating and safely disposal of waste as a last resort.

In terms of the NEM:WA, all waste management activities must be licensed. According to Section 44 of the NEM:WA, the licensing procedure must be integrated with an EIA process in terms of the NEMA. GN R921 of 29 November 2013 contains the list of waste activities that requires EA. The application form lodged with the DMR also included Waste Management Licence listed activities which requires EA. Table 3-2 includes the Waste Management Licence listed activities applied for in terms of GN R921 of 29 November 2013. The location of where these waste management activities will take place is illustrated in Figure 3-2.

Table 3-2: NEM:WA listed Activities as Applicable to the Proposed Project

Number and Date of the Relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each Activity
GN R921 of 29 November 2013 Category A - Basic Assessment	1	The storage of general waste in lagoons: • *Storage of general waste in the RWD.*
	13	The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule: • *Extension of the TSF associated infrastructure covering an area of approximately 150 ha.*
GN R921 of 29 November Category B - Scoping and EIA	8	The disposal of general waste to land covering an area in excess of 200 m^2 and with a total capacity exceeding 25 000 tons: • *TSF covering an area of approximately 150 ha*
	10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity): • *Extension of the existing BRPM TSF and associated infrastructure covering an area of approximately 150 ha;* • *Construction of a RWD of approximately 12,7 ha;* • *Construction of a Topsoil Stockpile of approximately 12 ha;* • *RDW 15ha;* • *Construction of Pipelines from the TSF to the RWD;* • *Construction of Pipelines from the RWD to the existing BRPM Concentrator Plant; and* • *Construction of Pipelines from the existing BRPM Concentrator Plant to the TSF.*

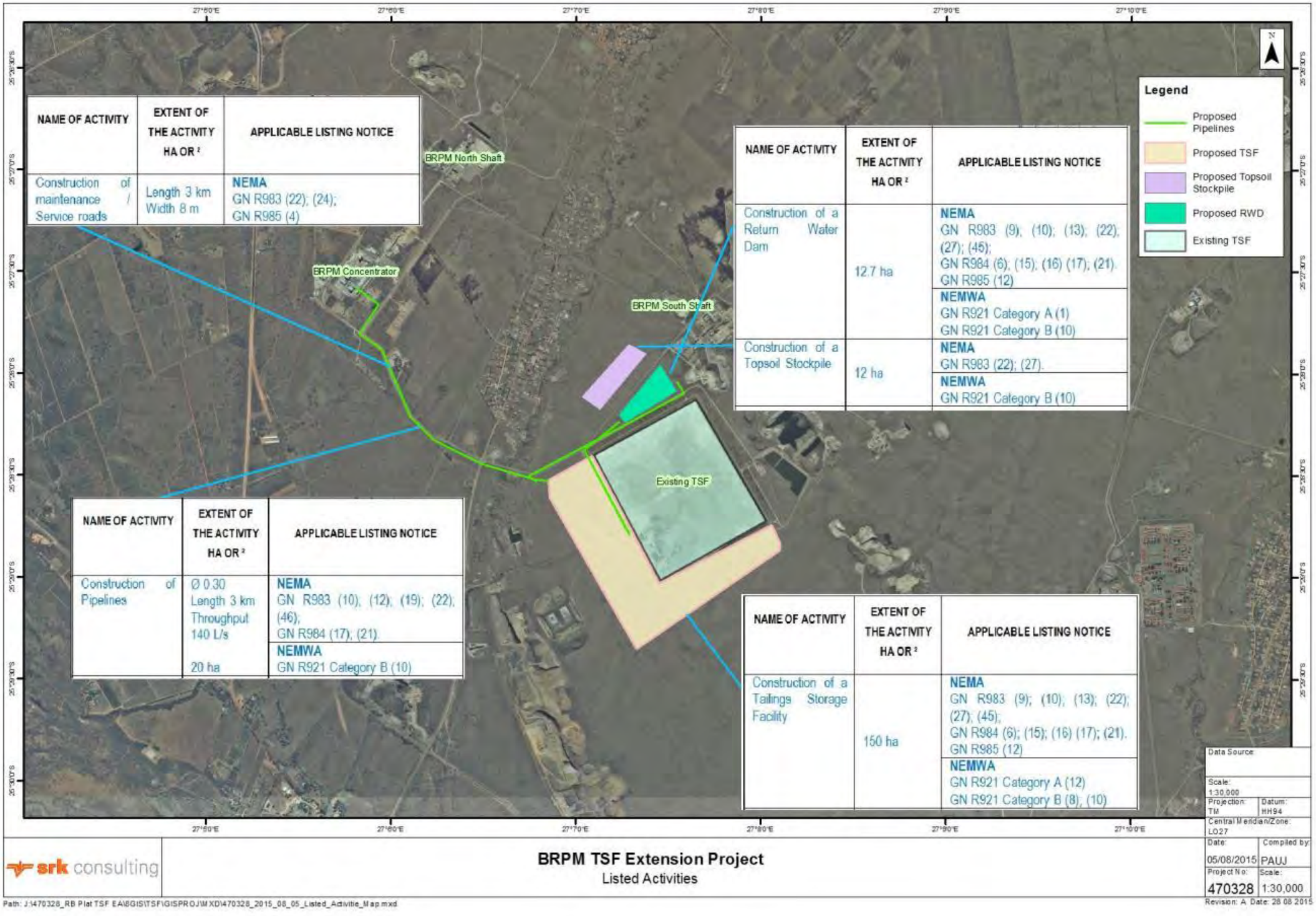


Figure 3-2: Proposed Listed Activities and Waste Management Activities associated with the BRPM TSF Extension Project

3.2.3 National Environmental Management Air Quality Act (Act No. 39 of 2004)

The National Environmental Management: Air Quality Act (Act No. 39 of 2004) was implemented on 24 February 2005 and reforms the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

On 22 November 2013 the list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage was published under GN R893 in Governmental Gazette No 37054, in terms of Section 21(1)(b) of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) thereby repealing the previous list of activities which were promulgated on 31 March 2010.

An Air Quality specialist study was conducted as part of this application process and no listed activities in terms of GN R893 of 31 March 2010 are anticipated for the proposed project (Please refer to Appendix I). However, should an Atmospheric Emission License (AEL) be required an application for AEL will be lodged with the Bojanala Platinum District Municipality.

3.2.4 Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

The main objective of the MPRDA is to recognise the sovereignty of the State over all the mineral and petroleum resources in South Africa and to promote equitable access to the country's resources. This Act ensures that holders of existing and new mining and production rights contribute towards the socio-economic development in the areas in which they operate, promoting economic growth, employment and advance the social and economic welfare of all South Africans.

BRPM has an existing EMPR, issued on February 1998, for its BRPM mining operations (Reference Number: RDNW(KL)6/2/2/391) in terms of the Minerals Act (Act No. 50 of 1991). The approved BRPM EMPR (1998) included the construction of a TSF (known as the existing BRPM TSF).

The SMC has an existing EMPR issued in March 2008, for its Styldrift mining operations (Reference Number: NW30/5/1/2/3/2/1/(312) EM) in terms of the MPRDA and an existing WUL No: 26031507 in terms of the NWA. The approved EMPR (2008) included the extension of the existing BRPM TSF located on the Farm Boschkoppie 104 JQ onto the Farm Uitvalgrond 105 JQ (footprint size of approximately 330 ha) to accommodate additional tailings produced by the modified BRPM Concentrator Plant. However, RBPlat have investigated alternative areas for the extension of the proposed BRPM TSF due to a delay in obtaining the required surface lease agreements associated with the Farm Uitvalgrond 105 JQ.

As part of the EA process, the existing approved EMPR will be amended to incorporate the proposed mining related activities and infrastructure associated with the BRPM Extension Project in terms of the MPRDA, in accordance with Section 102 of the MPRDA which stipulates that an EMPR may not be amended without the written consent of the Minister.

3.2.5 National Water Act (Act No. 36 of 1998)

The National Water Act (Act No. 36 of 1998) (NWA) is the primary regulatory legislation controlling and managing the use of water resources as well as the pollution thereof. The preamble to the NWA recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users.

As the NWA is founded on the principle the government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, an industry (including mines) can only be entitled to use water if the use is permissible under the NWA.

Further, Regulation 704 of the NWA deals with the control and use of water for mining and related activities aimed at the protection of water resources. It specifically deals with clean and dirty water in a mining environment. An assessment of requirements for the extension of the TSF and associated infrastructure in terms of Regulation 704 has been conducted as part of the WUL amendment application.

The SMC has a valid WUL in terms of Chapter 4 of the NWA, Licence Number 26031507. However, this licence will need to be amended to include the new water uses relating to the extension of the TSF and its associated infrastructure. SRK will compile and submit a WULA as well as updating SMC's IWWMP for submission to DWS for authorisation. A separate application will be lodged with the DWS. Table 3-3 depicts all the water uses currently being applied for. Figure 3-3 illustrates the location where all the water uses will take place.

Project specific water uses in terms of Section 21 of the NWA

The proposed BRPM TSF Extension Project will require amendment to the existing WUL in terms of the following water uses that will be triggered through the implementation of the proposed project:

- Section 21 (c) and (i) water uses for watercourse crossings by the conveyer belt, pipelines, service roads and power lines: Some of the coordinates are incorrectly reported in the approved WUL and corrections were submitted in February 2012.
- Section 21 (g) water use for Styldrift Ericson dams 1, 2, 3, & 4: Corrections were made to the original design – the capacity has changed to 14 535 m^3. Corrections were submitted in February 2012.
- Section 21 (g) water use for Styldrift sewage treatment plant: The plant was submitted as part of the original WULA but was omitted from the WUL issued. A new application was submitted in June 2015.
- Section 21 (g) water use for Styldrift dust suppression: The area used for dust suppression has been updated, corrections were submitted in February 2012.

Relevant exemptions in terms of Regulation 704

Regulation 704 (Government Gazette 20118, 4 June 1999), under the NWA, stipulates conditions for managing water on a mine. Exemption will be applied for the following aspects under Regulation 704 in terms of the BRPM TSF Extension Project:

- **Regulation (4):** *The pipelines associated with the TSF will cross 2 wetlands and one riparian feature.*
- **Regulation (5):** *The TSF starter wall, RWD wall and the shallow excavation remaining following rehabilitation of the Glencore Open Pit*[9] *will be with waste rock.*

[9] Rehabilitation of the open pit by Glencore is in accordance with Water Use License number 03/A22F/ACGIJ/580 dated 19 July 2011- licence held by Glencore.

Table 3-3: New Water Uses Applicable to the Proposed Project

Ref. No	Water Use triggered in terms of section 21 of the NWA		Source	Purpose	Property	Title Deed No.	Location	
							Longitude	Latitude
W1	21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource;	Extension of TSF	Storage of tailings deposited from concentrator plant	Boschkoppie Farm 104 portion 1	T1712/1929BP	27° 6' 50.97" E	25° 28' 31.08" S
W2			RWD	Decanting and storage of water recovered from the TSF for re-use as process water			27° 7' 32.03" E	25° 28' 4.50" S
W3			Spraying with process water from RWD	Dust suppression at project site during construction and operation	Boschkoppie Farm 104 portion 1	T1712/1929BP	This water use will take place throughout the project footprint area	
					Boschhoek 103JQ Portion 70	T60686/1997		
					Boschhoek 103JQ Portion 71	T60685/1997		
					Boschhoek 103JQ Portion 85	T60687/1997		
					Boschhoek 103JQ Portion 103	T60688/1997		
W4	21(c) 21(i)	Impeding of flow & Altering the bed, banks, course or characteristics of a watercourse;	Pipelines crossing Wetland 1	Interconnecting pipelines to transport slurry and process water	Boschhoek 103JQ Portion 71	T60685/1997	27° 6' 44.82" E	25° 28' 30.82" S
W5			Pipelines crossing a Riparian Feature				27° 6' 37.31" E	25° 28' 28.81" S
W6			Pipelines crossing Wetland 3				27° 6' 50.97" E	25° 28' 31.08" S
W7			Diversion of clean stormwater around the TSF will result in a loss of runoff to the Leragane and Matlopyane streams.	Storage of tailings deposited from concentrator plant	Boschkoppie Farm 104 portion 1	T1712/1929BP	27° 6' 11.43" E	25° 28' 17.45" S

W8	21(i)	Altering the bed, banks, course or characteristics of a watercourse;	Extension of TSF: Footprint within 500 m of Wetland 3	Storage of tailings decanted from concentrator plant at the extended TSF, which will lie within 500 m of wetland 3	Boschkoppie Farm 104 portion 1	T1712/1929BP	27° 6' 50.97" E	25° 28' 31.08" S

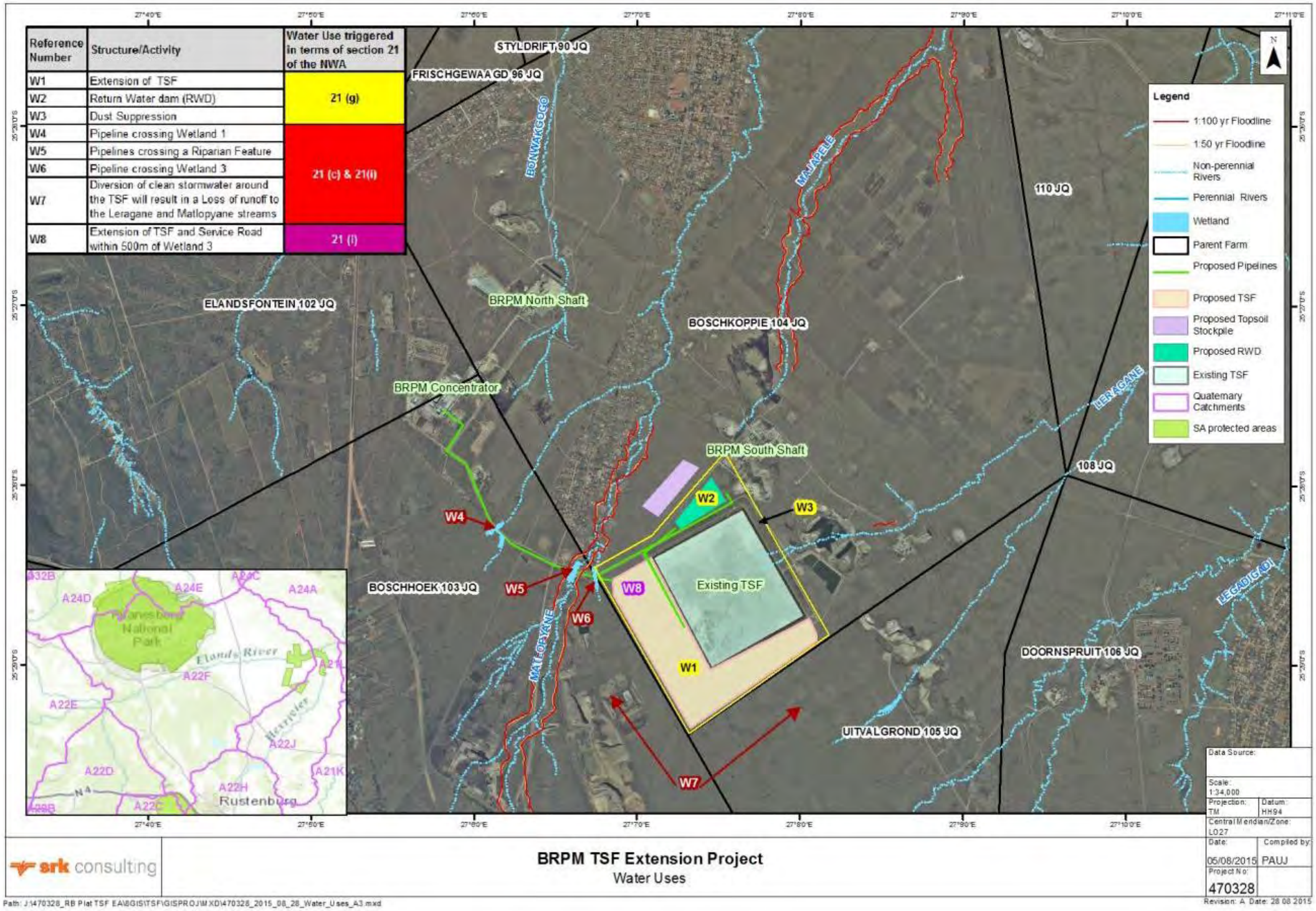


Figure 3-3: Proposed Water Uses associated with the BRPM TSF Extension Project in terms of the NWA

3.3 Technical Investigation and Reporting

3.3.1 Terms of Reference

During the Scoping Phase, potential environmental, social and cultural impacts associated with the proposed development were identified. The Terms of Reference were developed for specialists to undertake specific studies to investigate the potential impacts that may be associated with this proposed project. The Terms of Reference is provided in Appendix D.

3.3.2 Specialist Studies

Existing baseline information from previous studies undertaken in the area and the existing EIA and EMPR Reports for RBPlat was supplemented by extensive specialist investigations and consideration during the Impact Assessment Phase. Table 3-4 provides a list of the various specialist studies that were conducted between **February and March 2015** as well as the details of the specialist responsible for the relevant investigation.

Table 3-4: Specialist Team

Specialist field	Company	Contact Person
Air Quality	SRK Consulting	Mr. Dhiren Naidoo / Mr Arrie Jansen
Biodiversity and Wetlands	Scientific Aquatic Services (SAS)	Mr. Stephen van Staden
Groundwater	SRK Consulting	Ms. Sarah Skinner
Surface Water	SRK Consulting	Mr. James Kettledas
Soils, land use and land capability	Terra-Africa	Ms. Mariné Pienaar
Noise	DB Acoustics	Mr. Barend van der Merwe
Heritage	Department of Anthropology and Archaeology, UNISA	Mr. Francois Coetzee
Visual	SRK Consulting	Mr. Wouter Jordaan
Palaeontology	Heidi Fourie Consulting	Ms. Heidi Fourie
Closure & Rehabilitation	SRK Consulting	Mr. James Lake

Refer to Appendix E to Appendix N for the Specialist team's Curriculum Vitae and Declarations and the individual specialist reports. In addition a liability assessment in terms of Regulation 54 of the MPRDA has also been conducted by SRK to determine the quantum financial provision of RBPlat as detailed in Section 14.6.

3.3.3 Assessment of Impacts

An assessment of the anticipated impacts was undertaken for both pre- and post-mitigation. The impact assessment methodology is provided in Section 9.

3.3.4 Reporting and Development of an Environmental Management Programme (EMPR)

An EMPR specific to RBPlat's proposed BRPM TSF Extension Project was developed to mitigate the negative anticipated impacts and enhance any potential positive impacts that may be associated with the proposed project.

The results of various specialist studies, impact assessment, the environmental management programme and monitoring programme are collated and recorded in this EIAr/EMPR Amendment Report and released for public review for a 30 days[10] period from 02 September 2015 to 05 October 2015.

4 Project Alternatives

During the Pre-feasibility Phase, the Screening and Scoping Phase of the Project various alternatives have been considered for the BRPM TSF Extension Project and associated infrastructure. Many of these alternatives have been identified as being non-viable and will be excluded from the Impact Assessment Phase. The following alternatives were taken into account:

- Tailings Storage Facility Location/Site Alternatives;
- Tailings Disposal Alternatives; and
- "No-go" Alternative.

4.1 Tailings Storage Facility Location/Site Alternatives

As mentioned previously, the TSF site, located on the Farm Uitvalgrond 103 JQ which is situated adjacent to the existing BRPM TSF, has always been earmarked to accommodate the tonnage generated from the SMC. However, RBPlat has not currently been able to secure surface lease agreements with the land owners, and the availability of alternate TSF sites in line with the Mine Expansion strategy has been investigated.

The Farm Uitvalgrond 103 JQ has always been earmarked to accommodate the tonnage generated from the SMC. Twenty one (21) alternative locations for the TSF extension were investigated as part of the original SMC EMPR. Of these sites only 3 sites were found suitable in terms of the site selection criteria for the location of the proposed TSF extension and of these 2 sites were considered during the Impact Assessment Phase (Figure 4-1). The TSF site selection was done by taking cognisance of the following factors:

- Required capacity and footprint extent (the TSF needs to be able to handle both tailings produced by the Styldrift shaft 1);
- Existing and future infrastructure and servitudes e.g. powerlines, roads etc.;
- Position in relation to other mine infrastructure;
- Distance from the existing BRPM Concentrator Plant;
- Area available for development as a TSF;
- Sterilisation of ore reserves/outcrops;
- Environmental and social constraints;
- General topography;
- Geology of the site;
- Surface geotechnical conditions in the footprint zone;
- Geohydrology;

[10] Refer to the 2014 NEMA EIA Regulations where Regulation 3(8) of GN R982 of 04 December 2014 where it is regulated that the Report must be made available for a 30 day commenting period.

- Watercourse locations;
- Land use;
- Land ownership;
- Burial and archaeological sites;
- Proximity to settlements.

The location alternatives for the TSF have been investigated and the preferred location alternative was determined based on the site selection criteria and based on the anticipated impacts on the receiving environment i.e. biodiversity, heritage, water sources and surrounding communities.

4.1.1 Tailings Storage Facility Alternative 1 (Preferred Alternative)

The proposed alternative is located on the Farm Boschkoppie 104 JQ. This alternative is located in close proximity to existing infrastructure. This alternative offers the advantage of making use of the same pipe route as the existing BRPM TSF and being adjacent to the existing BRPM TSF, it will be less costly to operate, as labour, plant and the required pump station could be shared with the current TSF. The area where the extension of the BRPM TSF is proposed to be constructed comprises of a transformed environment. This alternative will have the smallest impact zone considering the size of the footprint of approximately 150 ha. This alternative is situated within the BRPM mining right in an area already disturbed by mining activities. Due to its proximity to existing infrastructure a minimal visual impact will be realized as well as shorter pipelines. The location of the Preferred Alternative can be found in Figure 4-2.

4.1.2 Tailings Storage Facility Alternative 2

In terms of the MPRDA EMPR approval RBPlat has approval to extend the existing BRPM TSF located on the Farm Boschkoppie 104 JQ onto the Farm Uitvalgrond 105 JQ (footprint size of approximately 330 ha) to accommodate additional tailings produced by the modified BRPM Concentrator Plant. The surface lease agreements for the extension of the existing BRPM TSF onto the Farm Uitvalgrond 105 JQ have not been successful to date and this necessitated RBPlat to investigate alternative sites/locations for the extension of the proposed TSF extension to accommodate the future tailings produced by the BRPM Concentrator Plant. Please refer to Figure 4-2 for the location of Alternative 2.

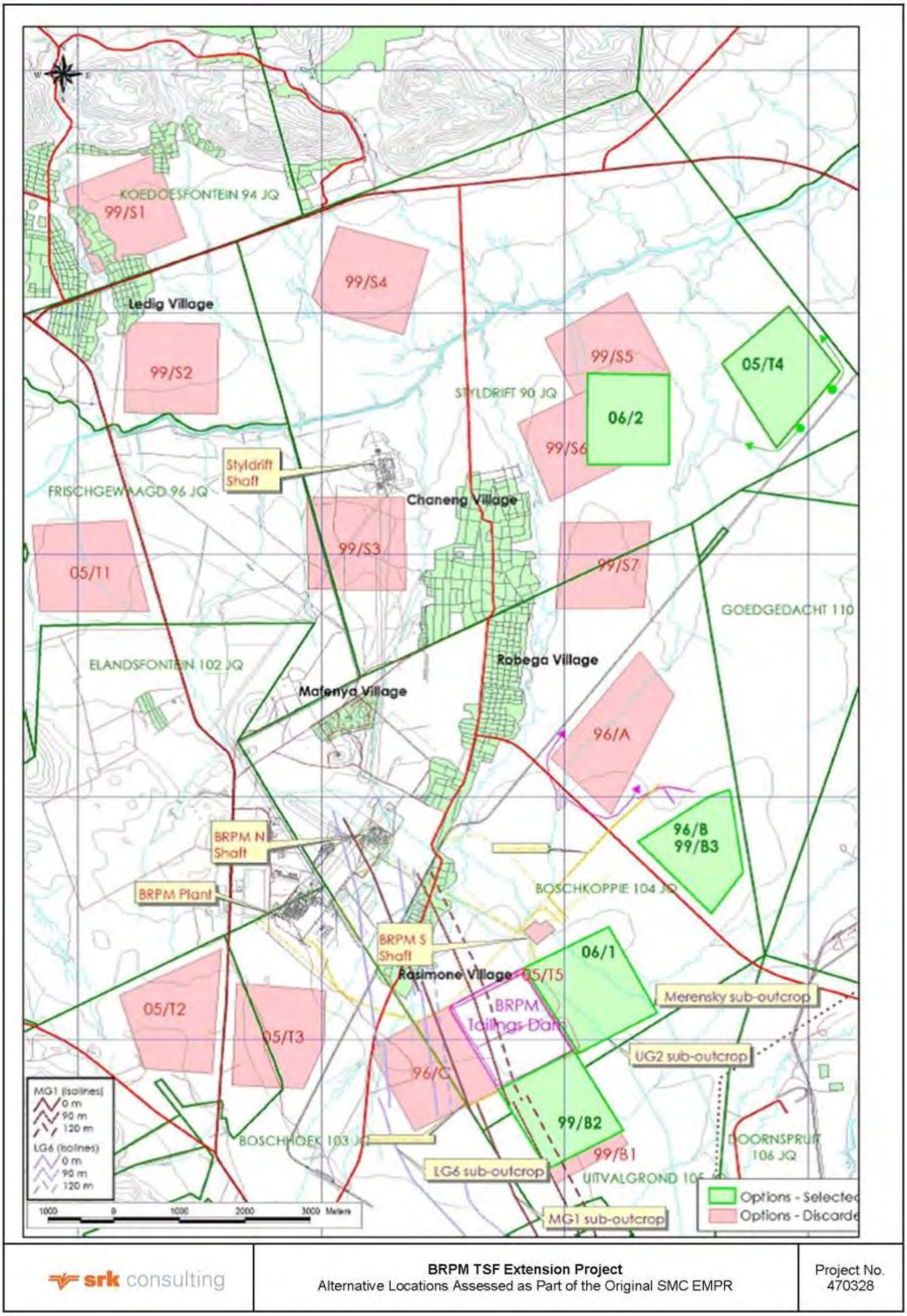


Figure 4-1: Options Considered: Alternative Locations Assessed as Part of the Original SMC EMPR

Figure 4-2: Location of the Alternative 1 (Preferred) and Alternative 2

4.2 Tailings Disposal Alternatives

Tailings are the waste materials left over after the valuable constituents have been abstracted from the ore. Tailings produced by most conventional milling processes are comprised of a mixture of solids in solution/slurry form.

4.2.1 Paste Technology for Tailings Disposal

Paste technology tailings are produced in specialised paste thickeners, or ultra-high-density thickeners and transported by positive displacement pumps. It is claimed that paste is generally discharged with 70-85% solids by weight which is more than double that provided for conventional tailings.

It has been recommended for use at mines with low production rates with water and space constraints as well as inexpensive energy, which is not generally the case in South Africa. Paste has not been widely used for moderate to high production mines or with coarse tailing materials.

A high level trade off study between paste, conventional and thickened tailings disposal/storage was performed by Knight Piésold (2010).

Benefits claimed for paste tailings include:

- More water recovered for recycling;
- Reduced seepage water;
- Greater TSF storage capacity;
- Fewer earthworks.
- Improved geotechnical performance;
- Increased operational flexibility;
- Earlier rehabilitation.

Disadvantages of paste tailings:

- Paste tailings methods within the platinum industry are not well established;
- Additional resources required i.e. thickeners, positive displacement pumps, control equipment and people;
- Thickeners are sensitive to properties of the feed material, whereas conventional tailings facilities can tolerate quite large variations in slurry density and particle size distribution;
- Operators are still unfamiliar with the system;
- Larger ground footprint may be required, depending on topography and configuration;
- Capital and operating cost – thickeners, stronger pipes, flocculants, positive displacement pumps and additional power.

4.2.2 Thickened Technology for Tailings Disposal

Tailing materials may be 'thickened' through the use of high-density or deep-cone thickeners to about 65-72% solids by weight. This is claimed to create a structurally stable tailings that can be deposited at an impoundment site with little segregation and releases very small amounts of reclaim water.

It has been recommended for use at mines with small to moderate production rates where disposal areas are spacious and almost flat. This method can also be suitable for areas with weak foundation materials, which preclude the development of an embankment. Thickened disposal may not be feasible in areas with heavy precipitation, low temperatures and little sun to enhance evaporation.

4.2.3 Conventional Technology for Tailings Disposal (Preferred Alternative)

Tailing materials are dewatered in conventional thickeners to about 30-55% by weight and transported as slurry to the repository. Tailing particles typically segregate during deposition and the deposits release significant amounts of water for recovery in reclaim water ponds. Conventional disposal involves the use of dams, embankments or surface impoundments and may use either cycloning or spigoting for deposition.

It has been recommended for use at any production rate, but in particular at high production mines where the mine's topography lends itself to storage of the tailing in surface impoundments. Environmental concerns related to TSFs can be minimised by favourable site geologic conditions and engineered controls or by lining the impoundment.

In addition to the higher capital and operating costs associated with paste tailings, the associated technological risks (as the paste tailings methodology within the tailings industry is not well established) may require extensive research and investigation before this option can be implemented with confidence.

Based on the information provided above, the conventional thickened tailings disposal technique is the selected option on which the TSF Extension has been designed.

4.3 "No-go" Alternative

The "No-go" option would mean that the BRPM TSF would not be extended. This could result in the closure of the mining activities at SMC as mining activities result in the generation of tailings which requires disposal. Between 2000 and 3000 personnel will be permanently employed during the operational phase of the SMC. The additional infrastructure as proposed in this application will provide a number of temporary and permanent job opportunities to the surrounding communities. SMC can supply the growing platinum demand whilst generating economic returns for stakeholders such as employees, their dependants, shareholders, the community, local, provincial and national government. SMC will increase economic activities in the area and will earn valuable foreign exchange for South Africa. If the project does not go ahead, then these economic benefits will not be realised.

The total tailings production from the existing BRPM operations and SMC (Phase 1 now being constructed) will not be able to accommodate the future production from the SMC Project. An extension to the TSF capacity is thus be required to handle the SMC tailings arising from 2016. In order for the SMC to achieve its objective of initially supplementing, and eventually replacing, the production at BRPM, additional TSF capacity is required to accommodate the tailings. Approval for the construction of a new TSF was granted in terms of the MPRDA to allow for the extension of the existing BRPM TSF onto the Farm Uitvalgrond 105 JQ. However, the surface lease agreements for the extension of the existing BRPM TSF onto the Farm Uitvalgrond 105 JQ have not been

successful to date and it necessitated the investigation of alternative areas for the extension of the existing BRPM TSF to accommodate the future tailings produced by the BRPM Concentrator Plant.

The benefits of this project i.e. to extend the existing BRPM TSF are considered to outweigh the possible implementation of the “No-go” option/alternative.

5 Project Description

The BRPM TSF Extension Project forms part of a greater project, which is also referred to as the SMC, and which is being implemented by BRPM JV Mining Operations. The project context is shown diagrammatically in Figure 5-1. It should be noted that SMC and BRPM have shared operations at the BRPM concentrator plant as well as the TSF.

The following activities are included in the BRPM TSF Extension Project:

- Extension of the Existing BRPM TSF;
- Construction of a new RWD;
- Construction of pipelines and accompanying service roads from the existing BRPM concentrator plant to the extended TSF;
- Construction of pipelines and accompanying service roads from the extended BRPM TSF to the newly constructed RWD; and
- Construction of pipelines and accompanying service roads from the newly constructed RWD to the existing BRPM Concentrator Plant.

In order to give context to the BRPM TSF Extension Project, a brief description of the activities included in the SMC mining operations, and how it relates to the BRPM TSF Extension Project is described in the following section. Details on the BRPM operations are outside the scope of this report and are therefore not described.

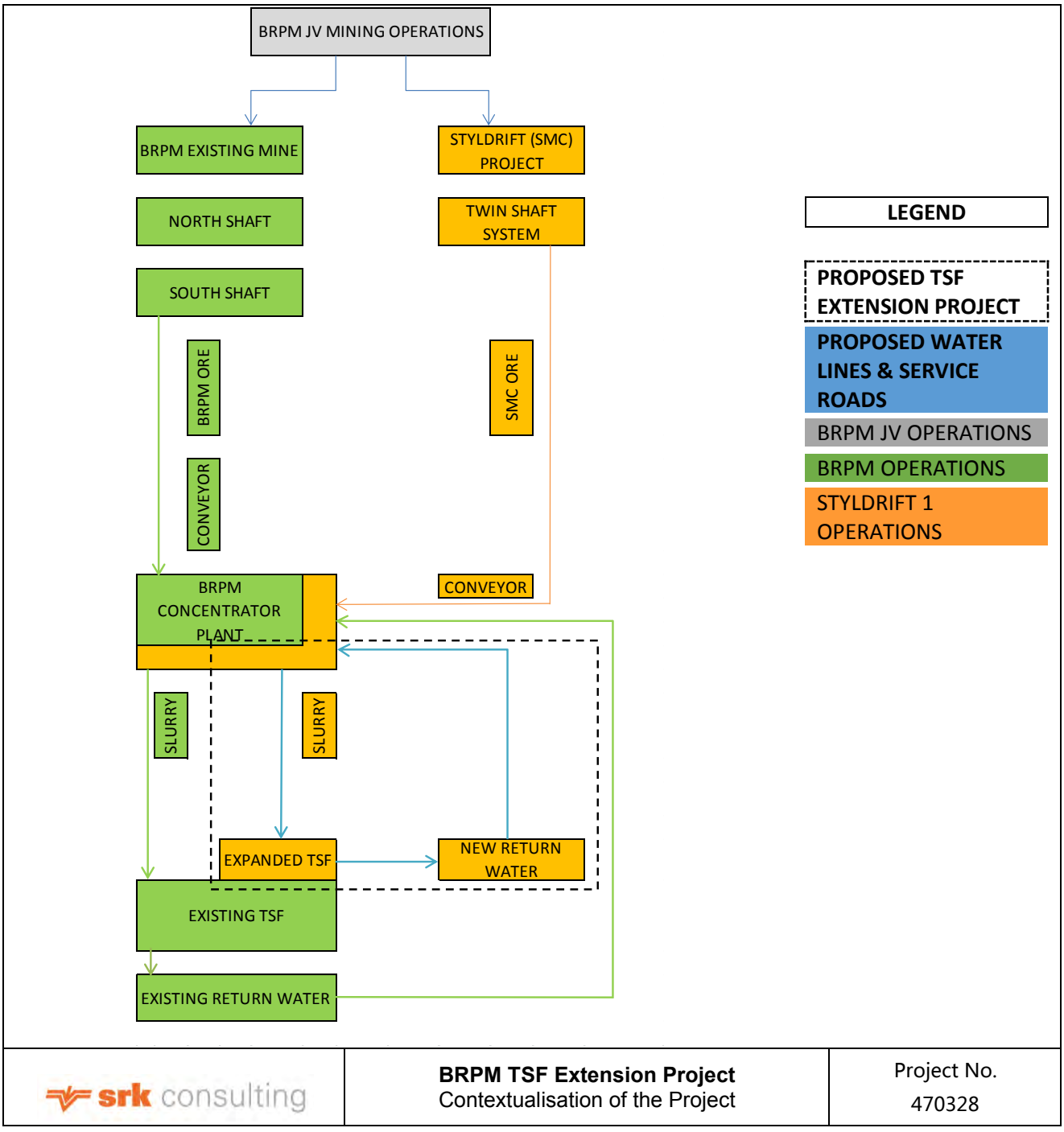


Figure 5-1: Contextualisation of BRPM TSF Extension Project

5.1 Project Service Requirements

The following services may be required for the BRPM TSF Extension Project:

Electricity: Should electricity be required in terms of the proposed construction activities, electricity will be sourced from the existing electricity grid of the mine.

Water supply: Potable and process water supply will be sourced from existing water sources at the mine.

Waste management: All waste generated during the construction phase will be stored at existing storage facilities at the mine and disposed of appropriately, as per the mine's current waste management procedures which stipulates that different waste classes are disposed of separately as follows:

- General Waste: Disposed of at BRPM's internal approved/authorised landfill site;
- Industrial Waste: Removed and recycled by a suitably qualified contractor;
- Hazardous Waste: Removed by a suitably qualified contractor, and disposed of a licensed facility (records of safe disposal certificates are kept on the mine);
- Paper is recycled at a recycling facility in Rustenburg.

Employment opportunities: During construction, temporary portable ablution facilities and a conservancy tank will be utilised and removed on completion of the construction phase by an appointed service provider. The employment opportunities required for the BRPM TSF Extension Project are illustrated in Table 5-1 for the construction and operational phase. The RBPlat Recruitment Policy will be applied during the employment of people that could arise from this project.

Table 5-1: Employment needs for the BRPM TSF Extension Project

Activity	Construction Phase	Operational Phase
Skilled	35	5
Unskilled	120	20
Total employment opportunities	**155**	**25**

5.2 Background of the Existing SMC Mining Operations

5.2.1 Mineral Deposit

The SMC is located in the Western lobe of the Bushveld Igneous Complex (BIC). The BIC comprises four major zones and subsequent layered sub-zones and horizons, each with its own chemistry and characteristics. Multiple economic commodities are mined within the complex along the layering, including the platinum group metals (PGMs), chrome (Cr), vanadium (V) and base metal by-products. Two economic reefs are mined by RBPlat, namely Upper Group 2 (UG2) and Merensky Reef (MR).

5.2.2 Mine Products

The BRPM Concentrator Plant produces a concentrate of PGMs which includes six pure metals with high melting points: platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), osmium (Os) and ruthenium (Ru); as well as gold and base metals such as nickel, copper and cobalt. The residue from the Concentrator is the tailings which require the extension of the BRPM TSF.

5.2.3 Mining Method Description

The SMC is an underground mine. Mechanised methods are being employed in the thick Merensky resource areas with mining heights varying between 1.6 m and 2.2 m. The narrow MR area will be mined using a conventional breast mining layout.

Access to the underground workings at SMC is via a twin concrete-lined vertical shaft system.

The planned production rate for the SMC is 230 ktpm. Ore are transported via a conveyer system for approximately 5 km from the SMC to the existing BRPM Concentrator Plant.

5.2.4 BRPM Concentrator Plant

SMC will make use of the existing BRPM Concentrator Plant, which has capacity to accept ore from the existing BRPM mine as well as the SMC.

The BRPM concentrator currently has a capacity of 250 ktpm. It is, however, being upgraded to accommodate additional ore from the SMC. The plant operates on a 24 hours, 365 days a year basis.

5.2.5 Tailings Storage Facility (TSF) and Return Water Dam (RWD)

Tailings are the residue produced from the existing BRPM Concentrator Plant in a slurry form (a mixture of fine mineral particles and water). The TSF is a structure which stores the slurry and isolates it from the surrounding environment.

As the slurry thickens, water is drained from the TSF to a RWD, where it is stored for re-use at the existing BRPM Concentrator Plant.

Deposition of tailings commenced in late 1999 on the existing BRPM TSF under the EMPR held by BRPM (reference RDNW(KL) 6/2/2/391) and BRPM WUL (number 26032490). The existing BRPM TSF is rectangular in shape. The total tailings production from the existing BRPM operations and SMC (Phase 1 now being constructed) will not be able to accommodate the future production from the SMC Project. Water collected from the penstock on the existing BRPM TSF is returned to the RWD. Water from the RWD is recycled to the existing BRPM Concentrator Plant for re-use. The existing RWD has a total capacity 190 000 m^3, which does not provide sufficient storage capacity to facilitate the extended TSF hence an additional RWD will be constructed.

It is therefore evident that, in order for the planned mining operations at SMC to continue, the existing BRPM TSF would have to be extended and an additional RWD would have to be constructed to cater for the additional tailings and waste water generated.

5.3 Description of the BRPM TSF Extension Project

From this section the remainder of the report describes the ***preferred alternatives*** as contained in Section 4.

The mining activities currently at SMC comprise of an underground mining operation with a decline shaft, which has been established to exploit the Merensky Platinum Group Metals ore reserve and UG2.

The key components of the infrastructure associated with the proposed amendment to the existing approved EMPR that will have to be constructed include (refer to Figure 5-2 for a site layout plan of the BRPM TSF Extension Project):

- **Tailings Storage Facility** - Extension of the existing BRPM TSF covering approximately 150 ha on Portion 1 of the Farm Boschkoppie 104 JQ;
- **Return Water Dam (RWD)** - Construction of a RWD covering approximately 12.7 ha on Portion 1 of the Farm Boschkoppie 104 JQ;

The proposed secondary infrastructure and activities associated with the above key infrastructure includes:

- Construction of overland pipelines (covering approximately 3 km in length) for:
    - The transportation of tailings from the BRPM Concentrator Plant to the extended TSF on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;

- The transportation of return water between the extended TSF and the RWD on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
- The transportation of return water between the RWD and the BRPM Concentrator Plant on Portion 1 of the Farm Boschkoppie 104 JQ, Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
- The overland pipelines will be placed onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF. The pipelines will cross two wetlands and a riparian habitat areas associated with the Matlopyane tributary and length thereof will be approximately 3 km on Portion 1 of the Farm Boschkoppie 104 JQ;

- Establishment of a topsoil stockpile , service roads, water management infrastructure and stormwater systems; and
- Relocation of a power line (a separate Basic Assessment application has been submitted to National Department of Environmental Affairs (DEA) (DEA reference number 14/12/16/3/3/2/648, Environmental Authorisation was granted on 31 March 2015).

5.4 Project Timeline

The project life timeline is described in Table 5-2.

Table 5-2: Project Phase Description

Phase	Planned Duration	Description
Planning and Design Phase	September 2015 – September 2017	Planning will continue until construction starts
Construction Phase	April 2016 – September 2017	Construction will start with the establishment of site camps and end with commissioning
Post-Construction Rehabilitation Phase	April 2016 – September 2017	Rehabilitation will take place concurrently with construction.
Operation and Maintenance Phase A	September 2017 - 2024	The BRPM TSF extension will be operated as a separate unit from the existing TSF at this stage.
Operation and Maintenance Phase B	2025 - 2070	The BRPM TSF extension and the existing TSF will be operated as a single unit from this stage onwards.
Decommissioning Phase	2070	This depends on market conditions, but the current mine closure date is estimated to be in 2070
Post-Decommissioning Rehabilitation phase	On mine closure	Monitoring of groundwater and surface water in the surrounding area is likely to be required to continue for up to 30 years after closure.

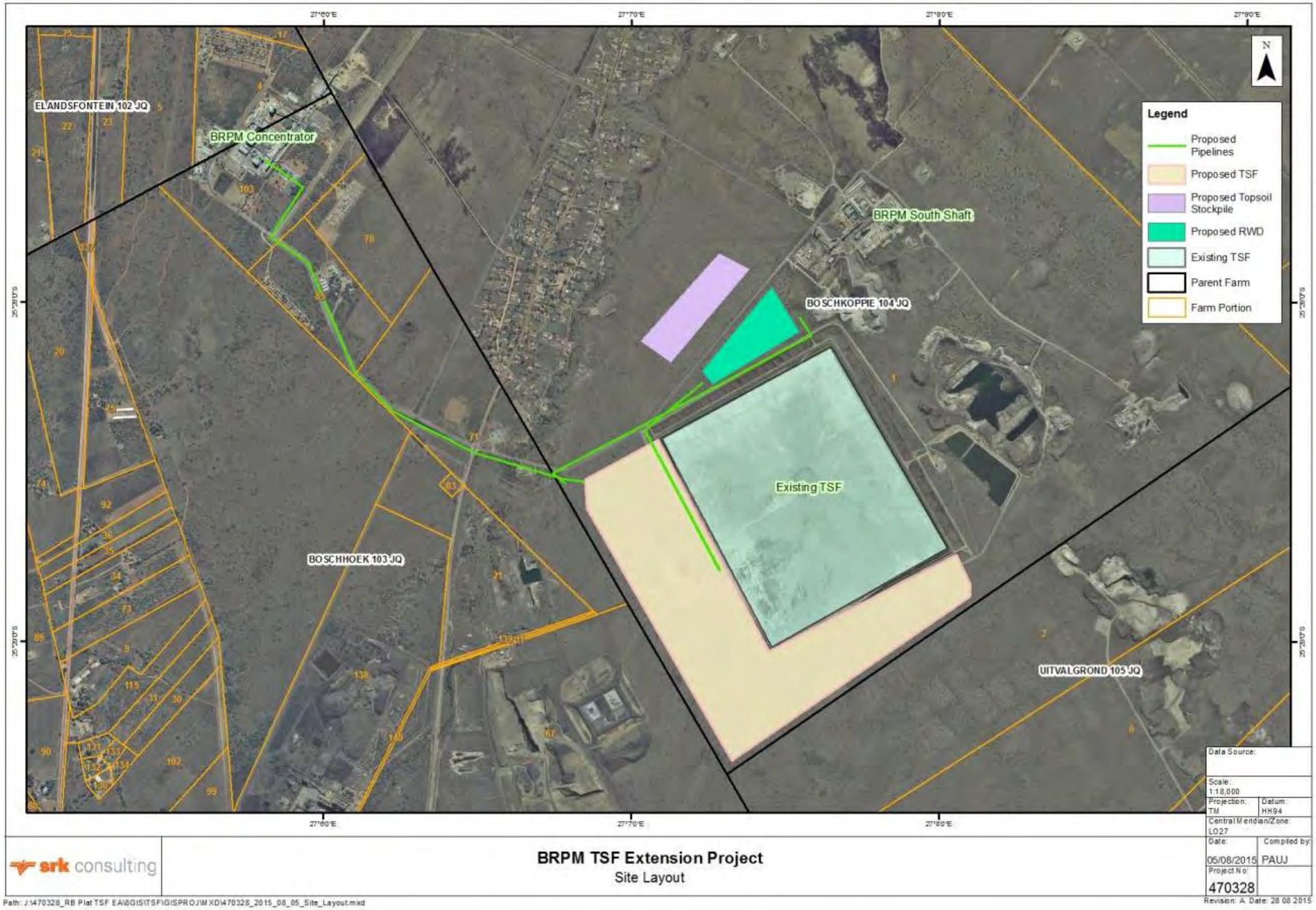


Figure 5-2: Site Layout Plan for the Proposed BRPM TSF Extension Project

6 Project Motivation

6.1 Project Need and Desirability

6.1.1 Existing BRPM Tailings Storage Facility

The Merensky reserves at the existing BRPM South Shaft and North Shafts are now being depleted, with the South Shaft reducing Merensky production during 2012 and a decrease in the North Shaft production planned. The SMC is planned to initially supplement and eventually replace production at BRPM Shafts. The existing BRPM TSF is not able to accommodate the SMC tailings arising from 2016.

In order for the SMC to achieve its objective of initially supplementing, and eventually replacing, the production at BRPM, additional TSF capacity is required to accommodate the tailings produced at the BRPM Concentrator Plant.

The area adjacent to the existing BRPM TSF site has always been earmarked to accommodate the future tailings generated from the SMC. Approval was granted in terms of the MPRDA to extend the existing BRPM TSF onto the Farm Uitvalgrond 105 JQ (Styldrift EIAr/EMPR, 2008). However, securing surface lease agreements with the land owners for the Farm Uitvalgrond 105 JQ has proved problematic and therefore alternative TSF locations have been investigated.

6.2 Benefits of the Project

The BRPM TSF Extension Project forms part of the bigger SMC Project which will contribute to the National and North West Provincial economy in terms of an increase in Gross Domestic Product (GDP).

South Africa is the world's leading primary producer of platinum. The SMC Project will boost RBPlat's platinum production capacity. Platinum is used in a range of industrial applications and in the jewellery sector. The automotive industry requires the powerful catalytic properties of platinum for use in exhaust systems as catalytic converters – which convert harmful gases (such as carbon monoxide) into less harmful carbon dioxide and water vapour. BRPM SMC therefore contributes not only to the local economy but also to the national and international economy.

RBPlat is fully committed to meeting the socio-economic requirements of the MPRDA and the Mining Charter. The Group is proud of the contribution it has made to empowerment in South Africa through numerous transactions since 2000 which have resulted in meaningful empowerment of Historically Disadvantaged South Africans. These include disposal transactions, joint ventures as well as establishing an employee share ownership scheme and various community trusts.

RBPlat has appointed a Social and Ethics Committee who is responsible for executing the Social Labour Plan as well as Corporate Social Investment. RBPlat has further earned best performer status on the Johannesburg Stock Exchange (JSE) socially responsible investment index. RBPlat's socio-economic expenditure from 2010 to 2014 was R276 million. RBPlat aims to add value to the communities that surround the operations through consulting with stakeholders to identify local needs and then delivering on projects that make a social and economic difference.

By year-end 2014, R3.818 billion of the total capital commitment of R4.552 billion for the project to date had been expended. The total capital cost of the project will be approximately R11.014 billion. RBPlat has made considerable investments to ensure that the local communities have access to uncontaminated potable water, which is supplied by Magalies Water. A summary of investments made to improve community infrastructure is attached in Appendix R.

The BRPM TSF Extension Project is necessary for RBPlat to continue its mining operations at SMC, which is in public interest, since mineral extraction is in the best interests of the public at large as this generates earning power both locally and internationally.

The BRPM TSF Extension Project will be required to realize the GDP increase of the SMC Project. As a result the GDP of the Bojanala Platinum District Municipality could increase by approximately 4.32%, while that of the Province could benefit by approximately 1.35%. Although the project will have a high positive impact on the economy for a minimum of 25 years, the dependence of the Province on a single district (Bojanala Platinum District Municipality) for at least 31% of its economic activity necessitates greater diversification at a provincial level.

In order for the bigger SMC Project to continue, the identified new infrastructure will have to be constructed.

A number of benefits associated with the proposed BRPM TSF Extension Project have been identified by RBPlat which include:

- Exploiting the natural mineral resources as appropriate under the MPRDA;
- Creating employment opportunities during construction phase and decommissioning phase of the BRPM TSF Extension Project;
- Retaining, and possible creation, of employment opportunities on local and regional scale during operational phase; and
- Continued long term supply of platinum ore for further processing at the existing Concentrator and Smelter Plants.

BRPM SMC has a positive socio-economic impact through employment of local community members. Un-skilled and semi-skilled labour is sourced mainly from the local communities and surrounding areas and recruitment is in conjunction with the local unemployment forum.

Specialist and skilled labour are recruited outside the local boundaries due to skills scarcity. The BRPM TSF Extension Project is crucial for the continuation of the RBPlat operations, which currently employ approximately 8000 people. Women make up 23% of the RBPlat management team and 11% of the total workforce. RBPlat is committed to recruit people from the local communities whenever possible.

Alternative formal employment is very limited in the surrounding area, which means that the RBPlat mining operations act as the main source of income to the local communities. Furthermore, the non-perennial nature of the majority of local rivers makes agriculture unappealing alternative which does not provide an income to great numbers of local people.

Approximately 155 employment opportunities will be created in the construction phase of the TSF which will be made up of the following:

- 35 Skilled;
- 120 Unskilled.

Approximately 25 employment opportunities will be created during the operational phase of the TSF which will be made up of the following:

- 5 Skilled;
- 20 Unskilled.

The mainstay of the economy of North West Province is mining, which generates more than half of the province's gross domestic product and provides jobs for a quarter of its workforce and makes up more than a fifth of the South African mining industry as 94% of the country's platinum is found in the

Rustenburg and Brits districts, which produce more platinum than any other single area in the world. North West also produces a quarter of South Africa's gold, as well as granite, marble, fluorspar and diamonds. Employment along the Platinum Corridor, from Pretoria to eastern Botswana, accounts for over a third of total employment in North West. Mining has a dominant role in the economy of the North West Province employing a quarter of the labour force and contributing about 55% of to the GDP with significant multiplier effects in the service and trade sectors.

Should the BRPM TSF Extension Project not take place it could result in economic losses for the area as the additional tailings produced by the BRPM Concentrator Plant could not be accommodated at the existing BRPM TSF. Thus mining activities could cease and this could result in employment losses.

7 Description of the Baseline Environment

This section of the report presents an overview of the baseline environment within which the proposed BRPM TSF Extension Project will be located. The baseline information presented consist of existing baseline information obtained from previous studies undertaken in the area and the existing EMPR Reports for RBPlat and was supplemented by extensive additional specialist investigations that was conducted during the Impact Assessment Phase of the proposed project. Please refer to Appendix E to Appendix N for copies of the specialist reports that were compiled for this project.

7.1 Socio-Economic

The Bojanala Platinum District Municipality (BPD) compromises five local municipalities namely Kgetleng, Moretele, Moses Kotane, Madibeng and RLM. The total population of BPD is estimated to be 1 507 492 persons. Almost a third of the population of BPD Municipality is from RLM which has a population of 549 575 (census 2011).

The proposed BRPM TSF Extension Project will take place in Ward 1 of the Rustenburg Local Municipality (RLM). The Bafokeng Nation is the dominant ethnic group in these Ward. The closest neighbouring communities to the project, namely Chaneng, Rasimone, Mafenya and Robega are located in Ward 1 of the RLM in the BPD. These four communities were also included to form part of the public participation process. The closest community to the Project Area is Rasimone and situated approximately 2km north-east from the BRPM TSF Extension Project. No communities are located on the BRPM TSF Extension Project Area site where the construction activities are anticipated to take place.

In Ward 1 of the RLM there a large percentage of the population earning no income and approximately 36% of the population earn a low income. Of this approximately 36% about 30% of the population earn an income in the formal sector, 9% in the informal sector and 3% work and earn as private households (Nemai Consulting, 2013).

The BRPM TSF Extension Project is necessary for RBPlat to continue its mining operations at SMC, which is in public interest, since mineral extraction is in the best interests of the public at large as this generates earning power both locally and internationally.

Un-skilled and semi-skilled labour is sourced mainly from the local communities and surrounding areas and recruitment is in conjunction with the local unemployment forum. Specialist and skilled labour are recruited outside the local boundaries due to skills scarcity. RBPlat is committed to recruit people from the local communities whenever possible.

Alternative formal employment is very limited in the surrounding area, which means that the RBPlat mining operations act as the main source of income to the local communities.

Between 155 (skilled and unskilled) employment opportunities will be created in the construction phase, whilst approximately 25 (skilled and unskilled) employment opportunities will be created during the operational phase of the BRPM TSF Extension Project. This is a positive impact of medium to high significance. Salient management measures will include the following:

- A transparent recruitment process with well-defined and communicated recruitment criteria;
- Recruitment offices will be located close to the villages;
- The exact number of positions available and the qualifications required will be advertised locally;
- BRPM has an agreement with the Royal Bafokeng Holdings that they will employ local employees wherever feasible which will apply to the Styldrift Phase 1 Mine. All tenders for work

and supplies are referred to the Royal Bafokeng Economic Board and training offered to enable entrepreneurs in tendering procedures. Local suppliers will be identified through the Board and contractors are involved through temporary and permanent work;

- The objective of the all contractors must be to use and develop the capacity of communities, making maximum use of local Small and Medium Enterprises (SME) and Black Employment Equity (BEE) companies;
- BRPM has a Skills Development Plan, which is the foundation for the mines' education, training and development programmes; and
- Relevant training will be provided either at the BRPM Training Centre or AAP training centres.

The BRPM TSF Extension Project is needed to realize the GDP increase of the SMC Project. As a result the GDP of the Bojanala Platinum District Municipality could increase by approximately 4.32%, while that of the Province could benefit by approximately 1.35%. Should the BRPM TSF Extension Project not take place it could result in economic losses for the area as the additional tailings produced by the BRPM Concentrator Plant could not be accommodated at the existing BRPM TSF and the SMC cannot operate. Thus mining activities could cease and this could result in employment losses.

From the employment statistics, it is clear that unemployment remains a critical issue in the project and broader Rustenburg area. An increase in employment is anticipated with the construction and operation of the BRPM TSF Extension Project.

7.2 Heritage and Palaeontology

The information provided in this Section is a summary of the information provided in the Heritage and Palaeontology Specialist Reports. Please refer to Appendix E for the Reports.

The Surveyor General's database shows that the Farm Boschkoppie 104 JQ was first surveyed in 1894, and the Farm Boschhoek 103 JQ in 1879. No historical structures were recorded in the survey area; the farm was probably used for additional farming activities (agricultural fields and pastures) and no farm house complex was built. The 1980s topographic map confirms that the area was mostly used as agricultural fields and was probably extensively farmed for several decades. During the baseline assessment no archaeological (Stone Age or Iron Age) structures, features, assemblages or artefacts were recorded during the survey. No historical structures or associated features were recorded and no graves were recorded.

There is a presence of mining past and present. Fossils in South Africa mainly occur in rocks of sedimentary nature and are not typically found in igneous rocks. It is therefore anticipated that the palaeontological sensitivity is low.

7.3 Vibration and Blasting

A sensitivity map was compiled with distances normally associated where possible influences may be (vibration) as a result of blasting. A high sensitive area of 50m from where trenches are expected to be was identified and secondly a medium sensitive area of 50m to 100 m from the expected trenches. Beyond the 100m the area can be considered a low sensitivity area. No blasting activities are anticipated to take place and due to the nature of the proposed infrastructure, it is anticipated that no vibration impact is associated with the construction and operation of the BRPM TSF Extension Project. It is evident from Figure 7-1 that there are no residences/villages located within the vibration sensitive areas that would be impacted upon negatively.

srk consulting	**BRPM TSF Extension Project** Vibration sensitive areas	Project No. 470328

Figure 7-1: Vibration sensitive areas

7.4 Visual Aspects

The information provided in the Visual Section is a summary of the information provided in the Visual *Specialist Report. Please refer to Appendix G for the full Report.*

Due to the subjective nature of Visual Impact Assessments, a number of criteria have been used to describe the visual aspects of the environment. The criteria evaluate the current visual landscape and the potential changes to the landscape that the proposed extension may have.

The following criteria can be used to describe the visual landscape of an area:

- Visual Character;
- Sense of Place; and
- Visual Quality.

These criteria are combined with an assessment of the magnitude of the impact to determine its severity, it must however be noted that the sense of place is used to inform the potential sensitivity of a viewer and does not have its own rating. Criteria used in the determination of the magnitude, include Viewshed, Viewing Distance, Visibility, Visual Absorption Capacity (VAC), Landscape Compatibility and Viewer Sensitivity.

7.4.1 Visual Character

The BRPM TSF Extension Project is located approximately 40 km north-west of Rustenburg in the North West Province, and 5 km north of the existing BRPM operations. The surrounding land uses include mining operations to the north and north-west; tourism, in the form of Sun City, to the north and various residential areas, including Chaneng, Rasimone, Mafenya and Robega villages to the south and east.

Regionally the area can be divided into distinct 'land types' each with a dominant landscape character. These land types are Mining and utility, Settlement / built environment, Rural / grazing, Semi-natural areas and Tourism.

The visual character of region can be described as being a degraded/modified grassland (refer to Figure 7-2), interspersed with mining activities and tourist attractions (i.e. Sun City). The visual character of the Project Area can be described as being a **Modified rural landscape (3)**, attributed to the various mining operations and open fields of indigenous vegetation.

srk consulting	**BRPM TSF Extension Project** View towards the proposed TSF Extension	Project No. 470328

Figure 7-2: View towards the proposed TSF Extension

7.4.2 Sense of Place

The sense of place, in the areas surrounding the proposed extension comprises of mining activities. Through previous communication with employees from the mine, it was noted that many of the residents from the villages surrounding the BRPM TSF Extension Project are either employed at the mine or gain an income from secondary employment as a result of the mining activities within the area. Travellers along the R565, although may have a different sense of place of the area depending on their purpose for being in the area, would have been exposed to numerous mining complexes similar to that of the BRPM TSF Extension Project. The sense of place, in the immediate vicinity around the BRPM TSF Extension Project is considered to be that of mining.

7.4.3 Visual Quality

The visual quality of the Project Area is presented in Table 7-1.

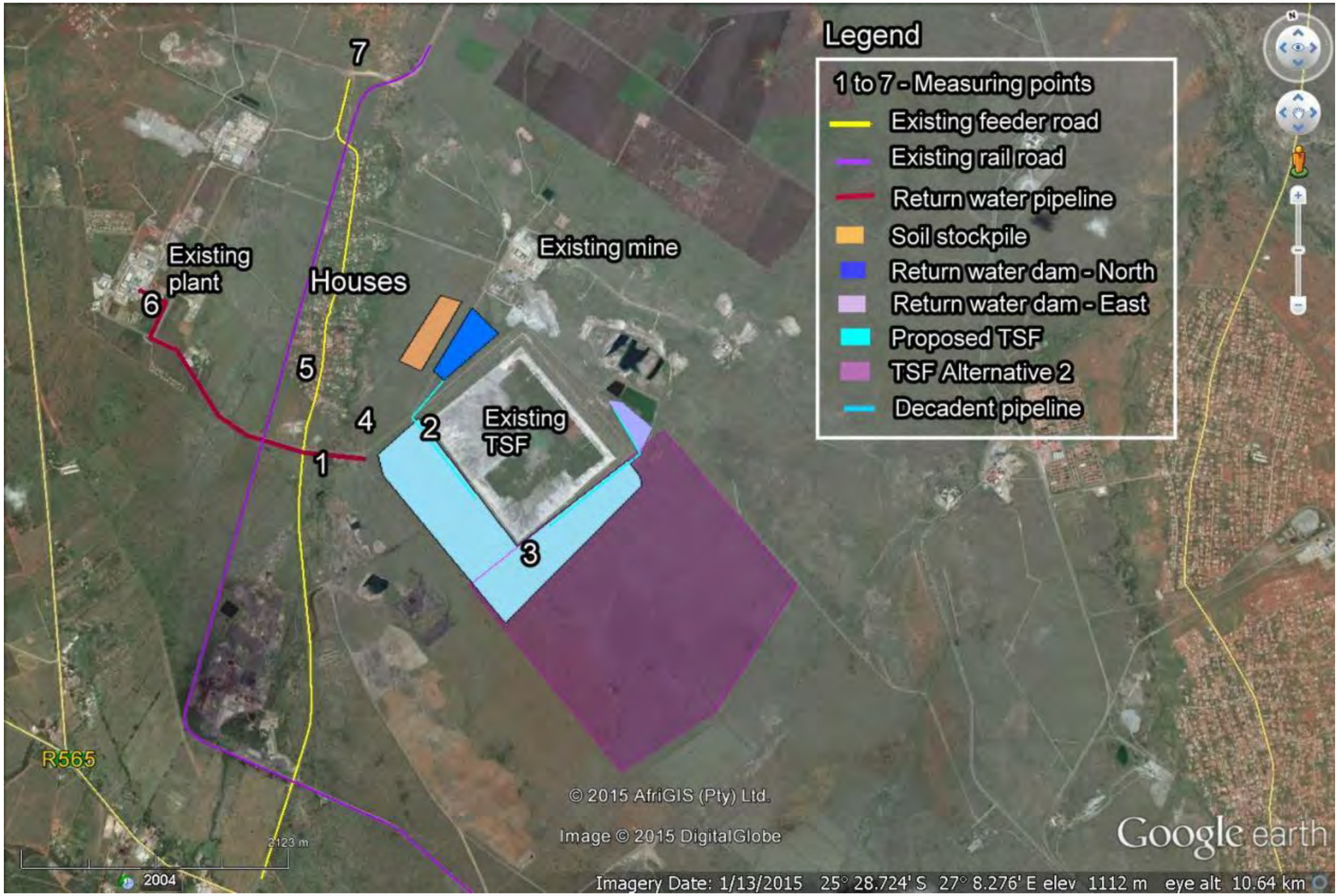
Table 7-1: Visual Quality rating for the proposed BRPM TSF Extension Project

Criteria	Rating	Description
Vividness	3	The study are can be described as having a moderately memorable impression, based on the interspersed natural of mining activities and open degraded grasslands. Thus the vividness of the area is described as being Medium, which can also be attributed to the Pilanesberg Mountain range to the north of the Project Area.
Intactness	1	The intactness of the area is described as Low, due to the encroachment of the mining activities within the area onto the surrounding landscape.
Unity	3	The Project Area can be described as having a Medium unity, as the mining areas and natural zones are considered to be moderately coherent, although evidence disruption in the visual order is evident.
Rating	**Medium - Low**	

7.5 Noise

The information provided in the Noise Section is a summary of the information provided in the Noise Specialist Report. Please refer to Appendix H for the full Report.

The proposed construction activities will take place in an area where the prevailing ambient noise levels are already increased by existing mining activities and traffic from the feeder roads. The distance between the proposed activities and the abutting noise sensitive area are given in Table 7-2. This is for direct line of sight and in many of the cases there are vertical structures such as trees and buildings and the natural topography that creates a noise barrier. The measuring points for the Project Area were selected to be representative of the prevailing ambient noise levels for the Project Area. It includes all the noise sources such as traffic, rail road and mine activities noises, and can be seen in Figure 7-3.



srk consulting	**BRPM TSF Extension Project** Noise measuring points for the Project Area	Project No. 470328

Figure 7-3: Noise measuring points for the Project Area

Table 7-2: Distance between the activities and the noise sensitive area.

Noise source	Existing residential area west of the existing tailings dam - m
Topsoil stockpile	422
RWD	728
Western Decadent pipeline	648
Western side of proposed TSF	438
Western side of the Tailings Alt 2	1 735
Return water pipeline	408

Noise survey was conducted to determine the prevailing ambient noise levels for the specific areas, which include all the noise sources currently in the area such as mine activity noise, traffic noise and hauling vehicle noise.

The prevailing ambient noise level in the vicinity of the topsoil stockpile, RWD, pipelines and TSF are 47.4 dBA during the day (06:00 – 22:00) and 44.6 dBA during the night (22:00 – 06:00). There were other noises such as distant mine activities, traffic, plant and rail road noises audible at the time of the noise survey. The noise levels as monitored at existing BRPM TSF are currently in compliance with the Noise Control Regulations.

7.6 Ambient Air Quality

The information provided in the Air Quality Section is a summary of the information provided in the Air Quality Specialist Report. Please refer to Appendix I for the full Report.

7.6.1 Sources of Air Pollution in the Region

The Project Area and surrounding land can be described as being rural and mainly used for mining operations. There are several small residential villages in the vicinity of the proposed project. There are major tourist attractions to the north of the mine area i.e. Sun City (± 6 km) and Pilanesberg National Park (± 20 km to the centre of the park).

The following sources of air emissions have been identified in the area:

- Smelter operations from the adjacent Glencore and Impala operations;
- Mining activities;
- Road network;
- Windblown dust (windblown dust especially during the dry season);
- Vehicle tailpipe emissions; and
- Domestic fuel combustion.

Smelter operations

Depending on operational conditions at the smelters, emissions of pollutants such as carbon monoxide (CO), carbon dioxide (CO_2), sulphur dioxide (SO_2), oxides of nitrogen (NOx), and particulates (both PM_{10} and $PM_{2.5}$) are expected from the following sources:

- Impala Platinum Smelter (8.5 km south east of operations); and
- Glencore-Merafe Chrome Smelter (Boschhoek smelter) (2.1 km west of operations).

Mining activities

The Project Area is currently surrounded by several mining operations owned by different companies. Activities at these mines include blasting, crushing, hauling, and materials handling, which all contribute to pollutants emitted to the atmosphere. The main pollutant of concern is particulate matter in the form of inhalable dust and nuisance dust as a result of dust fallout. The mines that are within 5 km of the BRPM TSF Extension Project Area are:

- Bakubang Platinum Mine, which includes the Wesizwe- and Maseve operations;
- Impala Platinum mining operations; and

- Glencore-Merafe mining operations.

Road network

The road network in the mine area consists of unpaved roads. Entrainment of dust by vehicles may increase dust levels in the atmosphere. The unpaved roads are mainly used for transporting waste rock to the waste rock dumps and general incoming and outgoing traffic to and from the mine.

Windblown dust (windblown dust especially during the dry season)

The wind direction of the Project Area is east and east-northeast and east-southeast. There are numerous sources of windblown dust in the Project Area such as TSF, topsoil stockpile and roads. It is anticipated that any dust blown off the TSF and RWD will move in a southern to south-westerly direction based on available data.

Vehicle tailpipe emissions

Vehicle tailpipe emissions are expected to be relatively low in the area over a 24 hour period. However, it may be elevated during specific times of the day i.e. during the morning and evening peak vehicle travel periods associated with shift changes.

Domestic fuel combustion

Wood and charcoal is used for domestic purposes in the area, but usage is expected to be very low. Due to electricity being supplied from the national grid to households in the area, it reduces the need for domestic fuel burning. Airborne particulate matter (PM_{10} – Respirable and TSP - nuisance) and gaseous pollutants (NO_x, SO_2, CO and CO_2) are the main emissions from domestic wood and coal combustion.

7.6.2 Air Quality Monitoring

The mine has an existing Air Quality Monitoring network. The dust (PM_{10} and dust fallout) monitoring data was compared against the standards prescribed in the the National Dust Control Regulations (NDCR) promulgated in terms GN R827 of 01 November 2013. The dust (PM_{10} and dust fallout) monitoring data comprises a combination of data collected by BRPM and SRK. The data was compared against the standards prescribed in the NDCR. The following data sets were reviewed:

- Daily PM_{10} concentrations for the period January 2009 to December 2014; and
- Monthly dust fallout concentrations for the period October 2008 to December 2014.

The locations of the various sampling equipment are presented in Figure 7-4 also includes the names of all of the locations. The dust fallout (DFO) locations included in this section are not all managed and operated by SRK, but also by BRPM. The following numbering was used to differentiate between the different DFO locations:

- **Set 1:** PM_{10} Monitoring location;
- **Set 2:** Styldrift DFO locations;
- **Set 3:** BRPM DFO locations;
- **Set 4:** BRPM DFO locations – Additional locations relevant to the Project Area; and
- **Set 5:** BRPM DFO locations.

Set 2 and Set 3 DFO locations are reported on monthly by SRK for the Styldrift Merensky Phase 1 Project. Set 3, 4 and 5 DFO locations are managed by BRPM.

7.6.3 Dispersion Modelling Results

Predicted 99th percentile concentrations for PM_{10}, $PM_{2.5}$ and maximum predicted dust fallout concentrations were simulated using the US-EPA approved AERMOD model. Isopleth maps showing PM_{10}, $PM_{2.5}$ and dust concentrations are presented in the Sections below.

Predicted PM_{10} concentrations at sensitive receptor locations

The predicted results for the ambient air PM_{10} concentrations were predicted by the dispersion modeling (24 hour 99th percentile and annual average). All predicted 99th percentile PM_{10} concentrations at the towns were below the South African standard of 75 µg/m³.

Based on the modeling results, the locations for both the options are unlikely to impact on the nearby towns and villages that are beyond the fence line of the mine.

Predicted $PM_{2.5}$ concentrations at sensitive receptor locations

The predicted results for the ambient air $PM_{2.5}$ concentrations were predicted by the dispersion modeling (24 hour 99th percentile and annual average). All predicted 99th percentile 24 hour $PM_{2.5}$ concentrations at the villages/towns were below the current South African standard of 65 µg/m³. Higher $PM_{2.5}$ concentrations are observed at the towns closer to the proposed tailings storage facility and operational areas, and a decrease in concentration is observed in towns further away.

Based on the modeling results, the locations for both the options are unlikely to impact on the nearby towns and villages that are beyond the fence line of the mine.

Predicted dust fallout concentrations at actual locations

The predicted maximum 24 hour dust fallout concentrations at the towns were below the Residential Area rate of 600 mg/m²/day. The highest predicted dust fallout concentrations are observed at towns closer to the mine operations, such as Rasimone, and a decrease in dust fallout concentrations is observed in towns further away.

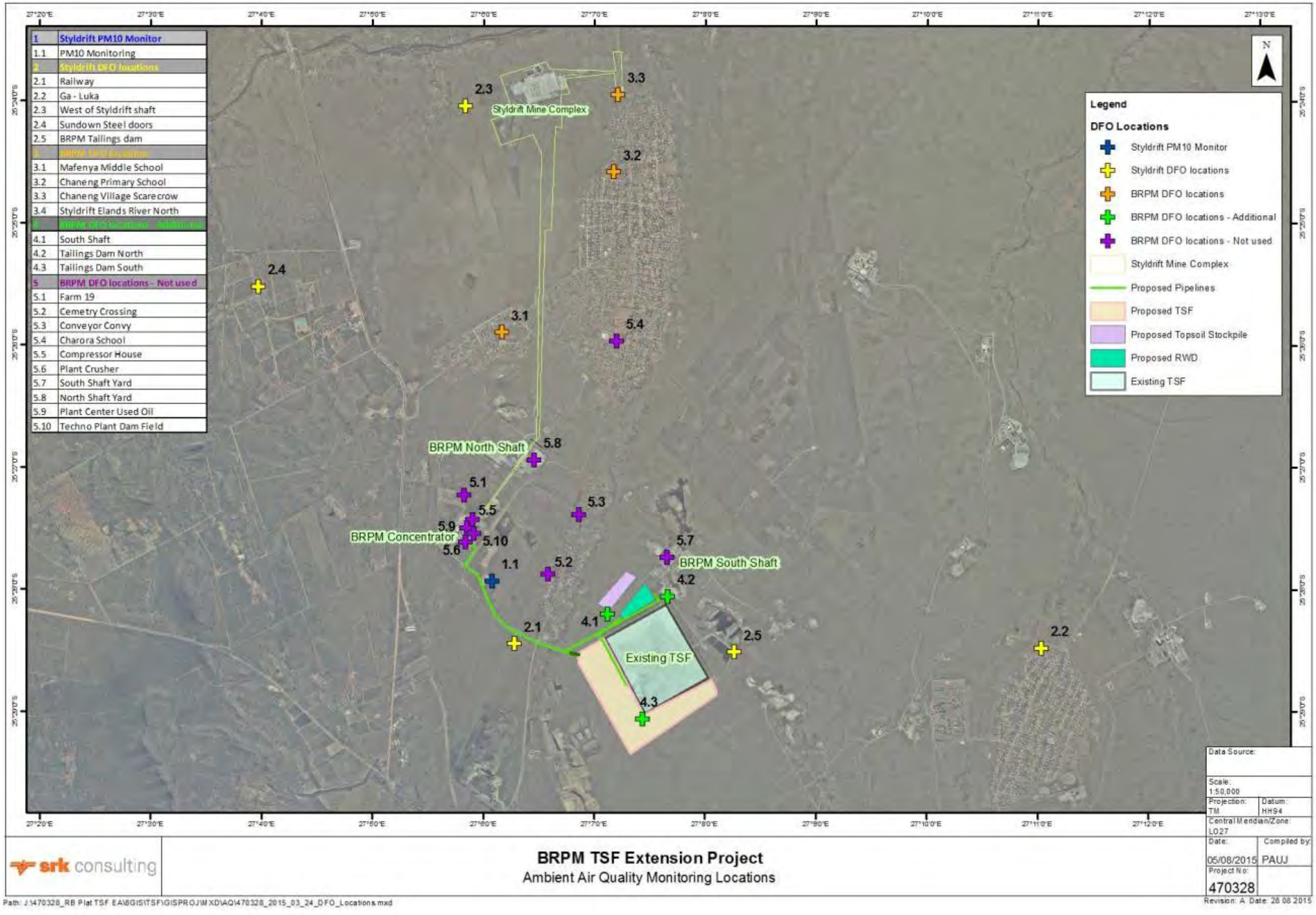


Figure 7-4: Ambient Air Quality Monitoring Locations

7.7 Groundwater

The information provided in the Groundwater Section is a summary of the information provided in the Groundwater Specialist Report. Please refer to Appendix J for the full Report.

The aquifer system present at the site is characterized as a confined to semi-confined weathered and/or fractured rock aquifer associated with the layering of the RLS (Figure 7-5). Literature reviewed indicated that yields generally varied from 0.5 L/s – 2.0 L/s. Sustainable yields in the TSF area are higher where associated with the fault, at >0.5 L/s, but are generally lower in the vicinity of the TSF (<0.3 L/s).

The regional groundwater flow directions are from southwest to the northeast towards the Elands River with local mounding observed around the existing BRPM TSF and RWD area. The groundwater flow directions in the TSF area are radially towards the tributaries.

Base flow to tributaries is considered to be minimal since tributaries are non-perennial and were noted to be dry during the site visit in September 2014. The hydrogeological investigation identified three lithology's of importance with respect to groundwater bearing zones namely:

- 0 m – 3 m: Dark, silty clay overlying an unsaturated zone of between 1.6 to 7.2 m in thickness and a permeability of around 10-6 m/s.
- 2 m – 50 m: Highly weathered and fractured norite which grades to slightly weathered pyroxenite/norite from 20 m (in the vicinity of the TSF) to 50 m (east of the TSF and generally in the Project Area). The hydraulic conductivity was estimated as 1.7 m/d for the fault zone and approximately 0.5 m/d for the weathered norites.
- >50 m: Deeper, occasionally fractured pyroxenite/norite. The fresh pyroxenite/norite/gabbro-norite aquifers display limited fracturing and water strikes are generally associated with fractured rock. Water yielding fracture zones intercepted in the mine workings have, however been observed to yield low flows in excess of 500 m below surface.

7.7.1 Aquifer Classification and Vulnerability

Groundwater vulnerability was considered in terms of the DRASTIC method of assessment of the intrinsic vulnerability of an aquifer to contamination from the surface (Aller, 1987). The method considers the following factors, which control the vulnerability of an aquifer to contamination from surface:

- Depth to water table (D)
- Recharge (R)
- Aquifer material (A)
- Soils (S)
- Topography and slope (T)
- Impact of the vadose (unsaturated) zone (I)
- Hydraulic conductivity (C)

The South African Aquifer System Management Classification is presented by five major classes:

- Sole Source Aquifer System;
- Major Aquifer System;
- Minor Aquifer System;
- Non-Aquifer System; and
- Special Aquifer System.

The aquifer around the Styldrift area is classified as a Minor aquifer system, according to the DWS classification system (1998).

The results of the aquifer vulnerability assessment are shown in Table 7-3.

Table 7-3: Aquifer Classification and Vulnerability Assessment

Description	Aquifer	Vulnerability	Rating	Protection
Weathered Aquifer	Minor (2)	2	4	Medium
Fractured Aquifer	Minor (2)	1	3	Low

The above classification implies that the regional aquifer is less sensitive due to the fact that the aquifers are not considered potential future resources. Low to medium protection is therefore required, which will primarily include monitoring. A liner system underneath the proposed BRPM TSF Extension area will further protect the aquifers.

7.7.2 Hydrocensus

Water point and hydrocensus data was reviewed from previous reports (EMPR, 2007; SRK 437381, 2013), the BRPM surface and groundwater monitoring database (Aquatico, 2014), National Groundwater and the chemistry database maintained by DWS. A site survey was carried out on existing boreholes and surface water locations in the immediate vicinity of the existing BRPM TSF.

Water is supplied to communities from Magalies Water Board via municipal pipelines, but there may be limited *ad hoc* groundwater use for domestic supply from local boreholes in the communities in the regional area (DWS Water Services information, 2007, Jasper Muller and Associates, 2007). The closest community to the proposed BRPM TSF Extension Project is Rasimone (approximately 2 km north-east). The mine monitors the water quality and water level upgrade of the community wells (between the TSF and the community).

BRPM Database

The groundwater monitoring program includes some 32 monitoring boreholes in the groundwater monitoring network of 2013 and 2014. The locality of the monitoring boreholes is presented in Figure 7-6. This information includes water levels and water chemistry information, (Aquatico, 2014). The database includes analyses for TDS and fluoride prior to 2007.

National Groundwater Archive (NGA) data

Various boreholes were identified in the NGA within the hydrogeological model boundary of which three are located within 2 km of the proposed BRPM TSF Extension Project including:

- One (2527C00004) located within Boschhoek village approximately 2.25 km to the west of the proposed BRPM TSF Extension Project; and
- Two boreholes located in Rasimone Village within 1 km of the proposed BRPM TSF Extension Project. These boreholes appear to be located in the same locality as the boreholes listed in the monitoring program as ST-B4 (2527C00210) and ST-B1 (2527C00211).

Site Survey

A site survey was carried out in September and October 2014 on existing boreholes and surface water locations in the immediate vicinity of the existing BRPM TSF. The information collected during the survey is summarised in Table 4-1 of the Groundwater Specialist Report (see Appendix J).

All the surface water drainage lines were dry at the time of the site visit and no springs or points of natural groundwater discharge were observed.

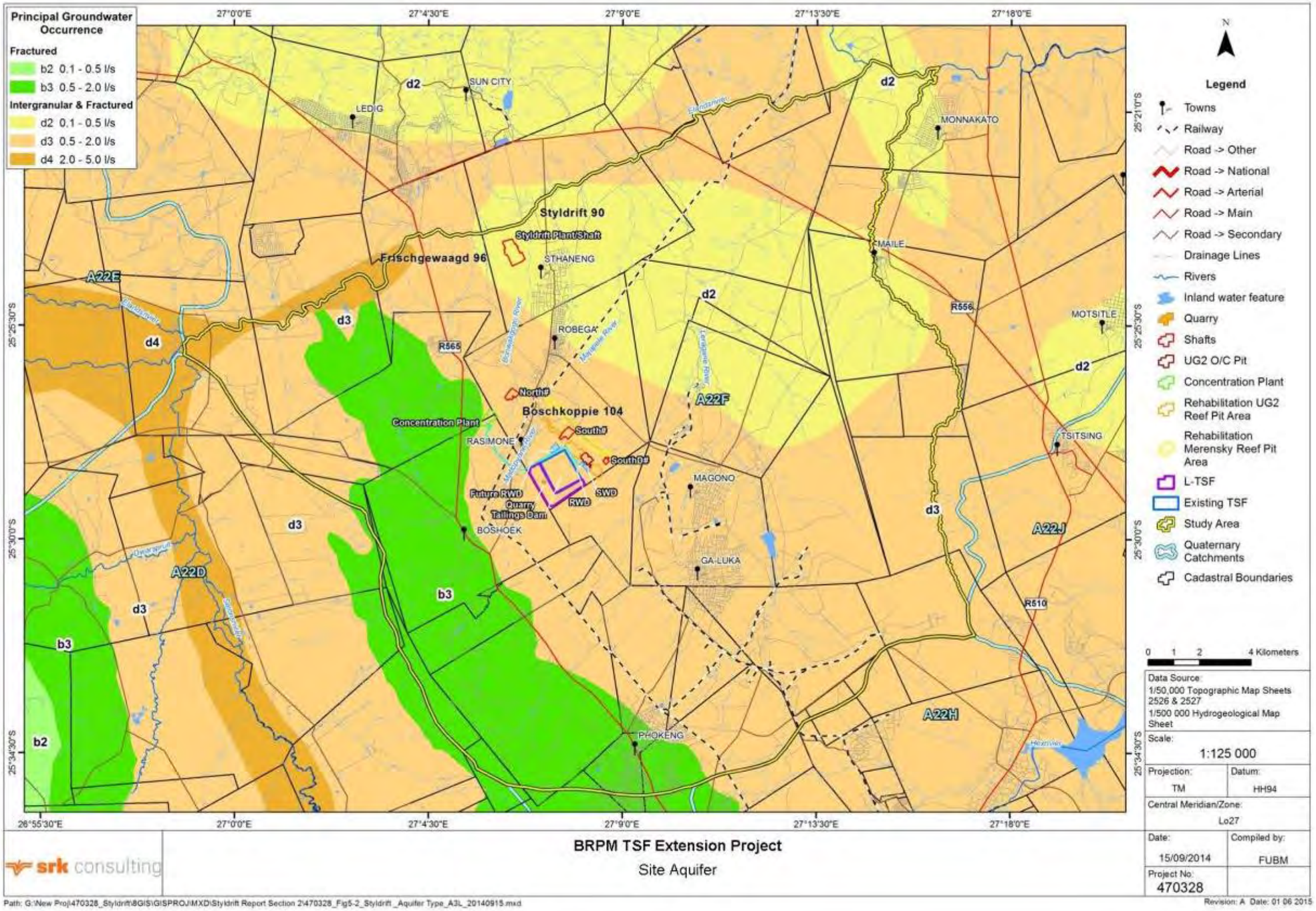


Figure 7-5: Site Aquifer

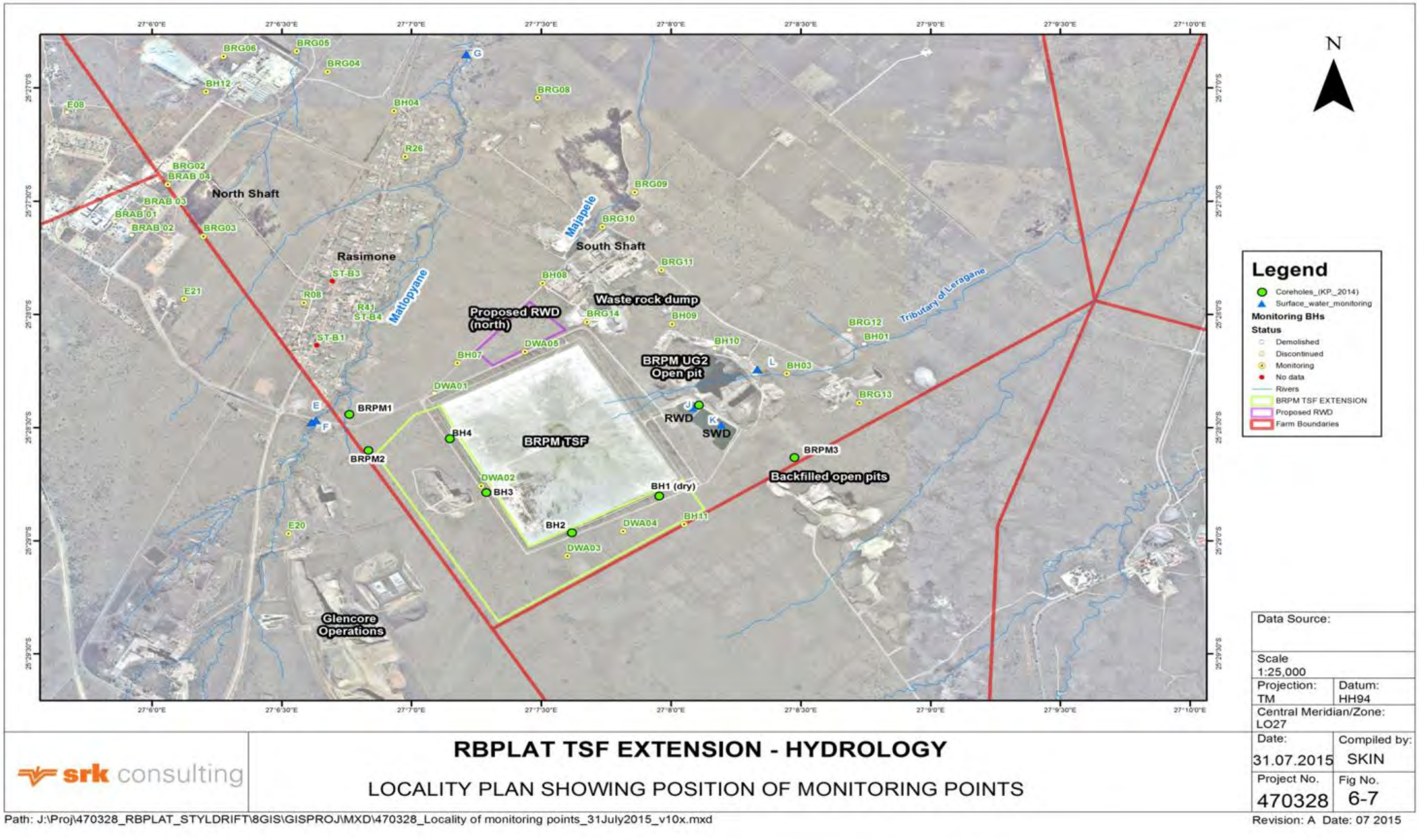


Figure 7-6: Surface and Groundwater Monitoring points

7.7.3 Groundwater Quality

The BRPM groundwater monitoring programme encompasses the existing mining area and tailings facilities. Groundwater samples are collected (depth specific) from monitoring boreholes and submitted to Aquatico for chemical analysis. The monitoring database includes results (TDS) from 1999 – July 2014 for surface, process and groundwater samples. The analytical suite was expanded from 2007 to include pH, EC, major anions and cations and metals as well as water levels for the monitoring boreholes. Data was also obtained from Glencore for the Open Pit (termed the Boschhoek Smelter Open Pit) from October 2011 to August 2014, (Glencore, 2014). The data base includes results for pH, EC, TDS, major ions and selected metals (aluminum, manganese, iron, zinc and chromium). The data was reported monthly from 2013 to 2014. Samples collected in September 2014 as well as the latest datasets reported by Aquatico at the time of the study (September 2014) are presented in the groundwater specialist report.

Background groundwater quality was assumed based on previous reports, historical monitoring data which pre-dates commissioning of the existing BRPM TSF (1998-1999) and the water quality reported in boreholes (E12, E15 and E19) located up-gradient of both the Glencore and RB Plat operations. The groundwater is generally alkaline with concentrations of EC of <80 mS/m, TDS of <520 mg/l (with an upper limit of 1160 mg/l), magnesium of <55 mg/l, and nitrate of <6 mg/l as N. Baseline water chemistry is generally good with concentrations reported as below the SANS 241:2015 limits for drinking water and either Class 0 (Ideal) or Class I (Good). Magnesium concentrations in the Rasimone borehole (R08) are locally elevated due to the dissolution of the host mafic mineralogy of the pyroxenites and gabbros. TDS (< 700 mg/l) and nitrate (<6 mg/l) have decreased from higher concentrations and, despite the marginal quality due to the magnesium concentrations, should (based on the reported parameters for July 2014) be acceptable for domestic use by the majority of individuals although the water may have a slightly bitter taste and the lathering of soap may be slightly impaired

Glencore Jig Tailings Pit

The water quality sampled from the Glencore Open Pit in September 2014 reports concentrations within a similar range to that reported by Glencore in 2014 (Boschhoek Smelter, 2014). The water quality is elevated with respect to pH (alkaline) and salts including sodium, potassium, fluoride, nitrogen and sulphate and some metals where concentrations exceed background concentrations for groundwater and SANS 241:2015.

BRPM Process Water (TSF)

The results indicate that the process water is alkaline and has an elevated salinity as indicated by the higher concentrations of TDS and EC. Concentrations of EC, sulphate, nitrate and occasionally calcium exceed the WUL limits for the TSF discharge however it is noted that WUL limits for the TSF discharge are very conservative and seem to be based on baseline water quality guidelines (WUL TSF limits < SANS 241:2015).

Groundwater

Concentrations of total dissolved salts / electrical conductivity, sulphate, magnesium and occasionally nitrate are locally elevated in the groundwater compared to the background groundwater quality in:

- A localised area adjacent to the existing BRPM TSF (which started operation in 1999);
- Around the partially backfilled Glencore Open pit (a redundant chromite pit that Glencore are in the process of backfilling);

- Around the process water dams down-gradient and to the east of the existing BRPM TSF. These include the unlined existing RWD, storm water dam (SWD) and the redundant UG2 open pit that has become filled with water overflowing from the SWD backfilled open pit areas; and
- Locally around the backfilled open pits and waste rock dump to the north-east and east of the existing BRPM TSF.

The data has been grouped into the boreholes located within 500 m of the TSF and proposed BRPM TSF Extension Project and boreholes located within 2 km of the TSF to the east and north-east of the RWD, South shaft and Open Pit. The following observations are made with regard to the water chemistry:

Water quality in community boreholes (Background and Rasimone)

- Groundwater samples around the Project Area and, more locally in the communities of Rasimone and Boschhoek, plot within the calcium-magnesium-bicarbonate dominated facies. The Mg-Ca-HCO3 character of the groundwater samples indicates recently recharged groundwater with its chemical character attributed to silicate mineral weathering processes associated with the Bushveld Complex (Titus et al, 2009);
- Background water quality is indicated by the up-gradient monitoring boreholes E12, E15 and E20 although salts are slightly elevated in E20, probably due to Glencore operations. Trend graphs indicate that concentrations in the background boreholes up-gradient and to the south-east of the TSF (E12, E15, E19) remain generally similar;
- Baseline water chemistry is generally good with concentrations generally reported as either Class 0 (Ideal) or Class I (Good). Similarly, the water quality in Rasimone boreholes is also of good quality. R08 comprises Class II water due to the elevated magnesium (108 mg/L) concentration which has been indicated as being due to the host rock geology, (JMA, 2006). Concentrations (EC, TDS, chloride, sulphate and magnesium) are locally higher in R08 (Rasimone) but the long term TDS trend for R08 indicates that TDS concentrations have decreased from the high levels reported in 2003 (>1200mg/l) to the current concentrations of < 700mg/l. Similarly, nitrate concentrations have been reported at higher concentrations (5 to +/- 20 mg/L as N) in R08 and have decreased in 2014 to <6 mg/L. The higher concentrations may be attributable to seepage from pit latrines. Despite the marginal quality due to the magnesium concentrations; the water quality (based on the reported parameters) should be acceptable for domestic use by the majority of individuals although the water may have a slightly bitter taste and the lathering of soap may be slightly impaired; and
- The lower concentrations in boreholes between the TSF (DWA02, BRPM1, BRPM2) and Rasimone boreholes suggests that the higher concentrations noted in the Rasimone boreholes are unlikely to be due to contaminated groundwater migrating from the TSF. The monitoring network should, however, be extended to confirm this.

Boreholes located within 500 m of the TSF

- The groundwater is locally contaminated in the boreholes around the TSF (BH07, BH11, DWA04, DWA02, BH3, BH4, DWA05) with concentrations of magnesium, sulphate, chloride and TDS elevated above both the background water quality and SANS 241:2015. Magnesium and sulphate concentrations are highest in DWA04 and BH07 and exceed the concentrations reported for the process water facilities. Concentrations are also locally higher in the boreholes between the existing BRPM TSF and the open pit (DWA02 and BH3) but lower than that reported in the Glencore Open Pit;
- Concentrations down-gradient of the western portion of the proposed BRPM TSF Extension Project (DWA01, BRPM1 and BRPM2) are of better quality with concentrations in BRPM1 and BRPM2 being near background quality;

- A higher concentration of nitrate is noted in BRPM3, either due to interactions with the backfill material or a local plume emanating from the RWD/SWD and Open pit area;
- Groundwater samples from the existing BRPM TSF and RWD (BH03, BH07, BH08, BH09, BH11, BRG11, BRG14, DWA05) plot within the top quadrant of the piper diagram, suggesting that it has been impacted by the deposition of tailings. Borehole DWA05 lies on the northern boundary of the existing BRPM TSF and BH11 is located on the southern boundary, on the footprint of the proposed TSF Extension Project. Boreholes BH03, BH07, BH08, BH09, BRG11 and BRG14 are located to the north of the existing BRPM TSF;
- The water quality is similar in boreholes located to the east and north-east of the TSF to the groundwater quality around the TSF but appears to also be affected by the RWD, SWD and Open pit;
- Analysis of the monthly ground water monitoring data for boreholes in the immediate vicinity of the existing BRPM TSF shows that the sulfate concentrations have been increasing steadily from October 2007 to April 2013. A decrease in 2014 is noted but should be confirmed once the full data set for 2014 is available; and
- Metals are slightly elevated above background but below SANS 241:2015 in BH2 (Al, Fe, Mn, Cr), DWA03 (Al, Mn), BRPM3 (Fe, Cr(VI) and Cu).

7.7.4 Groundwater Levels

Regionally, there is a strong correlation between groundwater levels and the local topography and regional groundwater flow takes place in a predominantly southwest to northeast direction. Groundwater levels are higher below the TSF and RWD and flow radially towards the localised depression zone formed by dewatering of the underground mining areas.

Multiple dolerite dyke intrusions cross the Project area, but they do not appear to significantly influence groundwater levels. Based on all the boreholes in the Project area, the groundwater levels vary between 2 and 30 meters below ground level (mbgl). Groundwater levels measured in September 2014 in the TSF area range between 1.6 and 14 mbgl. Monitoring boreholes within the communities further north of the TSF vary between 13 and 15 mbgl. Shallow water levels occur along the river channels and below seepage areas such as the TSF and the RWD. Although shallow, the water levels are still below the base of the drainage channels in the vicinity of the existing BRPM TSF, and there is therefore no direct hydraulic connection between the surface water and the groundwater.

7.7.5 Groundwater Model

A conceptual hydrogeological model is a descriptive representation of a groundwater system that incorporates an interpretation of the geological and hydrological conditions. It consolidates the current understanding of the key processes of the groundwater system, including the influence of stresses, and assists in the understanding of possible future changes. Figure 7-7 presents a schematic representation of the hydrogeological profile at the site. A detailed description of the groundwater model inputs and results is contained in the Geohydrological Study.

Potential Pollution Source Identification

The following existing contaminant sources were included in the groundwater model in the area of the BRPM TSF Extension Project:

- Existing BRPM TSF;
- RWD;
- Existing SWD;

- Flooded backfilled Open pits;
- South Shaft waste rock dump; and
- Glencore Open Pit partially backfilled with jig tailings.

Potential Pathway Identification

The pathway is the route the source takes to reach a given receptor. Various potential seepage pathways were identified for the leachate water which included: Managed/Pumped Surface Water; Managed/Pumped Groundwater; Unmanaged/Decanting Surface Water; Unsaturated Soil/Clay Flow; Unsaturated Weathered Zone Flow; Groundwater Flow in the Upper Weathered and Fractured Layers; Groundwater Flow along Faults and Groundwater Flow in the Solid Bedrock.
During the movement of contaminants along the pathway from the source to the receptor, they also undergo attenuation processes. Important attenuation processes at the site include Dispersion; Dilution; Sorption; Diffusion, Radioactive decay and/or Biological decay.

Potential Receptor Identification

Private Groundwater Users and Rivers were identified as potential receptors in the vicinity of the TSF.

7.7.6 Groundwater Model Results

A description of the groundwater modelling procedure and results is contained in the Geohydrological Study. Hydrogeological modelling indicates that the existing BRPM TSF is the main controlling influence on the groundwater contaminant plume. The model results imply that boreholes in Rasimone will be marginally affected (TDS increased from 300 mg/l to 500 mg/l) by 2030. These concentrations are expected to still meet the SANS 241:2015 limit (unless the groundwater is affected by other sources unrelated to the TSF).

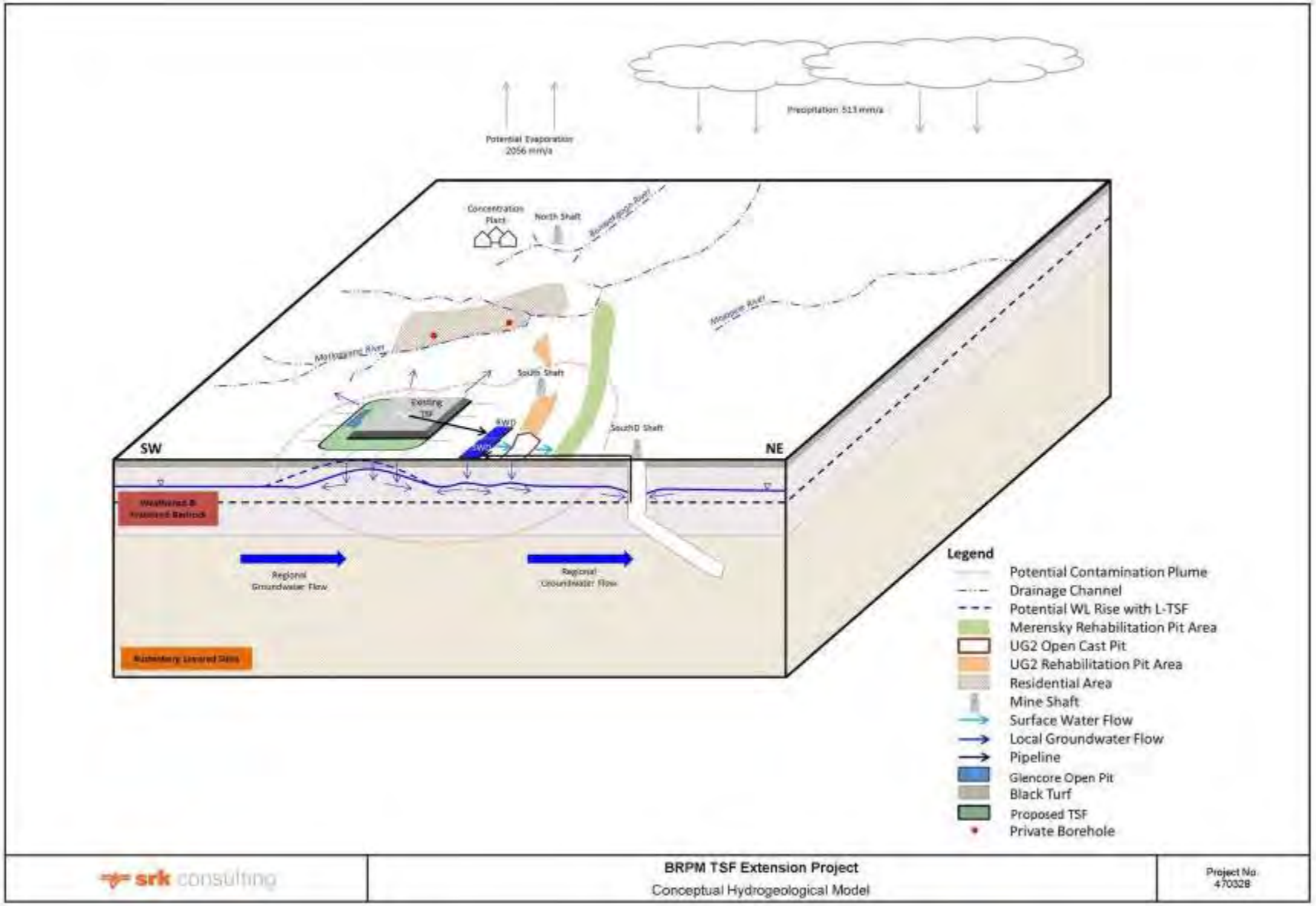


Figure 7-7: Conceptual Hydrogeological Model

7.8 Surface Water

The information provided in the Surface Water Section is a summary of the information provided in the Surface Water Specialist Report. Please refer to Appendix K for the full Report.

The Project Area falls within the A22F quaternary catchment, which has an area of 1 690 km^2. However, the upstream quaternaries that also contribute to the total run-off at the outlet of A22F are A22A, A22B, A22C, A22D and A22E. The main watercourse within A22F is the Elands River which drains east into the Vaalkop Dam. The BRPM TSF Extension Project Area consists of a relatively flat landscape which drains towards the Elands River. The Elands River is situated approximately 10 km north of the proposed BRPM TSF.

The Leragane stream is situated 900 m east of the proposed BRPM TSF Extension Project and a minor tributary of the Elands River. The existing and proposed pipeline route is 200 m to the west of the Matlopyane stream and 420 m to the west of the Majapele stream. The proposed RWD is 380 m to the west of the Matlopyane stream.

7.8.1 Surface Water Hydrology

The catchment characteristics for the catchments falling within the proposed BRPM TSF Extension Project are shown in Table 7-4.

Table 7-4: Summary of catchment characteristics for catchments falling within the proposed BRPM TSF Extension Project area

Catchment name	Area (km^2)	Length of Longest watercourse (km)	10 : 85 Height difference (m)	Time of concentration Tc (hours)
Catchment 1	1.73	3.81	29	2.05
Catchment 2	0.87	2.87	25	1.66

The definitions of the terms described above are listed below:

- 10-85 slopes denote the slope of the catchment from a point, 10% from the end point and 85% of the distance to the furthest point;
- Time of concentration denotes the length of time it takes for a raindrop to travel from the furthest point of the catchment to the outlet point; and
- Longest watercourse denotes the longest length of the watercourse from the furthest point of the catchment to the outlet.

7.8.2 Flood peaks and volumes

The flood peaks for the BRPM TSF Extension Project and applicable tributaries were determined using the Rational Method or the Alternative Rational Method.

The flood peaks and delineated sub-catchments for the proposed BRPM TSF Extension Project are presented in Table 7-5.

Table 7-5: Flood peaks for the various return periods (m^3/s)

Catchment name	Return period (years)						
	2	5	10	20	50	100	200
Proposed BRPM TSF							
Catchment 1	2.02	2.96	3.78	5.45	7.68	11.16	14.38
Catchment 2	1.11	1.63	2.09	3.18	4.49	6.52	8.41

7.8.3 Surface Water Quality

Surface water is currently being monitored by Aquatico (Pty) Ltd. The following points are being monitored:

- Matlopyane stream (north-west of the existing BRPM TSF) from up-stream at the point closest point "E" (approximately 900 m from the existing BRPM TSF) and progressively downstream at "F", "G" and "I"; and
- Tributary of the Leragane stream (east of the TSF) from immediately downstream of the UG2 open pit "L" and downstream at "M".

All the drainage lines around the existing BRPM TSF were dry in 2013 (Aquatico 2013) and during the site survey in September. Results reported by Aquatico in February and March (E, F, G, L) are all within Class 0 drinking quality (and hence also below the SANS 241: 2015) and report at concentrations below the WUL surface water reserve limits. The only exception is the result reported for "L" in March and this data appears to be anomalous when compared to historical records and has therefore been excluded from the data set.

The database includes water quality information for the Open pit ("Pit"), the RWD ("J") and Stormwater Dam (SWD) ("K"). The locality plan showing the positions of the monitoring points can be seen Figure 7-6.

7.8.4 Mean Annual Runoff

The localised catchments were delineated for the area around the proposed BRPM TSF Extension Project Area. These footprint from these areas will no longer be a part of the localised catchment area, thus all runoff generated from these area will not contribute to the localised catchment areas.

The mean annual runoff for the quaternary catchment A22F together with its contributing catchment area was obtained from the WR2005 manual. The area weighted method provided an estimate of 24497 m^3 of runoff lost to the A22F catchment. This represents 0.089% of the A22F Quaternary catchment.

7.9 Water balance

Accurate water and salt balances are considered to be one of the most important and fundamental water management tools available to mines (DWAF, 2006). The objective of the water balance is to estimate the volume of water flows relating to the TSF extension project. This provides input into the storage capacity required to ensure legal compliance, in terms of prevention of spills from the proposed TSF and RWD, as well as pump capacities, penstock sizes and canal and pipeline sizes. The water balance serves as a tool for auditing and assessing the water reticulation system, which aids in identifying and hence minimizing points of high water consumption, wastage and pollution. Water and salt balance modelling is therefore a key input to the overall water management strategy for the site. The average rainfall condition water balance for the BRPM TSF Extension project can be seen in Figure 7-8. The 2015 BRPM process design water balance for the BRPM Tailings Dam

Extension was used as the basis for this water balance. This water balance is an excerpt of the larger integrated mine water balance that is discussed as part of the IWWMP. The basis for the water balance included the following:

- Monthly tonnage of 350 ktpm;
- Extension of the tailings dam, to the full proposed area;
- The extension is lined;
- The new RWD is lined;
- There will be a transition period where the old RWD and old stormwater dam receive water simultaneously with the new RWD. However, when the 350 ktpm capacity is reached, all process water and stormwater will collect in the new RWD;
- The possibility of flow into the old open cast pits exist, and the ability to pump from these pits also exists. The new RWD and open cast pits were modelled as a single water-containing unit; and
- All water used for tailings dam irrigation evaporates.

The inputs into the water balance system are:

- Rainfall;
- Water in the slurry from the concentrator plant;
- Treated sewage effluent;
- Stormwater from the shafts;
- Runoff; and
- Magalies water for human use at the TSF.

The outputs from the water balance system are:

- Evaporation and evapotranspiration (ET);
- Interstitial storage;
- Return water to BRPM concentrator;
- Seepage;
- Water for dust suppression; and
- Sewage to Phokeng Wastewater Treatment Works.

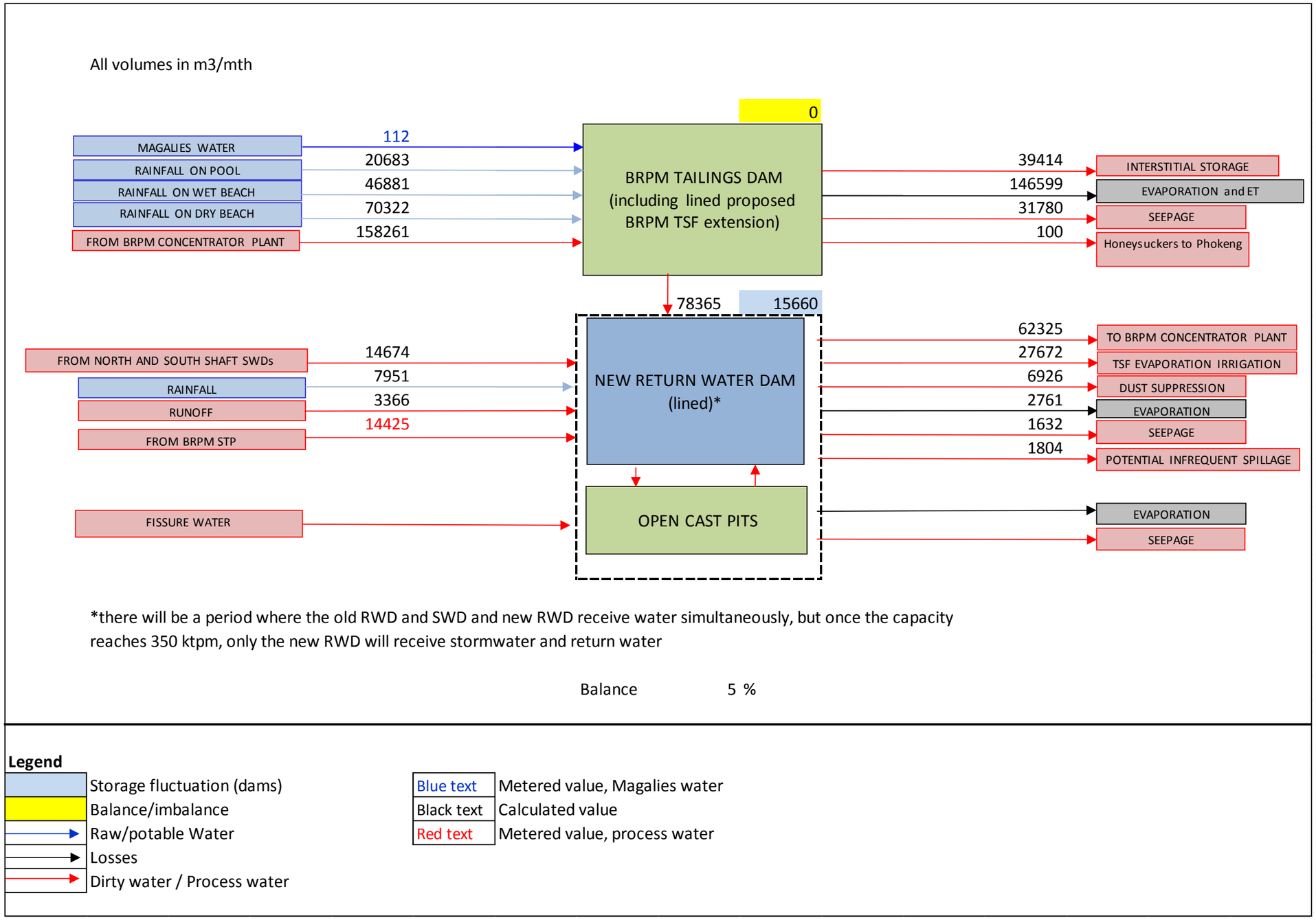


Figure 7-8: Water balance for BRPM TSF Extension Project

7.10 Land Use and Conservation Characteristics of the Project Area

7.10.1 North West Conservation Plan (2012)

The North West Conservation Plan indicates that the Project Area is located within an area considered to be a Critical Biodiversity Area (CBA) (Figure 7-9).

Although the area is identified as a CBA, significant habitat transformation has occurred due to current and historical agricultural, anthropogenic and mining activities. Thus the field assessment focused on identifying areas within the Project Area which may still be considered representative of the above category.

7.10.2 Importance According to the Mining and Biodiversity Guideline (2012)

According to the Mining and Biodiversity Guidelines the majority of the Project Area falls within an area considered to be of High Biodiversity Importance (Figure 7-10).

Although areas of High Biodiversity Importance are indicated within the Project Area, significant habitat transformation has occurred due to current and historical agricultural, anthropogenic and mining activities. Thus the field assessment focused on identifying areas within the Project Area which may still be considered representative of the above category.

7.10.3 National List of Threatened Terrestrial Ecosystems for South Africa (2011)

The National Environmental Management Biodiversity Act (Act 10 of 2004) provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected.

According to the National List of Threatened Terrestrial Ecosystems (2011) the Zeerust Thornveld is listed as being of least concern and therefore the Project Area is not considered to fall within a threatened ecosystem.

7.10.4 National Biodiversity Assessment (2011)

The latest National Biodiversity Assessment (NBA) (2011) provides an assessment of South Africa's biodiversity and ecosystems, including headline indicators and national maps for the terrestrial, freshwater, estuarine and marine environments.

According to the NBA (2011), the Project Area is not located within a formally or informally protected area, with the extent of the Project Area falling within an area that is currently poorly protected (Figure 7-11).

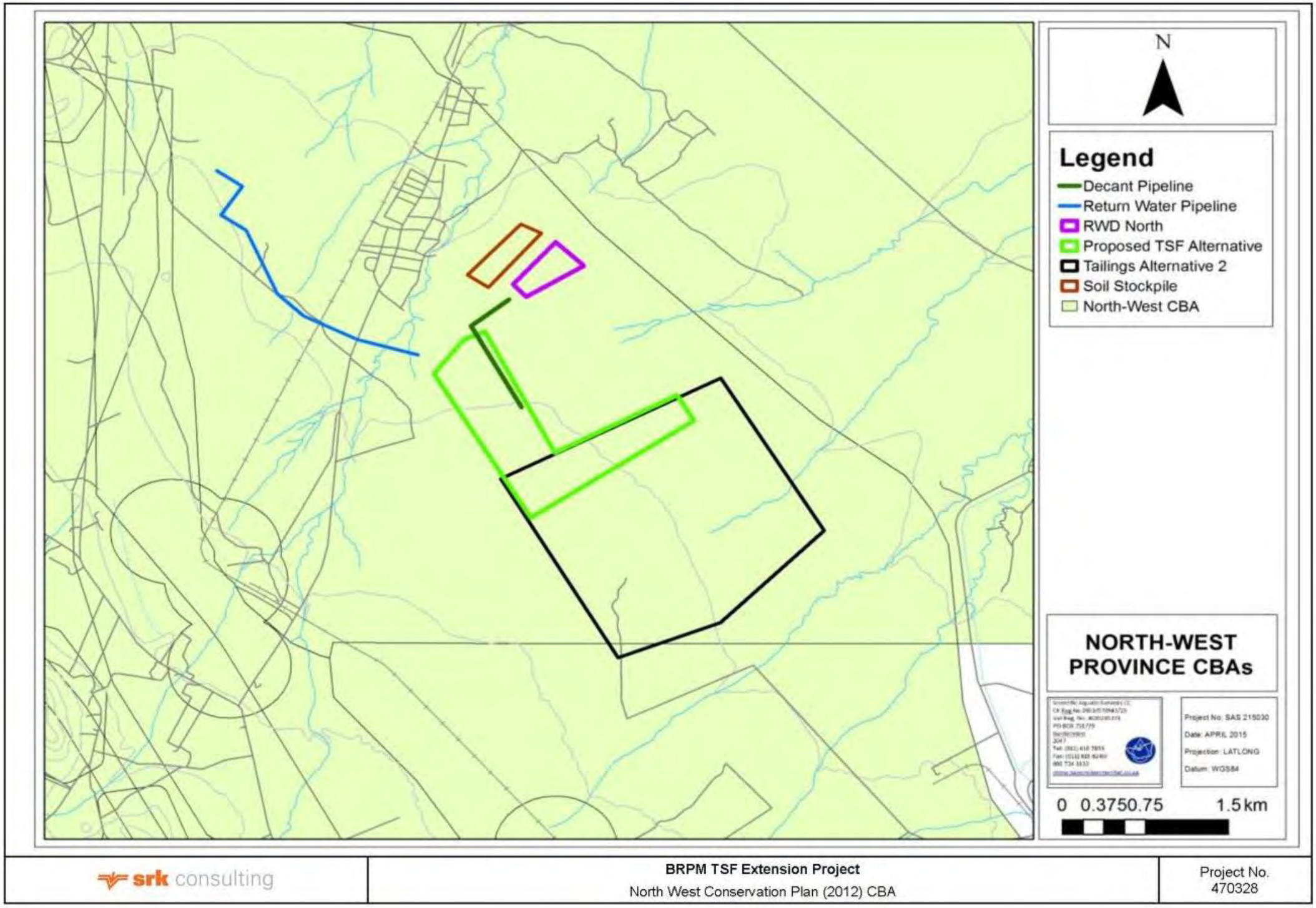


Figure 7-9: North West Conservation Plan (2012) CBA

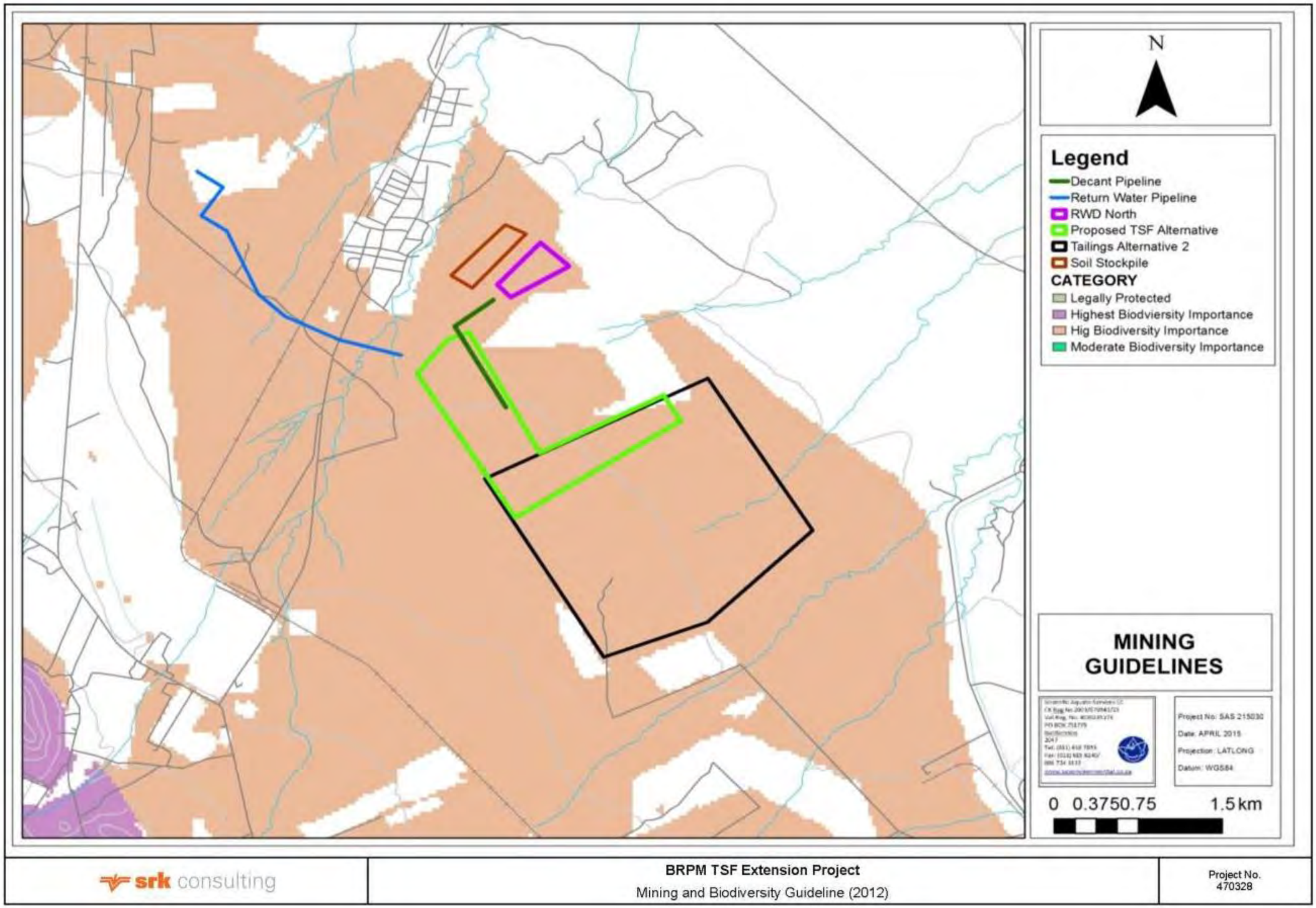


Figure 7-10: Mining and Biodiversity Guideline (2012)

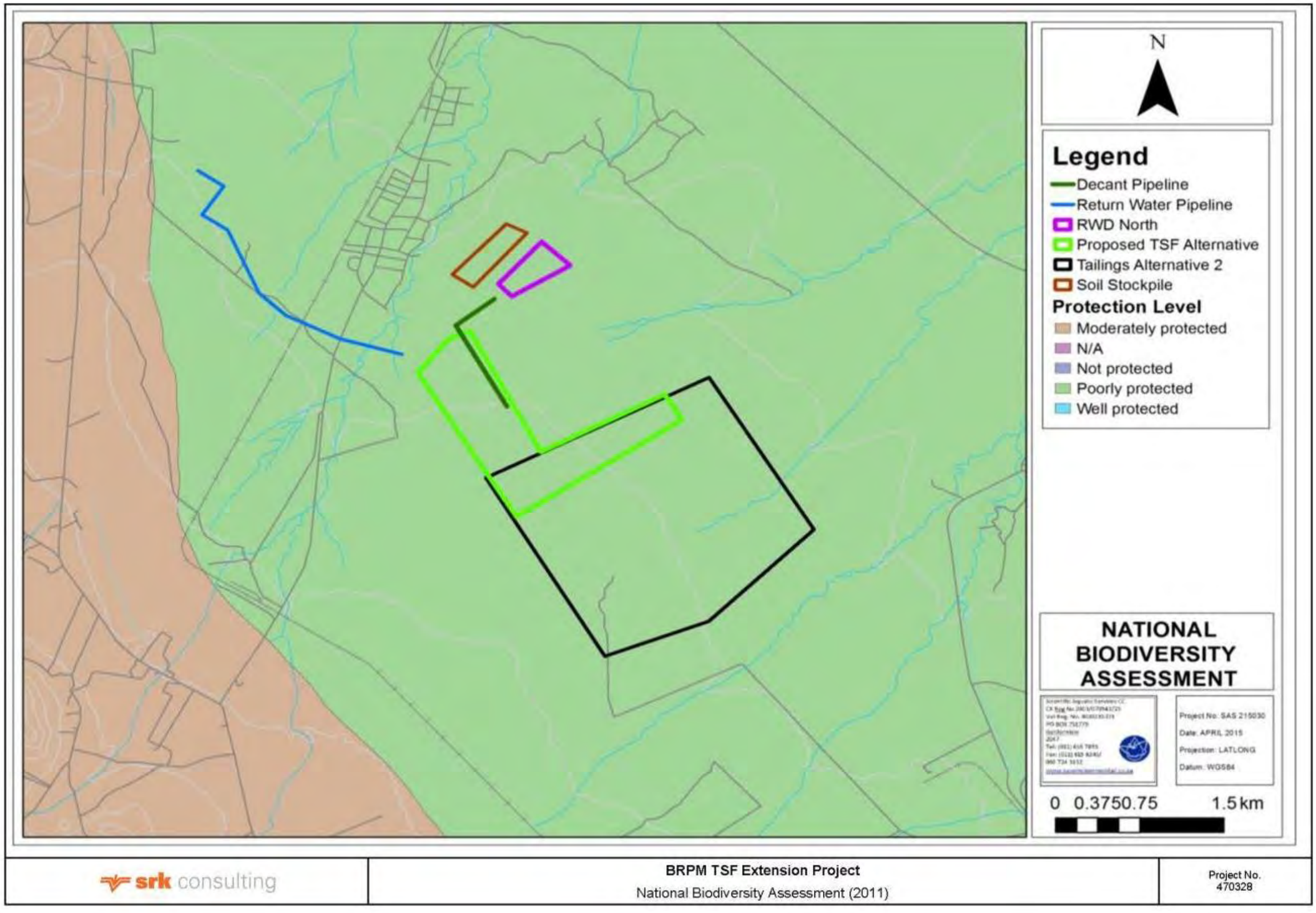


Figure 7-11: Level of ecosystem protection according to the National Biodiversity Assessment (2011)

7.10.5 National Protected Area Expansion Strategy Focus Areas for Protected Area Expansion (2008)

The goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. It deals with land-based and marine protected areas across all of South Africa's territory (SANBI, BGIS).

According to the NPAES database, the Project Area does not fall within an area earmarked as an NPAES area.

7.10.6 National Freshwater Ecosystems Priority Areas (NFEPA) database (2011)

The National Freshwater Ecosystems Priority Areas (NFEPA) (2011) database was consulted to define the aquatic ecology of the wetlands and river systems close to and within the Project Area that may be of ecological importance.

The Project Area falls within the Crocodile (West) and Marico Water Management Area (WMA). Each WMA is divided into several subWMAs, where catchment or watershed is defined as a topographically defined area which is drained by a stream or river network. The subWMA indicated for the Project Area is the Elands sub-WMA, of which 17% is classified as a FEPA.

From the NFEPA database it is evident that:

- ***No importance in terms of water supply is indicated;***
- ***No importance in terms of fish sanctuaries is indicated;***
- ***The WetVeg group of the wetland features are classified as "Vulnerable";***
- ***None of the wetlands present in the Project Area are shown to be of any biodiversity importance; and***
- ***According to the NFEPA database, there are no wetlands intersecting with a Ramsar site or within 500m of a threatened amphibian or threatened bird locality (Figure 7-12).***

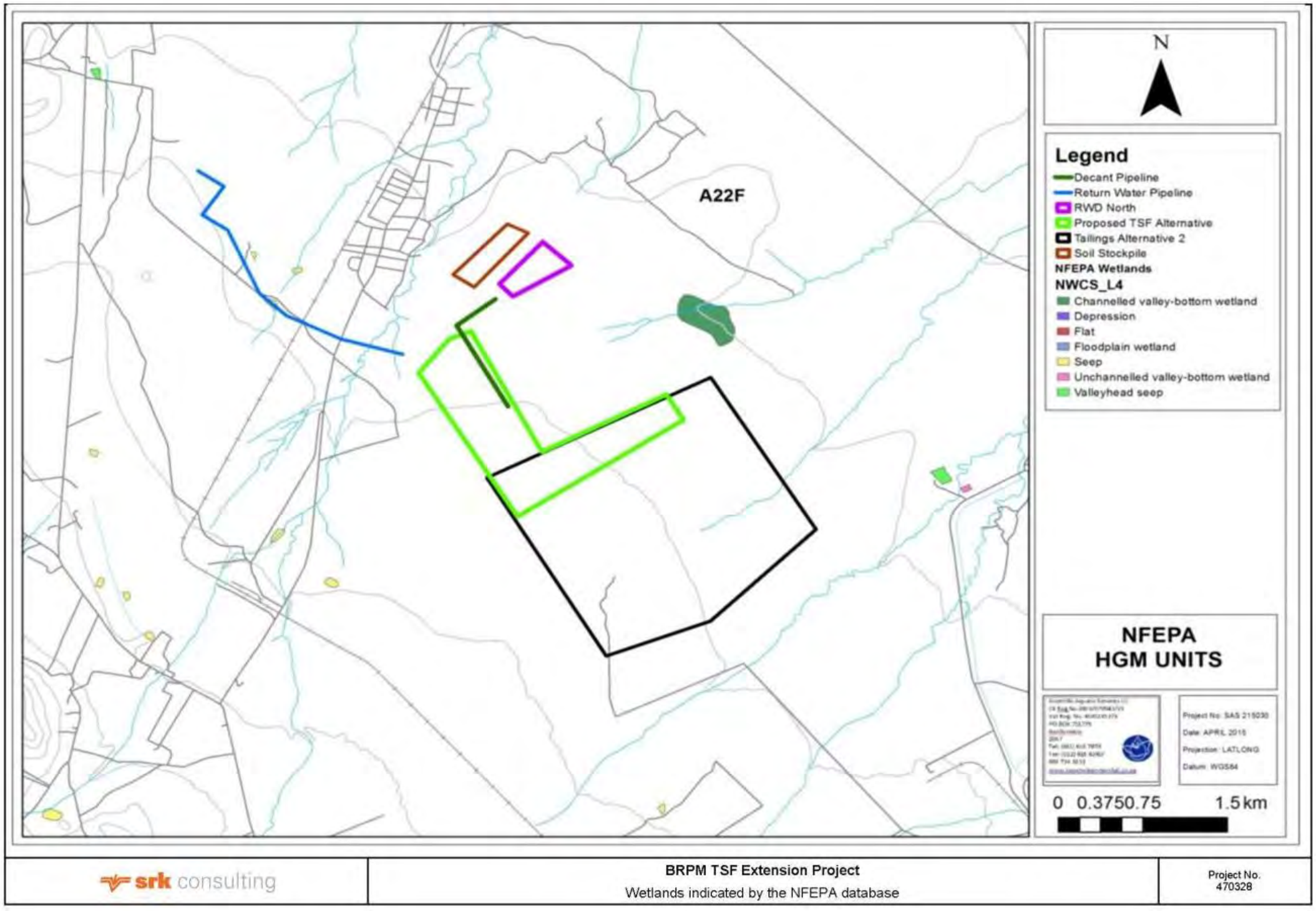


Figure 7-12: Natural and artificial wetlands indicated by the NFEPA database

7.11 Ecology

The information provided in the Ecological Section is a summary of the information provided in the Ecological Specialist Report. Please refer to Appendix L for the full Report.

7.11.1 Fauna

High levels of historical anthropogenic activity within large portions of the Project Area and within the surrounding area have led to a high level of disturbance of natural faunal habitat within large portions of the subject property. Despite the disturbed nature of large portions of the subject property and the immediate surroundings, habitat integrity and ecological function was still largely intact in many habitat units. However, in terms of the Faunal Assessment the following was evident:

No Species of Conservation Concern (SCC)[11] mammals were encountered during the field assessment. However, four mammal species were observed either directly or from spoor and/ or dung evidence during the field assessment:

- *Lepus saxatilis* (Scrub Hare)
- *Otomys irroratus* (Southern African Vlei Rat)
- *Sylvicapra grimmia* (Common Duiker)
- *Rhabdomys pumilio* (Four-striped Grass Mouse)

- No threatened Red data List avifauna was identified during this site survey;

  Avifaunal surveys were conducted across the entire Project Area and all avifaunal species seen or heard during the time of the field assessment were recorded. No avifaunal SCC were observed within the Project Area
- No amphibian species were encountered during the field assessment
- No SCC invertebrate species were observed during the field assessment
- No SCC Arachnids or Scorpions or signs thereof were observed within the Project Area during the field visit
- Only one common reptile species was observed within the Project Area, namely *Trachylepsis striata* (African Striped Skink).

With the existing mining infrastructure and human activities in the roject area means that the natural habitat has already undergone a transformation to some degree and current mining and anthropogenic activities occurring within close proximity of the Project Area, only the more common species are likely to occur within the Project Area.

7.11.2 Flora

The Project Area falls within the Central Bushveld Bioregion of the Savanna Biome and the vegetation comprises of Zeerust Thornveld (Mucina & Rutherford, 2006) (refer to Figure 7-13 and Figure 7-14).

Three Habitat Units have been identified within the Project Area, namely the Impacted Bushveld Habitat Unit, the Wetland Habitat Unit and the Transformed Habitat Unit (refer to Figure 7-15).

[11] The term **'**SCC' in the context of this report refers to all national RDL and IUCN listed faunal species, as well as protected species as recorded for the North West Province.

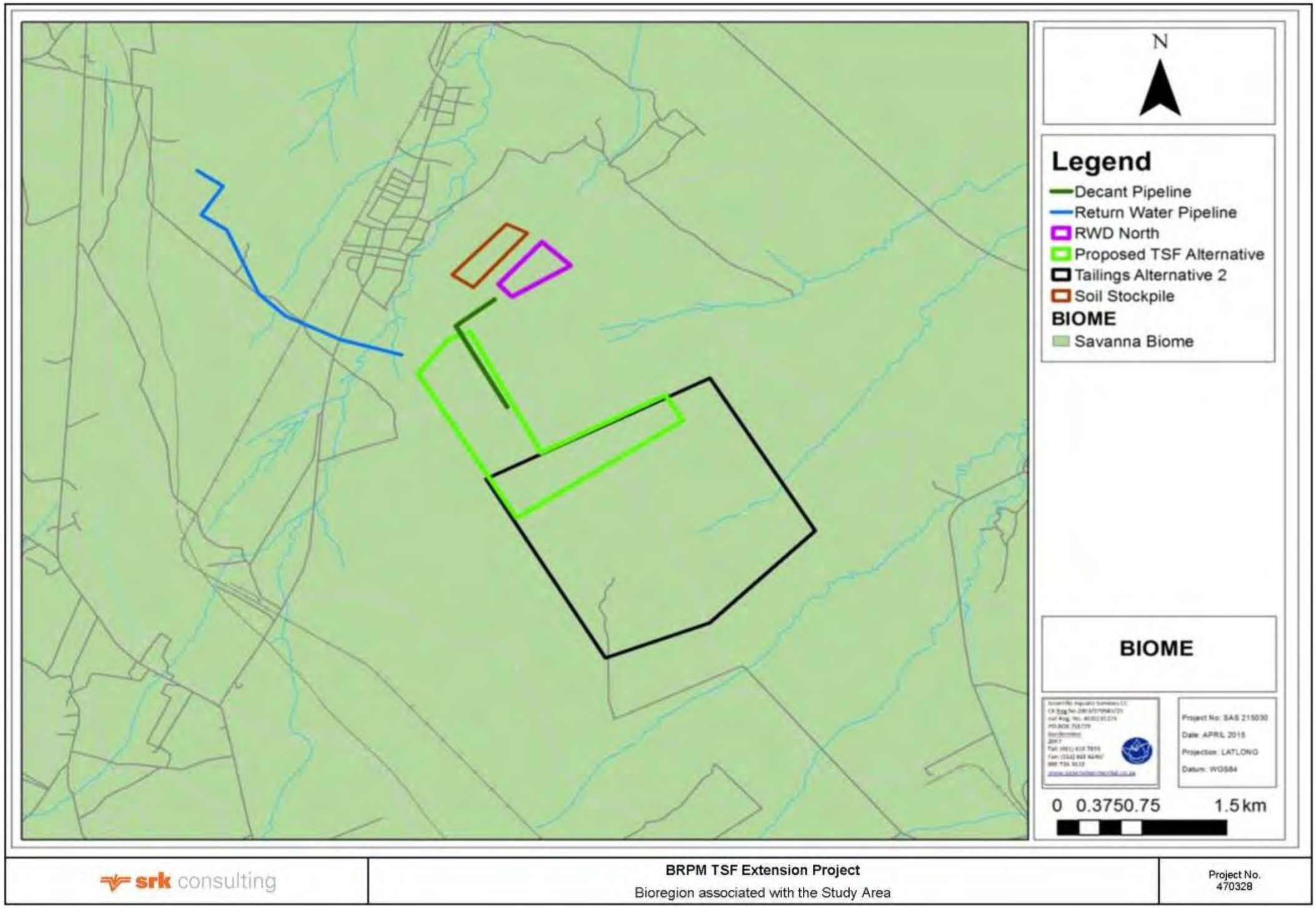


Figure 7-13: Bioregion associated with the Project Area (Mucina & Rutherford, 2010)

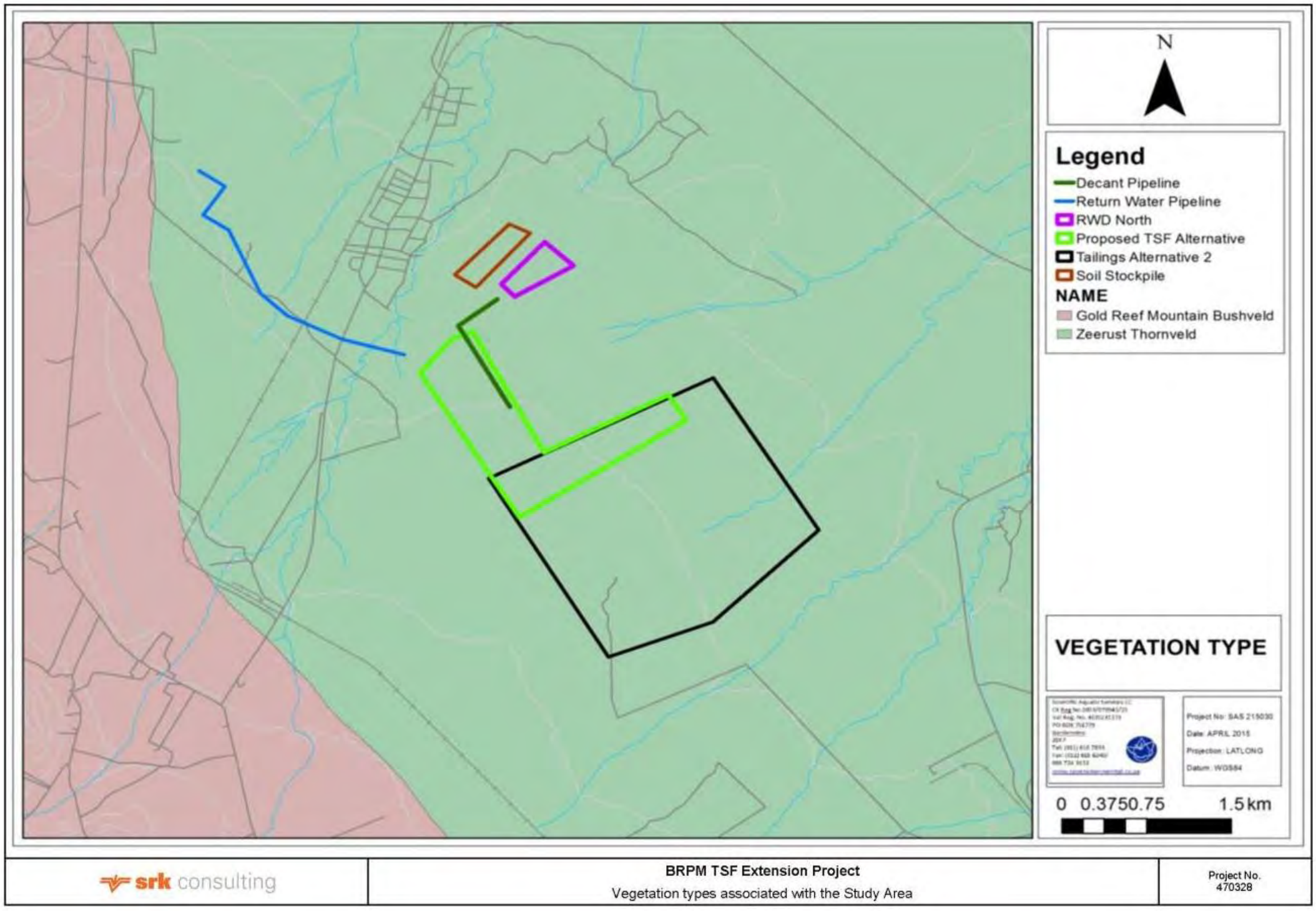


Figure 7-14: Vegetation types associated with the Project Area (Mucina & Rutherford, 2010)

Bushveld Habitat Unit

This habitat unit includes areas affected by edge effects from current mining activities and associated infrastructure as well as extensive areas where historical crop cultivation activities have taken place, with secondary bushveld and altered vegetation composition. The impacted Bushveld Habitat Unit bordering the proposed return water pipeline has been severely impacted by past mining activities, mowing of road reserves as well as the construction of existing pipelines, fencing and roads.

No RDL species were listed for the Project Area. Two specimens of *Sclerocarya birrea subsp. caffra* are located in the vicinity of the proposed return water pipeline, but not in the pipeline route, in the west of the Project Area. Floral SCC species present within this habitat unit includes *Crinum spp.* and a limited number of *Boophane disticha* (both species are listed by SANBI as 'Declining').

Transformed Habitat Unit

A number of transformed habitat units are located within the vicinity of the Project Area. The transformed areas are not discussed in detail as the vegetation structure and composition of these areas have been completely altered, provide no natural habitat for indigenous floral and faunal species and as such, has no conservation value and very low ecological sensitivity.

Wetland Habitat Unit

Various drainage lines, comprising the Wetland Habitat Unit traverse the Project Area, including the larger Matlopyane stream and tributaries thereof, as well as a tributary of the Leragane stream, both draining in a northern direction towards the Elands River. The Matlopyane stream and its tributaries intercept the proposed return water pipeline alignment within the west of the Project Area, while a tributary of the Leragane stream is located within the footprint area of the TSF Alternative 2 in the east of the Project Area. The vegetation present within the Wetland Habitat Unit contains many species observed within the impacted Bushveld Habitat Unit, but also includes a number of obligate wetland species, such as *Phragmites australis, Cyperus sexangularis, Schoenoplectus corymbosys and Mariscus congestus*. No wetlands are present in the footprint location the preferred alternative (BRPM TSF Extension Project).

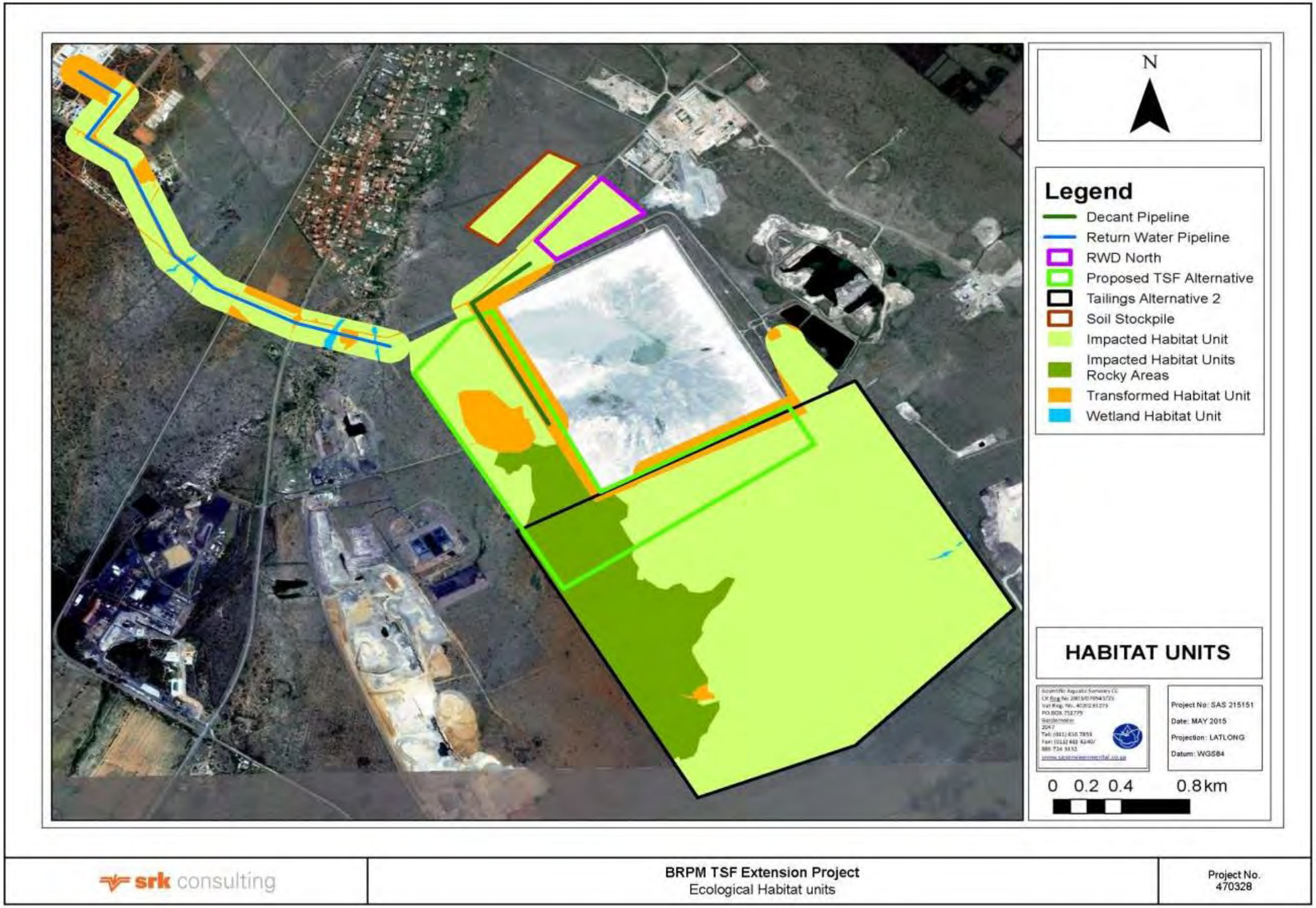


Figure 7-15: Ecological Habitat units

7.11.3 Wetlands

During the baseline study three wetland features and one riparian feature were found to occur within, or to traverse the proposed Project Area. From Figure 7-17 it can be seen that the planned pipelines will cross wetland 1, wetland 3 and the riparian feature. Figure 7-17 also includes the wetland delineation, 100 year floodlines, as well as the proposed project footprint. No water was present during the wetland study and the vegetation was used as the primary wetland indicator.

The proposed water pipeline will follow the existing crossings in order to limit the footprint area within the wetland and riparian areas. These wetlands are existing and currently being managed in terms of the existing BMPR EMPR.

The wetlands were classified according to the classification system compiled by SANBI (Ollis, 2013), which describes the degree of modification or level of impairment. The results of the wetlands classification concluded that:

- Wetland 1 and the Riparian feature, forming part of the same system, are located approximately 150m apart, along the proposed return water pipe and are traversed by a tar road as well as an existing pipeline alignment. The topography of Wetland 1 has been altered by historical disturbances such as cultivation as well as historical construction activities of the existing pipeline and road;
- The Riparian feature was classified as a non-perennial river associated with the Matlopyane stream; and
- The area where Wetland 3 intersects the proposed return water pipeline alignment and the service road does not show distinctive wetland characteristics such as wetland vegetation and surface water, due to extensive disturbance in the vicinity of the alignment. This can be attributed to road, culvert, pipeline and fence construction, as well as extensive mowing of the road reserves and resultant soil compaction. As a result of these disturbances, permanent wetland conditions do not exist in the immediate vicinity of the proposed pipeline. However, upstream and downstream wetland conditions are present and water is expected to flow in this area during rainfall event.

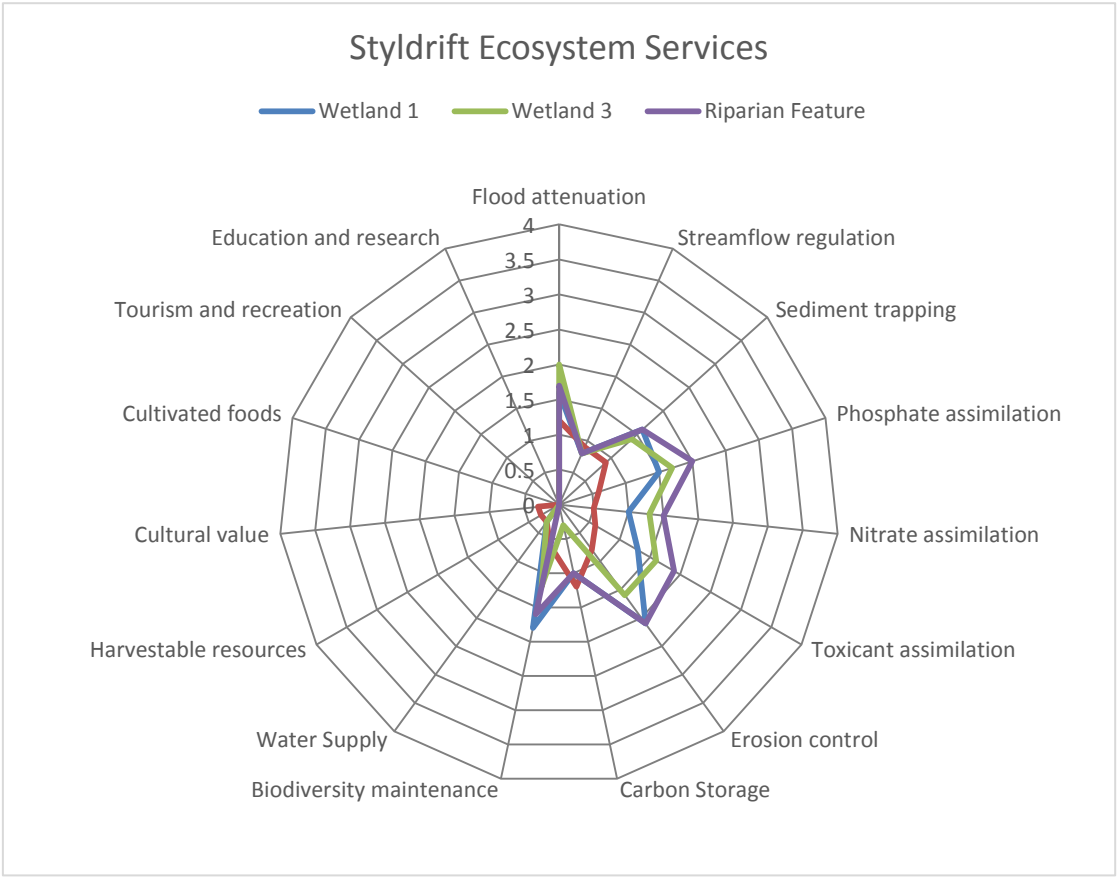
The Present Ecological State (PES) of each wetland was determined and it was concluded that:

- Wetland 1: **PES - C:** Moderately Modified, which indicates that that loss of natural habitat, biota and basic ecosystem functions, has occurred. The hydrology of the wetland has been impacted by cultivation, topographic alteration due to construction activities, pipeline development and road construction. In addition, the road traversing the wetland contributes to increased water influx as a result of runoff. The vegetation cover within the wetland was intermediate with a number of obligate wetland floral species present. This means that the vegetation structure associated with this wetland feature has been largely modified.
- Riparian Feature: **PES - C:** Moderately Modified, which indicates a loss and change of natural habitat and naturally occurring biota, with the basic ecosystem functions being predominantly unchanged. These impacts can largely be attributed to the road and bridge construction as well as alien species invasion. The existing road traversing the feature has also resulted in altered water flow patterns and increased water influx. A number of alien floral species, including Melia azedarach, Verbena bonariensis and Conyza bonariensis were observed within and along the feature, which indicates that the vegetation composition of the feature has been altered. The geomorphology of the riparian feature has been moderately modified by sediment deposition within the feature and minor bank erosion was observed. At the time of the assessment, there was no water within the wetland and water quality could therefore not be determined.

- Wetland 3: **PES - D:** Largely Modified, which indicates that a large change in ecosystem processes and a significant loss of natural habitat and biota and had occurred. The hydrology of the wetland has been largely modified by the presence and construction of fencing, a culvert and a tar road and historical construction activities associated with these structures. This induced altered water flow patterns and subsequent alteration of wetland conditions. Extensive vegetation mowing and vegetation loss continues to occur along the existing road reserve, which has led to serious modification of the vegetation and reduced surface roughness within the wetland.

The Wetland Function and service provision results are shown in Figure 7-16. An average score of 0.9 (range: 0 – 4) was calculated for both Wetland 1 and the riparian feature, indicating that the features provide moderately low levels of service provision and ecological functioning.

Wetland 3 obtained an average score of 0.8 which indicates that the wetland provides moderately low levels of service provision and ecological functioning.



srk consulting	**RB Plat TSF EA: WULA** Wetland Function Assessment Results	Project No. 470328

Figure 7-16: Wetland Function Assessment Results

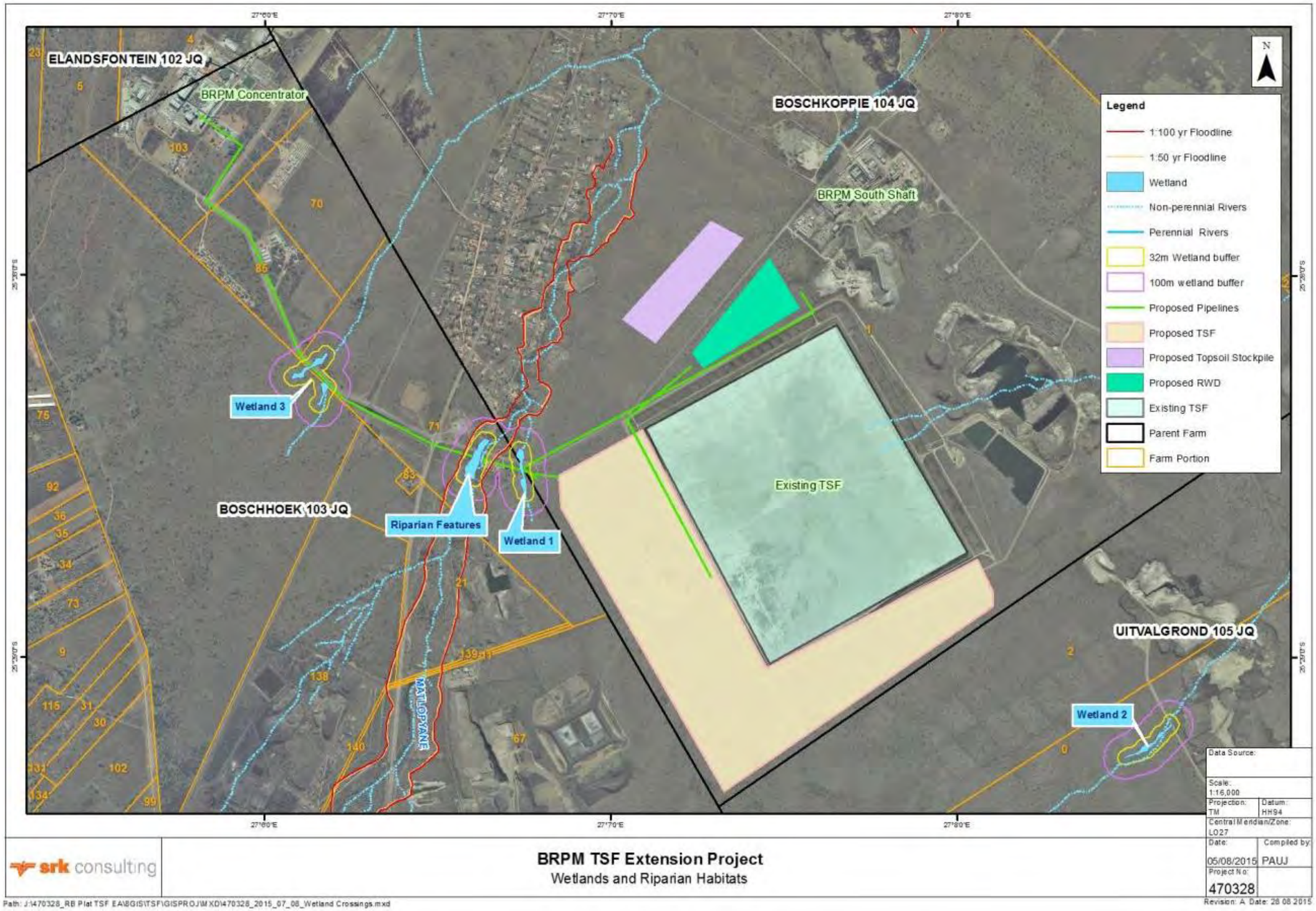


Figure 7-17: Location of Wetlands and Riparian Feature

Ecological Importance and Sensitivity (EIS), & Recommended Ecological Category (REC)

The EIS of the wetlands and riparian feature identified within the Project Area were determined based on the PES scores obtained, as well as function and service provision levels. These EIS scores were used to determine the REC.

The REC for the HGM Units within the Project Area was further determined, taking all previous results into consideration. The REC specifies the level of management that is necessary to ensure that present levels of ecological services and functioning of the wetland and riparian features are maintained. The EIS and REC results are shown in Table 7-6.

Table 7-6: EIS & REC for Wetlands

Feature	EIS Score	REC
Wetland 1	D: Low	D: Largely Modified
Wetland 3	D: Low	D: Largely Modified
Riparian Feature	C: Moderate	C: Moderately Modified

From the table it can be seen that the wetland and riparian features are in a largely modified state.

7.12 Soils, Land Use and Land Capability

The information provided in the Soils Section is a summary of the information provided in the Soils, Land Use and Land Capability Specialist Report. Please refer to Appendix M for the full Report.

7.12.1 Soil Classification

Three different soil forms were identified within the Project Area (Figure 7-18).

Arcadia soil form (Ar) (117.4 ha or 62.6% of the area assessed)

Soils of the Arcadia form occur on 62.6% of the area assessed. The vertic A-horizon is calcareous which make it part of the Rustenburg soil family. These dark brown to black vertic soils have deep A-horizons (60 cm to 150 cm deep) and are high in clay content with swelling-shrinking properties under conditions of water content changes. Most Arcadia soils on site have medium to high agricultural potential. Crop production on these soils would require irrigation. No such crops are observed currently in the Project area, and are unlikely to be cultivated in the Project area. The Project Areas currently has low to no irrigation potential and it transformed by historical mining activities, pipeline and the Glencore Open Pit.

Mayo soil form (My) (64.2 ha or 34.3% of the area assessed)

The Mayo soil form identified consists of a melanic A horizon (20 cm to 80 cm deep), overlying a lithocutanic B horizon. More than 70% by volume of the hard lithocutanic B horizon consists of parent bedrock, fresh or partly weathered, with a hard consistence in the dry, moist and wet states.

The land use associated with this type of soils is normally confined to livestock grazing or wildlife conservation. No such formal land use is observed currently in the Project area, and is unlikely to be developed in the Project area. The site is already transformed by historical mining activities, pipeline and the Glencore Open Pit.

Witbank form (Wb) (5.8 ha or 3.1% of the area assessed)

In South Africa there is currently only one soil form that caters for the anthropic group according to the Soil Classification Working Group (1991), namely Witbank soil form. Anthropic soils are those soils that have been so profoundly affected by human disturbance that their natural genetic character (i.e. their link to the natural factors of soil formation) has largely been destroyed or has had insufficient time to express itself.

7.12.2 Soil Chemical Characteristics and Soil Fertility

The pH of the analysed soil samples in the Project Area ranges from 5.16 to 6.96 (refer to the specialist study for the soil chemistry results). For successful crop production, a pH of between 5.8 and 7.5 is optimum and crops produced in soils with lower pH may suffer aluminium (Al) toxicities and phosphorus (P) deficiencies. Phosphorus levels were as low as expected for natural veld conditions (1 mg/kg). The soil chemistry of the samples analysed indicate that soil at the project site has the chemical suitability for crop production. However the site is transformed with existing mining activities taking place.

7.12.3 Land Capability

Land capability classes were determined using the guidelines outlined in Section 7 of The Chamber of Mines Handbook of Guidelines for Environmental Protection (Volume 3, 1981). The Chamber of Mines pre-mining land capability system was utilised, given that this is the dominant capability class classification system utilized in the mining and industrial fields. The soil and land types identified in the Project Area could all be classified into two different land capability classes. Deeper soils of the Arcadia form have arable land capability which could also have been suitable for irrigated crop production should irrigation water be available. Because of the restricted soil depth of the Mayo soil form the land capability is mainly grazing on this soil and wilderness on the Witbank soil form. Refer to Figure 7-19 for the land capability of the BRPM TSF Extension Project Area.

7.12.4 Agricultural Potential

Irrigated crop production potential

The Project Area did not have any current irrigation infrastructure that was being used for irrigation purposes. No large dams with irrigation potential have been observed on site. The Project Area currently has low to no irrigation potential.

Rainfed crop production potential

The Project area is suitable for rain fed maize production with its average annual rainfall of 629 mm. Although some of the soil groups identified would be moderately to highly suitable for crop production, once more the location of the small sites adjacent to mining activities and residential villages restrict the potential for crop production.

Cattle and game farming potential

The entire Project area will have grazing available for 18 head of cattle whilst maintaining the quality of the field. Cattle farming are a viable long-term land use of the site as long as the field quality is maintained by never exceeding the grazing capacity.

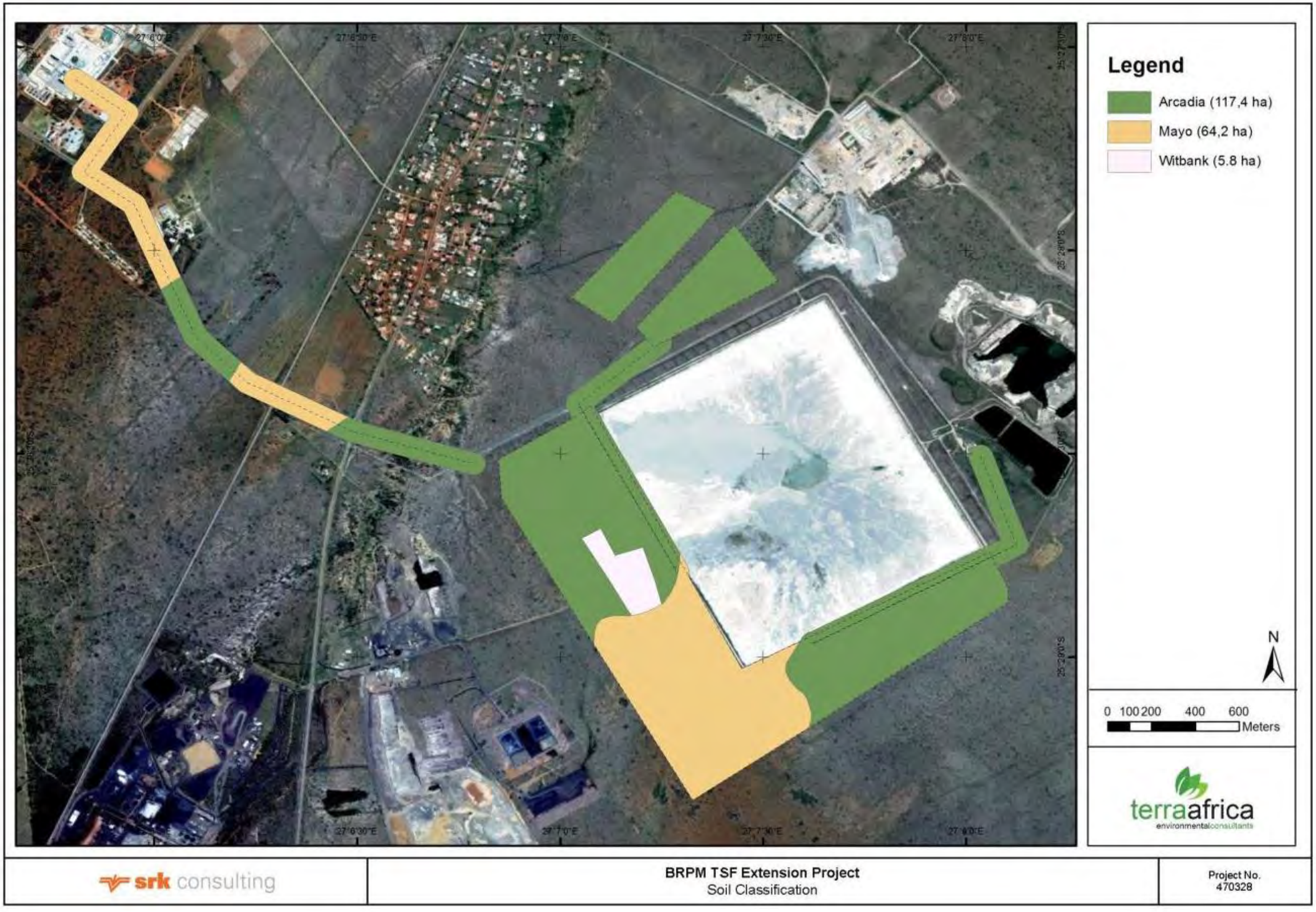


Figure 7-18: Soil Classification of the Project Area

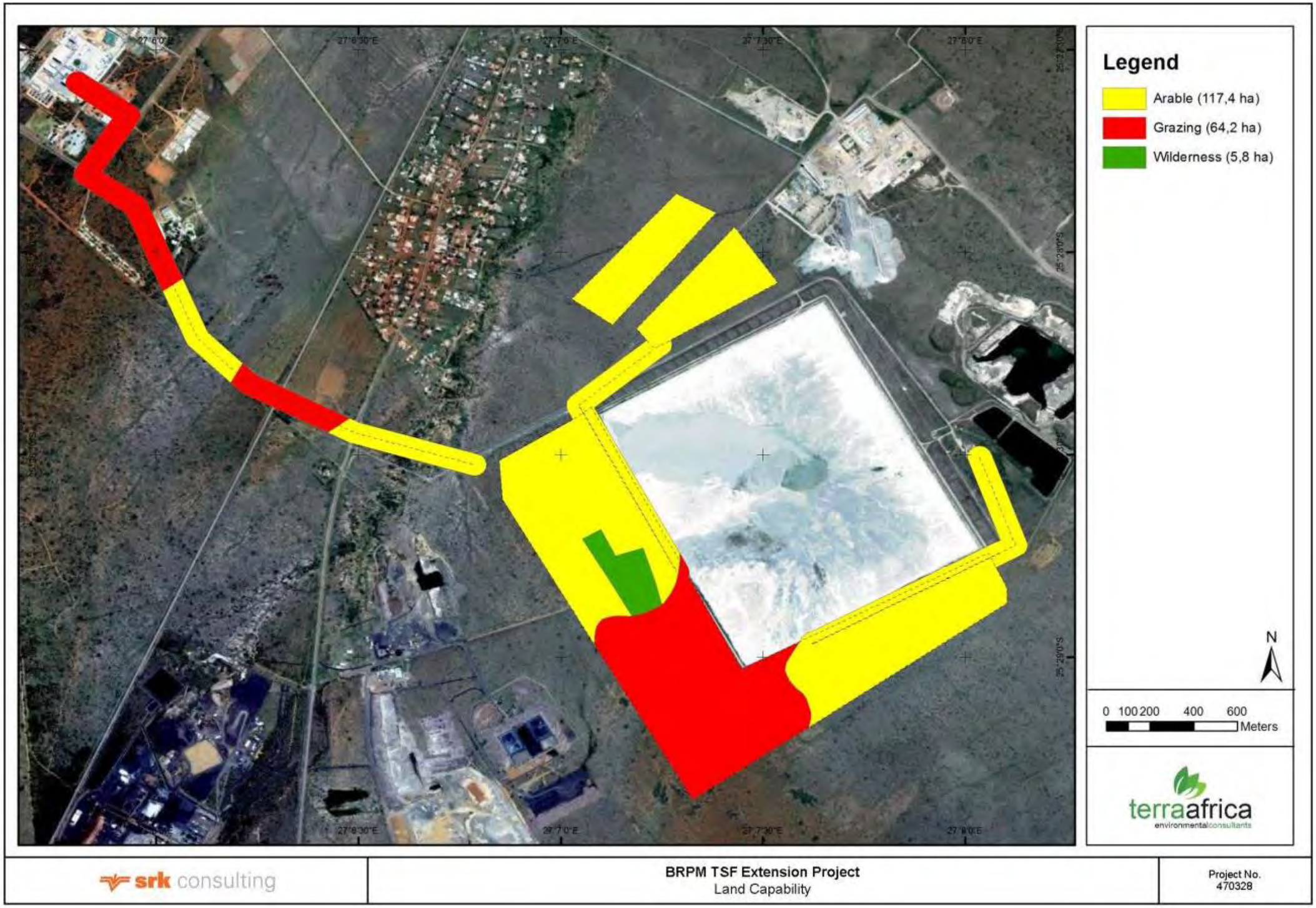


Figure 7-19: Land capability map of the Project Area

7.13 Geology

The information provided in the Geological Section is a summary of the information provided in the Groundwater Specialist Report. Please refer to Appendix J for the full Report.

The Project Area is located in the Western Limb of the BIC. The Rustenburg Layered Suite (RLS) is categorized into four zones, namely the Upper, Main, Critical and Lower Zones, of which the site is located on the norite and gabbro rock of the Main Zone., which comprises similar rock types with varying compositions of norite, pyroxenite, anorthosite and diorite Figure 7-20).

The dip of the layered sequence is approximately 3° to 15°, becoming steeper in the eastern part of Styldrift and around 12^{o} at Boschkoppie, (DRA, 2012). Quartzite hills of the Magaliesberg (Transvaal) form the basement of the RLS and comprise the topographically higher area to the far east and south of the mine area. The dominant feature is the Pilanesberg intrusion to the north and Pilanesberg age syenite and unmineralised dykes occur throughout the complex. Iron rich ultramafic pegmatoid (IUEB) containing titanium rich magnetite occurs as small hills to the north of the existing BRPM TSF on Boschkoppie farm, (DRA, 2012).

The sub-outcrop of the chromitite reefs occurs to the west of the existing BRPM TSF with a chromite seam (coincident with the Glencore Open Pit) underlying the western portion of the BRPM TSF Extension Project whilst the UG2 and MR of the upper part of the Critical Zone occurs to the east of the existing BRPM TSF. The MR and UG2 reefs strike north-west to south-east on Boschkoppie before curving in a westerly direction to the north of the farm boundary.

7.13.1 Structural Geology in the BRPM TSF Extension Project Area

Several dykes associated with the Pilanesberg Volcanic Complex magmatic activity cross the Farms Boschkoppie 104 JQ and Styldrift 90 JQ in a south-east to north-west direction. The dykes are a dominant geological feature north of the Project Area. There are regionally two major normal faults in the area. The main water bearing structures being identified (on a regional scale or alternatively for the SMC and BRPM area) as:

- Boundary fault: strikes north-west to south-east – largest down throw is 100 m; and
- Caldera fault: strikes east-northeast to west-southwest – largest down throw are 1000 m.

The main water bearing structures have been identified as (on a project specific scale):

- The Elands River Fault (north of the mine area);
- Randalf's dyke; and
- The Railway block fault (north).

These structures are all located outside the BRPM TSF Extension Project Area. The main structures in the BRPM TSF Extension Project Area which generally strike from north-east to south-west include the Railway fault to the north of Rasimone a regional unnamed fault to the south and the south shaft shear zone located to the east of the existing BRPM TSF and a regional unnamed fault to the south. Minor lineaments were also noted to strike through the existing BRPM TSF.

7.13.2 Undermining

There is no current undermining underneath the footprint of the BRPM TSF Extension Project and there is also no future undermining planned for this area (Knight Piesold, 2015).

7.14 Geochemistry

The information provided in the Geochemistry Section is a summary of the information provided in the Geochemistry section of the Groundwater Specialist Report. Please refer to Appendix J for the full Report.

Knight Piesold provided geochemical analyses for the dry tailings samples which DWS have requested. These results, together with the water chemistry for the RWD, provide a basis of the geochemical assessment.

The results (UIS, 2014) are compared to the Waste Classification and Management Regulations and the National Norms and Standards for the Assessment of Waste for Landfill Disposal, (Government Gazette No 36784, No R634 and R635). The total concentration and leachable concentration of elements in the waste are compared to threshold limits, the total concentration threshold (TCT) and Leachable Concentration Threshold (LCT) that are specified in the above regulations.

Both UG2 and MR tailings classify as a Type 3 waste in respect to the content of:

- Cobalt, copper, manganese, nickel and fluoride are elevated above the TCT0 but below TCT1 in both samples with vanadium and zinc elevated for the UG2 sample;
- In the leach test (1:20 water leach); arsenic and nickel concentrations are elevated above LCT0 in the Merensky sample and concentrations of barium and total chromium are elevated above LCT0 in the UG2 sample.

The Acid Base Accounting tests indicated that neither of the samples are acid generating. This is supported by the results obtained from the existing BRPM TSF where the pH in the penstock and RWD is typically alkaline.

If compared to the National Norms and Standards for the Assessment of Waste for Disposal of Waste to Landfill (Government Gazette No 36784, No R635, 23 August 2013), the tailings is a Type 3 waste and therefore would require a Class C liner design for the TSF and RWD.

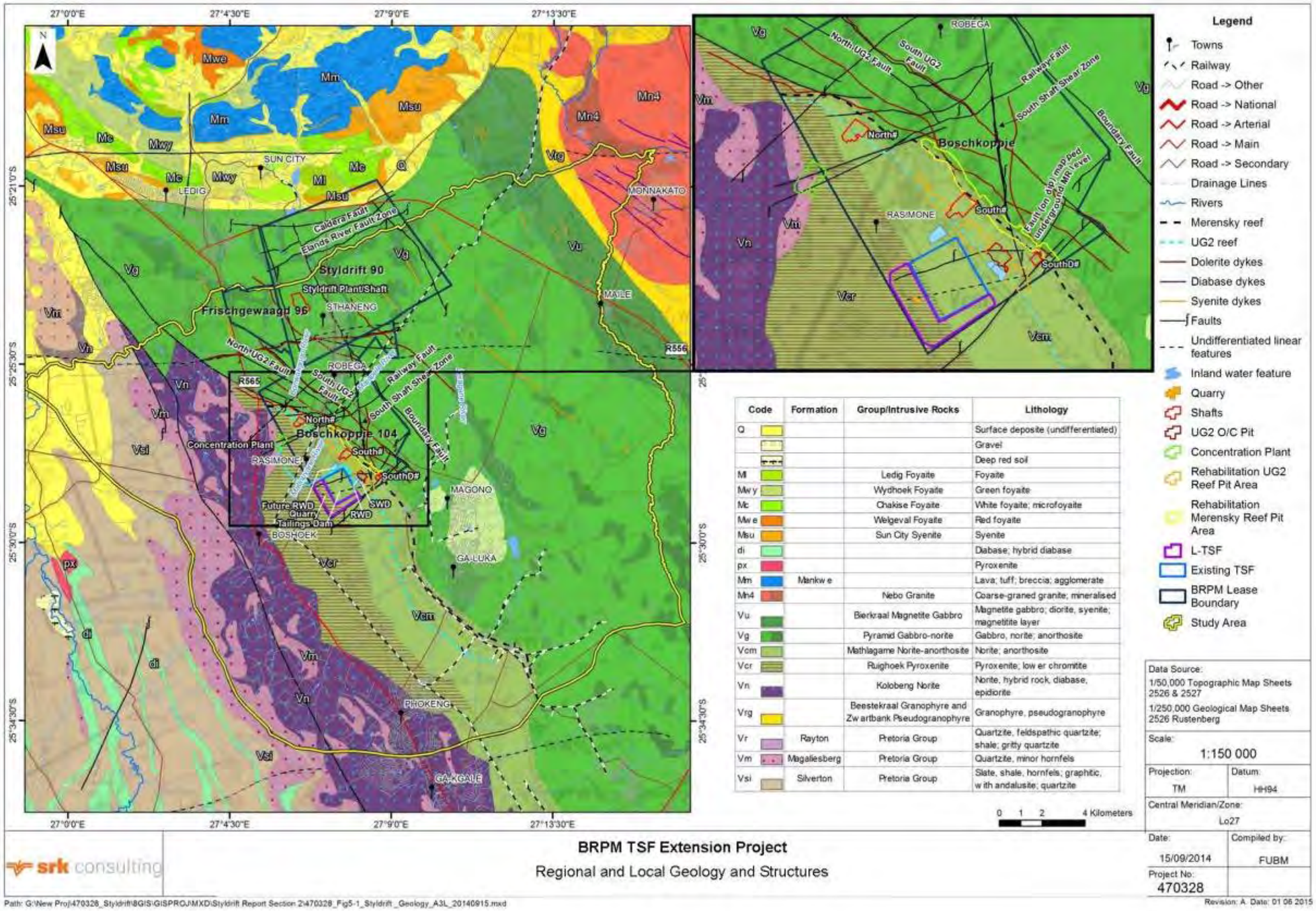


Figure 7-20: Regional and Local Geology and Structures

7.15 Climate

The information provided in the Climate Section is a summary of the information provided in the Surface Water Specialist Report. Please refer to Appendix K for the full Report.

The Project Area falls within the Highveld Climatic Zone which is warm temperate, with mild dry winters and hot summers. The average temperature for the year in Rustenburg is 18.1°C, the warmest month, on average, is January. The coolest month on average is June, with an average temperature of 11.2°C.

7.15.1 Rainfall and Evaporation

Rainfall and evaporation are measured daily at the existing BRPM TSF. The Mean Annual Precipitation (MAP) at the existing BRPM TSF based on existing data is 682.4 mm/a, for the period 2000 – 2013, with the highest rainfall being recorded in 2000 and 2009. Average monthly rainfall values are shown in Figure 7-21. The mean annual potential evaporation is 1 649 mm at the Pilanesberg Weather Station (1908-1999) and 1 468.8 mm at the existing BRPM TSF for the period 2011 to 2013. Average monthly evaporation values are shown in Figure 7-22.

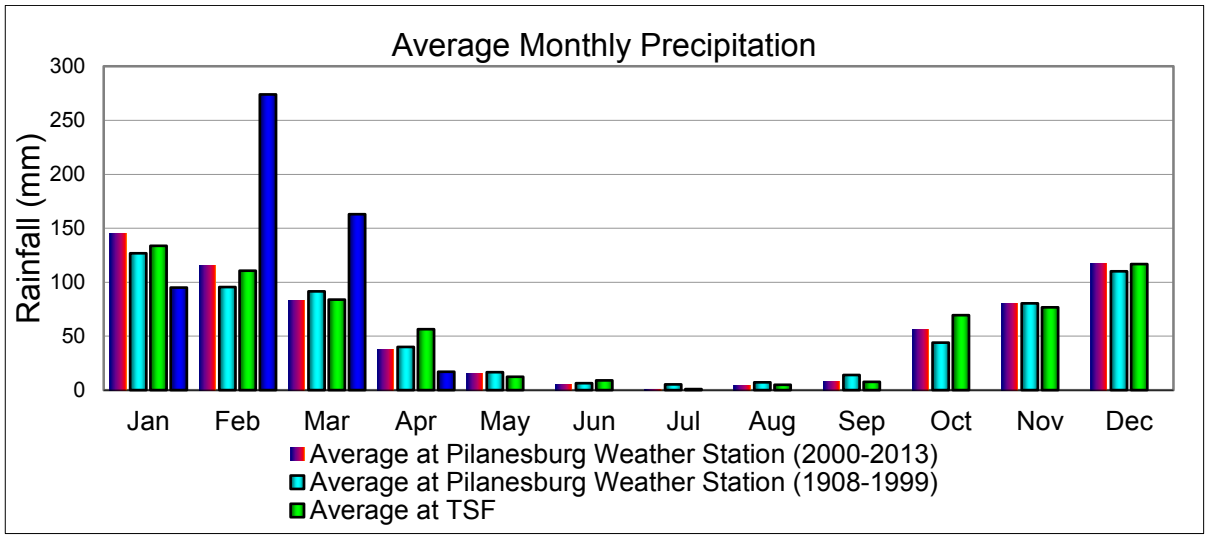


Figure 7-21: Average monthly rainfall values

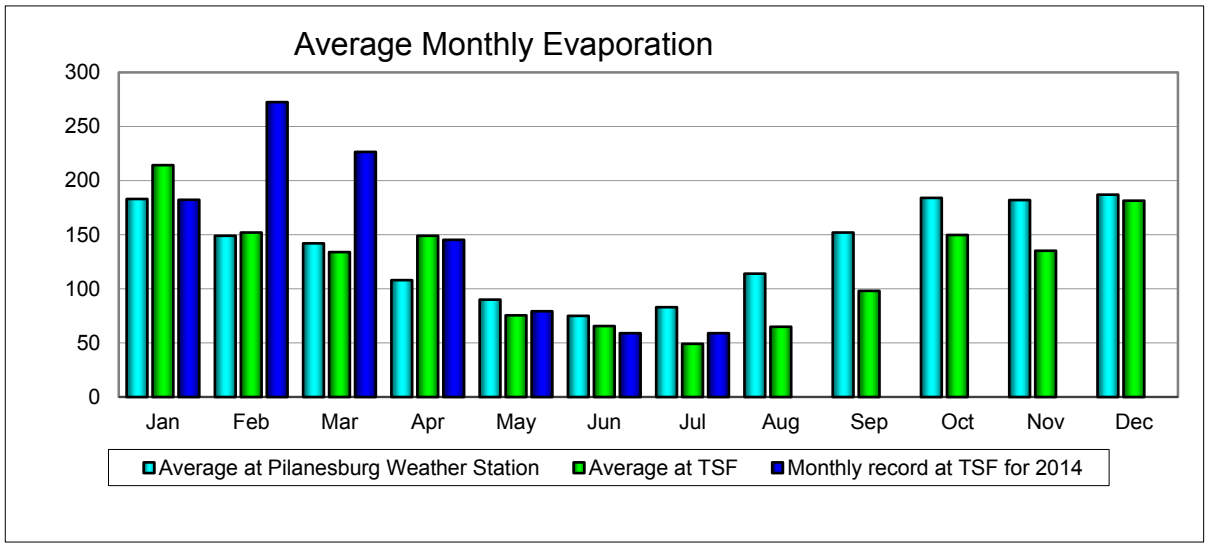


Figure 7-22: Average monthly evaporation values

7.16 Topography

The information provided in the Topography Section is a summary of the information provided in the Groundwater Specialist Report. Please refer to Appendix J for the full Reports.

Regionally, the greater Project Area consists of a relatively flat landscape sloping towards the perennial Elands River which flows through the central part of the Farm Styldrift 90 JQ.

The topography in the BRPM TSF area is also relatively flat with the highest point in the south-western corner of the BRPM TSF Extension Project Area and generally sloping to in a north-easterly direction towards South Shaft. The western segment of the BRPM TSF Extension Project Area follows a natural gradient towards the Matlopyane stream whilst the southern segment slopes towards the Leragane stream. These streams, originating on the Farm Boschkoppie 104 JQ, are non-perennial and drain northwards to the Elands River and are not located within the footprint of the BRPM TSF Extension Project Area.

The highest point in the TSF area is the south-western corner of the proposed BRPM TSF extension (1129 m above mean sea level (mamsl)) with the general topographical gradient being to the north-east towards South Shaft. The lower areas of the proposed BRPM TSF extension are the eastern boundary (1115 mamsl) towards the origin of a tributary of the Leragane stream and on the northern boundary (1110 mamsl) towards the Matlopyane stream. The topography of the Project Area is presented in Figure 7-23.

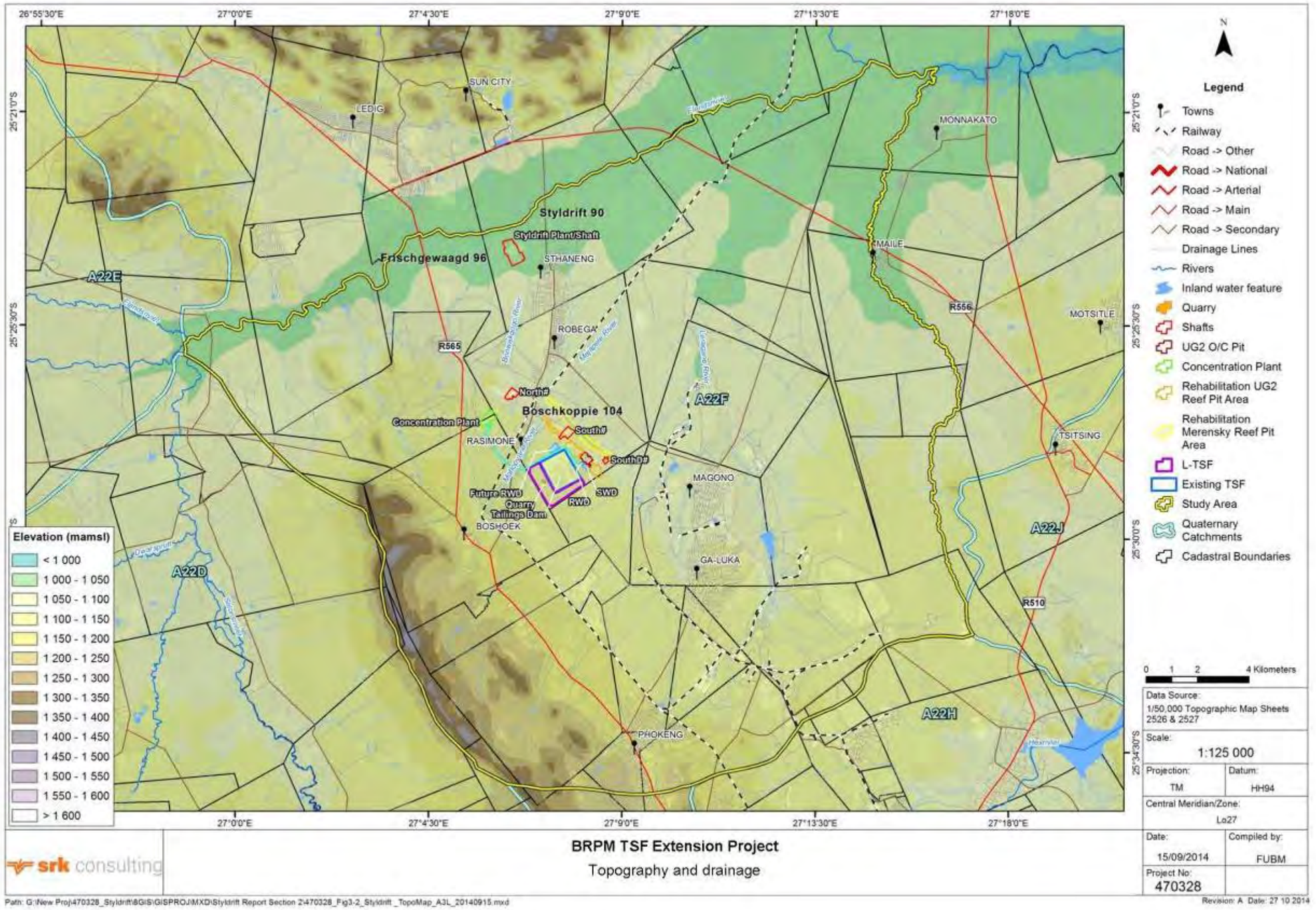


Figure 7-23: Topography and drainage of the Project Area

8 Stakeholder Engagement Process

Public participation is a key element of the environmental decision making process, and stakeholder engagement formed part of the Scoping as well as the Impact Assessment Phase of this proposed project. Figure 8-1 briefly outlines the broad timeframes and the various technical and stakeholder engagement activities being undertaken during the three phases (Scoping, Impact Assessment, Decision-making) of the integrated environmental decision making process relating to the proposed project.

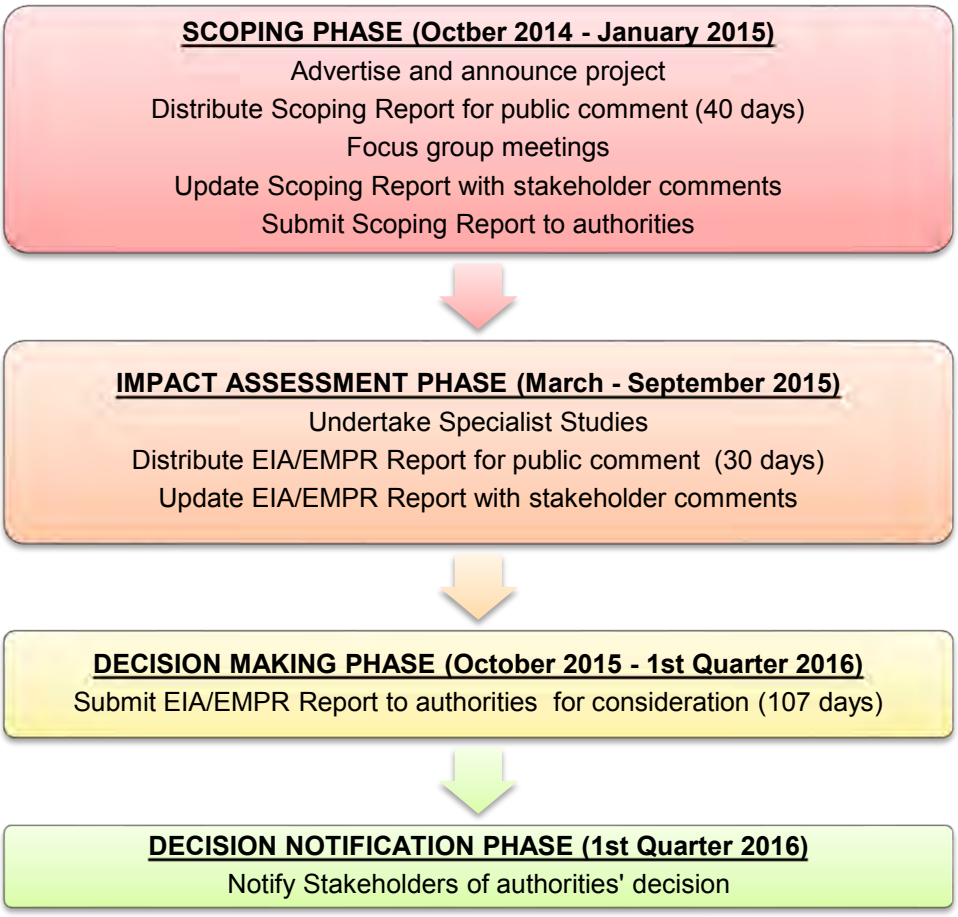


Figure 8-1: Stakeholder engagement process as part of the integrated environmental authorisation process

The Sections below describe the stakeholder engagement process being followed through the various phases of the integrated authorisation process for the proposed BRPM TSF Extension Project.

8.1 Pre-Scoping Stakeholder Engagement Activities

8.1.1 Stakeholders Identification

Identification of landowners

The identification of landowners in the Project Area is an important part of the stakeholder engagement process. SRK conducted a deeds search to identify the current landowners in the Project Area. Please refer to Table 8-1 for information regarding landowners of the properties affected by the proposed project. Refer to Appendix A for a copy of the WINDEED property information.

Other affected parties that may be affected are the adjacent landowners and associated land occupiers. Sun City Legacy Hotels and the Pilanesberg National Park are located to the north of the RBPlat SMC and have been identified as possible I&APs.

Please refer to Table 8-2 for information regarding adjacent landowners located within the proposed Project Area. Please refer to Figure 8-2 for the affected and adjacent properties.

Table 8-1: Landowners located within the proposed Project Area

Farm Name and Number	Surveyor General code	Title deed number	Registered Owner
Boschkoppie 104 JQ - Portion 1	TOJQ00000000010400001	T1712/1929BP	Republic of South Africa (formally Bophuthaswana) And kept in a Trust for the Royal Bafokeng Nation[12]
Boschhoek 103 JQ – Portion 71	TOJQ00000000010300071	T60685/1997	Rustenburg Platinum Mines Limited
Boschhoek 103 JQ – Portion 85	TOJQ00000000010300085	T60687/1997	Rustenburg Platinum Mines Limited
Boschhoek 103 JQ – Portion 103	TOJQ00000000010300103	T60688/1997	Rustenburg Platinum Mines Limited
Uitvalgrond 105 JQ – Portion 2	TOJQ00000000010500002	T233/1984BP	Mokgatle Trust

Table 8-2: Adjacent Landowners located within the proposed Project Area

Farm Name	Surveyor General code	Title deed number	Registered Landowner
Boschkoppie 104 JQ – Portion 2	T0JQ00000000010400002	T29329/1968BP	Edbaal Rakgokong
Boschkoppie 104 JQ – Remainder	T0JQ00000000010400000	T12173/1937BP	Republic of South Africa
Elandsfontein 102 JQ – Portion 2	T0JQ00000000010200002	T27357/2011	Maseve Inv 11 (Pty) Ltd
Elandsfontein 102 JQ – Portion 4	T0JQ00000000010200004	T60689/1997	Rustenburg Local Municipality
Elandsfontein 102 JQ – Portion 5	T0JQ00000000010200005	T19060/1981	Struthio (Pty) Ltd
Elandsfontein 102 JQ – Portion 12	T0JQ00000000010200012	T141933/2007	Platinum Group Metals RSD (Pty) Ltd
Elandsfontein 102 JQ – Portion 14	T0JQ00000000010200014	T141934/2007	Platinum Group Metals RSD (Pty) Ltd

[12] The Title Deed search for this Property stated that the Owner is the "Republic of Bophuthaswana". Thus owned by the Republic of South Africa but kept in a Trust for the Royal Bafokeng Nation.

Farm Name	Surveyor General code	Title deed number	Registered Landowner
Elandsfontein 102 JQ – Portion 17	T0JQ00000000010200017	T50113/1999	Rustenburg Platinum Mines (Pty) Ltd
Elandsfontein 102 JQ – Portion 19	T0JQ00000000010200019	T50193/1999	Rustenburg Platinum Mines (Pty) Ltd
Frischgewaagd 96 JQ – Portion 15	T0JQ00000000009600015	T9562/2001	RBN
Frischgewaagd 96 JQ- – Portion 16	T0JQ00000000009600016	T47725/1993	Christoffel Jacobus Taute
Styldrift 90 JQ – Not Subdivided	T0JQ00000000009000000	T955/1894BP	Republic of South Africa
Boschhoek 103 JQ – Portion 21	T0JQ00000000010300067	T90206/2001	RBN
Boschhoek 103 JQ – Portion 67	T0JQ00000000010300067	T90206/2001	RBN
Boschhoek 103 JQ – Portion 83	T0JQ00000000010300083	T88964/1993	Eybers Pieter Hendrick
Boschhoek 103 JQ – Portion 70	T0JQ00000000010300070	T60686/1997	RBN
Boschhoek 103 JQ – Portion 138	T0JQ00000000010300138	T2060/2002	South African Ferrochrome & Mining (Pty) Ltd
Uitvalgrond 105 JQ – Portion 2	TOJQ00000000010500002	T233/1984BP	Mokgatle Trust

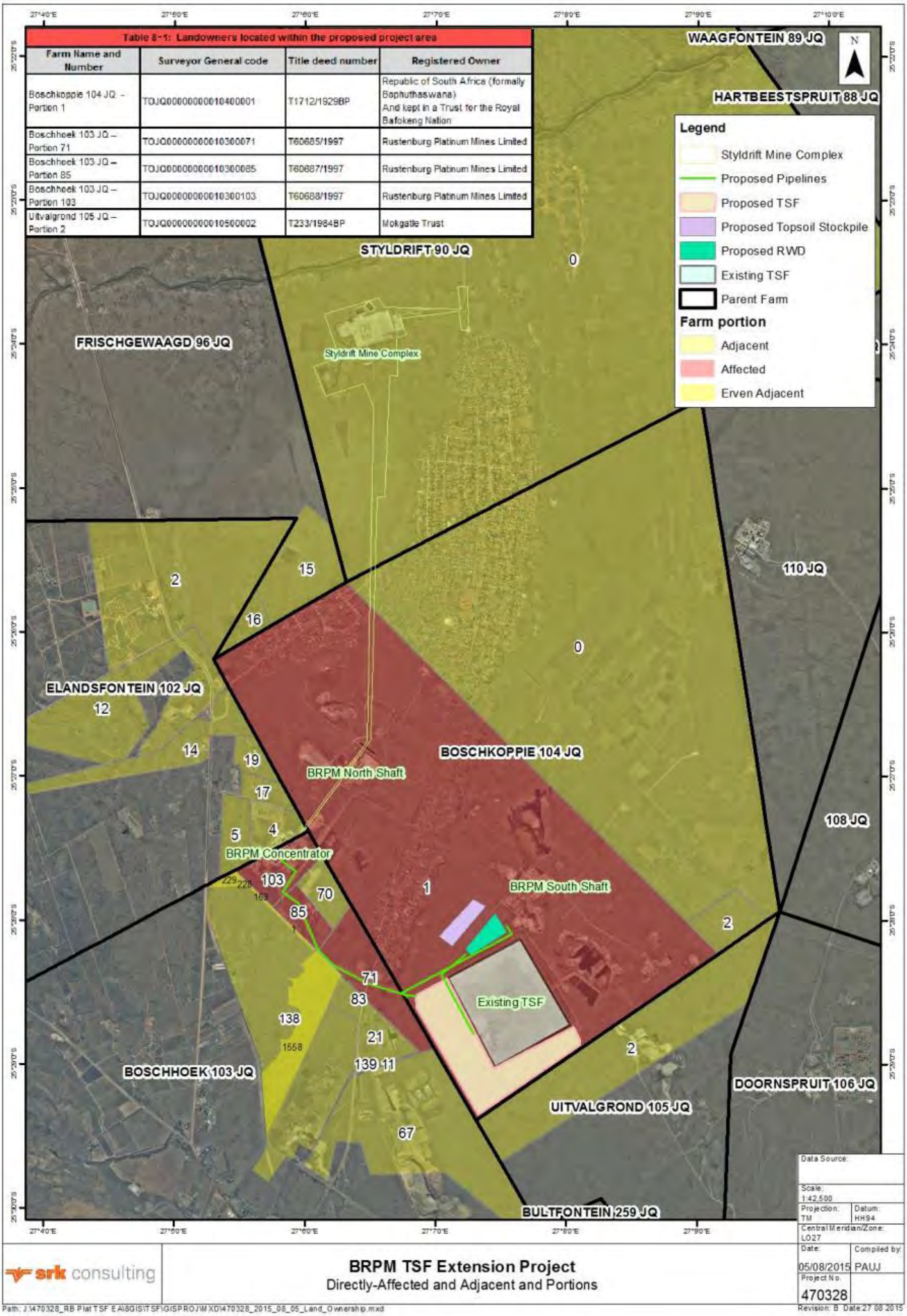


Figure 8-2: Directly Affected and Adjacent Properties

Traditional Authorities and communities

The Royal Bafokeng Tribal Authority with four communities (Table 8-3) is located in the vicinity of RBPlat/SMC. The location of the communities in relation to the proposed BRPM TSF Extension Project Area is shown in Table 8-3.

Table 8-3: Traditional authorities and communities in close proximity to RBPlat/SMC

Tribal authority	Community villages			
Royal Bafokeng Tribal Authority	Rasimone*	Robega	Mafenya	Chaneng

** Community located adjacent to the proposed BRPM TSF Extension Project*

There are no formal towns adjacent to the project site. The nearest established towns/villages to the Project Area are identified below in Table 8-4 and Figure 8-3.

Table 8-4: Project Area in Relation to Adjacent Towns and Villages

Village	Approximate Distance	Approximate Direction in relation to the project
Rasimone	2 km	South Easterly direction
Robega	3.5 km	Southerly direction
Mafenya	4 km	South Easterly direction
Chaneng	6 km	Southerly direction

Land Occupiers

The villages of Chaneng, Robega, Rasimone and Mafenya are situated on the mine surface lease area, but none of the villages are located on the area where the proposed BRPM TSF Extension Project will take place. Table 8-5 provides details of the land occupiers.

Table 8-5: Land Occupiers and Farm Portions Details

Farm name	Farm number	Portion	Land Occupier/s
Boschkoppie	104 JQ	1	Robega, Rasimone, and Mafenya Villages BRPM Mining Operations
Styldrift	90 JQ	Not subdivided	Chanen Village SMC Mining Operations
Boschhoek	103 JQ	70, 71, 83 and 103	Rasimone Village and BRPM Mining Operations
Elandsfontein	102 JQ	4, 5 and 17	Rasimone Village and BRPM Mining Operations

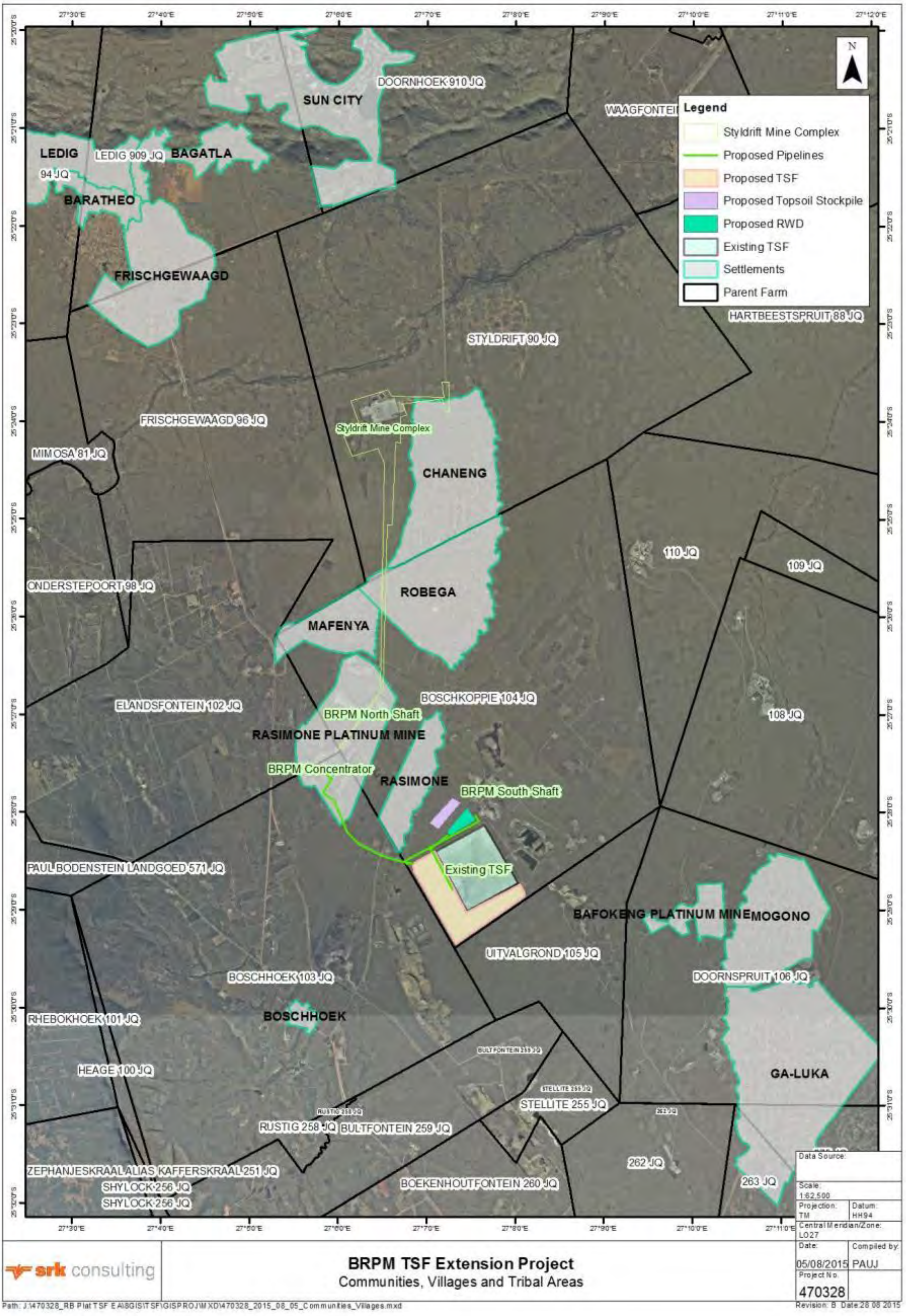


Figure 8-3: Adjacent Towns/Villages and Tribal Area

Land Claimants

SRK has been made aware that the Styldrift 90 JQ ownership of RBN is being disputed by residents of the property and that there is currently a court case underway. This claim is not against RBPlat but against the RBN. RBN has requested the Court to order the Minister to register their farms, which are still held by the Minister, in the name of the "RBN". However, SRK understands that the Chaneng Community contend that the Farm Styldrift 90 JQ was privately bought by five 'natives' separate from the larger Bafokeng 'tribe'. The land claimants are working closely with Bafokeng Land Owners Association, which is a body of land claiming communities within the RBN. SRK approached the North West Department of Rural Development and Land Reform to verify whether any possible land claims were filed with regard to the properties affected by the proposed project. SRK was informed that according to the Department's database, no land claims were lodged against the following farms and farm portions (a copy of this letter is included in Appendix O):

- Boschhoek 103 JQ 21;
- Boschkoppie 104 JQ 1;
- Boschhoek 103 JQ 85;
- Boschhoek 103 JQ 103; and
- Styldrift 90 JQ (Although part of the SMC, it is not part of the affected farm portion for this project).

Competent Authorities

Environmental Authorisation for the proposed project is required from the DMR and an amended of the existing WUL is required from the DWS. Details of the Competent Authorities are provided in Table 8-6 below.

Table 8-6: Competent Authority

Department	Contact Person	Contact Details	
DMR (Klerksdorp)	Mr Phumudzo Nethwadzi	**Tel:**	(018) 487 9830
		Email:	phumudzo.nethwadzi@dmr.gov.za
DWS (Hartbeespoort Office)	Mr Sebenzile Ntshangase	**Tel:**	(012) 996 7677
		Email	sntshangase@dws.gov.za

The BRPM TSF Extension Project Area is located within the Rustenburg Local Municipality, which forms part of the greater Bojanala Platinum District Municipality. Details of the relevant municipalities are given in Table 8-7. Figure 8-4 depicts the Municipal and Ward area in relation to the proposed BRPM TSF Extension Project.

Table 8-7: Local and District Municipality Details

Municipality	Contact Person	Contact Details	
Bojanala Platinum District Municipality	Mr Innocent Sirovha	**Tel:**	(014) 590 4502
		Email:	innocents@bojanala.gov.za
Rustenburg Local Municipality	Ms Kelebogile Mekgoe	**Tel:**	(014) 590 3185
		Email:	kmekgoe@rustenburg.gov.za
Ward 1 Municipal Ward Councilor	Mr Jacob Mzizi	**Tel:**	(073) 666 0161

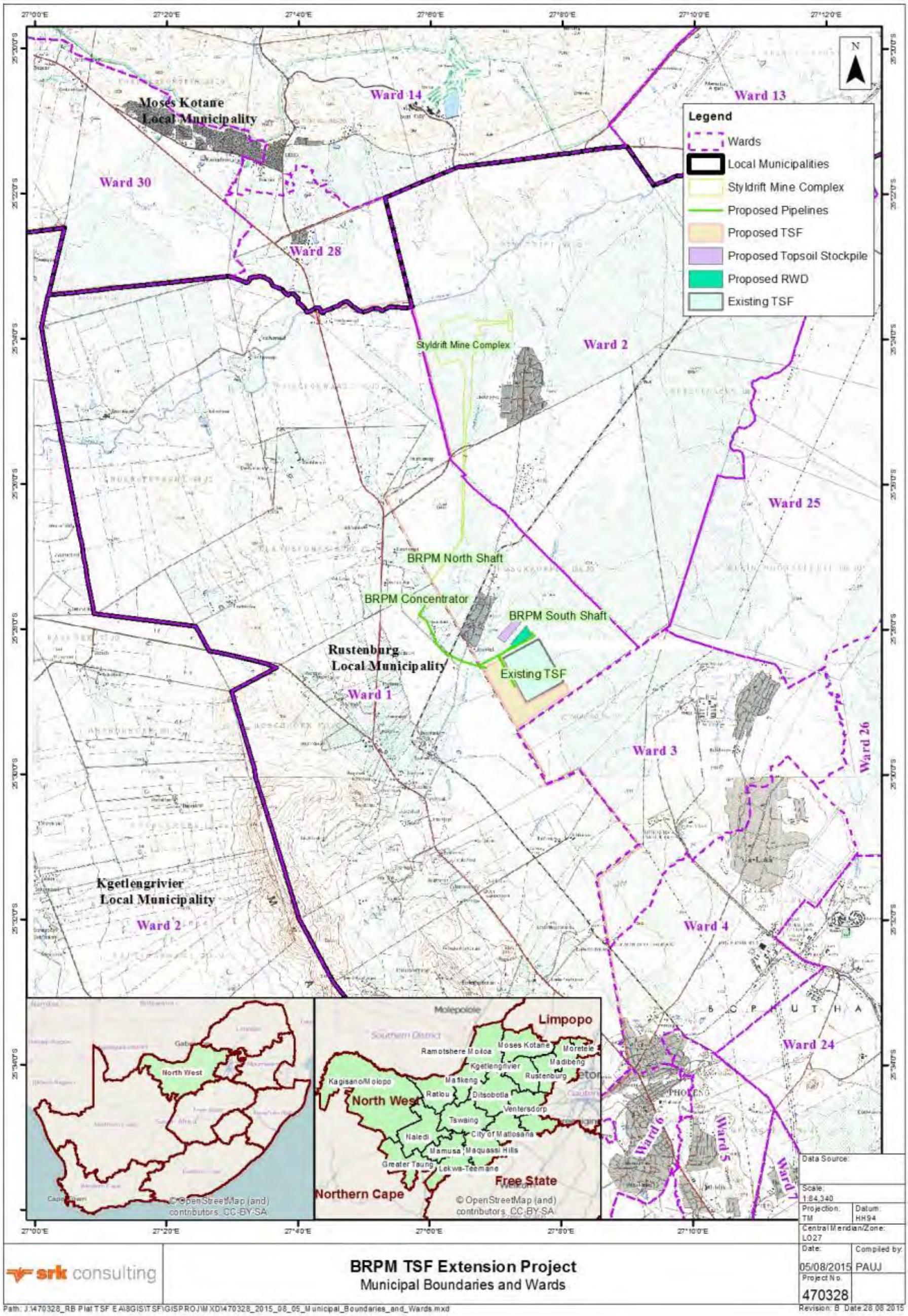


Figure 8-4: Municipal Boundaries/Areas and Ward areas

Stakeholder database

A stakeholder database was developed and maintained for this project using existing data from previous EA processes undertaken by SRK within the Project Area, existing stakeholder's database lists provided by RBPlat, referrals from the traditional authorities in the area and all new information obtained throughout the stakeholder engagement process undertaken for the proposed project as described previously.

The current stakeholder database comprises of 160, representing various sectors of society as shown below:

- ***National Government***: such as the DMR, DWS and Department of Land Affairs;
- ***Provincial Government:*** DMR, DWS, NWDPWR, North West Department of Rural Development and Land Reform, Department of Labour; Department of Public Works, Roads and Transport, Department of Social Development, Department of Health and Social Development, Department of Transport Roads and Community Safety North West Office and the NWREAD;
- ***Local and District Government:*** Rustenburg Local Municipality and the Bojanala Platinum District Municipality
- ***Traditional Authorities:*** Royal Bafokeng Tribal Authority and Bakubung Tribal Authority*;*
- ***Interested and affected parties***: community members residing within or in close proximity to the proposed Project Area;
- ***Environmental and conservation groups:*** Birdlife Rustenburg, Environmental Justice Networking Forum, Brits Bankeveld Bewaringsforum, Ergosaf, Kanana Environmental Forum and North West Air Pollution Control Forum;
- ***NGOs***: Federation for Sustainable Environment (also referred to as the "FSE"), Boschhoek Farmers Union;
- ***Business and commerce:*** North West Business Forum, Legacy Resorts / Bakubung Lodge, Robega Business Forum, North West Business Forum, Invest North West, Sun City, Sun Village Shopping Centre, Sundown Ranch, Pilanesberg Game Reserve, Engen Sun City and Sun Village Super SPAR;
- ***Mining and industry:*** Wesizwe, Maseve / Platinum Group Metals (PGM), Xstrata / Merafe Venture, Lonmin Platinum Mines and Impala;
- ***Labour:*** National Union of Mineworkers and Federated Mining and Allied Industries Workers Union.
- ***Parastatals:*** ESKOM, AFGRI SA, SASOL, TRANSNET and SANRAL;
- ***Utilities and services***: ESKOM;
- ***Transport***: SANRAL; and
- ***Agriculture***: AFGRI SA.

The stakeholder database is updated throughout the various phases associated with the EA process of this proposed project. A copy of the I&AP Register is contained in Appendix O.

8.1.2 Meetings

Public Meeting

I&APs were notified of the public meeting via e-mail, Short Message Service (SMSs) and flyers distributed in the area. Notification to the introductory public meeting was physically hand delivered to the Headsmen of the potentially affected villages. Two days prior to the meeting loud hailers were commissioned in and around the surrounding communities to remind all inhabitants of the public meeting date and times.

The public meeting was held on 09 April 2014 in the Bonwakgogo Primary School Hall at 16:00.

Special arrangement was made for a BRPM bus to transport interested community members to the meeting. Buses collected individuals at 15h00 at the following venues:

- Chaneng - Bus Circle; Kagiso Butchery; Four way stop signs (Robega and Chaneng);
- Mafenya - Middle School;
- Robega - Charora High School;
- Bonwakgogo Primary Bus Stop;
- Rasimone Kgotla Office; and
- Rasimone 2 way stop signs next to Dan Sekano Business.

The aim of the meeting was to inform the public on the proposed project, provide the public with technical background on the activities proposed to take place and the environmental process that will be followed. The public meeting gave additional opportunity for the public to register as I&APs, and to raise their concerns, issues and queries relating to the proposed project.

Please refer to Appendix O for the attendance register of the meeting as well as a copy of the meeting presentation, and Background Information Letter distributed at the meeting.

8.2 Stakeholder Engagement during the Scoping Phase

8.2.1 Project Announcement

Written Notice

Potential I&APs were notified of the opportunity to participate and the invitation to register as I&APs. This announcement was sent on 14 February 2014 by means of written notification and it was accompanied by a BID and registration and comment sheet by, post, e-mail or fax. A copy of the notification is contained in Appendix O.

Background Information Document (BID)

A BID was compiled and sent to all I&APs to provide background information on the proposed project, outline the EIA process, and to notify stakeholders of the initial introductory public meeting. The BID gave the public the opportunity to register as I&APs. I&APs for whom no e-mail address could be located were sent a SMS notifying them of the proposed project, and the contact number of SRK personnel where additional information could be obtained. Copy of the BID is contained in Appendix O. The BID was also placed at the following public places:

- Rasimone Community Office;
- Robega Community Office;
- Robega Police Station;
- Chaneng Community Office;
- Chaneng Community Clinic; and
- General Dealer at Mafenya.

Site Notices

Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&APs of the proposed activity were placed at conspicuous places in the Project Area. Table 8-8 provides a list of the locations were site notices were placed and Figure 8-5 spatially depicts the site notice placement locations. A copy of the site notice is contained in Appendix O.

Table 8-8: Site Notice Locations

Site Notice	Location	Coordinates	
		Latitude	Longitude
1	Chaneng Village Council Offices	25.42082921 S	27.11893832 E
2	Robega Community Offices	25.42720941 S	27.12052625 E
3	Robega Police Station	25.43308271 S	27.1208709 E
4	Rasimone Village Council Offices	25.46323868 S	27.11260495 E
5	Mafenya Middle School	25.43132268 S	27.10301029 E
6	General Dealer at Mafenya	25.43366998 S	27.0982667 E
7	Meeting Place of the Elders in Chaneng	25.4101604 S	27.12111515 E
8	Entrance to Chaneng village Opposite Styldrift Mine	25.39809266 S	27.12058857 E
9	Chaneng Post Office	25.40992067 S	27.12209028 E
10	Engen Garage Next To Sun City Main Entrance	25.36205067 S	27.09998108 E
11	Entrance gate to the Chaneng Clinic	25.41323704 S	27.12461931 E

Advertisements

SRK placed English advertisements in the Rustenburg Herald and Platinum Weekly on 14 February 2014. A Setswana advertisement was placed in the Leseding News on 26 February 2014. Copies of the Adverts are contained in Appendix O.

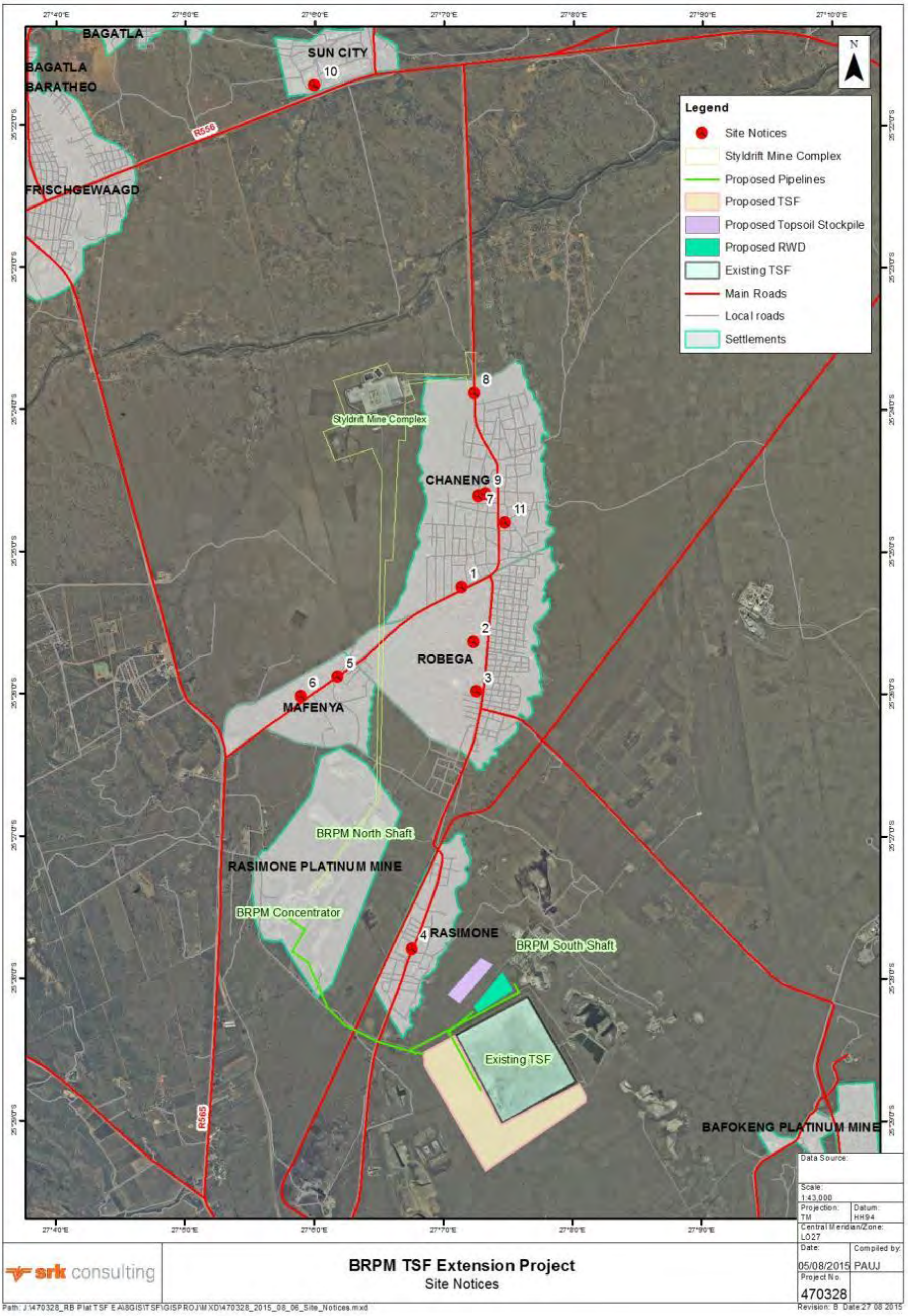


Figure 8-5: Location of the areas where site notices were placed

8.2.2 Comment and Response Report (CRR)

Table 8-9 highlights the key Stakeholder groups that raised comments during the application process with relevant Sections in the Report where their comments were addressed. For a detailed ad complete version of the comments raised during the application process please refer to Appendix O where the details are captured in the CRR.

Table 8-9: Key Stakeholder groups that raised comments

Stakeholder group	Relevant section in the Report
Landowners	Sections 2, 7, 10, 11, 12
Potentially Direct and Indirect Affected Parties	Sections 7, 10, 11, 12, Appendix G
Organs of State	Sections 7, 10, 11, 12
Mining and Industry	Sections 0, 2, 5, 6, 7, 8, 10, 11, 12
Business and Commerce	Sections 7, 10, 11, 12
Non-governmental Organisations	Sections 2, 5, 6, 7, 8, 10, 11, 12

8.2.3 Availability of the Scoping Report for Public Comment

The Draft Scoping Report was compiled in terms of Regulation 28 of 18 June 2010. The availability of the DSR was announced by means of letters, emails and SMSs to I&APs and key Organs of State and commenting authorities. The DSR aimed to provide I&APs with documentary proof that their contributions have been captured and addressed. The issues and comments raised by I&APs as well as issues raised by the environmental technical specialists have been used to inform the Terms of Reference compiled for the specialist assessments which will be conducted during the Impact Assessment Phase of the project.

The Draft Scoping Report was made available for a period of 40 days[13], from 10 September 2014 to 20 October 2014 at various public venues as indicated in Table 8-10 as well as on the SRK website (www.srk.co.za).

The Final Scoping Report is an updated version of the DSR to reflect the issues, concerns, comments and suggestions raised during the commenting period. The FSR was made available for a period of 21 days[14], from 19 January 2015 to 9 February 2015 at various public venues as indicated in Table 8-10 as well as on the SRK website (www.srk.co.za).

Table 8-10: Public places where Scoping Report was available

Public Place	Locality	Contact person	Tel No
Rustenburg Public Library	Rustenburg	Mr Pieter Louw	(014) 590 3060/3295
Robega Village Community Office	Robega	Bushy Rasebitse	(083) 844 3546
Chaneng Village Community Office	Chaneng	Mr Jacob Setshwane	(083) 729 2989
Rasimone Community Office	Rasimone	Mr Thabo Diale	(078) 398 6190
Mafenya Primary School	Mafenya	Mr Jacob Mzizi	(073) 666 0161

[13] Refer to Regulation 56 of GN R543 of 18 June 2010 (the Report must be made available for a 40 day commenting period).
[14] Refer to Regulation 56(6) of GN R543 of 18 June 2010 (the Final Report must be made available to the Registered I&APs).

8.2.4 Opportunities for Comment

In addition to opportunities to comment verbally at the engagement meetings, stakeholders were also invited and encouraged to comment on the Scoping Report by submitting their written comments to SRK's stakeholder engagement office. Stakeholders was also allowed to contact the SRK stakeholder engagement team via telephone, email, fax or request a telephonic consultation to discuss their comment on the Scoping Report.

At the end of the public commenting period (09 February 2015), two comments were received on the Final Scoping Report, namely:

- The Rustenburg Local Municipality; and
- The Foundation for a Sustainable Environment (referred to as the "FSE").

8.3 Stakeholder Engagement during the Impact Assessment Phase

The DMR have accepted the Scoping Report and the Plan of Study for the EIA and gave permission to proceed with undertaking of the Impact Assessment Phase of the process.

The stakeholder engagement activities that will be conducted during the Impact Assessment Phase of the proposed project are outlined below:

- The Draft EIAr/EMPR Amendment Report containing the findings of the specialist studies, and accompanying specialist reports was made available for public comment for a period of at least 30 days[15] - from 02 September 2015 to 05 October 2015. Registered I&APs was notified by letter of the availability of the EIAr/EMPR Amendment Report for public comment;
- The Draft EIAr/EMPR Amendment Report was made available for public review at the following public venues as well as on the SRK website (www.srk.co.za):
  - Rustenburg Public Library;
  - Robega Village Community Office;
  - Chaneng Village Community Office;
  - Rasimone Community Office; and
  - Mafenya Primary School.

All comments received during the Draft EIAr/EMPR Amendment Report public review period will be captured in the CRR. On the basis of the comments received, the Final EIAr/EMPR Amendment Report will be finalised and submitted to DMR.

8.4 Notification of Authority Decision

Once the EA decision is received from the Competent Authorities, the decision, the fact that an appeal may be lodged against the decision and the manner in which the decision can be accessed will be communicated to all registered I&APs. Registered I&APs will be advised in writing (mail, email, fax and sms) the authority's decision.

[15] Refer to Regulation 3(8) of GN R982 of 04 December 2014 (the Report must be made available for a 30 day commenting period).

9 Methodology for the Assessment of Impacts

The purpose of impact assessment is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The potentially significant environmental impacts were identified based on the nature of the receiving environment, a review of the proposed activities, and the issues raised in the public participation process.

All specialists were required to assess each identified potential impact according to the Impact Assessment Methodology as described below.

This Impact Assessment Methodology has been formalised to comply with Regulation 31(2)(l) of GN R543 of 2010, which states the following:

> *(2) An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision …, and must include –*
>
> *(l) an assessment of each identified potentially significant impact, including –*
>
> *(i)* ***cumulative impacts****;*
>
> *(ii) the* ***nature*** *of the impact;*
>
> *(iii) the* ***extent*** *and* ***duration*** *of the impact;*
>
> *(iv) the* ***probability*** *of the impact occurring;*
>
> *(v) the* ***degree*** *to which the impact can be* ***reversed****;*
>
> *(vi) the* ***degree*** *to which the impact may* ***cause irreplaceable loss of resources****; and*
>
> *(vii) the* ***degree*** *to which the impact can be* ***mitigated****.*

This table along with the Impact Assessment Methodology was provided to all specialists in electronic format (Excel) by SRK. The Impact Assessment Methodology must be undertaken for the pre-construction, construction, operational and decommissioning phases of the proposed development.

9.1 Methodology

In the impact assessment stage of an EIA, identified issues are analysed and expected impacts are defined in order to determine the overall significance of the impact. The EIA Methodology will require that each potential impact identified is clearly described (providing the nature of the impact) and be assessed in terms of the following factors:

- Extent (spatial scale) → will the impact affect the national, regional or local environment, or only that of the site;
- Duration (temporal scale) → how long will the impact last;
- Magnitude (severity) → will the impact be of high, moderate or low severity; and
- Probability (likelihood of occurring) → how likely is it that the impact may occur;

9.2 Identification of Environmental Aspects and Impacts

The outstanding environmental issues identified as having significance will be assessed using the following methodology. First, the issues raised will be described giving consideration to the associated activity and the aspect of that activity that is likely to result in an impact. The nature of the impact will also be described. Once this has been undertaken the significance of the impact can be determined. The following definitions will apply:

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.
- An **environmental aspect** is an "element of an organisations activities, products and services which can interact with the environment"[16]. The interaction of an aspect with the environment may result in an impact.
- **Environmental impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative. Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts. Cumulative impacts refer to the accumulation of changes to the environment caused by human activities.
- Aspects and impacts associated with the proposed development have been differentiated into construction and operation phases of the project.

9.3 Description of Aspects and Impacts

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined during the scoping process, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified will therefore be described according to the following:

9.3.1 Spatial Scope

The spatial scope for each aspect, receptor and impact will be defined. The geographical coverage (spatial scope) description will take account of the following factors:

- The physical extent/distribution of the aspect, receptor and proposed impact; and
- The nature of the baseline environment within the area of impact.

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially. Many will be significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a local (municipal) or regional level.

[16] The definition has been aligned with that used in the ISO 14001 Standard.

The spatial of each of the impacts will be rated on the following scale:

Spatial Scope of the Impact (Extent)	Rating
Activity specific	1
Area specific	2
Whole site/plant/mine	3
Regional	4
National	5

9.3.2 Duration

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment[17] .

The environmental assessment will distinguish between different time periods by assigning a rating to duration based on the following scale:

Duration of Impact (Temporal Scale)	Rating
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

9.3.3 Severity

The severity of an environmental aspect is determined by the degree of change to the baseline environment, and includes consideration of the following factors:

- The reversibility of the impact;
- The sensitivity of the receptor to the stressor;
- The impact duration, its permanency and whether it increases or decreases with time;
- Whether the aspect is controversial or would set a precedent; and
- The threat to environmental and health standards and objectives.

The severity of each of the impacts will be rated on the following scale:

Severity of Impact (Magnitude)	Rating
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

[17] This may take place without a receptor being impacted.

9.3.4 Frequency of the Activity

The frequency of the activity refers to how often the proposed activity will take place. The frequency of the activity will be rated on the following scale:

Frequency Of Activity / Duration Of Aspect	Rating
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

9.3.5 Frequency of the Impact

The frequency of the impact occurring refers to how often the aspect impacts or may impact either positively or negatively on the environment. The frequency of the impact will be rated on the following scale:

Frequency Of Impact	Rating
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

9.4 Method of Assessing of Significance of Impacts

The purpose of impact evaluation is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The information presented above in terms of identifying and describing the aspects and impacts will be summarised in a tabular form and a significance rating will be assigned with supporting rational. Significance will be determined before and after mitigation, taking into consideration all the factors described above.

A definition of a “significant impact‟ for the purposes of the study is: “An impact which, either in isolation or in combination with others, could, in the opinion of the specialist, have a material influence on the decision-making process, including the specification of mitigating measures.”

9.5 Significance Determination

The environmental significance rating is an attempt to evaluate the importance of a particular impact, the consequence and likelihood of which has already been assessed by the relevant specialist. The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 9-1. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact.

The ***severity***, ***spatial scope*** and ***duration*** of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. Thus the sum of the first three criteria (spatial scope, duration and severity) provides a collective score for the CONSEQUENCE of each impact. The ***frequency of the activity*** and the ***frequency of the impact*** together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. Thus the sum of the last two criteria (frequency of activity and frequency of impact) determines the LIKELIHOOD of the impact occurring.

The product of CONSEQUENCE and LIKELIHOOD leads to the assessment of the SIGNIFICANCE of the impact, shown in the significance matrix below as shown in Table 9-2. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Table 9-1: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT (magnitude)	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT (Extent)	RATING
Activity specific	1
Area specific	2
Whole site/plant/mine	3
Regional	4
National	5

DURATION OF IMPACT (temporal scale)	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD (Probability)

Table 9-2: Interpretation of Impact Rating

Likelihood \ Consequence	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	
10	20	30	40	50	60	70	80	90	100	110	120	1	140	150	

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

9.6 Description of Feasible Alternatives

Although alternatives were investigated in detail during Scoping (see Section 4), a review of the options based on the impact assessment and specialist studies will be undertaken in comparison with the preferred option.

9.7 Mitigation

Measures to avoid, reduce or manage impacts consistent with best practice will be proposed and the effectiveness of such measures assessed in terms of their ability to avoid, remove an impact entirely, render it insignificant or reduce its magnitude.

In assessing the significance of the impact, natural and existing mitigation will be taken into account. Natural and existing mitigation measures are defined as natural conditions, conditions inherent in the project design and existing management measures that alleviate (control, moderate or curb) impacts. In addition, the significance of impacts will be assessed taking into account any mitigation measures that are proposed.

An EMPR has been prepared and is incorporated as part of this EIA report (Section 11). This plan specifies the methods and procedures for managing the environmental aspects of the proposed development. Monitoring requirements are also be detailed within the plan, particularly for those environmental aspects that give rise to potentially significant impacts.

10 Impact Assessment

The Table 10-1 lists the main project related activities that will be undertaken during the implementation of the different phases of the proposed BRPM TSF Extension Project.

Table 10-1: Proposed project related activities during different project phases

Project Phase	Activity
Construction – including pre-construction	• Site clearing and grubbing of the footprint areas associated with the TSF, RWD, Pump Station, contractor laydown area and all proposed service/maintenance road/s
	• Construction of the TSF and associated service/maintenance road/s
	• Construction of the RWD
	• Construction of the overland pipelines and pump station/s
Operation	• Operation, management and maintenance of the TSF and associated service/maintenance road/s
	• Operation, management and maintenance of the RWD
	• Operation, management and maintenance of the river crossings, associated with the pipelines and pump station, including the stormwater management infrastructure. Utilisation of general mining and project related infrastructure: • The pump station will operate 24 hours, 7 days per week to ensure that tailings are transported via the pipeline system constantly from the BRPM Concentrator Plant to the TSF. Through the operation of the booster pump station, the pumping of water accumulating in the RWD back to the BRPM Concentrator Plant will also be ensured and regulated. • During the operational phase, the pipeline system will be operating 24 hours, 7 days a week, to ensure that tailings and process water is transported from the BRPM Concentrator Plant to the TSF and the RWD which in turns are re-circulated to the Concentrator Plant as process water. All process water systems will be lined or bunded. • Mining vehicles will travel on the newly constructed gravel roads in order to reach the various new proposed infrastructures.
Rehabilitation / Decommissioning	• The RWD will be retained until the facility has consolidated and the drainage from the toe to the RWD is negligible. Thereafter, the RWD will be decommissioned, primarily to reduce the risk of drowning in these facilities post closure. • The TSF will be retained and the final surfaces can be shaped in order to drain water to collection points from where it can be returned from the top surface via an engineered spillway. There will, however, be a need to mechanically reshape areas not appropriately profiled at closure. The design criteria for the spillway must be for a 1:100 rainfall event. • Demolition of all other project related infrastructure. Removal of all access and haul roads. Handling of potential contaminated soils.
Post-closure	• This is a period of maintenance and monitoring of the various structures and infrastructure closed during the time of rehabilitation. The activities are limited to groundwater monitoring activities and maintenance or repairing of erosion and vegetation if necessary.

The footprint areas that will be disturbed in terms of the construction and operation of the proposed infrastructure are summarized below. The key infrastructure that will be constructed comprise of:

- **Tailings Storage Facility (TSF)** - Extension of the existing BRPM TSF covering approximately 150 ha on Portion 1 of the Farm Boschkoppie 104 JQ;
- **Return Water Dam (RWD)** - Construction of a RWD covering approximately 12.7 ha on Portion 1 of the Farm Boschkoppie 104 JQ;

The proposed secondary infrastructure and activities associated with the above key infrastructure includes:

- Construction of overland pipelines (covering approximately 3 km in length) for:
  - The transportation of tailings from the BRPM Concentrator Plant to the extended TSF on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The transportation of return water between the extended TSF and the RWD on Portion 1 of the Farm Boschkoppie 104 JQ; Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The transportation of return water between the RWD and the BRPM Concentrator Plant on Portion 1 of the Farm Boschkoppie 104 JQ, Portions 71, 85 and 103 of the Farm Boschhoek 103 JQ;
  - The overland pipelines will be placed onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF. The pipelines will cross two wetlands and a riparian habitat areas associated with the Matlopyane tributary and length thereof will be approximately 3 km on Portion 1 of the Farm Boschkoppie 104 JQ;
- Establishment of a topsoil stockpile and service roads and water management infrastructure and stormwater systems; and
- Relocation of a power line (a separate Basic Assessment application has been submitted to National Department of Environmental Affairs (DEA) (DEA reference number 14/12/16/3/3/2/648, Environmental Authorisation was granted on 31 March 2015).

The following sections provide further details on the potential impacts (negative and positive), in terms of the various environmental aspects for each aforesaid activity and associated actions that will be undertaken during the implementation of the overall BRPM TSF Extension Project.

The potential identified impacts were rated, as discussed in Section 9, in terms of the Spatial Scope, Duration, Severity, Frequency of the Activity and Frequency of the Impact.

10.1 Pre-Construction and Construction Phase

During the pre-construction and construction phase, the following main activity will take place:

- Site clearing and grubbing of the footprint areas associated with the BRPM TSF Extension, new RWD, Pump Station contractor laydown area and all proposed service/maintenance road/s;
- Construction of the BRPM TSF Extension and associated service/maintenance road/s;
- Construction of the new RWD; and
- Construction of the overland pipelines and pump station.

10.1.1 Preparation for the footprint areas associated with the BRPM TSF Extension, new RWD, Pump Station, contractor laydown area and all proposed service/maintenance road/s

Activity:

- Site clearing and grubbing at the location of the BRPM TSF Extension, new RWD, Pump Station, contractor laydown area and all proposed service/maintenance road/s.

Actions:

- Removal of vegetation (grass, shrubs and trees);
- Stripping and stockpiling of topsoil on a designated area in close proximity to the activities; and
- Preparation of the contractor's yard. All equipment and vehicles to be used during the pre-construction and construction phases will be stored at this facility.

10.1.2 Construction of the RWD, TSF and associated service/maintenance road/s

During the construction phase, the following activities will take place:

- Construction of services roads around the BRPM TSF Extension and new RWD for maintenance purposes;
- Construction of a 6kV power line for electricity reticulation to all new infrastructures that require power to operate, i.e. pump station, return water pumps and the BRPM TSF Extension and new RWD;
- Construction of the BRPM TSF Extension, which will be a conventional surface TSF; and
- Construction of the overland pipelines and a pump station.

Activity:

- Construction of the overland pipelines and pump station.

Actions:

- Construction of overland pipelines from the BRPM Concentrator Plant to the extended TSF and from the extended TSF to the RWD;
- The overland pipelines will be placed adjacent to existing pipelines;
- The overland pipelines will be placed onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF; and
- The pipelines will two wetlands and riparian habitat areas associated with the Matlopyane tributary and length thereof will be approximately 3 km on Portion 1 of the Farm Boschkoppie 104 JQ.

Potential impacts and mitigation measures associated the pre-construction and construction phases as presented in Table 10-2 and Table 10-3.

Table 10-2: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Construction Phase for the Pipelines

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Faunal Assessment	Direct	No material impact expected as clearing of land for the pipelines will not be required due to the proposed pipelines being placed on existing pipeline route.								No specific management measures associated with this activity, however the following should be noted when activities associated with the pipeline take place. • Management measures associated with the existing pipelines will be implemented. • No areas falling outside of the existing pipeline routes may be cleared for construction purposes. • The boundaries of the pipeline footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • Disturbance of sensitive habitat must be actively avoided. • Implement management measures as detailed in Section 11.2.4.								
Floral Assessment	Direct	No material impact expected as clearing of land for the pipelines will not be required due to the proposed pipelines being placed on existing pipeline route.								No specific management measures associated with this activity, however the following should be noted when activities associated with the pipeline take place. • Management measures associated with the existing pipelines will be implemented. • All contractors should be made aware of sensitive areas associated in the area where the proposed pipeline will be placed. • Where areas are disturbed during construction activities, propagation of alien invasive species within these areas should be continually monitored and controlled throughout the construction phase. • The faunal Species of Conservation Concern (SCC) in close proximity to the proposed pipeline route should not be disturbed, if the faunal SCC will be disturbed due to activities associated with the construction of the pipelines, these species should be relocated to similar habitat within the vicinity of the study area with the assistance of a suitably qualified specialist. • Construction across wetland and riparian features along the proposed return water pipeline alignment may lead to habitat fragmentation as infrastructure may pose an obstacle to movement of species associated with the wetland areas, especially with reference to longitudinal systems such as valley bottom wetlands and rivers that act as important ecological corridors. • All construction must be done in such a manner so as to ensure species migration will take place by ensuring a suitable structure height to allow species to move under or over the pipelines. • As far as possible, existing roads are to be used for construction purposes. • All soils compacted as a result of construction activities falling outside of development footprint areas should be ripped and profiled. • All disturbed areas must be rehabilitated, where work has been completed must commence during the construction phase. • Implement management measures as detailed in Section 11.2.3.								
Noise Assessment	Direct	Increased ambient noise levels may be experienced during the construction of proposed pipeline due to the following: • Hauling of construction material; and • Construction activities of associated with the proposed pipelines.	2	2	2	2	3	**30**	**ML Maintain Current Management**	There are already operational activities associated with the existing pipelines, the noise associated with the construction of the TSF and RWD will be site specific Machinery with low noise levels to be used. • Project specific construction activities to take place during daytime (6 am - 10pm) period only unless where necessary and agreed with the communities that may be impacted.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Soils, Land Use and Land Capability	Direct	Potential impact on local soil resources during construction phase may be experienced during the construction of project related infrastructure due to the following: • Soil Compaction; • Soil Erosion; and • Soil contamination due to accidental spills.	3	2	2	2	3	**35**	**ML Maintain Current Management**	• Construction to be undertaken in the dry season where practical , Minimise footprint area as far as possible; • Ensure that maintenance on vehicles is undertaken to minimise accidental spillage form construction vehicles; • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of soils; The appropriate spill clean-up equipment must be kept on site; and • Implement management measures as detailed in Section 11.2.8.	1 month to 1 year	2	1	2	2	2	**20**	**L No Management Required**
Soils, Land Use and Land Capability	Direct	Potential loss of land capability may be experienced during the construction of project related infrastructure.	3	2	4	2	3	**45**	**MH Maintain Current Management**	• Re-establish natural vegetation on topsoil stockpiles; and • Implement management measures as detailed in Section 11.2.8.	1 month to 1 year	2	1	4	2	2	**28**	**ML Maintain Current Management**
Heritage Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated; • However, care should be taken that, when development commences, if any Archaeological findings are discovered, a qualified Palaeontologist be called in to investigate the occurrence; and • Implement management measures as detailed in Section 11.2.10.								
Palaeontological Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated; • However, care should be taken that, when development commences, if any Palaeontological sites are discovered, a qualified Palaeontologist be called in to investigate the occurrence; and • Implement management measures as detailed in Section 11.2.10.								

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Groundwater Assessment	Direct	Accidental spillages of hydrocarbons from construction machinery may occur during construction of the various pipelines and booster station facilities. The hydrocarbons may infiltrate to the underlying groundwater system	2	1	2	4	3	**35**	**ML Maintain Current Management**	• Maintenance of vehicles will limit the potential for spillages to occur; • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of the groundwater; • Monitoring of boreholes should continue; and • Implement management measures as detailed in Section 11.2.7 and Section 12.2.	1 month to 1 year	2	1	2	4	1	**25**	**L No Management Required**
Surface Water	Direct	No material impact expected as the proposed pipelines being placed on existing pipeline route.								• No specific management measures associated with this activity however the following should be noted when activities associated with the pipeline take place; • Management measures associated with the existing pipelines will be implemented; • All contractors should be made aware of sensitive areas associated in the area where the proposed pipeline will be placed; • Ensure that maintenance on vehicles is undertaken to minimise accidental spillage form construction vehicles; • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of surface water; • The appropriate spill clean-up equipment must be kept on site; • Restrict construction to the drier winter months, if possible, to avoid increased water inputs and sedimentation within the wetland; and • Implement management measures as detailed in Section 11.2.6 and Section 12.2.							
Wetland Assessment	Direct	During the construction phase of the proposed pipeline, indiscriminate driving of construction vehicles may cause damage within the identified wetland areas.	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Management measures associated with the existing pipelines will be implemented; • All construction vehicles will be restricted to existing designated roadways; • No areas falling outside of the existing pipeline routes may be used for construction purposes; • The boundaries of the pipeline footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas; • All contractors should be made aware of sensitive areas associated in the area where the proposed pipeline will be placed; • Disturbance of sensitive habitat must be actively avoided; and • Implement management measures as detailed in Section 11.2.2.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Wetland Assessment	Indirect	During the construction phase of the proposed pipeline, construction activities may increase alien species proliferation impacting on wetland vegetation and affecting wetland services provision.	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Implement the existing alien clearing programme; • Management measures associated with the existing pipelines will be implemented; • Consider implement an alien vegetation control program within wetland/drainage areas and ensure establishment of indigenous species within areas previously dominated by alien vegetation; • Removal of alien vegetation should commence during the construction phase and continue during the operational and decommissioning phases; and • Implement management measures as detailed in Section 11.2.2.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Wetland Assessment	Direct	During the construction phase of the proposed pipeline, construction equipment storage and waste dumping within wetland areas may damage the wetland areas.	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Appropriate sanitary facilities must be provided for the duration of the construction activities and all waste must be removed to an appropriate waste facility; • In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the concrete surfaced areaa to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss; • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries, wetland resources and associated buffer zones. All waste and rubble must be removed from site and disposed of according to relevant SABS standards; and • Implement management measures as detailed in Section 11.2.2.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Wetland Assessment	Indirect	No additional impact expected on the alien species proliferation impacting on wetland vegetation and affecting wetland services provision as this occurred during the construction phase.								• Management measures associated with the existing pipelines will be implemented; • Implement the existing alien clearing programme; • Proliferation of alien and invasive species is expected within any disturbed areas; • Eradication and control of the alien and invasive floral species, with specific emphasis on Category 1 alien species, encountered within the study area and immediate surrounds must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, (Act 43 of 1983, Section 28 of the National Environmental Management Act (Act 107 of 1998) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) and to prevent their spread beyond the development footprint areas. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled; • Removal of alien vegetation should commence during the construction phase and continue during the operational and decommissioning phases; • Species specific and area specific eradication recommendations: - Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. The use of herbicides must be limited and only be used under strict control and when no other alternative exists; - Footprint areas should be kept as small as possible when removing alien floral species; and - No vehicles should be allowed to drive through designated sensitive wetland and riparian areas during the eradication of alien and invasive species. • These mitigation measures must be implemented during the operational and decommissioning phases of the project.							
Cumulative impact		Cumulative impact of the construction of the pipeline (placed on trestles in adjacent to the existing pipelines).	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**

Table 10-3: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Construction Phase for the BRPM TSF Extension and new RWD

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio-economic	Direct	Potential positive Impact on Livelihoods - Potential increase in employment opportunities	1	4	2	2	3	**35**	**ML Maintain Current Management**	• Use local labour as far as possible. • RBPlat and their appointed contractors should adhere to the RBPlat policies on local procurement.	1 month to 1 year	2	5	4	4	4	**88**	**H Improve Current Management**
Socio-economic	Direct	Potential negative impact on Sense of Place due to the alteration of the current landscape	3	2	1	2	3	**25**	**L No Management Required**	• Contractors to provide adequate accommodation for non-local contractors.	1 month to 1 year	2	2	2	1	1	12	L No Management Required
Socio-economic	Direct	Potential negative impact on Health in terms of potential dust pollution	3	3	3	2	3	**45**	**MH Maintain Current Management**	• Develop a mechanism to record and respond to complaints during the construction phase. • Ensure that the mine's Health and Safety policy are implemented.	1 month to 1 year	3	1	2	2	2	24	L No Management Required
Socio-economic	Direct	Potential negative impact on Health from spread of HIV/AIDS	3	3	2	3	3	**48**	**MH Maintain Current Management**	• RBPlat to provide necessary and appropriate health and safety training including for HIV/AIDs to all personnel and contractors, and information to surrounding communities. This could be a co-ordinated response with partners including the provincial departments of health and education and the Rustenburg Local Municipality.	1 month to 1 year	2	2	2	2	3	30	ML Maintain Current Management
Faunal Assessment	Direct	Clearing of land for project specific infrastructure specifically the TSF and RWD and associated activities may cause a loss of natural habitats for fauna species.	3	2	1	3	3	**36**	**ML Maintain Current Management**	• Ensure as far as possible all infrastructure is placed outside of sensitive areas; • No areas falling outside of the study area may be cleared for construction purposes;	1 month to 1 year	2	1	1	2	2	**16**	**L No Management Required**
Faunal Assessment	Direct	Increased pressure on fauna may be experienced during the construction of project related infrastructure and may cause the following: • Loss of faunal species diversity; • Permanently altered faunal habitat; and • Loss of faunal habitat diversity in the region.	2	2	2	4	2	**36**	**ML Maintain Current Management**	• The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas; • The proposed development footprint areas should remain as small as possible; • All development footprint areas and areas affected by the proposed mining development should remain as small as possible and any disturbance of sensitive habitat must be actively avoided; • Planning of temporary roads and access routes should take the site sensitivity plan into consideration; • Site clearance must be limited to the project footprint areas only, with disturbance limited as far as possible; • A rehabilitation plan must be in place and implementation of disturbed areas where work has been completed, must commence during the construction phase; • Only clear faunal habitat where necessary; • Should any faunal SCC or other common faunal species be found within the TSF and RWD footprint area, these species should be relocated to similar habitat within the vicinity of the study area with the assistance of a suitably qualified specialist; • All areas of increased ecological sensitivity should be designated as No-Go areas and be off limits to all unauthorised construction vehicles and personnel; • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the TSF, RWD and associated infrastructure; and • Implement management measures as detailed in Section 11.2.4.	1 month to 1 year	1	1	2	3	2	**20**	**L No Management Required**
Floral Assessment	Direct	Increased pressure on flora may be experienced during clearing of the area and construction of the TSF, RWD and associated infrastructure and may cause the following: • Habitat fragmentation as a result of construction activities leading to loss of floral diversity;	2	2	4	4	2	**48**	**MH Maintain Current Management**	• The existing alien vegetation clearance programme must be implemented; • Where areas are disturbed during construction activities, propagation of alien invasive species within these areas should be continually monitored and controlled throughout the construction phase; • The faunal species of conservation concern (SCC) in	1 month to 1 year	2	1	4	4	1	**35**	**ML Maintain Current Management**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
		• Increase in alien vegetation as a result of disturbance; and • Loss of floral habitat may lead to altered floral biodiversity and a decrease in floral species diversity due to habitat transformation.								close proximity to the proposed TSF and RWD footprint area should not be disturbed, if the faunal SCC will be disturbed due to activities associated with the construction of the TSF, RWD and associated infrastructure these species should be relocated to similar habitat within the vicinity of the study area with the assistance of a suitably qualified specialist; • Site clearance must be limited to the TSF and RWD footprint areas only , with disturbance limited as far as possible; • As far as possible, existing roads are to be used for construction purposes; • All soils compacted as a result of construction activities falling outside of TSF and RWD footprint areas should be ripped and profiled; • All disturbed areas must be rehabilitated, where work has been completed must commence during the construction phase; • The proposed TSF must be suitable sloped/ terraced to allow for rehabilitation planting; and • Implement management measures as detailed in Section 11.2.4.								
Noise Assessment	Direct	Increase in ambient noise levels due to the commencement of ground works associated with the site clearing and grubbing activities for the TSF, RWD and associated activities.	2	2	2	2	4	**36**	**ML Maintain Current Management**	There are already operational activities associated with the existing BRPM TSF and RWD, the noise associated with the construction of the TSF and RWD will be site specific Machinery with low noise levels to be used; • Project specific construction activities to take place during daytime (6 am - 10pm) period only unless where necessary and agreed with the communities that may be impacted; • The existing noise monitoring plan must be implemented; and • All equipment with noise levels (higher than 85.0dBA) to be acoustically screened off.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Air Quality Assessment	Direct	Impacts associated with the construction of the TSF.	2	2	2	3	3	**36**	**ML Maintain Current Management**	• Regular irrigation by water (minimum of three times daily) of the site, access road and construction material and debris with just enough moisture to keep the dust down without creating runoff; • Material which cannot be watered should be covered until utilised; and • Restriction of transport speed on roads without special covering up to 30 km/h.	1 month to 1 year	2	1	1	2	1	**12**	**L No Management Required**
Air Quality Assessment	Direct	Impacts associated with the Transport of building material during the Construction of the TSF.	2	2	2	2	3	**30**	**ML Maintain Current Management**	• During grading activities, any exposed earth should be watered at least 4 times per day; and • Transportation of dust raising materials in close body vehicles or covering material with a tarpaulin.	1 month to 1 year	2	1	1	2	1	**12**	**L No Management Required**
Surface Water Assessment	Direct	Increase in turbidity of surface water during pre-construction caused by an increase in runoff from the cleared and stripped areas or from topsoil stockpiles which is high in suspended solids.	1	3	2	4	2	**36**	**ML Maintain Current Management**	• Where necessary, and as defined when the final detailed project design is confirmed, construct sediment collection paddocks downstream of the working activities to minimise uncontrolled runoff from the site; • Where necessary, and as defined when the final detailed project design is confirmed, construct bunds upstream of the construction sites that require storm water control (principally the TSF and RWD) to divert clean run-off from up-gradient areas to the natural environment and minimise run-off through the construction area; • Minimise the areas that are to be stripped of vegetation; • Adequate storm water management should be considered in the detailed design of the proposed infrastructure in order to minimize undue erosion; • Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways; and	1 month to 1 year	1	2	2	2	1	**15**	**L No Management Required**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
										• Implement management measures as detailed in Section 11.2.6.								
Surface Water Assessment	Direct	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing and grubbing occur.	3	2	2	4	4	**56**	**MH Maintain Current Management**	• Where necessary, and as defined when the final detailed project design is confirmed, construct sediment collection paddocks downstream of the working activities to minimise uncontrolled runoff from the site; • Where necessary, and as defined when the final detailed project design is confirmed, construct bunds upstream of the construction sites that require storm water control (principally the TSF and RWD) to divert clean run-off from up-gradient areas to the natural environment and minimise run-off through the construction area; and • Implement management measures as detailed in Section 11.2.6.	1 month to 1 year	2	1	2	2	2	**20**	**L No Management Required**
Surface Water Assessment	Direct	Accidental spillages of hazardous substances used during construction.	3	2	2	4	4	**56**	**MH Maintain Current Management**	• Management measures regarding the maintenance of all mine vehicles must be undertaken; This will ensure that any spillages or leakages of fuel and oil are reduced; • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste; and • Implement management measures as detailed in Section 11.2.6.	1 month to 1 year	2	1	2	4	1	**25**	**L No Management Required**
Surface Water Assessment	Direct	The rainfall water that would fall on the dirty water area of the proposed TSF and RWD that forms part of the Mean Annual Run-off (MAR) to the local water courses will be removed from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.	2	3	4	4	3	**63**	**MH Maintain Current Management**	• No management measure required. Initial impact rating will remain; • This impact cannot be mitigated to a lower significance because the probability that the impact will manifest remains definitely; • The impact reduces significantly at the outlet for quaternary catchment A22F to a reduction of less than 0.1% but in the area immediately downstream of the mining activities this impact will remain MEDIUM HIGH permanently; and • Implement management measures as detailed in Section 11.2.6.	1 month to 1 year	2	3	4	4	3	**63**	**MH Maintain Current Management**
Surface Water Assessment	Direct	Increase of erosion potential during construction activities.	2	2	2	4	4	**48**	**MH Maintain Current Management**	• Adequate storm water management should be considered in the detailed design of the proposed infrastructure in order to minimize undue erosion; • Ensure erosion protection measures are adequately implemented and monitored; • Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways; and • Implement management measures as detailed in Section 11.2.6.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Soil, Land Use and Land Capability	Direct	Potential impact on local soil resources during construction phase may be experienced during the construction of project related infrastructure due to the following: • Soil Compaction; • Soil Erosion; and • Soil contamination due to accidental spills.	3	2	2	2	3	**35**	**ML Maintain Current Management**	• Construction in dry season, use tracked vehicles, minimise footprint area as far as possible; • Stripping of topsoil not earlier than required, revegetate stockpiles, erosion control measures (berms), maintain roads; • Construct and maintain intercept drains, avoid spillage of chemicals; and • Implement management measures as detailed in Section 11.2.6.	1 month to 1 year	2	1	2	2	2	**20**	**L No Management Required**
Soil, Land Use and Land Capability	Direct	Potential loss of land capability may be experienced during the construction of project related infrastructure.	3	2	4	2	3	**45**	**MH Maintain Current Management**	• During construction, operation and closure there are limited management measures that can be implemented to the site specific infrastructure locations that can mitigate the risks associated with the permanent loss of the soil resource and the associated change in land capability. The Open Pit is already a materially disturbed site, as are the area where the where pipelines will run (on trestles adjacent to existing pipelines); • However, minimising the area of impact by constructing infrastructure on a footprint as small as practically possible	1 month to 1 year	2	1	4	2	2	**28**	**ML Maintain Current Management**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
										will minimise the area impacted, which reduces risk; • The stripping and stockpiling of topsoil and subsoil from the infrastructure areas will make soil resource available for use during the decommissioning and post closure phase of the project; • These soils will not necessarily be used on the TSF, but could be utilised in other areas of the operation, where there is a higher potential to restore land capability; • Re-establish natural vegetation on topsoil stockpiles; and • Implement management measures as detailed in Section 11.2.8.								
Heritage Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated; • However, care should be taken that, when development commences, if any Archaeological findings are discovered, a qualified Palaeontologist be called in to investigate the occurrence; and • Implement management measures as detailed in Section 11.2.10.								
Palaeontological Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated; • However, care should be taken that, when development commences, if any Palaeontological sites are discovered, a qualified Palaeontologist be called in to investigate the occurrence; and • Implement management measures as detailed in Section 11.2.10.								
Groundwater Assessment	Direct	Compaction of the soil surface for construction of the booster station, gravel access roads TSF and RWD footprint and will cause a very small reduction in recharge.	1	1	1	4	3	**21**	**L No Management Required**	• No mitigation measures are required as the impact is considered to be negligible; and • Implement management measures as detailed in Section 11.2.7.	1 month to 1 year	1	1	1	4	3	**21**	**L No Management Required**
Groundwater Assessment	Direct	Compaction of the surface for the construction of the RWD and the TSF will cause a reduction in recharge to the underlying aquifer.	1	1	4	1	2	**18**	**L No Management Required**	• No mitigation measures are required as the impact is considered to be negligible; an • Implement management measures as detailed in Section 11.2.7.	1 month to 1 year	1	1	4	1	2	**18**	**L No Management Required**
Groundwater Assessment	Direct	Groundwater will flow into the Glencore Open Pit once Glencore cease abstraction of the water accumulated in the open pit. The open pit is still some 7m deep and could therefore provide a conduit to the underlying aquifer.	3	1	5	3	3	**54**	**MH Maintain Current Management**	• The proposed BRPM TSF extension design must include ground preparation to minimise seepage to the Glencore Open Pit so as to avoid providing a conduit to the underlying aquifers; and • Implement management measures as detailed in Section 11.2.7.	1 month to 1 year	2	1	3	2	2	**24**	**L No Management Required**
Cumulative impact		Cumulative impact of the construction of the TSF and RWD on the receiving environment.	3	3	2	2	3	**40**	**MH Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	1 month to 1 year	3	2	2	2	2	**28**	**ML Maintain Current Management**

10.2 Operational Phase

Activity:

During the operational phase, the following project related activities and infrastructure will be operated, managed and maintained:

- Utilisation of Pump Station, the pipeline system as well as the use of the maintenance and service roads between the newly constructed infrastructure;
- Deposition of tailings onto the TSF;
- Utilisation of RWD associated with the TSF; and
- Maintenance of pipeline system and stormwater related infrastructure.

Potential impacts and mitigation measures associated the pre-construction and construction phases as presented in Table 10-4 and Table 10-5.

Table 10-4: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Operational Phase for the Pipelines

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio-economic	Direct	Potential positive Impact on Livelihoods - Potential increase in employment opportunities	1	4	2	2	3	**35**	**ML Maintain Current Management**	• Use local labour as far as possible. • RBPlat and their appointed contractors should adhere to the RBPlat policies on local procurement.	Life of operation	2	5	4	4	4	**88**	**H Improve Current Management**
Socio-economic	Direct	Potential negative impact on Sense of Place due to the alteration of the current landscape	3	2	1	2	3	**25**	**L No Management Required**	• Contractors to provide adequate accommodation for non-local contractors.	Life of operation	2	2	2	1	1	12	L No Management Required
Socio-economic	Direct	Potential negative impact on Health in terms of potential dust pollution	3	3	3	2	3	**45**	**MH Maintain Current Management**	• Develop a mechanism to record and respond to complaints during the construction phase. • Ensure that the mine's Health and Safety policy are implemented.	Life of operation	3	1	2	2	2	24	L No Management Required
Socio-economic	Direct	Potential negative impact on Health from spread of HIV/AIDS	3	3	2	3	3	**48**	**MH Maintain Current Management**	• RBPlat to provide necessary and appropriate health and safety training including for HIV/AIDs to all personnel and contractors, and information to surrounding communities. This could be a co-ordinated response with partners including the provincial departments of health and education and the Rustenburg Local Municipality.	Life of operation	2	2	2	2	3	30	ML Maintain Current Management
Noise Assessment	Direct	The following activities may increase the ambient noise levels within the area where the pipelines area situated • Additional traffic during inspection and maintenance on pipelines; • Operation of the Booster Pump Station; • Transporting tailings area via pipeline system; and • Diesel emergency generators that may be used when and if necessary to operate the Pump Station.	1	1	4	5	1	**36**	**ML Maintain Current Management**	• Management measures associated with the existing pipelines will be implemented; • Adhere to the speed limits along the feeder roads and the roads inside the residential areas; • Generator to be encapsulated with a constructed brick building; • All equipment with noise levels (higher than 85.0dBA) to be acoustically screened off; • Booster pump must be enclosed with a brick constructed building and concrete roof with a door that can close; and • The existing noise monitoring plan must be implemented.	Life of operation	1	1	4	2	2	**24**	**L No Management Required**
Visual Assessment	Direct	During the operation of the pipelines very little additional visual impact is expected, due to the existing pipeline route.	1	2	4	3	2	**35**	**ML Maintain Current Management**	• Management measures associated with the existing pipelines will be implemented; and • If required , the pipelines can be painted a colour which is representative of the area it is located in (recommendation only).	Life of operation	1	1	4	2	2	**24**	**L No Management Required**
Soils, Land Use and Capability	Direct	Potential impact on local soil resources during operational phase may be experienced during the operation of the pipeline due to the following: • Soil contamination due to accidental spills; • Soil Compaction; and • Soil Erosion.	2	1	4	2	3	**35**	**ML Maintain Current Management**	• Management measures associated with the existing pipelines will be implemented; • Ensure that maintenance on vehicles is undertaken to minimise accidental spillage form construction vehicles; • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of soils; • The appropriate spill clean-up equipment must be kept on site; • Use existing roads for pipeline monitoring and maintenance activities; • Erosion must be monitored on a continual basis throughout the operational phase, particularly in the vicinity of wetland areas; • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed operational activities; • All soils compacted as a result of operational activities falling outside of development footprint areas should be ripped and profiled; • Limit operational activities to within the operational footprint; and • Implement management measures as detailed in Section 11.2.8.	Life of operation	1	1	4	2	2	**24**	**L No Management Required**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Groundwater Assessment	Direct	Risk of contamination of the groundwater from the proposed additional tailings pipeline and return water pipeline.	2	1	3	3	3	**36**	**ML Maintain Current Management**	• The aquifer in the BRPM TSF expansion area is a low yielding minor aquifer system and the overlying topsoil (black turf), which is largely clayey material and can be expected to retard downward infiltration of water and leachate; • The pipelines will follow the existing infrastructure; • Management is recommended as follows: - Implement pipeline maintenance plan; - Develop and implement a spill response system; and - Encourage contractors to report, react and manage all spills and leaks; and • Implement management measures as detailed in Section 11.2.7 and Section 12.2.	Life of operation	1	1	3	1	2	**15**	**L No Management Required**
Wetland Assessment	Indirect	No additional impact expected on the alien species proliferation impacting on wetland vegetation and affecting wetland services provision as this occurred during the construction phase.	3	1		3	3	**24**	**L No Management Required**	• Management measures associated with the existing pipelines will be implemented; • Implement the existing alien clearing programme; • Proliferation of alien and invasive species is expected within any disturbed areas; • Eradication and control of the alien and invasive floral species, with specific emphasis on Category 1 alien species, encountered within the study area and immediate surrounds must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, (Act 43 of 1983, Section 28 of the National Environmental Management Act (Act 107 of 1998) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) and to prevent their spread beyond the development footprint areas; Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled; • Removal of alien vegetation should commence during the construction phase and continue during the operational and decommissioning phases; • Species specific and area specific eradication recommendations: - Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used; The use of herbicides must be limited and only be used under strict control and when no other alternative exists; - Footprint areas should be kept as small as possible when removing alien floral species; and - No vehicles should be allowed to drive through designated sensitive wetland and riparian areas during the eradication of alien and invasive species; • These mitigation measures must be implemented during the operational and decommissioning phases of the project; and • Implement management measures as detailed in Section 11.2.2.	Life of operation	1	1	4	2	2	**24**	**L No Management Required**
Cumulative impact		Cumulative impact of the operation of the pipeline (placed on existing trestles adjacent to existing pipelines).	2	1	4	2	3	**35**	**ML Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	Life of operation	1	1	4	2	2	**24**	**L No Management Required**

Table 10-5: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Operational Phase for the BRPM TSF Extension and new RWD

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio-economic	Direct	Positive Impact on Livelihoods.	3	4	3	3	2	**50**	**MH Maintain Current Management**	• Because the probability of the impact occurring is small, due to limited visual receptors and the fact that similar linear infrastructure exists in the area, no mitigation measures are proposed; and • Ensure that the conveyor's enclosement is non-reflective and the same colour as existing conveyors, if If feasible, silo's should be fitted with relevant bag filters or alternative dust minimisation measures.	Life of operation	4	3	4	3	3	**66**	**MH Maintain Current Management**
Socio-economic	Direct	Positive Impact on Local Livelihoods and Local Economic Development.	3	3	3	3	2	**45**	**MH Maintain Current Management**	• RBPlat to increase the probability of retaining staff by implementing the RBPlat policy of upskilling employee skills where necessary and possible, and aligning with the RBPlat Social and Labour Plan.	Life of operation	2	2	2	1	1	**12**	**L No Management Required**
Socio-economic	Direct	Positive Impact on Economic Development.	1	2	1	1	1	**8**	**L No Management Required**	• RBPlat must inform companies it procures goods and services from of any procurement gaps during the development of the BRPM TSF Extension Project, so that affected companies can plan accordingly.	Life of operation	2	2	2	2	2	**24**	**L No Management Required**
Socio-economic	Direct	Positive Impact on Health.	3	2	2	3	2	**35**	**ML Maintain Current Management**	• To increase magnitude of the impact, increase the probability of retaining staff by implementing the MPM policy of upskilling employees where necessary, and aligning with the RBPlat Social and Labour Plant.	Life of operation	2	2	2	2	2	**24**	**L No Management Required**
Faunal Assessment	Direct	Due to the limited fauna species found around the proposed location of the project related infrastructure, no further impacts are anticipated in terms of operating and maintaining the project related infrastructure								No mitigation measures are required as no impact is anticipated.								
Air Quality	Direct	• The potential impact exist that wind-blown dust can be generated from the TSF and uncovered exposed areas. • Expected fugitive in PM10 emissions as a result of potential wind-blown dust.	1	1	2	5	1	**24**	**L No Management Required**	• When and where applicable, retaining walls and tops of tailings dams should be re-vegetated as soon as possible, or kept wet during windy periods. • During the operational phases for the Proposed Project any bare ground surrounding the main operational area but within the boundaries of the facility must be covered with suitable vegetation that will be able to grow in the area. • Whilst in operation the area of the dry beach portion of the TSF should be kept to a minimum and the area or covering the moist or water pooling portions of the TSF must be maximised in order to minimise windblown dust from this source. • If possible, the use of a chemical dust suppressant should be investigated in order to assist with suppressing dust emissions from the TSF when it is not practical to maintain stable moisture content over a long period of time. • When fugitive dust can be observed leaving the area additional dust suppression should be applied to the affected areas. • If inadequate, additional dust monitoring equipment needs to be installed and must be implemented in order to effectively monitor dust related impacts from the project area. • In places of high vehicular traffic, dust suppression measures on the roads may be implemented to reduce dust levels from the entrainment of dust. These measures will range from watering of roads, application of a chemical dust suppressant and/or paving of roads. • Reduce vehicle speeds on roads to less than 40 km/hr within the project area. • Rock cladding or grassing (or alternate means of dust suppression) of the side walls and the top of the TSF on closure. • Implement management measures as detailed in Section 11.8.	Life of operation	1	1	2	4	1	**20**	**L No Management Required**
Noise Assessment	Direct	Increased ambient noise levels may be experienced during the operational activities associated with the TSF , RWD and associated activities infrastructure due	1	1	4	2	3	**30**	**ML Maintain Current Management**	• Adhere to the speed limits along the feeder roads and the roads inside the residential areas. • Generator to be encapsulated with a constructed brick building.	Life of operation	1	1	4	2	2	**24**	**L No Management Required**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact			Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
		to the following: Additional Traffic to and from the different operational sites Diesel emergency generator Pump station at the TSF Inspection and Maintenance activities associated with the operational activities of the TSF and RWD								• All equipment with noise levels (higher than 85.0dBA) to be acoustically screened off. • The existing noise monitoring plan must be implemented.								
Visual Assessment	Direct	The construction of the TSF and RWD over a number of years will have a visual impact on the surrounding environment.	2	2	4	4	3	**56**	**MH Maintain Current Management**	• Where possible, natural vegetation around the expansions must be retained. • If vegetation is to be cleared on site, erosion control measures should be in place. • Concurrent re-vegetation of the sides of the TSF and RWDs should be undertaken. • The topsoil stockpile should be vegetated to reduce the visual impact associated with the bare soil. • During construction, dust control measures should be implemented. • If construction is to occur during the night, all lighting should be placed to ensure that excessive light does not escape from the site. • During construction, litter control measures should be kept in place to ensure that the site is maintained in a neat and tidy condition. • External signage should be kept to a minimum, and where possible should be attached to existing buildings. • Implement management measures as detailed in Section 11.2.11.	Life of operation	1	1	4	4	2	**36**	**ML Maintain Current Management**
Groundwater Assessment	Direct	Leachate will seep from the TSF and RWD to the underlying groundwater artificially recharging the aquifer and resulting in an increase in water levels (mounding) around the surface facilities. This would increase the hydraulic gradient away from the TSF and RWD. During the numerical modelling, ground water levels were seen to locally increase by a maximum of 10 m for the clay-lined scenario, and a maximum of 1 to 2 m for the HDPE-lined scenarios.	2	2	5	4	4	**72**	**MH Maintain Current Management**	• The aquifer in the BRPM TSF expansion area is a low yielding minor aquifer system and the overlying topsoil (black turf), which is largely clayey material and can be expected to retard downward infiltration of water and leachate. Management is recommended as follows: - The engineered liner design will reduce the mounding anticipated from the proposed facility and minimise the leachate that can seep from the proposed BRPM TSF expansion. - Compaction of the base of the BRPM TSF expansion site to further reduce infiltration to the ground water regime - Monitoring of piezometric head within the tailings should be conducted to ensure that there are no stability concerns . - Contain dirty water with sound storm water control measures to reduce the overall volume of water that must be handled in the system. - Separate clean and dirty water through sound storm water management principles. This must include a sufficiently sized cut-off trench and berm to be constructed up gradient of the BRPM TSF expansion to capture and divert clean surface runoff around the site - Contain dirty water in adequately sized RWD to avoid spillage and overflow into the catchment. - The ground water monitoring network should be extended to include the new monitoring boreholes installed as part of this investigation (BRPM1 and BRPM2) - The existing monitoring boreholes DWA01 and BH11 should be protected through refurbishment of borehole headwork's and included as part of the monitoring program for the BRPM TSF expansion. - Leachate from the tailings dam to be collected in underdrains and diverted to the RWD for re-use in the concentrator plant.	Life of operation	1	2	4	2	3	**35**	**ML Maintain Current Management**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact			Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
										- Water level loggers should be installed in BRPM1, BRPM2 and BH07. - Further remediation and/or management of the groundwater plume may be required in the future if indicated by rise in water levels above a critical level (+ 1112 mamsl) in the monitoring boreholes. This could include abstraction from the UG2 open pit, ongoing dewatering at the shaft and scavenger boreholes if required. • Implement management measures as detailed in Section 11.2.7								
Groundwater Assessment	Direct	Leachate may seep from the TSF and RWD and contaminate the underlying groundwater. This may add to the existing contamination plume	3	2	5	4	4	**80**	**H Improve Current Management**	• The aquifer in the BRPM TSF expansion area is a low yielding minor aquifer system. As for the existing facility, the affected zone is therefore likely to be localised to the immediate area around the BRPM TSF expansion which has already been impacted by mining activities • There are no groundwater users within the immediate zone of influence. • Dewatering from South Shaft appears to be providing a partial sink which reduces the extent of the contamination from the TSF and RWD area. • See management measures as discussed above and Section 11.2.7.	Life of operation	2	1	5	3	3	**48**	**MH Maintain Current Management**
Groundwater Assessment	Direct	Increased mounding from the TSF could result in an increase in water level in the surrounding aquifer and the development of poor quality seeps daylighting in the drainage lines closest to the proposed BRPM TSF expansion.	2	2	4	3	3	**48**	**MH Maintain Current Management**	• Base flow to tributaries is considered unlikely since there is currently no base flow to the surrounding streams. Based on the intended design, water levels are unlikely to increase to the level at which leachate would seep to the streams. • Construct an engineered liner design which will reduce the mounding anticipated from the proposed facility and minimise the leachate that can seep from the proposed BRPM TSF expansion. • Extend the monitoring program to include monthly monitoring of the water levels in BRPM1 and BRPM2 for the first year followed by quarterly monitoring (as described above). • Continue surface water monitoring of the streams as for the existing monitoring program. • Groundwater abstraction to lower the water level may be required if the water levels should increase more than 4m from the current baseline level or above a critical elevation of approximately 1112 mamsl. • Implement management measures as detailed in Section 11.2.7.	Life of operation	1	1	3	3	2	**25**	**L No Management Required**
Groundwater Assessment	Direct	Contamination of the surrounding aquifer and reduction in the ad hoc use (unconfirmed) by privately owned boreholes in the surrounding communities. It is noted that pumping from local abstraction points in the community could draw in contamination from the TSF at a higher rate than modelled.	2	1	5	4	4	**64**	**MH Maintain Current Management**	• The primary water supply is from the Magalies Water Pipeline with previous reports indicating ad hoc use by privately owned boreholes in Rasimone to the north of the area. Communities are therefore not solely reliant on groundwater for supply. • As of 2015, the ground water contaminant plume from the existing BRPM TSF does not appear to have reached any communities. The plume is likely to reach and reduce the quality in Rasimone boreholes with TDS (> 1000 mg/l) and nitrate (>25 mg/l) by 2070. This plume is predominantly from the existing BRPM TSF but this is partially mitigated through dewatering from South Shaft which appears to provide a localised sink thereby restricting the extent of contamination from the TSF and RWD area. Regular monitoring of community boreholes • Use of 'sentinel wells' in the monitoring network to trigger response if a contamination plume has moved in the direction of a receiving well • Implement community awareness. • Management/ Rehabilitation may be required should the community boreholes be adversely affected by	Life of operation	2	2	3	2	3	**35**	**ML Maintain Current Management**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact			Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
										contamination migrating from the TSF. • Implement management measures as detailed in Section 11.2.7.								
Groundwater Assessment	Direct	The residual Jig Tailings may leach contamination to the groundwater which will then migrate away from the Glencore open pit.	2	1	4	2	3	**35**	**ML Maintain Current Management**	• Whilst there may be the potential for leachate mobilisation from the jig tailings deposited in the Glencore Open Pit, further contamination from this is likely to be obscured by the existing groundwater plume from the BRPM TSF. • Leachate from the jig tailings in the Glencore Open Pit could be expected to migrate with the existing groundwater plume towards localised depressions caused by dewatering • The following management measures are recommended: - Monitoring of BRPM2 as an early warning system; - The open pit will be covered by the Class C barrier system which will further reduce recharge to the ground; and - The impact from the old open pit, should it develop, can be managed and contained as part of the cumulative plume from the existing BRPM TSF as described below. • Implement management measures as detailed in Section 11.2.7.	Life of operation	2	1	3	2	2	**24**	**L No Management Required**
Groundwater Assessment	Direct	Cumulative groundwater quality and mounding impact from the existing sources (unlined TSF, RWD, SWD, and backfilled open pit areas etc.) along with the proposed BRPM TSF expansion	2	2	5	4	4	**72**	**MH Maintain Current Management**	• The mitigation is as stated above. • Management measures are as stated above for pre-construction and as stated for direct, indirect and residual impacts. • Monitoring, in addition to the above boreholes, should include two additional boreholes are recommended to monitor the water quality to the north of BH07 and another to the east and downgrade of the backfilled open pit areas. The existing boreholes BH10 and BH01 should also be refurbished and/or replaced. • The groundwater model should be updated to include the dewatering recommended at the UG2 Open pit and the regional area so as to demonstrate that the measures implemented will be sufficient to contain the existing plume. • Implement management measures as detailed in Section 11.2.7.	Life of operation	2	1	4	2	3	**35**	**ML Maintain Current Management**
Surface Water	Direct	Surface water quality may be impacted due to: • Potential leachate from the TSF and the dirty water control systems as well as the runoff from these systems can have an impact on the quality of the surface water. • Pollution due to accidental spillages of hazardous substances or leaks from vehicles and equipment during maintenance.	3	3	4	4	3	**70**	**MH Maintain Current Management**	• Monitor the effective usage and functioning of the constructed paddocks downstream of the working activities to minimise uncontrolled runoff from the site. • Monitor the effective usage and functioning of the upstream bunds constructed upstream of the affected site. • Monitor and maintain good vegetation cover, to reduce runoff. • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste. • The Tailings dam will be lined as well as the RWD. • Implement management measures as detailed in Section 11.2.6.	Life of operation	1	2	2	2	1	**15**	**L No Management Required**
Surface Water	Direct	The rainfall water within the designated dirty water area of the TSF and RWD that forms part of the Mean Annual Run-off (MAR) to the local water courses will be removed from the catchment this will result in a low intensity potential on the local surface water resource.	1	2	4	3	2	**35**	**ML Maintain Current Management**	• The streams are non-perennial and flows occasionally. • The actual impact to the downstream water resource (Elands Rivers) is marginal (0.1%). • The stormwater will be diverted which further mitigates the impact. • Implement management measures as detailed in Section 11.2.6.	Life of operation	1	2	4	2	2	**28**	**ML Maintain Current Management**
Surface Water	Direct	Increase in volume of contaminated water that needs to be managed within the footprint of the TSF.	3	3	3	4	4	**72**	**MH Maintain Current Management**	• Monitor the effective usage and functioning of the constructed paddocks downstream of the working activities to minimise uncontrolled runoff from the site. • Monitor the effective usage and functioning of the upstream bunds constructed upstream of the affected	Life of operation	2	2	1	3	3	**30**	**ML Maintain Current Management**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact			Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
										site. • The water balance indicates that the return water from the TSF can be used in the Plant. Discharge will be minimised by using this water. • Treated sewage water presently discharges into the RWD and this water can be used in the plant process. • Implement management measures as detailed in Section 11.2.6								
Cumulative impact		Cumulative impact of the operation of the TSF and RWD on the receiving environment	2	2	4	4	4	**64**	**MH Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	Life of operation	1	1	4	4	2	**36**	**ML Maintain Current Management**

10.3 Rehabilitation / Decommissioning and Post Closure Phase

The main activity that will take place during this phase of the project is the demolition and removal of the project related infrastructure. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction. The impacts and mitigation measures have been dealt with during the discussions of the construction activities and will not be recaptured in this section, only references will be made where applicable. Also see Section 14 and Appendix N.

The following activities will be associated with the decommissioning of the TSFs and demolition of the RWDs:

- The under drainage system will be maintained;
- Demolish and remove all infrastructure (pipes, pumps, plinths etc.) not required post-closure;
- Seal penstocks with concrete plug at both inlet and outlet structures;
- Establish paddocks on the top of the TSF. Storm events larger than 1:100 years to be decanted via an engineered spillway (capacity for the 24 hour PMP) to the environment;
- Establish vegetation on the top surfaces of the TSF. Vegetation trials will determine which species are most suited to conditions on the facility. However, where possible a mix of grass species will be used which mimics that of the natural vegetation;
- During operation of the TSF it is necessary to routinely determine the impact on groundwater by these facilities through appropriate sampling. If at closure it is determined that groundwater has been or is likely to be impacted, and following a risk assessment, it may be necessary to implement groundwater remediation measures. It must be born in mind that these measures must be designed taking into cognisance the fact that the primary source, *viz.* entrained nitrates and ammonia in the slurry water is finite as it is added to the tails, rather than being derived from weathering of the mineralogy associated with the tails;
- The RWD will remain during the closure period as the surface consolidates via drainage from the under-drains and decant from the penstocks. Runoff monitoring during the closure period following establishment of vegetation and retention paddocks will be undertaken to determine compliance to the discharge requirements. Once runoff is within compliance, water management infrastructure can be decommissioned. At this time, the RWD will be reclaimed;
- Excess water in the RWD will be evaporated;
- Sediments from the RWD will be removed and where the opportunity exists to reprocess, these will be reprocessed. Residual sediments will be disposed of on the top surface of the TSF;
- RWD Liners will be disposed of as general waste (if recycling opportunities are not available);
- RWD rock embankment walls will be removed to the nearest remaining waste rock dump;
- Compacted clay in the base of the facility will be ripped to loosen compaction and to promote re-vegetation; and
- All process water systems must be lined or bunded.

Potential Impacts and Mitigation Measures→ It is anticipated that the potential impacts of the rehabilitation phase will be the same as the anticipated impacts listed in the construction phase for the construction in the operational phase for the operation of TSF and RWD.

It is recommended that the mitigation/management measures applicable to the construction phase (Section 10.1) and the mitigation measures contained in Table 10-6 are implemented. Please also refer to Table 10-7 and Table 10-8.

Table 10-6: Additional Mitigation Measures

Environmental Aspect	Additional Mitigation Measure
TSF Specific	• Please refer to 11.2.1
Surface Water	• Please refer to Section 11.2.3
Groundwater	• Please refer to Section 11.2.4
Soils, land use and land capability	• Please refer to Section 11.2.5
Waste Management	• Please refer to Section 11.2.6

The rehabilitation actions that the mine intends undertaking at the end of the life of the project are described below. These actions are designed to comply with the requirements of this rehabilitation plan's objectives, as well as the requirements of Best Practice Guidelines (BPG).

10.4 Post Closure Phase

This is a period of maintenance and monitoring of the various structures and infrastructure closed in the phase described above. The activities are limited to monitoring activities and limited erosion and vegetation repair if necessary. It is not anticipated that any significant impacts will arise during this period. Please refer to Section 12 and 14 for specific post closure measures relating monitoring and closure objectives.

Table 10-7: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Decommissioning Phase of the Pipelines

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Faunal Assessment	Direct	No material impact expected during the decommissioning and rehabilitation of the pipelines.								No specific management measures associated with this activity, however the following should be noted when decommissioning and rehabilitation activities associated with the pipeline take place. • Management measures associated with the existing pipelines will be implemented. • No areas falling outside of the existing pipeline routes may be impacted during the decommissioning and rehabilitation phase. • The boundaries of the pipeline footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas • Disturbance of sensitive habitat must be actively avoided. • Planning of temporary roads and access routes should take the site sensitivity plan into consideration. • Implement management measures as detailed in Section 14.							
Floral Assessment	Direct	No material impact expected as clearing of land for the pipelines will not be required due to the proposed pipelines being placed on existing pipeline route.								• No specific management measures associated with this activity however the following should be noted when activities associated with the decommissioning and rehabilitation of the pipeline take place. • Management measures associated with the existing pipelines will be implemented. • All contractors should be made aware of sensitive areas associated in the area where the pipeline decommissioning and rehabilitation will take place. Where areas are disturbed during decommissioning and rehabilitation activities, propagation of alien invasive species within these areas should be continually monitored and controlled throughout the construction phase. • The faunal Species of Conservation Concern in close proximity to the pipeline route should not be disturbed, if the faunal Species of Conservation Concern will be disturbed due to activities associated with the decommissioning and rehabilitation of the pipelines, these species should be relocated to similar habitat within the vicinity of the study area with the assistance of a suitably qualified specialist. • All decommissioning and rehabilitation must be done in such a manner so as to ensure species migration will take place by ensuring a suitable structure height to allow species to move under or over the pipelines. • As far as possible, existing roads are to be used for decommissioning and rehabilitation purposes. • All soils compacted as a result of decommissioning and rehabilitation activities falling outside of development footprint areas should be ripped and profiled. • The alien floral control plan must be implemented for a period of at least 2 years after decommissioning and closure. • Implement management measures as detailed in Section 14.							
Noise Assessment	Direct	Increased ambient noise levels may be experienced during the decommissioning and rehabilitation of the pipeline due to the following: Hauling of material associated with decommissioning and rehabilitation activities	2	2	2	2	3	**30**	**ML Maintain Current Management**	• Vehicles and machinery with low noise levels to be used. • Project specific decommissioning activities to take place during daytime (6 am - 10pm) period only unless where necessary and agreed with the communities that may be impacted. • Implement management measures as detailed in Section 14.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Soils, Land Use and Land Capability	Direct	Potential impact on local soil resources during Decommissioning and rehabilitation activates due to accidental spills	3	2	2	2	3	**35**	**ML Maintain Current Management**	• Ensure that maintenance on vehicles is undertaken to minimise accidental spillage form construction vehicles. • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of soils. • The appropriate spill clean-up equipment must be kept on site. • Prevent contamination as far as possible. • All erosion noted within the study area should be remedied immediately and as part of the ongoing rehabilitation plan. • Implement management measures as detailed in Section 11.2.8, Section 12.3 and Section 14.	1 month to 1 year	2	1	2	2	2	**20**	**L No Management Required**
Heritage Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated. • However, care should be taken that, during Decommissioning and rehabilitation if any Archaeological findings are discovered, a qualified Palaeontologist be called in to investigate the occurrence. • Implement management measures as detailed in Section 11.2.10							
Palaeontological Assessment	Direct	No material impacts are anticipated.								• No mitigation measures are required as no material impact is anticipated. • However, care should be taken that, during decommissioning and rehabilitation, if any Palaeontological sites are discovered, a qualified Palaeontologist be called in to investigate the occurrence. • Implement management measures as detailed in Section 11.2.10							

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Groundwater Assessment	Direct	Accidental spillages of hydrocarbons from machinery may occur during decommissioning and rehabilitation of the various pipelines and booster station The hydrocarbons may infiltrate to the underlying groundwater system	2	1	2	4	3	**35**	**ML Maintain Current Management**	• Maintenance of vehicles will limit the potential for spillages to occur. • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of the groundwater. • Monitoring of boreholes should continue. • Implement management measures as detailed in Section 11.2.7, Section 12.2 and Section 14.	1 month to 1 year	2	1	2	4	1	**25**	**L No Management Required**
Surface Water	Direct	Accidental spillages of hydrocarbons from machinery may occur during decommissioning and rehabilitation of the various pipelines and booster station The hydrocarbons may infiltrate have an impact on the water quality and wetland	2	1	2	4	3	**35**	**ML Maintain Current Management**	• No specific management measures associated with this activity however the following should be noted when activities associated with the pipeline take place. • Management measures associated with the existing pipelines will be implemented. • All contractors should be made aware of sensitive areas in the area where the proposed decommissioning and rehabilitation activities will take place. • Ensure that maintenance on vehicles is undertaken to minimise accidental spillage form vehicles. • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of surface water. • The appropriate spill clean-up equipment must be kept on site. • Restrict decommissioning and rehabilitation to the drier winter months, if possible, to avoid increased water inputs and sedimentation within the wetland. • Implement management measures as detailed in Section 11.2.6, Section 12.2 and Section 14	1 month to 1 year	2	1	2	4	1	**25**	**L No Management Required**
Wetland Assessment	Direct	During the decommissioning and rehabilitation phase of the proposed pipeline, indiscriminate driving of vehicles may cause damage within the identified wetland areas	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Management measures associated with the existing pipelines will be implemented • All vehicles will be restricted to existing designated roadways • No areas falling outside of the existing pipeline routes may be used for decommissioning and rehabilitation purposes • The boundaries of the pipeline footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas • All contractors should be made aware of sensitive areas associated in the area where the proposed pipeline will be placed. • Disturbance of sensitive habitat must be actively avoided. • Implement management measures as detailed in Section 11.2.2 and Section 14.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**
Wetland Assessment	Direct	During the decommissioning and rehabilitation phase of the pipeline, stockpiling and waste dumping within wetland areas may damage the wetland areas	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Appropriate sanitary facilities must be provided for the duration of the decommissioning and rehabilitation activities and all waste must be removed to an appropriate waste facility. • In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss. • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries, wetland resources and associated buffer zones. All waste and rubble must be removed from site and disposed of according to relevant SABS standards. • Implement management measures as detailed in Section 11.2.2 and Section 14.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Cumulative impact		Cumulative impact of the decommissioning and rehabilitation of the pipeline (placed on trestles adjacent to existing pipelines)	3	1	2	3	3	**36**	**ML Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	1 month to 1 year	1	1	2	2	2	**16**	**L No Management Required**

Table 10-8: Anticipated Impact Significance Pre and Post Mitigation and Associated Management and Mitigation Measures During the Decommissioning Phase of the BRPM TSF Extension and new RWD

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Noise Assessment	Direct	Increase in ambient noise levels due to decommissioning and closure activities for the TSF, RWD and associated infrastructure	2	2	2	2	4	**36**	**ML Maintain Current Management**	• Machinery with low noise levels to be used. • Decommissioning and closure activities to take place during daytime (6 am - 10pm) period only unless where necessary and agreed with the communities that may be impacted. • The existing noise monitoring plan must be implemented. • All equipment with noise levels (higher than 85.0dBA) to be acoustically screened off.	Duration of the decommissioning/ rehabilitation phase	1	1	2	2	2	**16**	**L No Management Required**
Air Quality Assessment	Direct	Impacts associated with the decommissioning and rehabilitation of the TSF	1	1	1	2	1	**9**	**L No Management Required**	• Wetting down areas prone to fugitive dust emissions until revegetation activities finished or until the vegetation cover is well established.	Duration of the decommissioning/ rehabilitation phase	1	1	1	1	1	**6**	**L No Management Required**
Soils, Land Use and Land Capability	Direct	Potential impact on local soil resources during decommissioning and closure phase may be experienced due to the following: Soil Compaction Soil Erosion Soil contamination due to accidental spills	3	2	2	4	3	**49**	**MH Maintain Current Management**	• Demolish and remove infrastructure in dry season, minimise footprint area as far as possible. • Replace topsoil in one action. • Ameliorate replaced topsoil with fertilizer and organic material, revegetate with endemic plants as soon as possible. • Implement management measures as detailed in Section 11.2.8. And Section 14.	Duration of the decommissioning/ rehabilitation phase	2	2	2	2	2	**24**	**L No Management Required**
Groundwater Assessment	Direct	Ongoing leachate through the TSF resulting in continued mounding and/or leachate to the groundwater.	2	2	4	3	3	**48**	**MH Maintain Current Management**	• Following closure there will be compaction and top soil and vegetative covering of the TSF which is expected to include the existing facility. • This is expected to result in a decrease in recharge to natural recharge (possibly less). • Reduction in seepage will return the groundwater to near its natural water level which should positively benefit the aquifer. • Implement management measures as detailed in Section 11.2.7 and Section 14.	Duration of the decommissioning/ rehabilitation phase	1	1	3	2	3	**25**	**L No Management Required**
Groundwater Assessment	Direct	The reduction in recharge is likely to cause an increase in salinity with a corresponding decrease in volumes in the short term.	3	2	3	3	3	**48**	**MH Maintain Current Management**	• Mitigation is as for the operational phase. • Sloping, top-soiling and re-vegetation of the top and side slopes of the BRPM TSF expansion, to reduce ingress of rainfall. • Contain dirty water and seepage from the BRPM TSF expansion in the RWD to prevent spillage into the catchment. • Investigate the option of continued dewatering from South Shaft mine workings to assist in the capture and containment of the groundwater plume. • Capture and containment of the groundwater contaminant plume, should this be necessary. This could include, for example, ongoing dewatering of the UG2 open pit, and ongoing dewatering at the shaft and scavenger boreholes if required. • The future impact to the communities, if indicated, could be further reduced through supply of potable water to the communities. • Implement management measures as detailed in Section 11.2.7 and Section 14.	Duration of the decommissioning/ rehabilitation phase	2	1	3	2	3	**30**	**ML Maintain Current Management**
Surface Water Assessment	Direct	The rainfall water that would fall on the dirty water area of the proposed TSF and RWD that forms part of the Mean Annual Run-off (MAR) to the local water courses will be removed from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.	2	3	4	4	3	**63**	**MH Maintain Current Management**	• No management measure required. Initial impact rating will remain. This impact cannot be mitigated to a lower significance because the probability that the impact will manifest remains definitely. The impact reduces significantly at the outlet for quaternary catchment A22F to a reduction of less than 0.1% but in the area immediately downstream of the mining activities this impact will remain MEDIUM HIGH permanently. • Implement management measures as detailed in Section 11.2.6 and Section 14.	Duration of the decommissioning/ rehabilitation phase	2	3	4	4	3	**63**	**MH Maintain Current Management**
Surface Water Assessment	Direct	Increase of erosion potential during decommissioning and closure activities	2	2	2	4	4	**48**	**MH Maintain**	• Adequate storm water management should be considered in the detailed design of the proposed	Duration of the decommissioning/	1	1	2	2	2	**16**	**L No**

STUDY	TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
			Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									Current Management	infrastructure in order to minimize undue erosion. • Ensure erosion protection measures are adequately implemented and monitored. • Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways. • Implement management measures as detailed in Section 11.2.6 and Section 14.	rehabilitation phase							**Management Required**
Cumulative impact		Cumulative impact of the decommissioning of the TSF and RWD on the receiving environment	3	3	2	2	3	**40**	**MH Maintain Current Management**	• Implementation of recommended mitigation, monitoring and management measures.	Duration of the decommissioning/ rehabilitation phase	3	2	2	2	2	**28**	**ML Maintain Current Management**

11 Environmental Management Programme

11.1 Project Mitigation and Management Commitments

Please refer to Section 10 for all relevant mitigation and management measures as prescribed by the various specialists in accordance to the activities that will be undertaken during the different phases of the BRPM TSF Extension Project by RBPlat.

11.2 Other Specific Management Plans/Programmes

Besides the mitigation and management measures prescribed in Section 10 for each of the potential impact, the following section provides additional management measures which will need to be implemented during the different phases of the BRPM TSF Extension Project.

11.2.1 BRPM TSF Extension Project Specific Management Measures

Construction Phase Activities

Construction and site preparation involves clearing of vegetation, grading of the site area to specific levels and topsoil stripping and stockpiling (for rehabilitation). A starter wall will be constructed along the lower perimeter of the dam, to cater for the initial high rate of rise during deposition, while the rest of the dam perimeter will be contained with a low toe wall. The starter and toe walls are typically constructed from an approved, available, in-situ material, e.g. norite clay. When the tailings height rises above the starter wall crest, the upstream construction method is utilised where wall building is done with dry tailings on top of the existing deposited dry tailings that have gained sufficient strength to be built on. The design manual is included as Appendix Q.

Tailings Storage Facility

It is proposed to construct a TSF covering an area of approximately 150 ha. The maximum rate of rise will be limited to 2.0 m / year once the starter wall is constructed with overall side slopes of 1V:5H resulting in improved slope stability.

A toe filter drain will be incorporated at the upstream toe of the starter embankment. An intermediate filter drain will be constructed on a berm on the upstream face of the starter wall to enhance the drainage capability on the highest section of starter wall. These filter drains will discharge into a solution trench around the perimeter of the facility. An elevated drain within the tailings mass will assist in ensuring that the phreatic surface does not intercept the outer face of the BRPM TSF Extension. Toe paddocks will collect any storm water runoff and erosion products from the outer slopes of the facility.

The footprint of the planned BRPM TSF Extension Project will be located on the site where the existing Glencore Open Pit is located, south-west of the existing BRPM TSF. Glencore (previously the Exxaro Boschhoek Chrome Smelter) are currently backfilling the redundant chromite open pit located to the west of the TSF with what is termed Jig Tailings. It is understood that this forms part of the Glencore Environmental Management Plan.

The extension to the existing BRPM TSF will be constructed directly adjacent to the existing BRPM TSF. It will have two perpendicular sides which form a L-shape around the corner of the existing BRPM TSF. The L-shaped TSF will consist of a Western Leg (LW) and a Southern Leg (LS). Once the L-Shaped TSF reaches the height of the existing BRPM TSF, the two structures will be managed and operated as one facility. This is expected to take place approximately two years after commissioning.

As the bottom steps of the tailings storage facilities are completed, the slopes will then be grassed by seeding and hand planting. This is done in the rainy season to ensure optimal growth opportunity.

Grassing will be done on completed sections of the dam outer walls, starting from the bottom. This will prevent erosion on completed sections and minimise dust generation from these completed sections. The details of the existing and proposed facilities are shown in Table 11-1:

Table 11-1: Details of Existing and Proposed Facilities

Parameter	Existing TSF	Proposed BRPM TSF extension	Proposed RWD
Height (m)	<45	76 (final height)	4.5
Average Discharge to Facility (Slurry)	220 000 tonnes/month	350 000 tonnes/month	10 500 m^3/day
Total Storage Capacity	68.7 million tonnes	108 million tonnes	285 000 m^3
Footprint Area (ha)	175	130	12.8
Liner Specifications	Clay Lined: average depth of 1.5m	Class C barrier liner	Class C barrier liner
Construction Commencement Date	1998	2017	2017

TSF Liner Requirements

Based on the results obtained from the samples analysed at UIS Laboratories in Centurion (a SANAS accredited laboratory according to ISO/IEC 17025:2005) the waste was classified as Type 3 according to Government Gazette No. 36784, Notice R. 636 of 23 August 2013 supporting the National Environmental Management: Waste Act (NEM: WA). The minimum requirement for a Type 3 waste system is a Class C barrier, as shown in Figure 11-1.

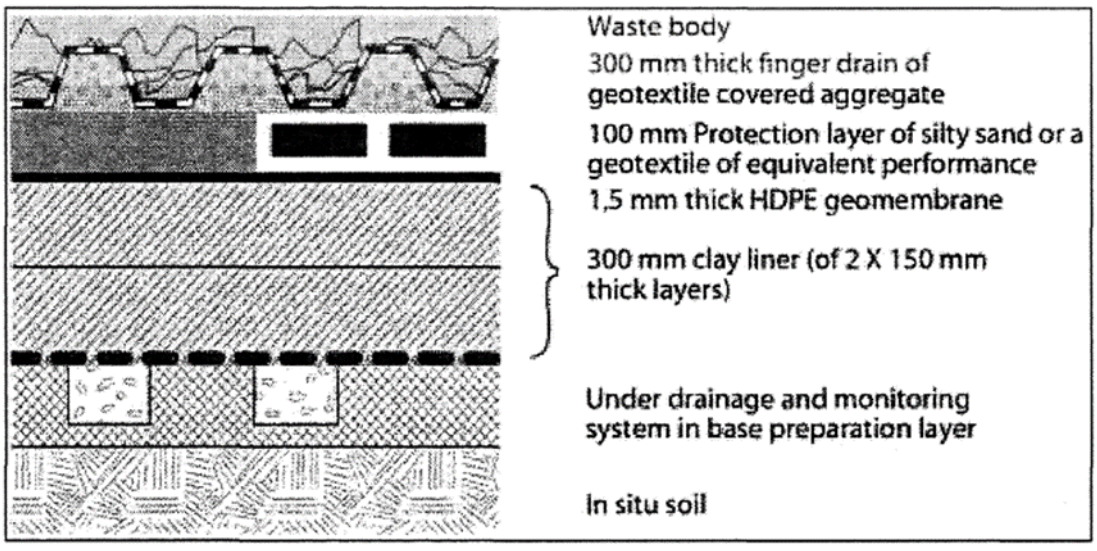


Figure 11-1: Class C Barrier System

The specific barrier system at the BRPM TSF Extension Project will consist of a 1.5 mm thick HDPE geo-membrane as the primary containment layer an in situ reworked compacted clay layer (CCL) of 300mm thick as the secondary containment system.

Tailings Deposition Method

The BRPM TSF Extension Project design is based on an upstream constructed, spigotted deposit system, which will operate as follows:

- Tailings will be pumped onto the edge of the dam crest, from where it will be deposited into the BRPM TSF Extension through a pipeline with spigots located at intervals along the dam crest;
- The spigots will be opened as required and the coarser portion of the tailings will settle closer to the outer edge while finer particles migrate with the water towards the centre;
- The water will be collected at the centre of the BRPM TSF Extension and discharged into the new RWD via a penstock system; and
- As the tailings are deposited, it will consolidate and dry out. Layer upon layer will then be built upon each other resulting in the rise in height of the BRPM TSF Extension.

Return Water Dam

The new RWD will be lined (Class C lining) and constructed to store excess water from the BRPM TSF Extension. The footprint of the new RWD will be approximately 12.7 ha. The new RDW will receive water from the BRPM TSF Extension via a gravity penstock, aided by a booster pump station. Water will be pumped from the new RWD back to the BRPM concentrator for re-use as process water. All process water systems will be lined or bunded.

The new RWD was designed to accommodate a stormwater surcharge of 205 000 m³. The new RWD capacity is sufficient to contain run-off from the TSF arising from the 1: 50 year recurrence interval storm with 24 hour duration. For runoff in excess of the storage capacity, an emergency spillway into the natural environment will be constructed.

The new RWD will be a single compartment dam. A maximum operating level will be set out in the operating manual for the facility. Excess water arising from rainfall on the BRPM TSF Extension will temporarily be stored above this level.

Side slopes have been specified at 1:3 (Vertical: Horizontal) in order to facilitate compaction using a conventional drum roller.

To mitigate the risk of drowning in the lined new RWD, nylon ropes (or equivalent) fastened to anchor blocks at strategic positions around the dam will be provided. The new RWD is fenced off to prevent any unauthorised access and to prevent livestock from drinking the water in the dam.

During construction and before the filling of the new RWD, a temporary ballast system will be installed. The new RWD will be constructed in adherence to the DWS BPGs requirements for the containment of contaminated water.

A booster pump station will be installed to transport the excess water from the BRPM TSF Extension to the new RWD. The new RWD will be drained by pumping any residual water reticulated from the BRPM TSF Extension to the BRPM Concentrator Plant for re-use as process water.

The solution trench and penstock s drain to the new RWD, from where water is pumped back to the BRPM Concentrator Plant.

It is recommended that the new RWD be managed in a way to prevent discharge to the receiving environment.

Pipelines

- The pipelines should be placed within the onto existing trestles adjacent to the existing pipelines that transport tailings and waste water between the BRPM Concentrator Plant and existing BRPM TSF;
- All pipelines should be regularly inspected in order to ensure they are in good working order in order to prevent spills of tailings and contaminated water within wetland areas. Special attention should be paid to the pipeline sections crossing wetland resources; and
- Support structures for infrastructure such as tailings and return water pipelines must be placed outside of wetland areas. Should it be essential to place such support structures within the wetlands, the crossing designs must ensure that upstream ponding and downstream erosion of wetland resources do not take place.

Powerlines

The existing 88 kV Eskom powerlines which is located within the BRPM TSF Extension Project footprint must be relocated to the south of the proposed BRPM TSF Extension Project footprint in order to accommodate the extension activities. A separate application for EA was lodged with the DEA who is the Competent Authority for all energy regulating activities (DEA reference number 14/12/16/3/3/2/648) and EA was granted on 31 March 2015 to accommodate the powerline relocation.

Design parameters

The following design parameters for the BRPM TSF Extension Project have been specified to comply with Regulation 3 of GN R636 of 23 August 2013 (Norms and Standards for Disposal of Waste to Landfill):

- Liner Requirements;
- Containment barrier;
- Design reports and drawings to be certified by a registered professional engineer;
- Service life quantified taking temperature into account;
- Alternative elements considered i.t.o. filters, geotextiles and clay components;
- All drainage layers contain drainage pipes designed according to seepage flow estimations based on a seepage analysis;
- The overall side slope is 1:5 (vertical: horizontal);
- Construction quality assurance plan to be implemented during construction; and
- Geo-synthetic materials to comply with relevant South African National Standards and to be sourced from an accredited supplier.

The liner was determined to be compatible with the waste stream by means of a literature review, manufacturer's tests, and laboratory test which indicate compatibility of the clay soils with the leachate.

Decant Structures

A multi–stage stacked ring decant, similar to that at the current BRPM TSF, will be constructed for the LW unit to accommodate the drainage for the full capacity of the BRPM TSF Extension up to an elevation of 1,170 mamsl. The location of the decant and the available space limits the elevation to which the LW decant can operate while still remaining a sufficient distance from the BRPM TSF Extension Project crest wall (100 m). After the BRPM TSF Extension reaches this elevation, the

decant method needs to revert to a pump barge option or similar. The LW decant tower will be located inside the existing paddocks on the Western side of the existing BRPM TSF.

A barge mounted pumped decant will be provided in the LS unit to pump collected supernatant over the high ground in the South West corner into LW for removal off the facility via the LW gravity penstock decant system. This pumped decant system will only operate until water can flow under gravity to the LW decant. Thereafter the decant tower for LW will control the water for the entire combined TSF. The decant towers will be accessed by means of a pool wall and timber catwalk. The decant outfall pipes will be concrete encased 750 mm concrete pipes, discharging through a 2-compartment silt trap into RWD with a barrier system similar to that of the TSF, with an operating capacity of 30,000 m³ plus a storm water retention capacity of 255,000 m³. The operating capacity of the process water pond is based on four days plant process demand. All process water systems will be lined or bunded.

Glencore Open Pit

The Glencore Open Pit is situated within the proposed BRPM TSF Extension Project footprint and covers an area of approximately 2 ha and with an excavated depth remaining of between 2 to 7 m below the natural surface level, with near-vertical pit wall sides.

The pit is currently associated with the Boschhoek ferrochrome smelter complex which is owned by Glencore (Pty) Ltd. Glencore started deposition of what is termed Jig Tailings into the pit from September 2011 in order to backfill the pit. SRK understands that Glencore has authorisation from the then Department of Water Affairs and Forestry (DWAF, now DWS) for the backfilling of the pit with Jig tailings as approved in 2007 for the Boschhoek Operations EMPR.

It was however found that backfilling the Glencore Open Pit with jig tailings will not render it stable enough to carry the weight of the BRPM TSF Extension. There is no current undermining underneath the footprint of the BRPM TSF Extension Project and there is also no future undermining planned for this area (Knight Piesold, 2015). In order to render the entire footprint of the BRPM TSF Extension stable for construction RBPlat made an agreement with Glencore to backfill the pit with waste rock on their behalf.

Operation Phase Activities

During the operational phase the tailings will be produced at the BRPM Concentrator and it will be pumped to the TSF. The return water will be pumped to the RWD. Water from the RWD will be pumped to the BRPM Concentrator Plant to be re-used at the BRPM Concentrator Plant.

A starter wall comprising borrowed material from within the TSF basin and rock-fill will be constructed to an elevation of 1,128 mamsl to contain the initial tailings deposited into the facility when rates of rise in excess of 3 m per annum will occur.

The tailings will reach an elevation of 1,128 mamsl approximately 2 years after commissioning. Once the TSF Extension area reaches the elevation of the starter wall (1,128 mamsl), the method of deposition for the TSF Extension will change to that of day-walling while the existing BRPM TSF will continue to be spigotted. The “catch up” will also be aided by a deposition plan whereby the tailings distributed to the existing tailings will virtually cease. This “catch up” is expected to occur approximately 3.5 years after commissioning the TSF Extension and thereafter the method of deposition will revert back to that of spigotting, for the combined TSF, to reduce the labour intensive nature of day-walling. Filter drains will be incorporated at the upstream toe of the starter embankments; and a blanket drain will be installed (at an offset from the toe drain). The collector drains will also act as finger drains and will discharge into a solution trench around the perimeter of the facility. Toe paddocks will collect any runoff and erosion solids from the outer slopes of the facility.

11.2.2 Sensitivity and Buffer Areas

- A sensitivity map has been developed for the Project Area, indicating wetland and riparian areas that are considered to be of increased ecological importance. It is recommended that this sensitivity map be considered during all development phases (refer to Figure 11-2);
- No construction of infrastructure may take place within wetland areas and wetland buffer zones unless authorisation is granted by the DWS;
- As far as practically possible, all mining activity and infrastructure should be located outside of wetland and riparian areas and the associated 100m buffer zone with the exception of pipeline crossings, which should, as far as possible follow existing crossing to minimise further impacts on wetland and riparian areas;
- Where wetland and riparian areas must be crossed, it should be done so at right angles as far as possible to minimise the extent of the impact on the receiving environment;
- All areas of increased ecological sensitivity should be designated as 'No-Go' areas and be off limits to all unauthorised construction vehicles and personnel;
- Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities;
- All development footprint areas and areas affected by the proposed mining development should remain as small as possible and any disturbance of sensitive habitat must be actively avoided;
- Planning of temporary roads and access routes should take the site sensitivity plan into consideration;
- Construction vehicles must remain on demarcated roads and should not encroach into the wetland areas or their associated buffer zones;
- It must be ensured that contractor laydown areas are located outside of wetland and riparian areas and associated 100m buffer zones and excluded from clearing activities in order to minimise vegetation loss and resultant erosion and sedimentation; and
- Areas to be cleared are to be clearly demarcated and it must be ensured that vegetation clearing only occurs within the demarcated areas.

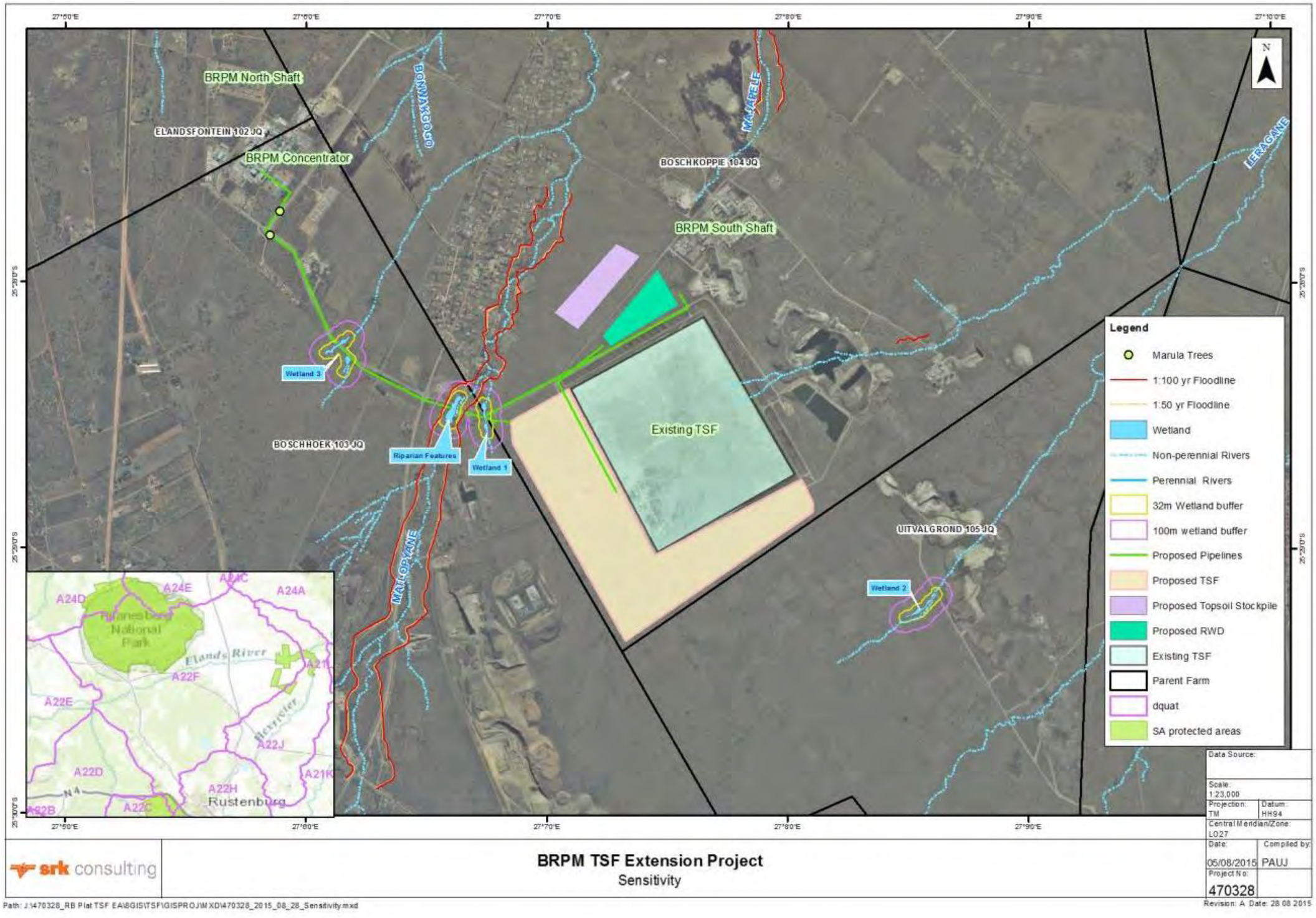


Figure 11-2: Sensitivity Map

11.2.3 Surface Water Specific Management Measures

Clear separation of clean and dirty water areas must take place in line with the requirements of Regulation 704 and in line with the Road drainage manual (van Vuuren *et al*, 2006).

Clean Water and Dirty Water Diversions

- Clean and dirty water separation systems should be the first systems developed on site;
- Clear separation of clean and dirty water must take place and diversion of clean water around operational areas must ensure minimisation of the loss of catchment yield;
- Clean water runoff arising within Catchments of the proposed BRPM TSF must be diverted and returned to the natural watercourse;
- The clean water diversion channels are required to divert run-off up to the 1:50 year 24-hour storm;
- The proposed diversions will need to be lined trapezoidal channels;
- Requirements at the channel outlets include the following:
  - The point where the clean water diversions re-enter the natural system must enter the system at the same elevation as the receiving aquatic environment via an energy dissipation structure thereby preventing erosion and incision of the natural watercourse; and
  - To further minimise erosion and incision of the natural watercourse to the diverted flow should enter the natural system where possible at an acute angle to prevent the creation of turbulent flow.

Dirty water containment

- Dirty water must be captured in holding facilities with a capacity to contain up to the 1:50 year flood event;
- Dirty water must be recycled back into the mining system;
- Dirty water containment requirements must be informed by the site hydrology in accordance with Regulation 704 to minimise the impact of any contaminants as a result of spillages and mine residue on the streams downstream; and
- The design criteria requirements must consider the recommendations from specialist studies undertaken as part of the project.

Storm water management measures

- The design of the stormwater management system must include the following:
  - discharge points of all stormwater outlets are to also have energy dissipation structures such that the concentrated flow is again dispersed and energy lowered before re-entering the natural environment; and
  - Attenuation of stormwater runoff at strategic points to slow down the flow velocity and hence prevent the build-up of high energy sections which then causes erosion and incision of the natural watercourse.

11.2.4 Groundwater Specific Management Measures

The following management measures are recommended:

- Pre-construction - Boreholes located within the proposed BRPM TSF footprint (BH4, DWA02, BH3, BH2, DWA03, DWA04) to be sealed, so that they do not act as preferential conduits to seepage once these facilities are constructed;

- During construction it is recommended that:
  - Best practice to be followed to minimise fuel leaks from machinery;
  - Design of the TSF to minimise leachate to the groundwater. DWS have advised that the TSF should be constructed to Class C design specifications; and
  - Ongoing monitoring as discussed below.
- During operation it is recommended that the seepage and dirty water from the proposed BRPM TSF Extension be managed by:
  - Separation and diversion of clean storm water and containment of dirty water;
  - Lining of the BRPM TSF Extension with collection of seepage from the underlying finger drains (which form part of the liner design) collected in the RWD from where the water is re-used in the concentrator plant; and
  - Ongoing monitoring as discussed below.
- Management measures during decommissioning, closure and post-closure are provided as follows:
  - Sloping, top-soiling and re-vegetation of the top and side slopes of the proposed BRPM TSF Extension and existing BRPM TSF, to reduce ingress of rainfall on closure;
  - Retain RWD to contain dirty water and seepage from the BRPM TSF Extension until flows from the TSF are negligible;
  - Management/Rehabilitation may be required should the community boreholes be adversely affected by contamination migrating from the TSF such as, for example, provision of alternative water supply and/or containment of the groundwater contaminant plume, through ongoing dewatering from the mine workings, the open pits, the shaft (which may be redundant at that stage) and/or scavenger boreholes; and
  - Long-term monitoring of groundwater to ensure that the natural attenuation processes are successfully removing the cumulative contamination plume. The future impact to the communities, if indicated, could be further reduced through supply of potable water to the communities.
- Monitoring of piezometric head within the tailings should be conducted during the operational and closure phases to ensure that there are no stability concerns;
- Management/Rehabilitation may be required should the community boreholes be adversely affected by contamination migrating from the TSF such as, for example, provision of alternative supply;
- It is recommended that the planned abstraction and treatment of water stored in the Open pit and RWD as part of the improved water management system by BRPM be implemented as this will reduce the source and should improve the groundwater quality locally to the east of the existing BRPM TSF, RWD, SWD and the rehabilitated workings; and
- The option of continued dewatering from South Shaft mine workings to assist in the capture and containment of the existing plume in the near future and on closure should be further investigated.

11.2.5 Soil Specific Management Plan

The aim of the Soil Management Plan is to provide guidelines that should be followed during any phase of land preparation, clearing of vegetation or general construction activities. The measures must be implemented:

- Strip a suitable distance ahead of the construction (disturbance) at all times, to avoid loss and contamination:

  Do not strip too large an area ahead of construction, because this exposes the stripped surface to the risk of water and wind erosion, with the associated dust and water sediment pollution

problems. However, if the stripping face is too close to the construction activity, it will result in the loss of valuable soil material. Contamination by overburden materials as well as chemical soil pollution by oil and fuel spills, etc. will occur.

- Supervise stripping to ensure soils are stripped correctly:

  Close supervision and monitoring of the stripping process is required to ensure that soils are stripped correctly to avoid stripping too little or too much. When too little, valuable rehabilitation material is lost, when too much, good quality soil is contaminated with poorer quality and unsuitable materials which are frequently highly compactable and tend to cement when exposed at surface.

  Risks of soil loss or contamination are particularly high when soil stripping contracts are purely issued on volume stripped, rather than on volume and quality. Monitoring requires assessment of the depth stripped the degree of mixing of soil materials and the volumes of material replaced directly or placed on stockpiles.

- Avoid vegetation clearance and earthworks during the rainy season when chances of runoff and water erosion are highest:

  The indigenous vegetation currently protects the erodible vertic and melanic soil profiles of the study site. The A-horizon is also the most fertile horizon that stabilises plant roots and contains sufficient organic material to allow good water infiltration in the rainy season. This horizon will most likely be stripped during construction and once this layer is removed, the rest of the profile will be extremely susceptible to water erosion.

- Strip soils only when moisture content will minimise compaction risk:

  Most soils are highly susceptible to compaction. Compaction is usually greatest when soils are moist, so soils should be stripped when moisture content is as low as possible. Stripping and replacement of soil should be done during the dry season when rainfall is at its lowest and soils are driest. When not practical, every effort must be made to minimise compaction by the methods used for soil stripping, stockpiling and replacement. With the vertic A-horizons on the Project Area, there are a possibility that construction machinery can get stuck and cause enormous damage to soil structure.

- Strip and replace in one action wherever possible:

  Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons. Stockpiling both increases compaction and decreases the viability of the seed bank, and should only be done when no areas of reshaped impacted land are available for direct placement.

- Locate soil stockpiles so that re-handling of soil is minimised:

  Soil stockpiles should not be moved after initial stripping unless the soil is being replaced in its final location in the rehabilitated profile. This is because each re-handling damages soil structure and increases compaction. Soil losses occur with each re-handling and additional cost is considerable. While it may cost more initially, it is better to place stockpiles in areas where they will not have to be moved. There will always be some soil that has to be stripped before any rehabilitated areas are available for direct placement (for example, soils stripped for roads infrastructure and box-cut development during construction), but these materials should be stockpiled as close as possible to where they are going to be ultimately used.

- Ensure free draining location:

  Placing soil stockpiles in drainage lines has two major harmful effects: the soils become waterlogged and lose desirable physical and chemical characteristics and the risk of loss of soil materials due to erosion is increased. Ideally, stockpiles should be placed on a topographical crest which provides free drainage in all directions. Alternatively, a side-slope location with suitable cut-off berm construction upslope is acceptable and with a down gradient berm to prevent sedimentation of the surrounding receiving environment.

- Minimise compaction during stockpile creation:

  Soils should be stockpiled loosely. The degree to which soils become compacted during stripping is largely dependent on the equipment used. If shovel and truck are used, the ideal is for soils to be dumped in a single lift. The use of heavy equipment over soil piles results in soil structure damage. If direct dumped soil piles are too low, then it is possible to increase stockpile height using a dozer blade or back-actor bucket to raise the height of the materials.

  Running trucks over the piles or using bowl scrapers or graders to level and shape stockpiles, is not recommended. When the only alternative to losing soil material is the use of unsatisfactory (i.e. bowl scraper) equipment, compaction damage can be reduced to some extent by stripping as thick a cut as possible and by dumping it as thickly as possible. In addition, deposition in a single track line may reduce to some extent the overall compaction of the dumped or replaced soil through the minimisation of the footprint area of disturbance.

11.2.6 Waste Management Measures

- RBPlat must implement and adhere to the existing Waste Management Procedure as contained in Section 13.4 and Appendix P. The Solid waste must be managed and monitored in terms of the existing Waste Management Procedure (contained in Appendix P). These volumes are recorded monthly in RBPlat's SHE database;
- Appropriate sanitary facilities must be provided for the duration of the construction activities and all waste must be removed to an appropriate waste facility;
- In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss;
- All spills (hydrocarbons, tailings or any other potentially polluting material) must be cleaned up in the manner prescribed for that type of spill;
- It must be ensured that mining related waste or spillage and effluent do not affect the receiving environment;
- It must be ensured that the mine process water system is managed in such a way as to prevent discharge to the receiving environment. All process water systems must be lined or bunded; and
- All waste and rubble must be removed from site and disposed of according to the Mine Health and Safety Act (Act No. 29 of 1996).

11.2.7 Decommissioning and Rehabilitation Phase Activities

- RBPlat will remain liable for the damage or degradation caused by its activities throughout the life cycle of the mining operations until effective decommissioning and rehabilitation has been achieved and a closure certificate obtained;
- Concurrent/ progressive rehabilitation must be implemented at all times and disturbed areas must be rehabilitated (ripped, scarified and re-vegetated with suitable indigenous grass species that will aid in soil stabilisation) as soon as possible. This will not only reduce the total disturbance footprint, but will also reduce the overall rehabilitation effort and cost;
- A detailed rehabilitation plan must be developed and must align with the site specific Biodiversity Action Plan that has previously been developed;
- All areas affected by construction should be rehabilitated upon completion of the construction phase. Areas should be reseeded with indigenous grasses as required. As much vegetation growth as possible should be promoted within the proposed development area to protect soils. In this regard, special mention is made of the need to utilise indigenous vegetation species and species that would naturally occur on the Project Area, during revegetation and rehabilitation works;
- Rehabilitation must ensure that wetland structure and function, if impacted by the development activities are reinstated in such a way as to ensure the ongoing functionality of the wetland and riparian features;
- All soils compacted as a result of construction activities falling outside of development footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas;
- Temporary access roads and other impacted areas not required for the mining operations are to be rehabilitated as soon as possible, in order to reduce the risk of erosion and further impacts on local flora;
- Side walls of the TSF and other surface infrastructure were applicable are to be rehabilitated on an on-going basis during the construction and operational phases. It must be ensured that the slopes remain stable and are of an acceptable gradient to allow for rehabilitation;
- Monitoring of relocation success of floral and faunal species, if undertaken, should take place during the operational phase and during and beyond the decommissioning and closure phase;
- Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure;
- Rehabilitated areas must be fenced, and all animals kept off the area until the vegetation is self-sustaining;
- Newly seeded/planted areas must be protected against compaction and erosion;
- Plants should be watered and weeded as required on a regular and managed basis were possible and practical;
- Check for pests and diseases at least once every two weeks and treat if necessary;
- Replace unhealthy or dead plant material;
- Fertilise, hydro seeded and grassed areas soon after germination if deemed necessary; and
- Repair any damage caused by erosion.

12 Monitoring and EMP Performance Assessment

As mentioned in Section 10, on-going monitoring will be conducted for the BRPM TSF Extension Project and the holder of the mining right will be responsible therefore. A formal audit of the performance assessment of the EMPR will take place every two years as stipulated in Regulation 55 (2)(b) of the MPRDA, or at any period as required by the Minister.

12.1 EMPR Performance Assessment

In terms of Regulation 55 of the MPRDA, the holder of a mining right must conduct monitoring on a continuous basis in order to comply with an EMPR as well as to assess the continued appropriateness and adequacy of the EMPR. In addition, the mining right holder must also conduct performance assessments of the EMPR and compile and submit a Performance Assessment Report to the Minister in which such compliance is demonstrated, this is scheduled to be undertaken every two (2) years.

12.2 Surface, Process and Groundwater Monitoring

RBPlat has an active monitoring program which includes identified water and waste management facilities and has been aligned with BPGs – Guideline 3 (DWAF, 2006). Sampling of surface water and groundwater sampling is undertaken by an external company that has been appointed to provide this service.

There is an existing monitoring program and a baseline has been established and the water quality monitoring should continue to be monitored during construction, after construction, during operational phase and during the closure and rehabilitation phases can be compared.

Surface water resources are monitored in the Matlopyane stream and the tributary of the Leragane stream, upstream and downstream of mining activities. Samples are submitted to an accredited laboratory for analyses and checks are sent to the SABS laboratories to verify results. Surface, process and groundwater are monitored monthly, and rest water levels are measured biannually. The sampling protocol is reviewed every two years and all parties involved in the monitoring are informed of updates. The surface water and groundwater monitoring points are required to be sampled in order to:

- monitor process water, discharges, effluents and receiving water to identify impacts caused by BRPM TSF operations;
- measuring of compliance against the existing WUL;
- determine the extent of groundwater pollution plumes;
- determine the fitness for use of water for potential downstream/down gradient users; and
- inform RBPlat's water management strategy, which is reliant on the implementation of a well-designed and maintained monitoring programme and database.

In addition to the abovementioned points, the water monitoring programme also includes the following water quality monitoring principles:

- Identification of pollution;
- Extent of pollution plume in groundwater (how far has pollution moved from the potential pollution source);
- Legal implications (contamination moving off site and contaminating bordering properties have liabilities associated with it, license conditions);
- Discharge point (impact on receiving water bodies/environment or other water users);
- Water use (compliance with water use guidelines, restricting the use of water based on its quality and its relevance to different water uses, preventing interference with processes);

- Planning for decommissioning and closure (what actions will be required based on data, financial planning);
- Assessing possibility of water re-use or recycling (impact of water quality on processes); and
- Background monitoring (establish quality not influenced by mining related activities).

The water quality data and independent reports are submitted to DWS every three months. Quantity monitoring includes water consumption and metering of the various water and waste streams on the mine. The data is reflected in the mine water balance. Should excessive water use be identified it will be reported to the RBPlat Departmental Managers for investigation and corrective action.

Groundwater monitoring is required in order to assess the potential impacts of the TSF on the water resources. This information can be used to identify and evaluate future remedial work and management procedures.

In addition to the aforementioned the following monitoring measures are recommended to be implemented:

- The existing monitoring program provides a valid baseline for monitoring of the groundwater around the proposed BRPM TSF Extension Project. Due to the position of the TSF, contamination emanating from the proposed TSF Extension Project area (especially if the facility is lined) will be obscured by the impact from the existing facilities. Additional physico-chemical monitoring should be implemented at points upstream and downstream of the clean water diversion outlets in order to monitor the impacts on water quality to the system;
- Groundwater monitoring of existing boreholes should continue as part of the BRPM management measures;
- Infrastructure such as the extended TSF, RWD and stockpiles must be monitored for seepages and erosion;
- Pre-construction monitoring of new boreholes (BRPM2 and 3) to increase the confidence in the baseline data for the proposed BRPM TSF Extension Project should be undertaken. Water level loggers are also recommended or monthly record of water levels during at least the first two years following operation; and
- Monitoring of piezometric head within the tailings should be conducted during the operational and closure phases to ensure that there are no stability concerns.

The groundwater model and water quality assessment undertaken as part of this study forms the basis for the following recommended amendments to the monitoring program as follows:

- Pre-construction:
  - Boreholes located within the proposed BRPM TSF footprint (BH4, DWA02, BH3, BH2, DWA03, DWA04) to be sealed, so that they do not act as preferential conduits to seepage once these facilities are constructed.
- During construction it is recommended that:
  - Best practice to be followed to minimise fuel leaks from machinery;
  - Design of the TSF to minimise leachate to the groundwater. DWS have advised that the TSF should be constructed to Class C design specifications;
  - The proposed BRPM TSF Extension Project design must include ground preparation to minimise seepage to the Glencore Open Pit so as to avoid providing a conduit to the underlying aquifers; and
  - Ongoing monitoring as discussed below.
- During operation it is recommended that the seepage and dirty water from the proposed BRPM TSF Extension Project be managed by:
  - Separation and diversion of clean storm water and containment of dirty water;

  - Removal and management of seepage from the TSF Complex (existing BRPM TSF and proposed BRPM TSF Extension Project) during the operational phase from the underlying finger drains which form part of the liner design; and
  - Ongoing monitoring as discussed below.
- Monitoring of piezometric head within the tailings should be conducted during the operational and closure phases to ensure that there are no stability concerns.

12.3 Soils Monitoring and Maintenance Plan

The aim of the soil management plan is to provide guidelines that should be followed during any phase of land preparation, clearing of vegetation or general construction activities.

The nutrient requirements must be based on the monitoring and sampling of the soils at the time of the baseline survey. These values will definitely alter during the storage stage and will need to be re-evaluated before being used during rehabilitation. Ongoing evaluation of the nutrient status of the growth medium will be needed throughout the life of the project and into the rehabilitation phase.

During the rehabilitation exercise preliminary soil quality monitoring should be carried out to accurately determine the fertiliser requirements that will be needed. Additional soil sampling should also be carried out annually until the levels of nutrients, specifically magnesium, phosphorus and potassium, are at the required levels for sustainable growth.

Once the desired nutritional status has been achieved, it is recommended that the interval between sampling is increased. An annual environmental audit should be undertaken. If growth problems develop, ad hoc, sampling should be carried out to determine the problem.

Monitoring should always be carried out at the same time of the year and at least six weeks after the last application of fertilizer.

Soils should be sampled and analysed for the following parameters:

pH (H_2O)	Phosphorus (Bray I)
Electrical conductivity	Calcium mg/kg
Cation exchange capacity	Sodium mg/kg;
Magnesium mg/kg;	Potassium mg/kg Zinc mg/kg;
Clay	Organic matter content (C %)

12.4 Dust Fallout / Air Quality Monitoring

- During the construction phase a weather station should be installed on site to be a permanent fixture that will continue to operate during the operational phase. As a minimum the parameters measured should include temperature, humidity, rainfall, wind speed and wind direction. Meteorological data will be used in the interpretation of other monitoring results;
- Maintain the current monitoring network and where necessary make minor adjustments to accommodate the installation of new infrastructure, such as at the BRPM TSF Extension Project i.e. monitors should be installed downwind (west) of the BRPM TSF Extension as the prevailing wind directions are from the east. Refer to Figure 7-4 for the dust monitoring locations;
  - In instances where activities change the monitoring network may be adjusted accordingly; and
  - When the BRPM TSF Extension Project is operational an annual monitoring program should be maintained to determine whether the BRPM TSF Extension Project is having an impact on the surrounding environment with respect to dust fallout.

- A site specific monitoring protocol should be developed that includes monitoring at the closest sensitive receptors and downwind of major dust generating sources;
- A continuous PM_{10} monitor should be installed by RBPlat as the current monitoring equipment does not monitor PM_{10} continuously and there are currently numerous gaps in the dataset; and
- Conduct periodic independent audits of monitoring systems and the implementation of management plans to ensure that the system is maintained and that suitable data is obtained for decision making.

12.5 Waste Management Monitoring

All waste streams produced must be managed in terms of the existing RBPlat Waste Management Procedure (refer to 13.4 and Appendix P). This must be monitored by means of monthly recording in the RBPlat's SHE database.

12.6 Post Closure Monitoring and Maintenance

The objective of the monitoring program will be to track the recovery of the site towards the long-term post-closure land use goals, in accordance with the overall closure objectives stated in Section 14 and and ultimately collect sufficient data to establish that the relinquishment criteria have been achieved. The anticipated monitoring will include:

- *Surface Water* – Quality monitoring against parameters as required by the WUL. Sampled monthly for a three-year post-closure period;
- *Groundwater* – Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled quarterly for a three year post-closure period;
- *Erosion monitoring*. This will take the form of developing a representative reference site on both footprints and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken once a year at the end of the wet season for a three year post-closure period; and
- *Vegetation establishment:* Vegetation will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference analogue site established in a similar ecotype, for a three year post-closure period.

13 Environmental Goals and Objectives

13.1 Environmental Goals

Environmental impacts will be mitigated and managed through the implementation of the management and mitigation measures as contained in in the Impact Assessment Tables (Section 10) and EMPR (Section 11).

The EMPR aims to:

- Achieve compliance with the relevant environmental legislation;
- Manage identified impacts; and
- Provide a reference by which future audits can be assessed.

RBPlat strive to prevent incidents and to minimise their impact on the environment through a total Integrated Environmental (including SHE) Management approach.

Specifically with regard to environmental aims, the following is noted:

- "Promote environmental awareness amongst all employees, contractors and partners through appropriate training and ongoing awareness programmes so as to achieve the agreed objectives and targets;
- Design, construct and operate our facilities in such a manner as to mitigate and manage environmental impacts;
- Minimise and manage the generation of waste and recycle waste products wherever technically and economically feasible;
- Optimise water utilisation;
- Prevention of pollution in all areas through the use of the best available technology not entailing excessive cost;
- Comply with all applicable legislation and other requirements; and
- Conduct periodic audits and reviews to ensure continuous improvement in performance."

Identified negative environmental impacts will be managed and mitigated whilst positive impacts will be enhanced through the implementation of the EMPR. RBPlat is responsible for ensuring that all environmental obligations are met.

The implementation of the environmental mitigation and management measures is monitored through the EMPR Performance Assessment process, which is reported on to the DMR.

13.2 Socio-economic Objectives

RBPlat indicates that it strives to maintain a positive impact on the socio-economic environment during the Life of Mine (LoM). The mine is actively involved in the community whereby funds are made available for the development of local infrastructure and social upliftment.

13.3 Principles of Operation

The following principles will be implemented with respect to operation:

- The environmental coordinator of RBPlat will be on site to monitor the operation activities; and
- Environmental specifications will be included in the contract specifications and induction process should contractors be used.

13.4 Waste Management Protocol

Waste (other than mine residues) will be stored, handled, transported and disposed of in accordance with the mine's existing waste management strategy, procedures and protocols (refer to Appendix P). The protocols address:

- The compilation and maintenance of a waste inventory detailing the volumes, types and classification of wastes generated, stored and disposed of;
- Where and how waste is stored;
- Criteria for handling, transporting and disposing of wastes;
- What monitoring is required;
- The health and safety requirements;
- Monitoring of water quality for storm flow and seepage; and
- Reporting requirements.

13.5 Submission of Information

Information which is required to be submitted to the relevant authorities is done on a planned basis in order to ensure that environmental management requirements are met. When and if needed the necessary updating of reports are undertaken and submitted to the relevant authorities.

14 Closure Action Plan

The information of the closure action plan provided in this section is a summary of the information available in the detailed conceptual Rehabilitation and Closure Plan report. Please refer to Appendix N for the full report.

The closure plan has been developed for the proposed BRPM TSF Extension Project and the quantum for financial provision has been calculated for infrastructure and activities associated with the BRPM TSF Extension Project.

No approved closure plan has yet been developed for the Mining Rights area, however, closure requirements have been included in previous Styldrift EMPR. The general objectives for closure that are reported in the Styldrift EMPR are:

- The mine will, as far as practicable, rehabilitate concurrently with the operation of the project to prevent excessive cost at the cessation of operations;
- All rehabilitation and residual environmental impacts after mining has ceased must be reasonably acceptable to all parties concerned. Rehabilitation will be conducted in accordance with the appropriate Sections of the EMPR with final rehabilitation being undertaken to the satisfaction of the Director: Minerals Development at the DMR;
- Areas occupied by infrastructure (either plant, shaft or other) will be restored to pre-mining land capabilities, where possible;
- Rehabilitation standards will be such that runoff from rehabilitated areas can be regarded as uncontaminated;
- No provision has been made to handle any of the material generated during decommissioning as hazardous waste. Therefore, all material not removed from the mine for recycling (e.g. concrete) will be disposed of in the shafts prior to sealing the shafts; and
- It has been assumed that no residual contamination (e.g. oil spills) will be present requiring remediation.

14.1 Closure Objectives

As an overall closure plan has not been developed for the rest of the Mining Rights area, this document includes closure and rehabilitation objectives for the BRPM TSF Extension Project.

The overall closure goal for the project area is to progressively re-instate an area that is safe, stable, and non-polluting with the final landform not adversely affecting water resources.

The above overall goal is underpinned by the more specific objectives listed below:

- Decommissioning all surface infrastructure that has no beneficial post-closure use;
- Rehabilitate all disturbed land to a state that is suitable for its post-closure uses;
- Rehabilitate disturbed land to a state that facilitates compliance with applicable environmental quality objectives (air quality objectives and water quality guidelines); and
- Rehabilitate disturbed land to a state where post-closure management is minimised.

14.2 Post Closure Land Use Objectives

Post closure land use (PCLU) is normally determined in consultation with stakeholders so that the PCLU meets the requirements of the stakeholders, within the context of the closure plan. This activity is normally undertaken for the whole mine lease area affected by mining activities and integrates stakeholder requirements with risk mitigation.

As the project under consideration is not a closure of the whole mine lease, but rather the rehabilitation of an area supporting a mining and processing activity, the post rehabilitation final land use of this area has not been developed in consultation with the stakeholders. Furthermore, given that the proposed extension will remain as a permanent feature in the landscape, PCLU options are limited. Therefore for purposes of this plan, the proposed PCLU of the BRPM TSF Extension Project is wilderness, supporting vegetation populations which mitigates both wind and water erosion on the facility.

14.3 Closure Assumptions

This plan has been developed based on available information including environmental data. Some of the information currently available is preliminary and may change as operational monitoring data becomes available. Therefore, a number of assumptions were made about general conditions, and closure and rehabilitation of the facilities at the site to develop the proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

The assumptions used to prepare this plan include the following:

- The battery limit for this plan is the tailings delivery line at the perimeter fence to the BRPM TSF Extension Project and the new RWD pump station returning water to the Concentrator. Included are the existing BRPM TSF and new RWD, the proposed BRPM TSF Extension Project and new RWD and roads traversing the BRPM TSF Extension Project;
- The closure period will commence once the last tonne of tailings have been deposited;
- Vegetation establishment will be in line with the Biodiversity Action Plan that the BRPM TSF Extension Project is expected to develop to manage its impacts on biodiversity;
- Closure water quality compliance criteria will be governed by the Water Use Licence;
- Water management infrastructure developed for the operational phase will be retained for closure at the end of the life of the project and will therefore not be demolished;
- Structures that are not retained for post-closure use, sold or used by another party will require demolition;
- The private access road will be maintained for post closure monitoring around the BRPM TSF Extension Project;
- The open pit within the footprint of the proposed expansion will be backfilled in line with requirements to provide a geotechnically suitable foundation on which to construct a BRPM TSF Extension Project. This will include the placement of appropriate overburden into the excavation. As this back filled pit will be within the footprint of the BRPM TSF Extension Project no further closure measures are included for this pit; and
- There is currently no precedent as to how platinum tailings facilities will be closed to comply with the requirements of the DEA in terms of the Waste Classification and Management Regulations or the interpretation of the Waste Classification and Management Regulations by the DWS in terms of the implementation of Section 19 of the NWA. Therefore, for purposes of this closure plan no low permeability covers are included in the closure design.

14.4 Rehabilitation Action Plan

The rehabilitation actions that the mine intends undertaking at the end of the life of the project are described below. These actions are designed to comply with the requirements of this rehabilitation plan's objectives, as well as the requirements of the DWS BPGs.

14.4.1 BRPM TSF Extension

The approach will be to minimize the volume of rainfall retained on the top surface by shaping the facility to be free draining where possible, as well as to install an engineered decant system to drain the water from the top. This strategy is adopted as water storage on the top surface over the long-term may result in stability being compromised, uncontrolled releases of contact water, limit the establishment of vegetation and a retained phreatic surface in the dam.

Compromised stability is unlikely to include (a large) dam failure, however, there may be the washouts of toe walls around the tailings dam resulting in uncontrolled decant to the environment. Although a water cover is likely to control dust generation when there is a standing pool on the top surface of the dam, as the size of the pool decreases during the dry season, it is likely that a dry beach will be formed, which could then become a source of dust. Furthermore, a fluctuating water level on the top surface of the tailings dam may make vegetation establishment difficult, with the primary intent of vegetation on the top surface to be for dust control.

Retaining water on the top surfaces is likely to maintain a phreatic surface that extends from the pool to the base of the facility, with this water draining from the BRPM TSF Extension Project into the drainage reticulation system and ultimately reporting to the return water dams. The phreatic water may also seep into the groundwater system - in concentrations that exceed license conditions, particularly for the original BRPM TSF which did not include any form of low permeability barrier system in the basement, other than compacted reworked in situ clay, as low permeability barriers were not a legislated requirement at the time the original facility was constructed.

Therefore, as closure approaches, the depositional strategy will be refined so that the final surfaces can be shaped in order to drain water to collection points from where it can be decanted from the top surface via an engineered spillway. There will, however, be a need to mechanically reshape areas not appropriately profiled at closure. The design criteria for the spillway must be for a 1:100 rainfall event.

The closure actions for the BRPM TSF Extension Project (existing and proposed new extension) will involve:

- Draining the pool on top of the tailings dam in a controlled manner into the return water dams, for evaporation. No active dewatering is intended to accelerate consolidation of the top surface zone - as this will consolidate naturally to a state on which vegetation can then be established;
- The overall slope from the crest to the toe of the BRPM TSF Extension Project will be approximately 1V:3H. Thus while no land form evolution modelling has been undertaken, SRK assumes that this slope will be sufficiently stable that vegetation can limit the rate of erosion so that this risk of sediment deposition into the environment is minimised. Therefore no slope reshaping is included in the closure activities of the BRPM TSF Extension Project;
- Vegetation will be established on the upper sections of the tailings facility, even during the period in which the top surface is consolidating. This includes vegetation on both the benches and inter-bench slopes;
- Once consolidation testing undertaken on the top surface indicates that the surface is safe to be traversed by people, vegetation will be established;

- The return water dams will be retained until the facility has consolidated and the drainage from the toe to the return water dam is negligible. Thereafter, the return water dams will be decommissioned, primarily to reduce the risk of drowning in these facilities post closure. The actions to achieve this are:
    - Demolish all concrete structures;
    - Remove liners and following waste classification testing dispose of appropriately;
    - Backfill excavations with material removed during construction; and
    - Profile footprint to be free draining with no low-points to accumulate water.
- Vegetation establishment techniques on platinum tailings are well developed and it has been demonstrated on the existing BRPM TSF, that vegetation can be established without the need for the placement of growth medium. Fertilizers and organic ameliorants are, however, required to assist establishment until nutrient cycles in the upper layers of the tailings are regenerated;
- The method of establishment will be to utilize a combination of indigenous grass species to establish a vegetative cover that limits wind and water erosion;
- All civil structures not required for the management of the facility will be decommissioned and possibly demolished; and
- These activities will result in a stable landform capable of supporting a vegetation community analogous with surrounding grasslands, where the generation of contact water is limited by the incorporation of appropriate covers in the closure design being implemented.

14.4.2 Roads

The private road will be closed when the relinquishment criteria for the BRPM TSF Extension complex have been achieved. Closure actions will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.;
- All concrete lined drainage channels, culverts and sumps to be broken up and removed;
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- All areas treated with saline dust suppression water need to be treated as “sealed” roads with the upper surface ripped and removed to designated contaminant disposal areas.

14.4.3 Return Water Dam

The new RWD will be reclaimed and the area shaped to form a stable landform congruent with the surrounding landscape.

The new RWD will however be retained during the majority of the closure period to capture any residual seepage and contact water which may be generated. The expectation is that as rehabilitation of the BRPM TSF Extension Project is implemented, the size of the contact water catchment reduces until there is no further need for the new RWD. During the reduction in catchment size, the contained contact water will be evaporated as runoff and seepage to the new RWD diminishes, with the result that there will not be a need to manage excess inventory in the new RWD at closure. Closure actions for the new RWD will include:

- Demolish all concrete structures;
- Remove any silt that accumulated in the dam;
- Remove liners and following waste classification testing dispose appropriately;

- Backfill excavations with material removed during construction which will be located adjacent to the new RWD; and
- Profile footprint to be free draining with no low points to accumulated water.

14.5 Relinquishment Criteria

Following the implementation of the Action Plan, it is necessary to have measurable criteria against which to assess the effectiveness of the plan and its implementation. These criteria will assist RBPlat's in identifying when the standard of closure achieved is sufficient to relinquish responsibility for a specific area. The site specific relinquishment criteria for the BRPM TSF Extension are documented in Table 14-1. Also included in the table are the indicators required to demonstrate achievement with the relinquishment criteria and the reporting requirements. The reporting requirements are those that are expected to fulfil the monitoring requirements set out by legislation.

Table 14-1 Relinquishment criteria

Category	Closure criteria	Indicators	Reporting requirements
Ground & Surface Water	Compliance with the WUL	Downstream/gradient water quality monitoring.	Monitoring report
Air	Compliance with the standards as per the National Environmental Management: Air Quality (Act 39 of 2004)	Records of air quality measurements.	Monitoring report
Erosion	Implementation or construction of erosion control measures	Engineered structures to control water flow.	Evidence in rehabilitation report that required structures are in place and functioning
		Establishment of vegetation.	See Vegetation below
Safety / stability	The site is safe for use by humans and animals, including in the foreseeable future in compliance with Occupational Health and Safety Act 85 of 1993 and relevant Regulations	Geotechnical and hydrological studies - outer batter slopes of tailings storage facilities.	Evidence in rehabilitation report that appropriate risk assessment has been undertaken and control measures are in place
Vegetation	Establishment of self-sustaining vegetation population which stabilizes slopes and is not invasive to the region.	Species cover and composition.	Monitoring report

14.6 Financial Provision for Closure

The Closure Liability Assessment for the BRPM TSF Extension Project is provided in Appendix N. These liabilities have been determined using the methodology of the DME (now known as DMR) 2005 Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine". Rates that have been used are those published in the guideline, but inflated at the Consumer Price Index (CPI) published by Stats SA.

The closure liabilities for the infrastructure and activities associated with the BRPM TSF Extension Project will amount to **R 43 437 754.83 (excluding VAT)**. Please refer to for the Table 14-2 calculation of the closure quantum.

As the BRPM TSF is already operational, the liability for this facility is assessed on an annual basis by RBPlat and the provision for closure is adjusted on an annual basis with the DMR to cover the liability for closure of these aspects. This assessment is therefore limited to the proposed BRPM TSF Extension. Please refer to Appendix N for a copy of the Closure and Rehabilitation Report.

Table 14-2 Calculation of the closure quantum

						YEAR OF ASSESSMENT	2015
						RISK CLASS	Medium risk (B)
						ENVIRONMENTAL SENSITIVITY	Medium
						NATURE OF TERRAIN/ACCESSIBILITY (WF 1)	Flat
						PROXIMITY TO URBAN AREA (WF 2)	Urban
	Main Description (if not applicable, indicate as N/A)	**Units**	**Amount**	**DMR Master Rate**	**DMR Multiplication Factor**	**Weighing Factor 1**	**Amount**
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3		12.91	1.00	1.00	R 0.00
2 (A)	Demolition of steel buildings and structures	m^2		179.89	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	1 000	265.11	1.00	1.00	R 265 110.00
3	Rehabilitation of access roads	m^2	36 000	32.19	1.00	1.00	R 1 158 840.00
4(a)	Demolition and rehabilitation of electrified railway lines	m		312.45	1.00	1.00	R 0.00
4(b)	Demolition and rehabilitation of non-electrified railway lines	m		170.43	1.00	1.00	R 0.00
5	Demolition of housing and facilities	m^2		359.79	1.00	1.00	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha		188 604	0.52	1.00	R 0.00
7	Sealing of shafts, adits and inclines	m^2		96.57	1.00	1.00	R 0.00
8(a)	Rehabilitation of overburdens and spoils	ha		125 736	1.00	1.00	R 0.00
8(b)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt producing waste)	ha	162.7	156 602	1.00	1.00	R 25 479 094.96
8(c)	Rehabilitation of processing waste deposits and evaporation ponds (acid, metal rich waste)	ha		454 846	0.80	1.00	R 0.00
9	Rehabilitation of subsided areas	ha		105 285	1.00	1.00	R 0.00
10	General surface rehabilitation, including grassing of all denuded areas	ha	12.8	99 603.98	1.00	1.00	R 1 274 930.94
11	River diversions	ha		99 603.98	1.00	1.00	R 0.00
12	Fencing	m	7 900	113.62	1.00	1.00	R 897 598.00
13	Water management	ha		37 872.23	0.67	1.00	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	162.7	13 255.28	1.00	1.00	R 2 156 634.06
					1	1.00	R 0.00
		Sub Total 1 (At Closure)					**R 31 232 207.96**
							TOTAL
					Weighting Factor 2		
					1.00		R 31 232 207.96
1	Preliminary and General	12% of Sub Total 1 if less than R100 mill 6% of Sub Total 1 if more than R100 mill					R 3 747 864.96
2	Contingency	10 of Sub Total 1					R 3 123 220.80
						Sub Total 2	**R 6 871 085.75**
						Sub Total 3	**R 38 103 293.71**
	VAT @ 14%						R 5 334 461.12
						Grand Total - Sub Total 3	**R 43 437 754.83**

15 Environmental Emergencies and Remediation Procedure

RBPlat's Environmental Emergency and Remediation Procedures are contained in their existing Integrated Environmental Systems Manual (Refer to Appendix P).

15.1 Complaints Register

A complaint register is kept by the environmental coordinator for the purpose of registering, monitoring and responding to all complaints received relating to the RBPlat's operations, through the various phases of the LoM. The register feeds into an environmental management system in order to ensure that the necessary actions are taken to mitigate negative impacts.

The complaints register includes, but not limited to, the following:

- Nature of complaint;
- Details of the person making the complaint;
- Date and description of the complaint;
- Description of incident;
- Description of corrective action taken in terms of the complaint; and
- Response to complaint.

16 Environmental Awareness Plan

RBPlat's Environmental Awareness Plan is contained in their existing Integrated Environmental Systems Manual (Refer to Appendix P).

17 Knowledge, Gaps, Assumptions and Limitations

17.1 Ecological

The following assumptions and limitations are applicable to this report:

- The ecological assessment is confined to the Project Area and does not include the neighbouring and adjacent properties; these were however considered as part of the desktop assessment;
- Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations are compared with literature studies where necessary;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal and floral communities have been accurately assessed and considered;
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa on the Project Area may therefore been missed during the assessment;
- The wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site condition present at the time of the assessment and limitations in the accuracy of the delineation due to anthropogenic disturbances are deemed possible;
- Wetland and terrestrial areas form transitional areas where an ecotone is formed as vegetation species change from terrestrial species to facultative and obligate wetland species. Within the

transition zone some variation of opinion on the wetland boundary may occur, however if the Department of Water Affairs (DWA, currently known as the Department of Water and Sanitation (DWS; 2005)) method is followed, all assessors should get largely similar results;
- Due to aquatic resources in the vicinity of the Project Area being dry at the time of assessment, no aquatic assessment has been conducted; and
- Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies due to the use of handheld GPS instrumentation may occur. If more accurate assessments are required the Project Area will need to be surveyed and pegged according to surveying principles.

17.2 Surface Water

Impacts are constrained to those impacts on the receiving environment as a result of aspects of the project interacting with the surface environment.

17.3 Groundwater

The following assumptions were made to develop the numerical model:

- The system is initially in equilibrium and therefore in steady state, even though natural conditions have been disturbed;
- Surface defined catchments and major drainage lines are assumed to approximate groundwater divides and were therefore used to define the model domain;
- The top of the aquifer is represented by the generated groundwater heads;
- Available groundwater level and chemistry data from monitoring boreholes are considered as correct and were used for steady state (long-term) calibration; and
- It is assumed that there is minimal abstraction from community boreholes based on the lack of drawdown noted in the monitoring boreholes located close to the community, and that this will continue to be the case in the future. However, should large-scale community pumping be implemented in the future, the associated drawdown zone could alter groundwater flow directions and pull contaminant plumes further in the direction of the community.

The following limitations of the model should be noted:

- In the case of a secondary fractured-rock aquifer such being present at the site, the finite difference model uses a representative elementary volume (equivalent porous media) representation of groundwater flow by assuming very low flows through a representative matrix for the entire area, instead of modelling slightly higher flows through discrete fractures;
- When modelling contaminant transport in a fracture zone area, it is possible that contaminant flow could extend further (such as an order of magnitude) along individual fractures than the contaminant footprint area that is calculated assuming continuous low flow in a matrix;
- Numerical groundwater models are very useful tools for assisting in the simulation and prediction of groundwater movement under proposed scenarios. They are always theoretical, however, and only based on available data and therefore careful interpretation of the results and regular update of the model e.g. with water level monitoring data, is required in order to draw the most informative conclusions;
- The liner configurations are as provided by KPC for the preliminary design. Based on these findings a Class C barrier system was provided for the final design drawings. This option is provided by Scenario 3 (liner design C) where the groundwater drains and the cover layer on top of the HDPE was omitted since this will be provided by the tailings itself; and
- Dewatering and re-watering on closure was based on the 2015 mine plan and interpolated inflows based on the preliminary water balance available at the time of the study.

17.4 Heritage

- No severe physical restrictions were encountered as access to the mining area was granted by RBPlat. However, please note that due to the subterranean nature of cultural remains this report should not be construed as a record of all archaeological and historic sites in the area.

17.5 Palaeontological

- A desktop study was conducted due to fossils not typically being found in igneous rocks.

17.6 Visual

The following assumptions and limitations are relevant to the study:

- The drawings (including the designs of the structures, site layout and height of the structures) supplied electronically on 09 February from RBPlat are assumed to be up to date and accurate and will remain unchanged for the duration of the Visual Impact Assessment;
- The layouts as provided to Mr. K. Allan, by Dr. L. Coetser (SRK) on 09 February 2015, were used to undertake the Visual Impact Assessment analysis;
- A site inspection was undertaken on 02 May 2013 (Autumn), to:
  - Become familiar with the site and its surroundings;
  - Verify the desktop spatial analysis undertaken;
  - Identify possible visual receptors; and
  - Identify and assess viewing points (affected communities) and visibility.
- The contour interval used in the analysis was 5 m, as; provided by RBPlat, for areas directly surrounding the site, and 20 m for the surrounding area.
- The view shed illustrates the area from which the proposed extension is likely to be visible. It does not take local undulations, existing vegetation and man-made structures into account. Due to the interval of the contours, many of the undulations or natural landscape features smaller than 5 m tall on the site, and 20 m tall in the surrounding areas could be lost. This means that the proposed development may not be visible from everywhere within the viewshed, as the development may be obscured by other existing infrastructure, vegetation or small/localised variations in the topography. It therefore indicates a “worst case” scenario;
- A Visual Impact Assessment, by nature, is not a purely objective or a quantitative process, but is dependent on the subjectivity of the judgments made. Where subjective judgments are required, appropriate criteria and motivations have been clearly stated; and
- The significance of the impact has been calculated using a combination of the Hassell Matrix[18] and the prescribed impact rating methodology for the project.

[18] The HASSELL matrix has been developed from “The Visual Management System (VMS)” produced by Litton(1968) primarily used for the U.S. Forest Service (1973) and the US Bureau of Land Management (1980).

18 Undertaking to Comply with the Provision of the Act

I _____ the undersigned and duly authorised by Royal Bafokeng Platinum (Pty) Ltd[19] hereby undertake to give effect to every undertaking contained in Sections 11 and 12 of this document, and accept full responsibility therefor.

Signed at _____ on this _____ day of _____20___

_____

Witnesses:

1. _____ 2. _____

_____ _____

Signature Signature

Approval

Approved in terms of the provisions of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA).

Signed at _____ on this _____ day of _____20___

_____

Director

Region: _____

[19] Proof of Power of Attorney was submitted as part of the Application Form.

19 EAP Declaration

I, Sarah Skinner, declare that:

- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the Competent Authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the Competent Authority may be attached to the report without further amendment to the report; and
- I will ensure that the plan of study for undertaking the environmental impact assessment will be clearly communicated with the interested and affected parties to ensure that everyone involved is aware and in agreement in terms of the plan of study.
- Neither SRK nor any of the authors of this report, its specialist / sub consultants and / or associates have any material present or contingent interest in the outcome of this report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.
- SRK, nor any sub- consultants and specialists, have any correlation or interest in the proposed project or future/present developments influenced by this project in any way.

Signature of the environmental assessment practitioner:

Name of company: SRK Consulting (South Africa) (Pty) Ltd

Date: 02 September 2015

20 Conclusion and Environmental Statement

SKR Consulting has undertaken the EA process and subsequent reporting (Scoping as well as the EIAr/EMPR) in terms of the proposed BRPM TSF Extension Project in accordance with the requirements of the NEMA and the MPRDA. This has included a comprehensive public participation process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Extensive specialist input has been sought for all key environmental aspects.

To date, no serious flaws/aspects that could render this proposed BRPM TSF Extension Project unfeasible and impractical have been identified. There are certain potential impacts that may require careful mitigation and monitoring measures.

Although some of the potential impacts identified during the Impact Assessment Phase were rated as a medium-high significant rating, the overall significance of the activity's impact can be lowered through the implementation of the recommended mitigation measures, as listed in Sections 10, 11 and 12.

It is anticipated that it will be possible to successfully mitigate the majority of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented.

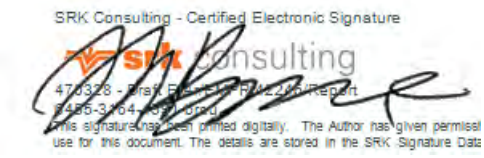
Therefore, from an EAP's perspective based on the current project description and the information obtained through existing and recent site specific studies, there is no reason why the proposed development may not continue subject to the recommended mitigation measures. The proposed BRPM TSF Extension Project should be allowed to proceed, given the relatively small potential contribution of the project to cumulative impacts (given the implementation of the appropriate recommended environmental management measures) and also considering the positive social and economic benefits associated with the project. Should the proposed BRPM TSF Extension Project not take place it would mean that the BRPM TSF would not be extended. This could result in the closure of the mining activities at SMC as mining activities result in the generation of tailings which requires disposal.

Prepared by

Toinette van der Merwe

Environmental Scientist

Reviewed by



Mr Matt Braune

Project Reviewer / Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

21 Bibliography

Acocks, J. P. H., 1988 . *Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa No. 57, Botanical Research Institute, RSA.* Third Edition ed. s.l.:s.n.

Aller, L. B. T. L. J. P. R. &. H. G., 1987. DRASTIC: A Standardised System for Evaluating Ground Water Pollution Potential Using Hydrogewologic Settings. *NWWA/EPA Series, EPA-600/2-87-035.*

Anon., 2015. *Wikipedia.* [Online]
Available at: http://en.wikipedia.org/wiki/North_West_(South_African_province)

Aquatico., 2014. *Bafokeng Rasimone Platinum Mine:Annual Water Report January 2013. December 2013. Report No. BRPM/AR1/2013/JM,* s.l.: Aquatico Scientific (Pty) Ltd.

Clean Stream Environmental Services, 2005. *BRPM Integrated Water Use Licence Application: Technical Supporting Document,* s.l.: s.n.

Crawford, D., 1994. *Using remotely sensed data in landscape visual quality assessment, Landscape and Urban Planning.,* s.l.: s.n.

DACE, 2002. *North West State of the Environment Report,* s.l.: Department of Agriculture, Conservation and Environment.

Department of Environmental Affairs, D., 2008. *National Environmental Management: Waste Act (NEM:WA),* s.l.: s.n.

Dickens, C., 2011. *South African Scoring Systems (SASS) version 5 Repid Bio-assessment for Rivers,* Pretoria: CSIR.

DMR, 1981. *The Chamber of Mines Handbook of Guidelines for Environmental Protection (Volume 3),* s.l.: Department of Mineral Resources.

DRA, 2012. *Styldrift Phase 1 Concentrator Pre-Feasibility Study. C3370-1-SRE-D03-001,* s.l.: s.n.

DRA, 2012. *Styldrift Phase 1 Concentrator Pre-Feasibility Study. C3370-1-SRE-D03-001,* South Africa: DRA.

DWAF, 1996. *South African Water Quality Guidelines, Volume 1: Domestic Water Use,* s.l.: Department of Water Affairs and Forestry.

DWAF, 1996. *South African Water Quality Guidelines, Volume 5: Agricultural Water Use: Livestock Watering,* s.l.: Department of Water Affairs and Forestry.

DWAF, 1998. Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste, Secon Edition. *Waste Management Series.*

DWAF, 1999. *Determining the ecological importance and sensitivity and ecological management class,* s.l.: Department of Water Affairs and Forestry.

DWAF, 2006. *Best Practice Guideline G3. Water Monitoring Systems,* s.l.: Department of Water Affairs and Forestry.

DWAF, 2006. *Best Practice Guideline H3: Water Reuse and Reclamation,* s.l.: Department of Water Affairs and Forestry.

DWAF, 2008. *Best Practice Guideline G4: Impact Prediction,* s.l.: Department of Water Affairs and Forestry.

DWAF, 2008. *Best Practice Guideline G5: Water Management Aspects for Mine Closure,* s.l.: Department of Water Affairs and Forestry.

Eberhard, A., 2011. *The Future of South African Coal: Market, Investment and Policy Challenges,* Cape Town: Freeman Spogli Institute For International Studies.

Golder Associates, 2012. *Hydrogeological Specialist Study to Support Consolidated EMP. Report Number 10613233-11481-2,* s.l.: s.n.

GSE Environmental, 2015. *RBPlat tailings dam liner service life,* Hamburg: s.n.

IUCN, 2013. *IUCN Red List.* [Online]
Available at: http://www.iucnredlist.org/

JMA, 2006. *Geohydrological Inputs for the Styldrift EMP. Report Ref. 10333,* s.l.: Jasper Muller and Associates CC.

Kleynhans, J., 1999. *The development of a fish index to assess the biological integrity of South African Waters,* s.l.: Water SA.

Knight Piesold, 2015. *Personal Communication* [Interview] (07 2015).

Knight-Piésold, 2010. *Royal Bafokeng Platinum – Bafokeng Rasimone Platinum Mine Tailings Deposition Strategy. Report 301-00079/04,* Johannesburg: Knight-Piésold.

Knight-Piésold, 2014. *Spreadsheet of Styldrift Climate Data for 1999 – July2014.,* s.l.: Knight-Piésold.

Kotze, D. et al., 2008. *WET-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report No. TT 339/09,* Pretoria: Water Research Commission.

Low & Rebelo , 1998. *Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs & Tourism, Pretoria.* s.l.:s.n.

Lynch, K., 1992. *Good City Form,* London: The MIT Press.

Macfarlane, D., 2009. *WEt - Health: a technique for rapidly assessing wetland health.,* Pretoria: WRC.

Mucina, L. & Rutherford, M., 2006. *The Vegetation of South Africa, Lesotho and Swaziland.,* Pretoria: South Africa National Biodiveristy Institute.

Nemai Consulting, 2013. *Updated and Consolidated Environemtnal Impact Assessment and Environmental Management Plan for the Bafokeng Rasimone PLatinum Mine Styldirft Phase 1 Project,* Johannesburg: Nemai Consulting.

Ollis, D. S. C. J. N. &. M. N., 2013. *Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Sytems,* Pretoria: South African Biodiversity Institute.

RBPlat, 2010. *RBPlat Geology, accessed on 03/07/2012. [Web],* s.l.: Royal Bafokeng Platinum.

SAS, 2014. *Faunal, Floral and Wetland Assessment,* s.l.: Scientific Aquatic Services.

SAWS, 2013. *South African Weather Service.* [Online]
Available at: http://www.weathersa.co.za/web/index.php
[Accessed 12 February 2014].

Schulze, R.E., 1997. *South African Atlas of Agrohydrology and -Climatology. Water Research Commission, Report TT 82/96.,* s.l.: s.n.

SRK Consulting, 2014. *Rehabilitation and Closure Plan,* s.l.: SRK Consulting.

SRK Consulting, 2014. *Surface and Groundwater Assessment,* s.l.: SRK Consulting.

SRK Consulting, S. A., 2013a. *Compilation of an updated and consolidated Environmental Impact Assessment (EIA) and Environmental Management Plan (EMPR) for BRPM Styldrift Phase 1 Project Hydrogeology. Project Number 437381,* Johannesburg: SRK Consulting.

SRK, 2013a. *Styldrift Surface Water Specialist Study for the Various Tailings Dam Options,* s.l.: SRK Consulting (SA) (Pty) Ltd.

Steenekamp, G., 2009. *Ground water monitoring boreholes for BRPM: July 2005,* s.l.: s.n.

Styldrift, 2008. *Environmental Impact Assessment/ Environmental Management Programme Report for the Styldrift Project,* s.l.: s.n.

van Staden, S. et al., 2013. *Faunal, Floral, Wetland and Aquatic, Assessment as part of the Proposed Bafokeng Rasimone Mine Styldirft Phase 1 Project, North West Province.* Johannesburg: SAS Environmental Solutions.

Weaver, J. C. L. &. S. T. A., 2009. *Ground water sampling - A comprehensive guide for sampling methods,* s.l.: Water Research Commission.

Appendices

Appendix A: WINDEED Title deeds

Appendix B: Curriculum Vitae's of EAP Project Team

Appendix C: Competent Authority Correspondence

Appendix D: Specialist's Terms of Reference

Appendix E: Heritage & Palaeontological Study

Appendix F: Blasting and Vibration

Appendix G: Visual Assessment

Appendix H: Noise Study

Appendix I: Air Quality

Appendix J: Groundwater Study

Appendix K: Surface Water Study

Appendix L: Biodiversity & Wetlands Study

Appendix M: Soils, Land Use and Land Capability Study

Appendix N: Rehabilitation and Closure

Appendix O: Public Participation Process

Appendix P: Mine Integrated Environmental Systems Manual

Appendix Q: Design Documents

Appendix R: Social Investment

SRK Report Distribution Record

Report No.	470328 – EIAr/EMPR Amendment Report
Copy No.	

Name/Title	Company	Copy	Date	Authorised by
Mr. Phumudzo Nethwadzi	Department of Mineral Resources	1-3 (HC) 4 (PDF)	September 2015	Ms S Skinner
Ms. Queen Imasiko	North West Department of Rural, Environmental and Agricultural Development	5 (HC) 6 (PDF)	September 2015	Ms S Skinner
Mr. Sebenzile Ntshangase	Department Water and Sanitation	7 (HC)	September 2015	Ms S Skinner
SAHRA Website	North West Provincial Heritage Resources Agency – Provincial via SAHRA ***(online)***	8 (PDF)	September 2015	Ms S Skinner
Mrs. Violet Molotsi	Bojanala Platinum District Municipality	9 (HC)	September 2015	Ms S Skinner
Ms. Kelebogile Mekgoe	Rustenburg Local Municipality	10 (HC)	September 2015	Ms S Skinner
Mr. Pieter Louw (Rustenburg)	Rustenburg Public Library in Rustenburg	11 (HC)	September 2015	Ms S Skinner
Bushy Rasebitse	Robega Village Community Office	12 (HC)	September 2015	Ms S Skinner
Mr. Jacob Setshwane	Chaneng Village Community Office	13 (HC)	September 2015	Ms S Skinner
Clr. Jacob Mzizi	Mafenya Primary School	14 (HC)	September 2015	Ms S Skinner
Mr. Thabo Diale	Rasimone Community Office	15 (HC)	September 2015	Ms S Skinner
Ms. Reotshepile Tlhapane	Royal Bafokeng Nation - RBN Civic Centre	16 (PDF)	September 2015	Ms S Skinner
RBPlat Portal	RBPlat Portal (Electronic)	17 (PDF)	September 2015	Ms S Skinner
Mr. Steven Manda	RBPlat	18 (HC)	September 2015	Ms S Skinner
Mr. Vinesh Dilsook	Anglo American	19 (HC)	September 2015	Ms S Skinner
SRK Library	SRK	20 (HC)	September 2015	Ms S Skinner
SRK File	SRK	21 (HC)	September 2015	Ms S Skinner
SRK Pretoria Server	SRK	22 (PDF)	September 2015	Ms S Skinner

Approval Signature: