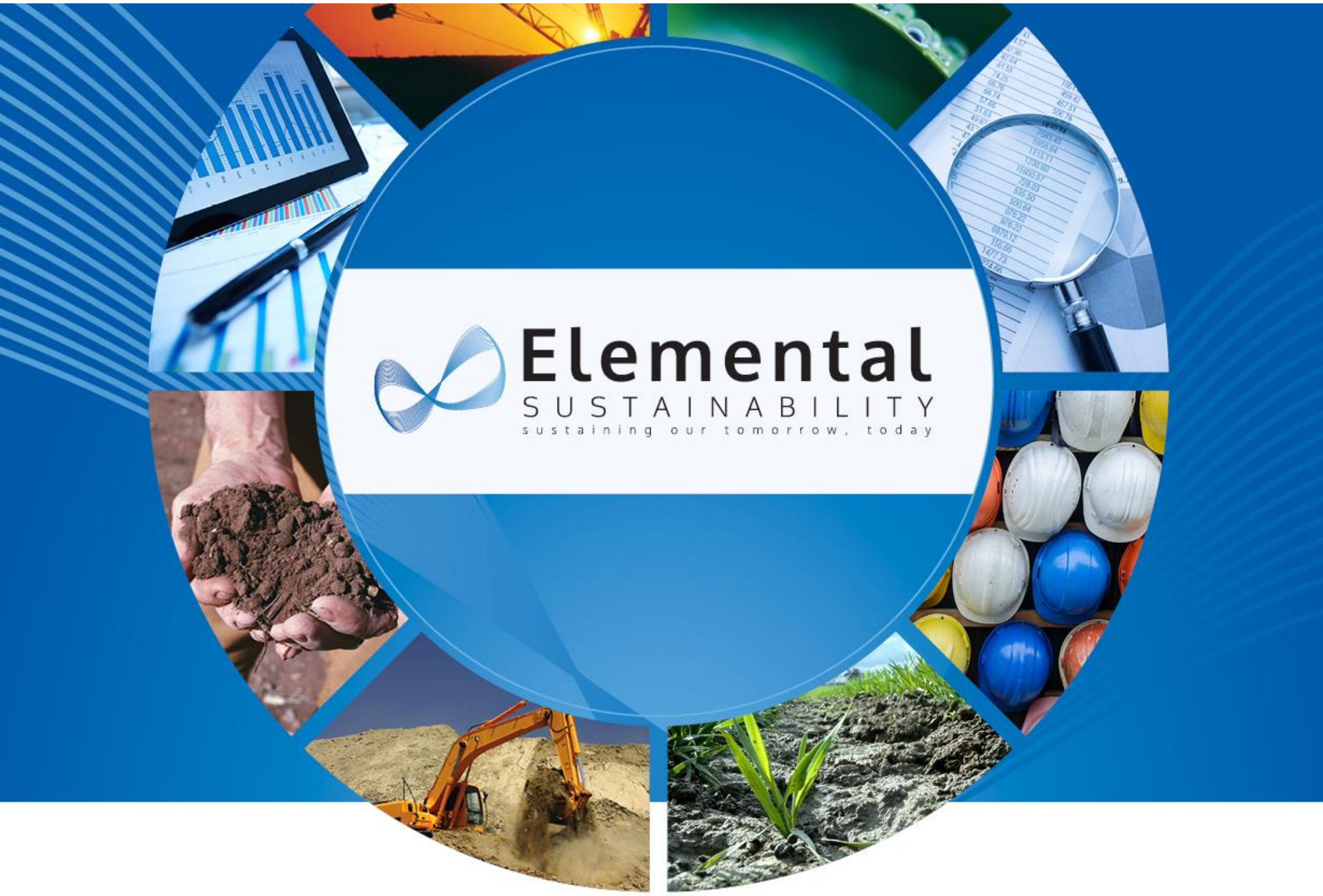

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR

TWO RIVERS PLATINUM

LIMPOPO PROVINCE

DMR REF: LP 30/5/1/2/3/2/1 (178) MR

AUGUST 2021

Submitted as part of an application process for environmental authorisation in terms of the National Environmental Management Act (Act 107 of 1998) [as amended] in respect of listed activities that have been triggered by application in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) [as amended]

DOCUMENT HISTORY

Document Control, Quality Control and Disclaimer

Report	Environmental Impact Assessment and Environmental Management Programme Report for Two Rivers Platinum (Pty) Ltd: Waste Rock Dump Project		
Client	Two Rivers Platinum (Pty) Ltd		
Responsible Person	**Responsible Person** **Position** **Contact Number** **Email Address**	Mr JJ Joubert General Manager +27 jj.joubert@trp.co.za	
Report Number	V0.0	**Report Status**	Draft
Draft Report	20 August 2021	**Final Report:**	

Report no	Date	Version	Status
Two Rivers Platinum_02_2021_EA	20 August 2021	0.0	Public Review
Two Rivers Platinum_02_2021_EA		0.0	Final for submission to DMRE

DOCUMENT REVIEW

Responsible Person	Date	Position	Signature
Yanaikumarie Pillay	25/08/2021	Senior Project Manager and Author	
Sonja van Giessen	27/08/2021	EAP – Senior Specialist (Pr.Sci.Nat & EAPASA)	
Du Toit Wilken	06/09/2021	Project Manager	

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE EXISTING MINING RIGHT FOR TWO RIVERS PLATINUM – WASTE ROCK DUMP PROJECT, LOCATED IN THE LIMPOPO PROVINCE

LP 30/5/1/2/3/2/1 (178) MR

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

Name of Applicant	Two Rivers Platinum (Pty) Ltd.
Project	Environmental Impact Assessment and Environmental Management Programme Report for Two Rivers Platinum (Pty) Ltd – Waste Rock Dump Project
Contact person	Mr JJ Joubert (General Manager)
Tel No	+27 13 – 230 2800
Email	jj.joubert@trp.co.za
Physical Address	Dwarsrivier Farm 372KT, Steelpoort, Limpopo Province, 1133
File Reference Numbers	LP 30/5/1/2/3/2/1 (178) MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17(1)(c), the Competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the Competent Authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner (EAP) must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) Determine the policy and legislative context within which the activity is located and document how the activity complies with and responds to the policy and legislative context;

(b) Describe the need and desirability of the activity, including the need and desirability of the activity in the context of the preferred location;

(c) Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) Determine the—-

  (i) Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

  (ii) Degree to which these impacts—

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources, and

    (cc) can be avoided, managed or mitigated

(e) Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) Identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) Identify residual risks that need to be managed and monitored.

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ABBREVIATIONS

Abbreviation	Description
BoQ	Bill of Quantities
BPEO	Best Practicable Environmental Option
DEFF	Department of Environment, Forestry and Fisheries
DEA	Department of Environmental Affairs
DM	District Municipality
DMR	Department of Mineral Resources
DMRE	Department of Mineral Resources and Energy
DSR	Draft Scoping Report
DHSWS	Department of Human Settlements, Water and Sanitation
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMPR	Environmental Management Programme
ESMS	Environmental and Social Management System
EWR	Ecological Water Requirement
GNR	Government Notice Regulation
IBAs	Important Bird and Biodiversity Areas
I&APs	Interested and Affected Parties
IDP	Integrated Development Programme
IEM	Integrated Environmental Management
IHAS	Invertebrate Habitat Assessment System
IHIA	Intermediate Habitat Integrity Assessment
IWUL	Integrated Water Use License
IWULA	Integrated Water Use License Application
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
MAMSL	Meter Above Mean Sea Level
MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002)
MRA	Mining Right Application
NAEIS	National Atmospheric Emission Inventory System
NEMA	National Environmental Management Act (Act 107 of 1998)

NEMAQA	National Environmental Management: Air Quality Act, 39 of 2004
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act 59 of 2008)
NFA	National Forest Act (Act 84 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act (Act 36 of 1998)
PAIA	Promotion of Access to Information Act (Act 2 of 2000)
PAJA	Promotion of Administrative Justice Act (Act 3 of 2000)
PES	Present Ecological State
PGMs	Platinum-Group Metals
PM10	Thoracic Particulate Matter
PM2.5	Inhalable Particulate Matter
PoI	Points of Interest (used in Blasting Assessment)
PPP	Public Participation Process
RoM	Run of Mine
RQIS	Resource Quality Information Services
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SANS	South African National Standard
SASS	South African Scoring System
SIA	Social Impact Assessment
SMME	South African Small, Medium and Micro Enterprise
TPA	Tons Per Annum
TSP	Total Suspended Particulates
WUL	Water Use License
WML	Waste Management License

INTRODUCTION

Elemental Sustainability (Pty) Ltd (“Elemental”) was appointed by Two Rivers Platinum (Pty) Ltd (TRP) to undertake the Environmental Authorisation process in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (as amended) and the National Environmental Management Waste Act, 2008 (Act 59 of 2008) for the proposed extension of the extended Waste Rock Dump (WRD) and addition of two (2) new waste rock dumps within the existing mining right and Environmental Authorisation area. The mine is located approximately 20 km south-west of the town of Steelpoort, within the Greater Tubatse Local and Sekhukhune District Municipalities, in the Limpopo Province.

Two Rivers Platinum has a New Order Mining Right (LP 30/5/1/2/3/2/1 (178) MR), Environmental Management Programme (approved 30 July 2015) and a Section 102 Amendment (approved 20 January 2020) to explore and mine the Platinum Group Metals (PGM’s), chrome and other precious metals (gold and silver), and associated base metals and ores on portions of the farm Dwarsrivier 373 KT, Tweefontein 360 KT, Buffelshoek 368 KT and Kalkfontein 367 KT.

The purpose of the additional three new Waste Rock Dumps is to ensure the continuity of the current established mining processing operations to accommodate the projected tonnage, based on the current Life of Mine (LoM) plan.

PART A – SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1. DETAILS

1.1.1. Details of the Environmental Assessment Practitioner

The details of the Environmental Assessment Practitioner (EAP) are provided in Table 1.

Table 1: Details of the Author and EAP

Name of EIA_EMPR	Yanaikumarie Pillay
Telephone Number	+27 72 062 5489
Facsimile Number	None
Email Address	kumari@elemental-s.co.za
Name of the EAP (Practitioner)	Sonja van de Giessen
Telephone Number	+27 83 388 4633
Facsimile Number	None
Email Address	sonja@elemental-s.co.za
Name of the Reviewer	Du Toit Wilken
Telephone Number	+27 84 588 2322
Facsimile Number	None
Email Address	dutoit@elemental-s.co.za

1.1.2. Expertise of the EAP (With Evidence)

Please refer to ***Section 1.1.2 and 1.1.3*** for a summary of the qualification and experience of the EAP. Refer to **Appendix 1 and 2** for more details (Qualifications and Curriculum Vitae).

- *Ms Yanaikumarie Pillay*
  - University of Durban Westville: BSc Geography – 1998
  - University of Durban Westville: BSc Hons Geography – 1999

- *Ms Sonja van de Giessen (EAPASA & Pri.Sci.Nat):*
  - University of South Africa, BSc Hons Environmental Management – 2011
  - North West University, MSc Environmental Management – 2018

- *Mr DuToit Wilken (Pri.Sci.Nat):*
  - University of Pretoria, BSc Hons Environmental Science – 2010
  - University of Pretoria, MSc Geography – 2015

1.1.3. Summary of the EAPs Past Experience (In Carrying Out the Environmental Impact Assessment Procedure)

(Attached, the EAPs Curriculum Vitae in Appendix 2)

Provided here is a summary of the qualification and experience of the EAP. Refer to **Appendix 1 and Appendix 2** for more details (experience).

Yanaikumarie Pillay is an Sustainability Practictioner with 20 years experience in environmental management, across a range of industries including mining, production and manufacturing, and FMCG. Yanaikumarie has wide-ranging environmental management experience ranging from development, implementation and certification of environmental management systems, managing environmental impact assessment and environmental managemer programme projects in both a corporate and consultant capacity, water use licenses applications, intergrated water and waste management plans, and stakeholder engagement, supported by extensive sustainability auditing skills. Yanaikumarie's project management, relational and report writing skills underpin her efficiency in project delivery.

Sonja van de Giessen is an Environmental Scientist with nearly 10 years of experience in environmental management, specifically the mining industry sector, focusing on Environmental Impact Assessments, Environmental Management Programmes, Water Use Licence Applications and Integrated Water and Waste Management Plans and Environmental Auditing. Sonja has extensive experience in public participation. She is registered as a Natural Professional Scientist (*Pr. Sci.Nat.* Number: 400084/18) with SACNASP and as an Environmental Assessment Practitioner South Africa (EAPASA Number: 2019/1496).

DuToit Wilken is an Environmental Scientist with more than 12 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He is registered as a Pri.Sci.Nat. (SACNASP), Natural Scientist, Registration number 118911. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Mining within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation.

A significant element of public participation is required throughout the life cycle of an EIA process. Du Toit has successfully liaised with interested and affected parties, ensuring that communication and dialogue are open and transparent, and that capacity building is conducted, as necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

2 DESCRIPTION OF THE PROPERTY

2.1. SITE LOCATION

Two Rivers Platinum (Pty) Ltd (hereinafter referred to as TRP) is located in the Limpopo Province and falls within the municipal boundaries of the Fetakgomo-Greater Tubatse Municipality which is in the Greater Sekhukhune District Municipality (refer to **Table 2**). TRP is situated on the farm Buffelshoek 368 KT, Portions 6 and 7 of the Dwarsrivier Farm 372 KT, Remaining Extent (Re) and Portions 1, 2, 3, 4, 5, 6, 8, 9, 10 and 11 of Kalkfontein 367 KT and Portions 1, 3, Re of 5, 6, 9, 11, 12, 13 and 14 of Tweefontein 360 KT, approximately 60 kilometres from Lydenburg and 20 kilometres from Steelpoort on the R577 road.

The proposed three additional Waste Rock Dumps will be located on Portion 6 of the farm Dwarsrivier 372 KT (T0KT00000000037200006).

Table 2: Property description

Name	Two Rivers Platinum (Pty) Ltd – Waste Rock Dump Project
Application area (Ha)	Mining Area: Approximately 13 890ha Waste Rock Dump 1: Approximately 1.10 ha Waste Rock Dump 2: Approximately 1.95 ha Waste Rock Dump 3: Approximately 1.40 ha The proposed three additional Waste Rock Dumps will be located on Portion 6 of the farm Dwarsrivier 372 KT (T0KT00000000037200006)
Magisterial district	Greater Tubatse Local and Sekhukhune District Municipalities
Distance and direction from nearest town	Approximately 20 km south-west of the town of Steelpoort, in the Limpopo Province.
21-digit Surveyor General Code for each farm portion	Refer to Table 3 below for the farm names, portions and the 21-digit Surveyor General Code.

Table 3: Details of the farms associated with Two Rivers Platinum

FARM NAME	FARM NR	PORTION NUMBER	OWNER	TITLE DEED	EXTENT (HA)	LOCAL AUTHORITY	LPI CODE
Kalkfontein	367 KT	Portion 1		T4492/909	1825.940	Greater Tubatse Local Municipality	T0KT00000000036700001
Kalkfontein	367 KT	Portion 2		T1033/921	209.2907	Greater Tubatse Local Municipality	T0KT00000000036700002
Kalkfontein	367 KT	Portion 4	Bakone Ba Masha Makopole Communal Prop Association	T5494/2021	225.2008	Greater Tubatse Local Municipality	T0KT00000000036700004
Kalkfontein	367 KT	Portion 5	Bakone Ba Masha Makopole Communal Prop Association	T5494/2021	408.8485	Greater Tubatse Local Municipality	T0KT00000000036700005
Kalkfontein	367 KT	Portion 6	Bakone Ba Masha Makopole Communal Prop Association	T5494/2021	50.0444	Greater Tubatse Local Municipality	T0KT00000000036700006
Kalkfontein	367 KT	Portion 8	National Government of the Republic of South Africa	T75765/2002PTA	793.2599	Greater Tubatse Local Municipality	T0KT00000000036700008
Kalkfontein	367 KT	Portion 10	National Government of the Republic of South Africa	T26171/1986PTA	77.0879	Greater Tubatse Local Municipality	T0KT00000000036700010
Kalkfontein	367 KT	Portion 11	Bakone Ba Masha Makopole Communal Prop Association	T108693/2003PTA	582.4418	Greater Tubatse Local Municipality	T0KT00000000036700011
Kalkfontein	367 KT	Remaining Extent	National Government of the Republic of South Africa	T65815/2001PTA	675.5982	Greater Tubatse Local Municipality	T0KT00000000036700000
Buffelshoek	368 KT	Portion 1	Botha Familie Trust	T28703/1987PTA	493.3709	Greater Tubatse Local Municipality	T0KT00000000036800001
Buffelshoek	368 KT	Portion 2	Bakoni-Tau Phuthi Communal Propp Association	T91307/2006PTA	168.9913	Greater Tubatse Local Municipality	T0KT00000000036800002
Buffelshoek	368 KT	Portion 3	Bakoni-Tau Phuthi Communal Propp Association	T91307/2006PTA	1169.4432	Greater Tubatse Local Municipality	T0KT00000000036800003
Buffelshoek	368KT	Remaining Extent	Bakoni-Tau Phuthi Communal Propp Association	T91307/2006PTA	1210.1066	Greater Tubatse Local Municipality	T0KT00000000036800000
Dwarsrivier	372 KT	Portion 6	Two Rivers Platinum Propriety Limited	T48140/2005PTA	1878.9867	Greater Tubatse Local Municipality	T0KT00000000037200006
Dwarsrivier	372 KT	Portion 7	Two Rivers Platinum Propriety Limited	T9520/2008PTA	260.7750	Greater Tubatse Local Municipality	T0KT00000000037200007
Tweefontein	360 KT	Remaining Extent of Portion 1	Samancor Chrome Limited	T8269/1993PTA	1929.5468	Greater Tubatse Local Municipality	T0KT00000000036000001

FARM NAME	FARM NR	PORTION NUMBER	OWNER	TITLE DEED	EXTENT (HA)	LOCAL AUTHORITY	LPI CODE
Tweefontein	360 KT	Portion 3	Samancor Chrome Limited	T54997/1993PTA	54.6573	Greater Tubatse Local Municipality	T0KT00000000036000003
Tweefontein	360 KT	Remaining Extent of Portion 4	Samancor Chrome Limited	T54997/1993PTA	34.0176	Greater Tubatse Local Municipality	T0KT00000000036000004
Tweefontein	360 KT	Remaining Extent of Portion 5	Samancor Chrome Limited	T21516/2008PTA	287.5255	Greater Tubatse Local Municipality	T0KT00000000036000005
Tweefontein	360 KT	Portion 6	Samancor Chrome Limited	T54997/1993PTA	414.2632	Greater Tubatse Local Municipality	T0KT00000000036000006
Tweefontein	360 KT	Portion 9	Samancor Chrome Limited	T54997/1993PTA	14.2338	Greater Tubatse Local Municipality	T0KT00000000036000009
Tweefontein	360 KT	Portion 11	Kadoma Investments cc	T21514/2008	9.3941	Greater Tubatse Local Municipality	T0KT00000000036000011
Tweefontein	360 KT	Portion 12	Kadoma Investments cc	T21515/2008	19.7503	Greater Tubatse Local Municipality	T0KT00000000036000012
Tweefontein	360 KT	Portion 13	Kadoma Investments cc	T21710/2008	186.1868	Greater Tubatse Local Municipality	T0KT00000000036000013
Tweefontein	360 KT	Portion 14	Department of Land Affairs	T21511/2008	103.9781	Greater Tubatse Local Municipality	T0KT00000000036000014

2.2. LOCALITY MAP (SHOW NEAREST TOWN, SCALE NOT SMALLER THAN 1:250 000)

(Please refer to Appendix 3 for the Locality Maps for the Project Area)

Two Rivers Platinum Mine ("TRP") is located approximately 20 km south-west of the town of Steelpoort, within the Greater Tubatse Local and Sekhukhune District Municipalities, in the Limpopo Province.

Figure 1 below depicts the regional locality of TRP, with Figure 2 portraying the locality of the additional three waste rocks dumps being applied for, within the current mining right area of TRP.

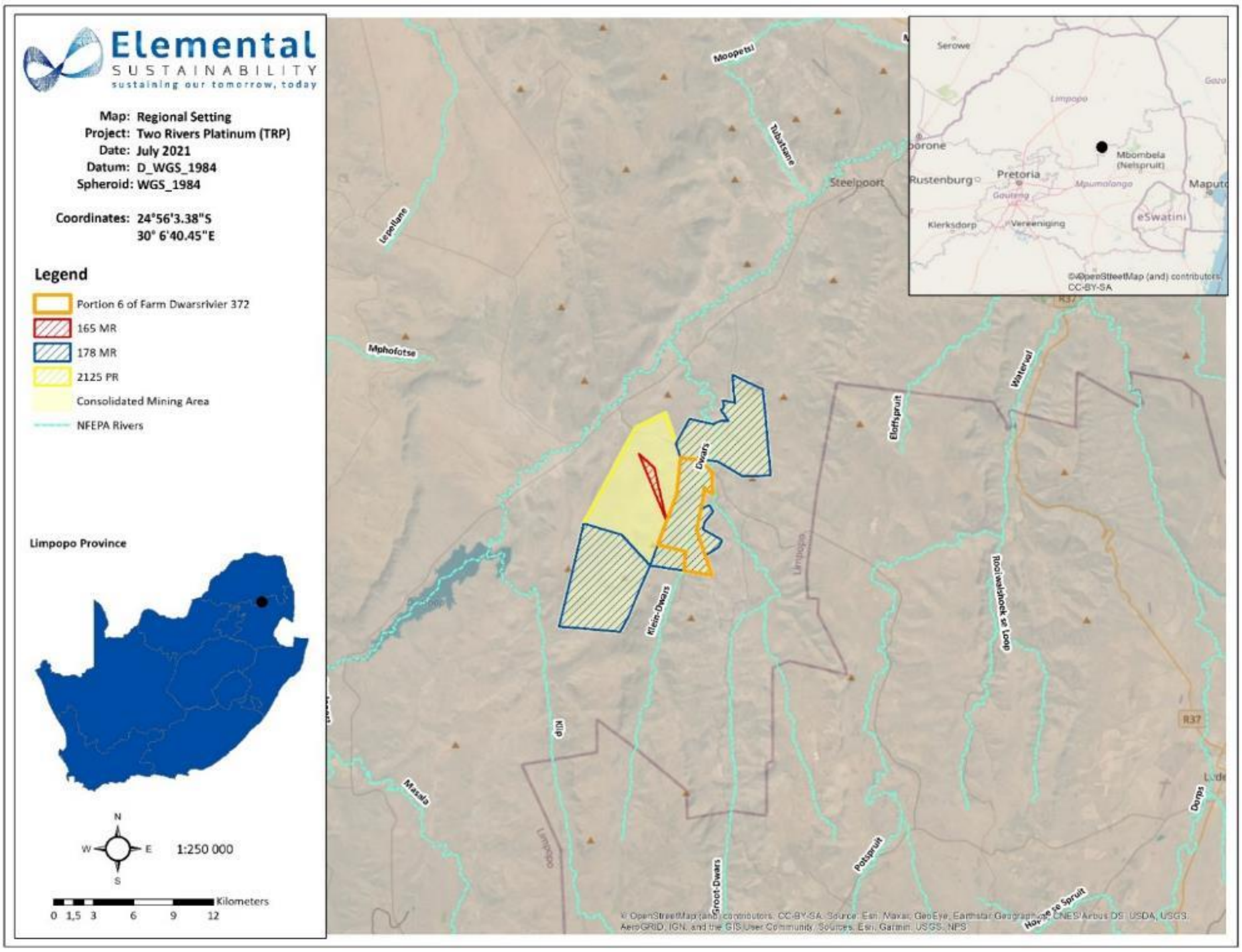


Figure 1: Regional Locality of Two Rivers Platinum Mine within the Limpopo Province

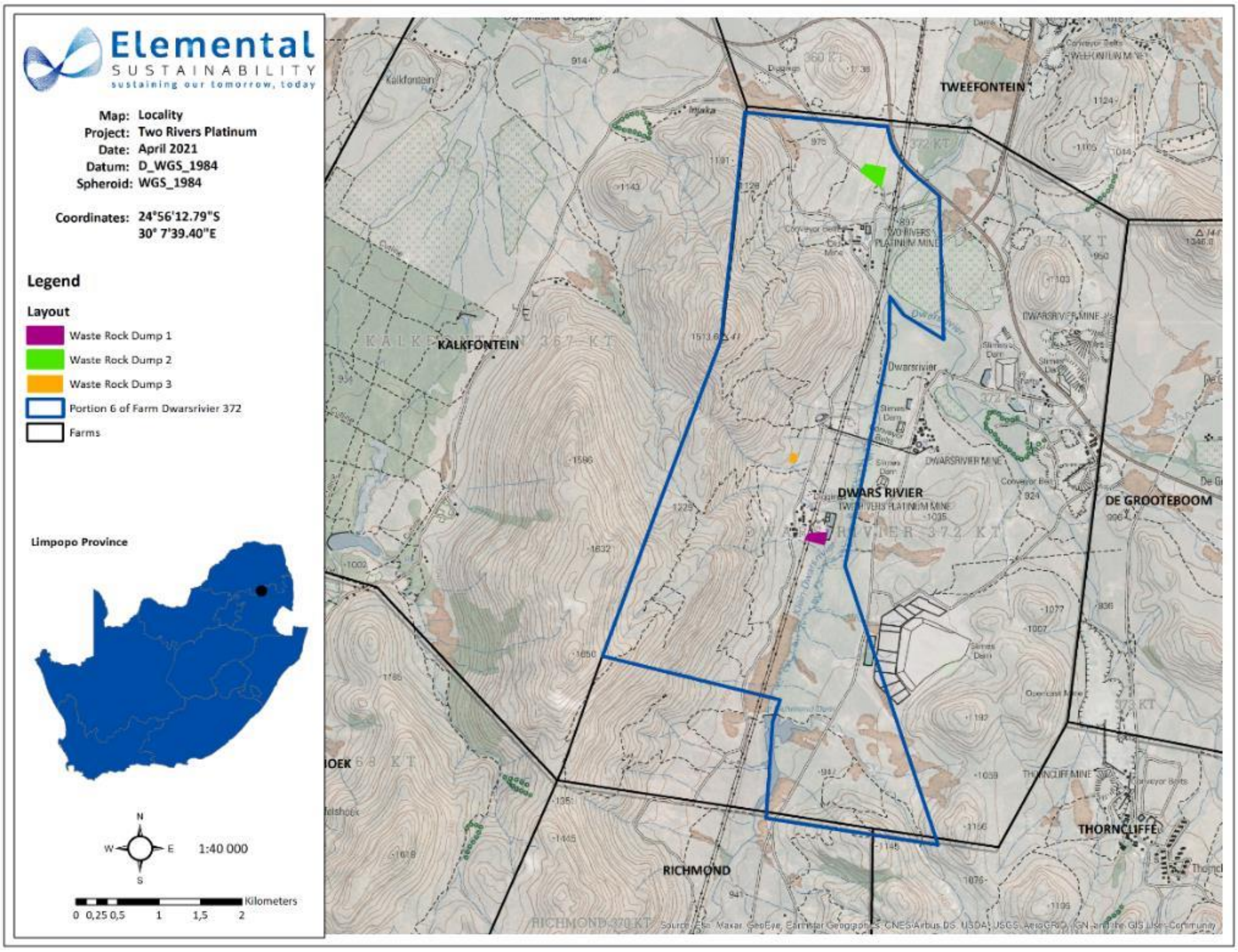


Figure 2: Locality of Waste Dumps within current Mining Right Area

3 DESCRIPTION OF THE SCOPE OF THE OVERALL ACTIVITY

This section provides a detailed project description. The aim of the project description is to indicate the activities that are planned to take place at the Two Rivers Platinum mine for the Waste Rock Dump Project. Furthermore, the detailed project description is presented to facilitate the understanding of the project – related activities which result in the impacts identified and assessed and for which management measures have been proposed.

3.1. LISTED AND SPECIFIED ACTIVITIES

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix.

Refer to Appendix 3.

Table 4 below provides the listed and specified activities for the Two Rivers Platinum – Waste Rock Dump Project. Table 5 provides the description of the EIA Regulations Listed Activities.

Table 4: Listed and specified activities

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUHTORISATION
(E.g. For prospecting to** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc ***E.g. for mining**, to excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)*	*Ha or m²*	*Mark with an X where applicable or affected*	*(GNR 327, GNR 325 or GNR 324) of 7 April 2017*	*(Indicate whether an authorisation is required in terms of the Waste Management Act).* ***(Mark with an X)***
Construction and operating of Pollution Control Dams and Stormwater management infrastructure			Not listed	
Tripping and stockpiling of topsoil and subsoil			Not listed	
Infrastructure (access roads)	Existing approved		Existing approved – See Table 7	
Waste Rock; Stockpiles, Waste residue Deposits.		**X**	GN 327, Listing Notice 1: Activity 27 and 30 GNR 324: Listing Notice 3: Activity 12	GN 633, Category B Activity 11: Residue stockpile in terms of GN 632 (2015)
Clearing of Vegetation		**X**	GN 327, Listing Notice 1: Activity 27 and 30 GNR 324: Listing Notice 3: Activity 12	GN 633, Category B Activity 11: Residue stockpile in terms of GN 632 (2015)

Table 5: Description of the EIA Regulations Listed Activities

Legislation	Listed activities	Applicability of the activity	Competent Authority
NEMA and the EIA Regulations, 2014 (as amended)	**<u>GN 327 - Listing Notice 1:</u>** • <u>Listing Notice 1 – Activity 27</u> *The clearance of an area of 1 hectare or more, but less than 20 hectares 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.* • <u>Listing Notice 1 – Activity 30</u> Activity within a Threatened Ecosystem. *Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).*	Waste Rock Dumps	DMRE – Limpopo Province
	<u>GNR 324: Listing Notice 3:</u> • <u>Listing Notice 3 – Activity 12</u> The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.		
	<u>Waste License Activities Triggered:</u> • <u>GNR 921 as amended by GN633: Category B – Activity 11</u> Waste residue stockpiles establishment *Establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a mining right under the MPRDA.*		
NWA Section 21 Water Uses	<u>Water Use Activities Triggered:</u> • <u>Section 21 c:</u> Impeding or diverting the flow of water in a watercourse • <u>Section 21 g:</u> Disposing of waste in a manner which may detrimentally impact on a water resource • <u>Section 21 i:</u> Altering the bed, banks, course or characteristics of a watercourse	Water Use Licence	Department of Human Settlements Water and Sanitation (DHSWS)

3.2. DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Refer to Appendix 3 for Master Layout

3.2.1. Background

Elemental Sustainability (Pty) Ltd (“Elemental”) was appointed by Two Rivers Platinum (“TRP) to undertake an amendment application of the existing environmental authorisation in terms of the National Environmental Management Act, 1998 (Act. No. 107 of 1998) (“NEMA”) [as amended], and Waste Management Licence (“WML”) in terms of the National Environmental Management Waste Act, 2008 (Act. No. 59 of 2008) (“NEMWA”) [as amended], and the Environmental Impact Assessment Regulations of 2014, for the proposed addition of three (3) new waste rock dumps (“WRD”) within the existing mining right area.

Two Rivers Platinum (TRP) is a Joint Venture (JV) between African Rainbow Minerals (ARM) and Impala Platinum. The mine is located in the Steelpoort area within the Greater Tubatse Local and Sekhukhune District Municipalities, approximately 20 km south-west of the town of Steelpoort, in the Limpopo Province.

Two Rivers Platinum has a New Order Mining Right (LP 178 MR) and Environmental Management Programme (approved 30 July 2015) and a Section 102 Amendment (20 January 2020) to explore and mine the Platinum Group Metals (PGM’s), chrome and other precious metals (gold and silver), and associated base metals and ores thereof on portions of the farm Dwarsrivier 373 KT, Tweefontein 360 KT, Buffelshoek 368 KT and Kalkfontein 367 KT. The addition of the three (3) new waste rock dumps will ensure continuity of the current operations, by accommodating the projected tonnage, based on the current Life of Mine (LoM) plan.

3.2.2. Existing Mining Operations

A summary of the existing mining right areas is presented in Table 6 below with the regulation 2.2 map in Figure 2. Below is a short description of the authorisations (EA’s, EMPr’s, WUL’s and Mining Rights) in place at Two River Platinum Mine are presented in Table 7.

Table 6: Summary of Mining Rights

Farm Name	Farm Number	Portions	Mining Right Number
Kalkfontein	367 KT	1,2,3,4,5,6,8,9,10 and 11	**LP 30/5/1/2/3/2/1 (2125) PR**
Kalkfontein	367 KT	Remaining Extent	**LP 30/5/1/2/3/2/1 (165) MR**
Dwarsrivier	372 KT	6 and 7	**LP 30/5/1/2/3/2/1 (178) MR**
Tweefontein	360 KT	1, RE of 1, 3, RE of 4, RE of 5, 10, 11,12,13 and 14	
Kalkfontein	367 KT	1,2,3,4,5 and 6	
Buffelshoek	368 KT	All portions	

Table 7: Existing Authorisations of Current Operation

Authorisation	Description	Date
Water Use Licences and General Authorisations		
16/2/7/B400/C110/2 WUL 24053346. DWAF - NWA	General Authorisation the construction of a low-level culvert to cross the Groot Dwars River	26 March 2004
16/2/7/B400/C110/1	Water use licence for the extraction and use of water	13 Dec 2004
DWA, Nelspruit. 16/2/7/B400/C110/2	Gen authorisation – NWA, low level culvert to cross the Groot Dwars.	26 Jan 2006
27/2/2/B741/10/1 B08000	Water use licence for the extraction and use of water	02 October 2017
DWS - IWUL Licence No: 06/B41H/AJIGC/6098 File No: 27/2/2/B741/10/1	Amendment Licence in Terms of Section 50 and 158 of the National Water Act, 1998 (Act No 36 of 1998)	02 October 2017
Exemptions		
File No 17.2.5 E-54. Mpumalanga - ECA	Exemption for the upgrading of road D1335 (Richmond Road) in the Steelpoort area.	04 October 2006
File No 17.2.4.E -66. Mpumalanga - ECA	DDS Storage Silos	5 April 2006
File No 17.2.5 E-54. Mpumalanga - ECA	Exemption for the installation of a fuel and lubrication system on the farm Dwarsrivier 372 KT.	28 Nov 2006
Environmental Authorisations and Amendments		
DME Witbank OT6/2/2/472	Amendment EMP (North Decline)	22 January 2007
DMR Stamped EMP document.	Chrome Plant	27 Nov 2007
12/1/9-6/7-G23	Amendment of an Environmental Authorisation for the installation of storage tanks. Above ground diesel, explosive and oil storage tanks	15 October 2008
12/1/9-6/7-GCS10. LDEDET - NEMA	Above ground explosive emulsion tanks	31 Dec 2009
12/1/9-6/7-GS10	Environmental Authorisation for the proposed installation of storage tanks	04 January 2010
DMR Ref: LP 30/5/1/3/2/1 (178) EM.	North Opencast (authorised, but not yet undertaken).	14 Dec 2010
12/1/9/S24G/GS2	Environmental Authorisation for the rectification of the unlawful construction of mining related facilities	24 June 2014
LP 30/5/1/2/3/2/1	Environmental Authorisation for the extension of underground workings and increase LoM.	20 January 2020
Mining Right and EMP Amendments		
DMR 4/2003 OT 5/3/2/545	Initial Mining Right (DMR)	4 March 2003
MP 30/5/1/2/3/2/1 (234) EM OT6/2/2/472	The Amended Environmental Management Programme for the upgrading of Plant upgrade – crusher and flotation cells	04 March 2009
DMR Limpopo. LP 178 MRC.	New Order Mining Right	20 March 2013

LP30/5/1/2/3/2/1 (0178) EM	Approval of an amendment to the approved Environmental Management Programme	30 July 2015
LP30/5/1/2/3/2/1 (0178) EM	Section 102 – Consolidated EIA ad EMP	20 January 2020

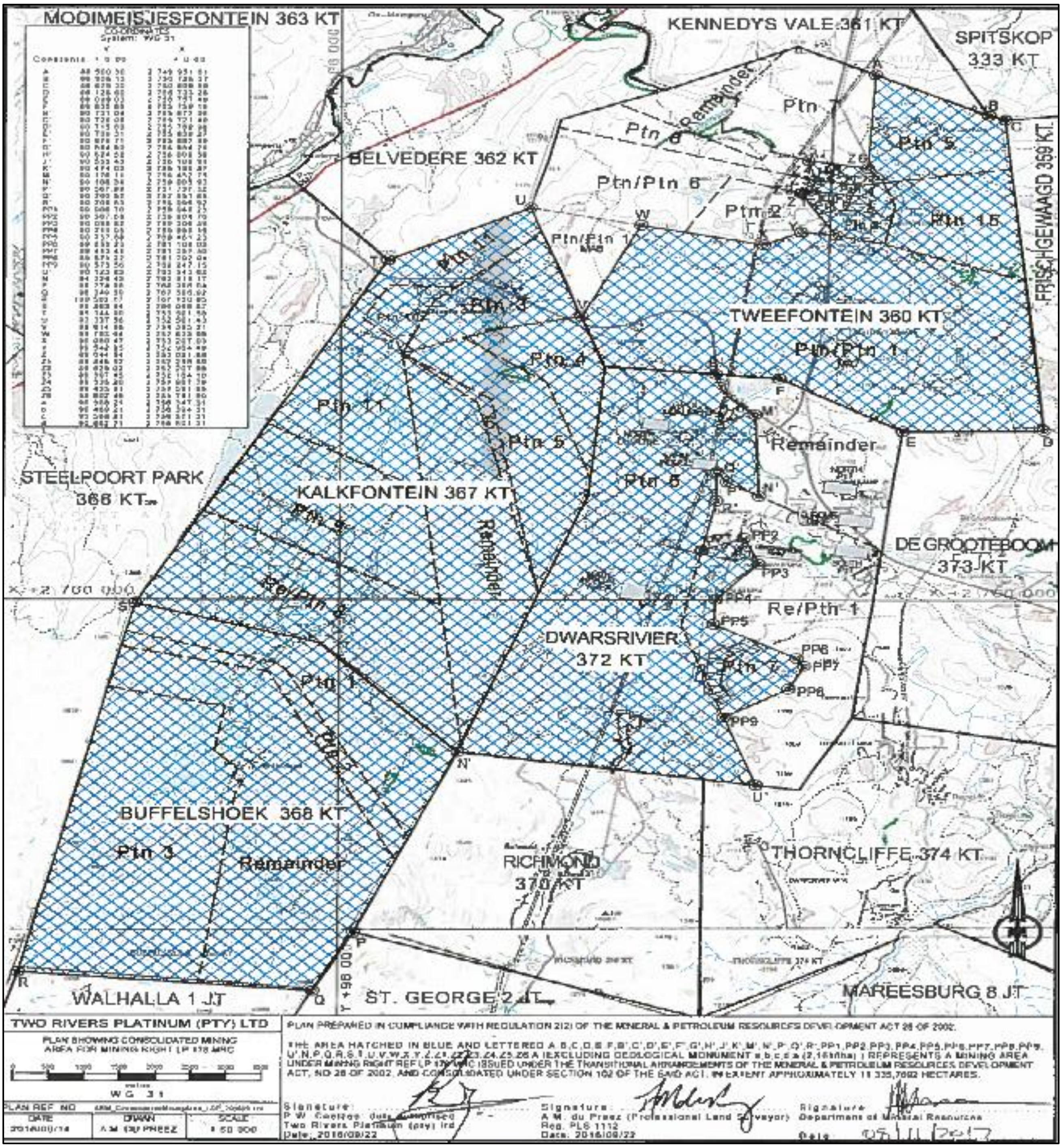


Figure 3: Regulation 2(2) Map as per Amended Mining Right, dated 08/11/2017

3.2.3. Mining Method

Two Rivers Platinum mine consists of two declines shafts (i.e., North and Main), each with an associated underground mining area. The technological approach at TRP is a fully mechanized mining operation, employing a Trackless Bord and Pillar method of extraction, at shallow to intermediate depths where a sufficiently wide mining cut is indicated. A mining section consists of 8-12 metre bords, with pillar sizes increasing with depth below surface. These bords are mined principally in a strike direction, except when re-establishing sections with geological disturbances (faults, dykes, potholes etc.).

The Upper Group 2 (UG2) ore is processed through a typical mill-float, mill-float (MF2)-type concentrator circuit. This comprises of an initial milling and flotation stage, which is followed by finer grinding of the tailings, and more flotation. The reagent suite used in the flotation-based recovery of the PGM in the MR and UG2 of the Bushveld Complex typically comprises of a frother, primary and secondary collectors, an activator, and depressants[1].

Conventional drilling, blasting and scraper mining is utilised in the stoping and secondary development areas. Drilling of the main development faces are done by means of mechanised drill rigs, whilst stoping, secondary development and support drilling is done by pneumatic hand-held drills. Explosives are transported to the faces by means of an explosives carrier and charged up. The broken rock is loaded with load haul dumps (LHDs) and transported with dump trucks to the tipping points.

Stoping sections exercise a multi-cycle operation during a shift. The full mining cycle in an eight bord section comprises two faces being drilled, two faces being cleaned, two faces being supported, with two faces standing idle. All the various phases are decoupled from one another, which assists in productivity. The two faces standing idle are essential when geological discontinuities are encountered as this provides additional face flexibility. A standard trackless Bord and Pillar section at TRP produces approximately 22,000 RoM tons of ore per month. This modular design allows production targets to be specified per shaft in terms of the number of Bord and Pillar sections required.

3.2.4. Mining Design

Production of ore is conducted utilising the Trackless Bord and Pillar type mining method, at shallow to intermediate depths where a sufficiently wide mining cut is indicated. These bords are mined principally in a strike direction, except when re-establishing sections with geological disturbances (faults, dykes, potholes etc.). Conventional drilling, blasting and scraper mining is utilised in the stoping and secondary development areas. Drilling of the main development faces are done by means of mechanised drill rigs, whilst stoping, secondary development and support drilling is done by pneumatic hand-held drills. Explosives are transported to the faces by means of an explosives carrier and charged up. The broken rock is loaded with load haul dumps (LHDs) and transported with dump trucks to the tipping points.

Two Rivers Platinum has two decline shafts and a processing plant. The schematic representation of the ore flow is presented in Figure 4 below. RoM from the North shaft is conveyed to a stockpile area from where it is fed into the RoM silo. The RoM from the Main shaft is conveyed to the RoM Silo. From the RoM silo the RoM is crushed before transfer to the two plant silos. The plant is fed from the silos at a constant rate.

The plant consists of the following:

- Crushing and screening
- Dense media separation (DMS) & waste rock disposal
- Milling and flotation processes
- Thickening of concentrate and tailings
- Stockpiling and loading of product, and
- Tailings disposal

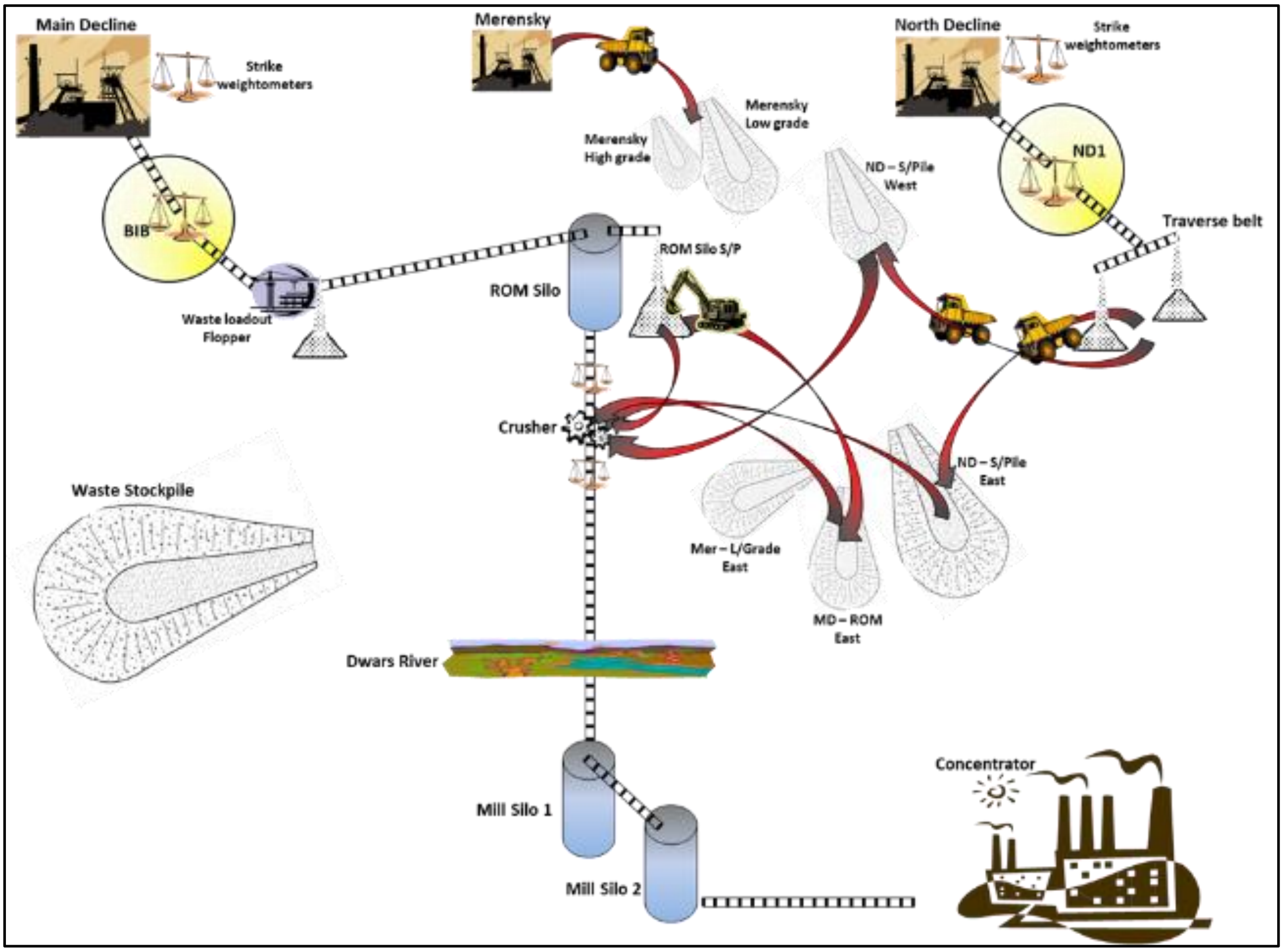


Figure 4: Schematic of TRP Ore Flow

3.2.5. Resource Statement

Due to the extreme topography, the Merensky reef outcrops further up the mountain slope and also results in the UG2 occurring at a depth of 935 metres below surface on the western boundary. Three distinct reef types have been defined for the UG2 Reef at Two Rivers, namely the ‘normal reef’ with a thick main chromitite layer;

a ‘split reef’ characterised by an internal pyroxenite/norite lens within the main chromitite layer; and a ‘multiple split reef’ with numerous pyroxenite/norite lenses occurring within the main chromitite layer.

TRP mines the UG2 reef via underground mining methods. Currently, the UG2 is being mined from the underground via two portals, namely the Main decline and the North decline. The existing processing plant on site produces PGM concentrate.

With the mining operations extended to the UG2 and Merensky outcrops in 2020, and current planning TRP has an estimated current Life of Mine (LoM) greater than 20 years, until 2042, with an estimated average annual production rate of 2.4 million tons. Figure 5 below is an indication of the scheduled mining operations for the next five (5) year period.

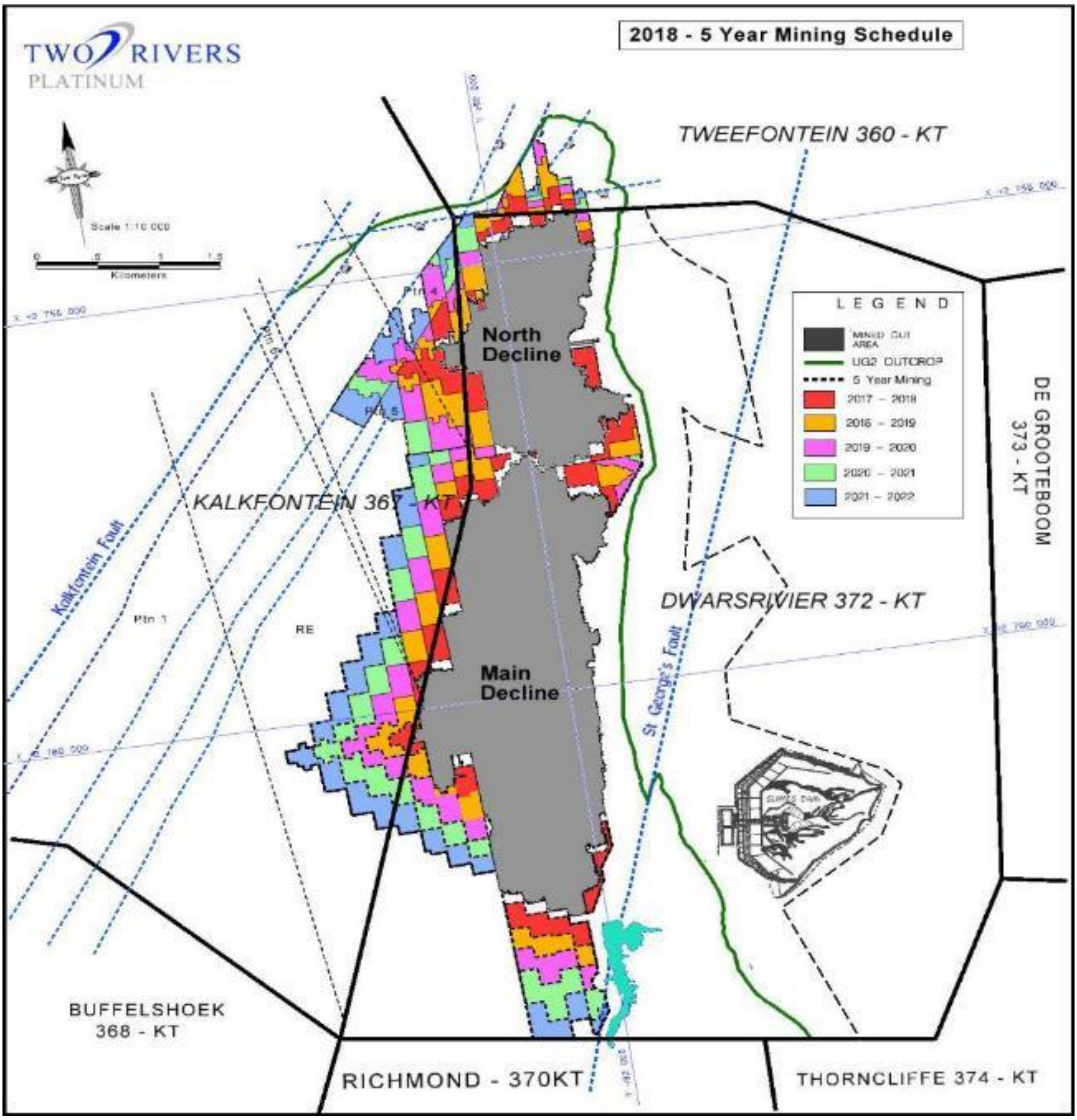


Figure 5: Five Year Mining Schedule

3.2.6. Mineral Processing Operations

Two Rivers Platinum is an existing, fully functioning and licensed operation (approved in terms of NEMA, NEMWA and NWA), with the processing plant including the following infrastructure:

- Crushing and screening
- Dense media separation (DMS) & waste rock disposal
- Milling and flotation processes
- Thickening of concentrate and tailings

- Stockpiling and loading of product, and
- Tailings disposal

3.2.7. Basic Plant Design

Crushing

ROM and stockpile ore is crushed from 400mm to -90mm size in a primary jaw crusher. This is further crushed to -20mm in a cone crusher that operates in closed circuit with a vibrating screen. The secondary crusher was an addition to the circuit to enable the milling rate to be increased by providing the primary mill with smaller feed.

The primary and secondary crushing plants are located halfway between the Main Shaft complex and the TRP plant, such that ROM ore existing the Main decline is first conveyed ~1km to a coarse ore silo over a section of overland conveyor. Ore from the crushing plant is subsequently conveyed to the fine ore silos, located at the TRP process facilities.

Milling

The standard MF2 process flow is employed, namely mill - float; mill – float. There are two Vecor ball mills installed in series, individually powered by 5,200 kW Alstom motors:

- One 24ft (grinding length) Primary mill
- One 26ft (grinding length) secondary mill

Primary milling is to 35% -75 microns. Secondary milling is to 75% -75 microns. The mills are installed in closed circuit with cyclone banks, which perform the separation of material, based on the size, with the undersize (overflow) from the cyclones being directed to the flotation plant, while the oversize (cyclone underflow (being returned to the mills).

Flotation

The flotation circuit includes primary and secondary rougher flotation. This is followed by 3-stage cleaner flotation, i.e., cleaner, re-cleaner and re-re-cleaner flotation. The flotation process is subject to rigorous planned maintenance schedules.

Filtration

The concentrate from the flotation circuit is filtered by a single Larox vertical hydraulic press filter, which reduces the concentrate to 15% moisture. The dewatered concentrate is subsequently conveyed to a storage building, from where it is loaded into trucks for transport to an Impala smelting facility. It is reported that the possibility exists to send concentrate slurry directly to the smelting operations, which requires a tanker type transport truck, as the smelter does have the ability to conduct dewatering.

Tailings Scavenger Plant (TSP)

The TSP receives live tailings from the concentrator plant and employs additional flotation cells to produce a low-grade concentrate. This is pumped to the final concentrate thickener. The TSP concentrate combines with the Concentrator final concentrate and is then filtered out and then trucked to Impala Smelter. The TSP plant produces ~1200 6E ounces monthly, of additional recovery.

Tertiary Milling Plan

The TSP receives live tailings from the concentrator plant and employs additional flotation cells to produce a low-grade concentrate. This is pumped to the final concentrate thickener. The TSP concentrate combines with the Concentrator final concentrate and is then filtered out and then trucked to Impala Smelter. The TSP plant produces ~1200 6E ounces monthly, of additional recovery.

To further improve recovery of both PGM's as well as recover chromite, which is also present in the TRP orebody, a Tertiary Milling Plant has been constructed. The Main Plant concentrator tails is pumped to the Tertiary Milling and chromite recovery plant.

The incoming tailings are first processed through a set of cyclones, which are used to separate the fine and coarse material. The coarse material is rich in chromite. The coarse material from the cyclones is pumped to the "Spiral Concentration Circuit". This spiral plant is a highly specialised equipment with no moving parts, which uses gravity and centrifugal force to separate small particles of different sizes and densities. The circuit consists of Roughers, 1st stage cleaner, 2nd stage Cleaner, Recleaner, scavenger roughers, and scavenger cleaners. Additional spirals have been added to provide additional recovery.

Through the spiral circuit, the chromite is upgraded and recovered, with subsequent stacking for product load-out. The chromite is trucked to Maputo harbour. Currently, the production of chromite is reported at ~22,000tpm. A portion of the stream (the rougher middlings) that is discarded by the spirals is high in silicate content and is also rich in PGMs. This stream is pumped to the tertiary mill, for subsequent grinding, resulting in additional size reduction of the materials. This slurry discharge from the mill is then pumped to the main plant flotation circuit, where the chemicals are added to recover the additional PGMs, upgrading the final concentrate grade.

3.2.8. Product Handling

Ore is mined from the production sections and transported by means of Load Haul Dumpers (LHD's) to a tipping facility located at the tail end of the nearest strike conveyor. The ore is transported via the strike conveyor system, along the strike towards the primary decline. Ore handling on surface is performed by either an overland conveyor system or by trucking, to the processing plant for processing, as per current operations. Waste rock and slimes are disposed at the current waste rock dump or slimes dam, and product is transported to the intended market.

3.2.9. Building and Processing Infrastructure

The mine is a fully operational mine with two declines, and associated building and processing infrastructure consisting of the following:

- Storm water dams, Drying Beds, Settling Dams and a treatment facility
- Dirty Water Handling Infrastructure – RWD, Cut off trenches
- Overland ore conveyances
- Waste material stockpiles
- High mast lighting. 10-15 high mast lights at each new shaft, in high traffic and security critical areas
- Ore silo to provide surge capacity for the overland conveyor system
- Office blocks
- Change houses – change facilities, ablution and storage lockers for 350 – 400 people at each shaft
- Lamp and crush facility at each shaft
- Roads network
- Haul Roads
- Bus stop and parking for personnel and visitors
- Security and access control
- Cable storage and salvage yard
- Sewage (treatment plants included as vendor supplied units, sized according to personnel complement)
- Firefighting and prevention (fire hydrants and hose reels, electric and diesel pumps to operate the deluge systems in the main substations of both shafts)
- Storm Water Management (cut off drains and berms at the Main and North shafts)
- General stores at each shaft for rock drills, rotary equipment, batteries and gas cylinders
- Explosive stores (a local explosives magazine to cater for daily usage, filled daily from the primary storage)
- Bulk fuel and lubricant storage (to receive store and dispense a week's consumption of each product)
- Miscellaneous facilities: portal rainwater sump and drain, dirty water sump and drain, covered walkways, brake test ramp, refuse disposal facilities, electrified fencing around the perimeter of the infrastructure
- Processing plants (UG 2 and Merensky)
- ROM Circuits, Silo's and Stockpiles
- Primary processing plant
- Secondary processing plant
- Underground infrastructure (refuge bays, workshops, offices and diesel and lubricant storage);
- Existing Tailings Storage and Waste Rock Facilities, and
- New Tailings Storage Facility and associated pipelines.

Figures 6 and 7 below presents a simplistic overview the building and processing infrastructure on site at the Two Rivers Platinum Mine.

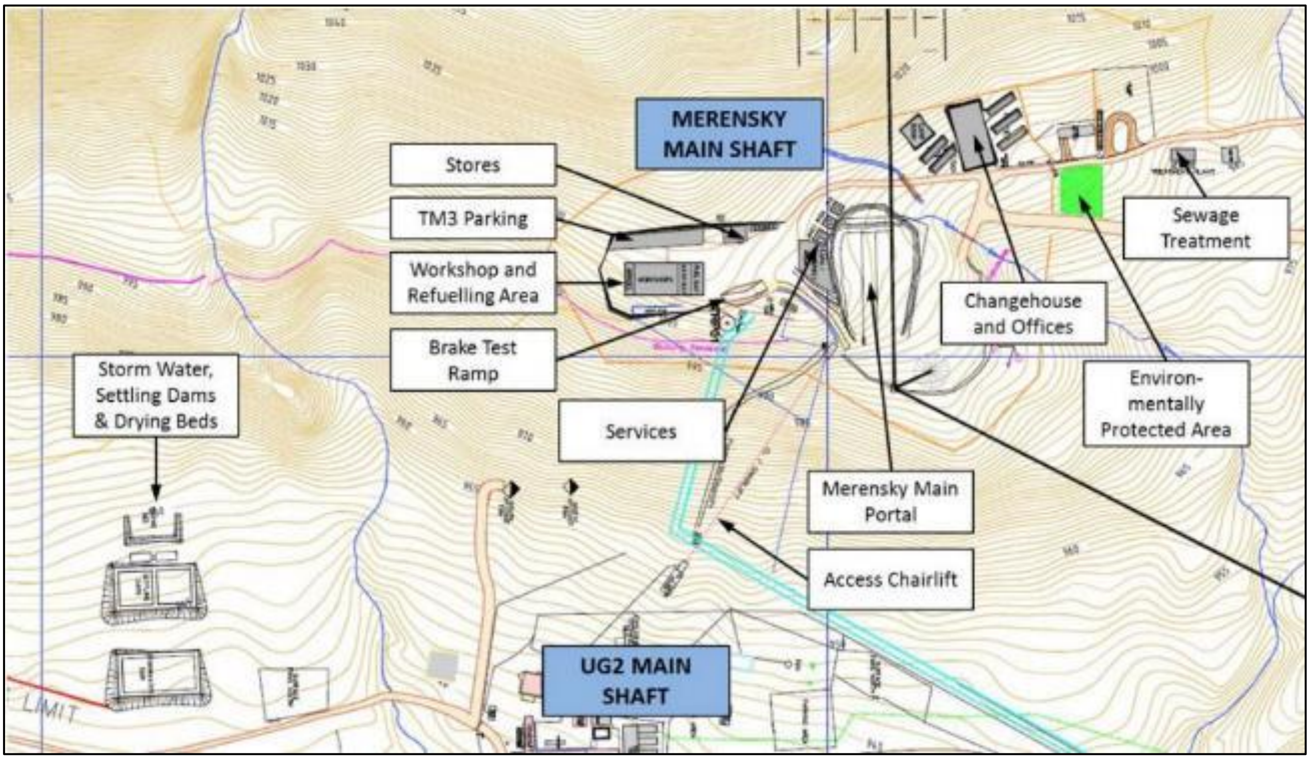


Figure 6: Main Decline Surface Infrastructure (not to scale)

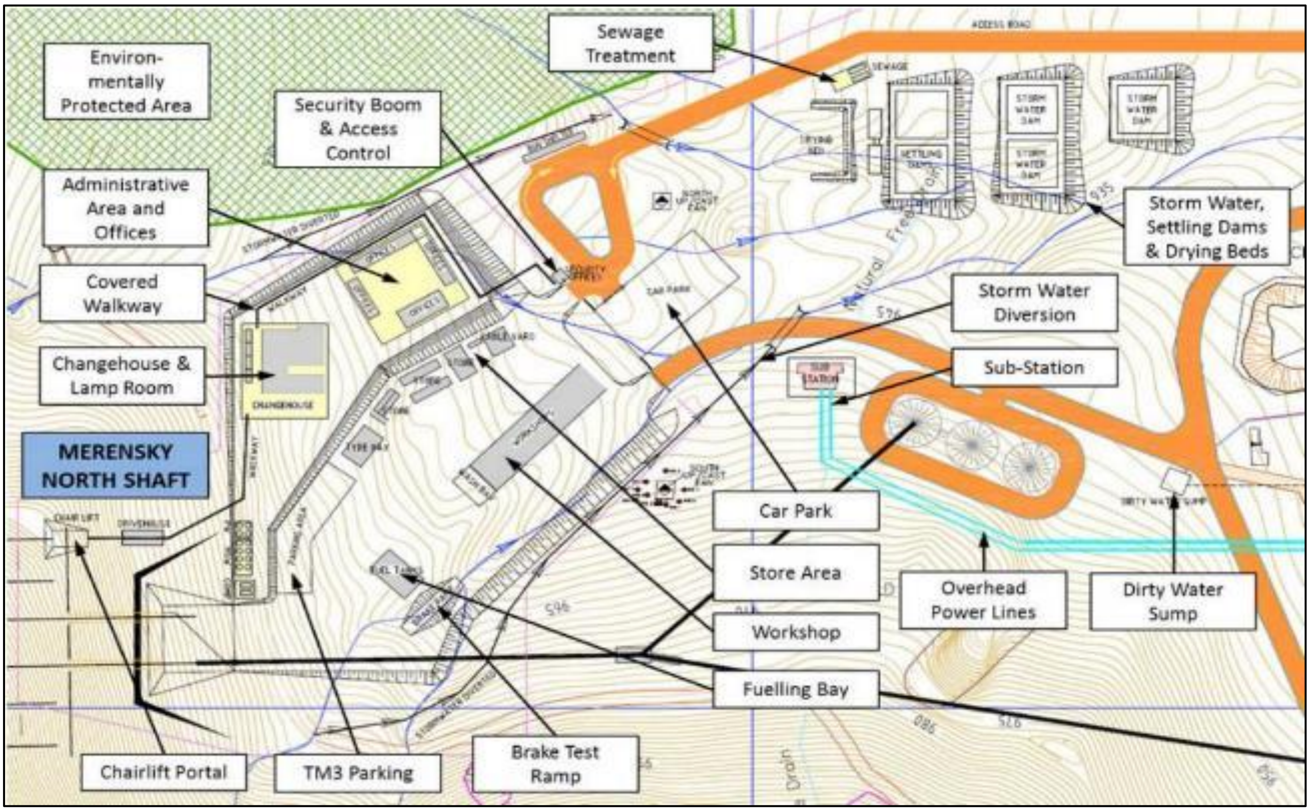


Figure 7: North Shaft Surface Infrastructure (not to scale)

3.2.10. Main Power Supply

Eskom's local Uchoba sub-station supplies TRP with electrical power, which steps supply voltage down from 132kV to 33kV before it is reticulated to the mine. The supply lines into the mine are rated from 30MVA.

Both the Merensky Main and North declines are fed from two 30MVA, 33/11kV transformers. One transformer is found to be able to supply the entire underground mining operation, should failure of the other transformer occur. The design of the overhead lines allows for the supply of electrical power to both the Merensky and UG2 North portals. Similarly, the design of the overhead lines in respect of the Main portal allows for the supply of electrical power to the Merensky and UG2 Main portal substations. The existing main power supply continues to be adequate for the current production rate for the mine.

3.2.11. Water Supply

TRP sources its water supply from the Klein and Groot Dwars Rivers. The majority of the water supply allocation i.e., 1 500 000m^3 per annum, may be sourced from the Inyoni dam located within the Klein Dwars river catchment area on the 372KT Dwarsrivier farm in Portions 1 and 2. TRP is also allocated a total of 547 000m^3 per annum of water which can be sourced from underground sources. No additional water supply is required for the addition of the three (3) waste rock dumps being applied for.

3.2.12. Surface Water Management

The current mining operation water uses (across all sources, including surface water resources) consist of:

- Use on the Concentrator Plant
- Mining purposes
- Dust suppression
- Irrigation, and
- Potable water for drinking and other domestic uses

The existing approved mining areas and the processing plant area each have its own water management infrastructure. Within each operational area, existing dirty water systems allow dirty water to be collected and either gravitated or pumped to the Pollution Control Dams (PCDs). The water captured in the PCDs is used for dust suppression along the haul roads, ROM stockpile area and the water is re-used in the process plant. Water is circulated from the underground to surface and back, where the water is utilised in the mining process and dust suppression underground. Natural evaporation takes place, which also reduces the water contained in the PCD. No dirty water is released into any natural waterway.

3.2.13. Fuel and Diesel Storage

The following fuel and diesel facilities are currently established and utilised at TRP:

- Above-ground bulk diesel storage facility
- Above-ground oil storage tanks
- Washbay area with a silt trap and oil separator
- Gas supply, and
- Chemicals store

These facilities were constructed in accordance with the approved designs. Each facility is designed to ensure that water contaminated with hazardous fluids (diesel and other lubricants used on site) is captured and channelled to the oil separation prior to being pumped to the PCD. The oil recovered from the purification process will be stored in oil containers and disposed of according to the existing Waste Management Plan.

3.2.14. Access Roads

The R577 provincial road is approximately 1km north of Two Rivers Platinum Mine, with the R555 provincial road approximately 5km to the west of the site. Access to the site is obtained from the R577 onto a tared road, which leads to the processing plant and mining area. Additionally, haul roads have been constructed within the mining area.

Roads are well maintained as part of the overall maintenance strategy of TRP. Based on the existing access roads that serve the waste rock dump areas, no further access roads need to be constructed. The existing roads will be utilised within the mining area for the new WRD's.

3.2.15. New Infrastructure for the Two Rivers Platinum – Waste Rock Dump Project

The Two Rivers Platinum – Waste Rock Dump project incorporates the construction of three additional waste rock dumps which will ensure the continuity of mining operations of the economically mineable resources in the existing mining area. The existing surface infrastructure will continue to be utilised for the processing of ore and disposal of waste, and the additional residue stockpiles (waste rock dumps) will ensure no impact on continuing with the mining operation.

The following infrastructure will be required for the TRP – Waste Rock Dump Project:

- Waste Rock Dump 1
- Existing PCD
- Waste Rock Dump 2
- Pollution Control Dam – WRD 2
- Waste Rock Dump 3
- Pollution Control Dam – WRD 3

The construction of the three (3) additional waste rock dumps and associated three (2) pollution control dams will be completed prior to it being required by the operations. The layout for the TRP – Waste Rock Dump Project is provided in Figure 8 below. Waste Rock Dump 1 will be the expansion of the existing approved WRD. The WRD will be extended to accommodate more waste rock from the underground area. The existing stormwater channels will be extended to include the proposed extension.

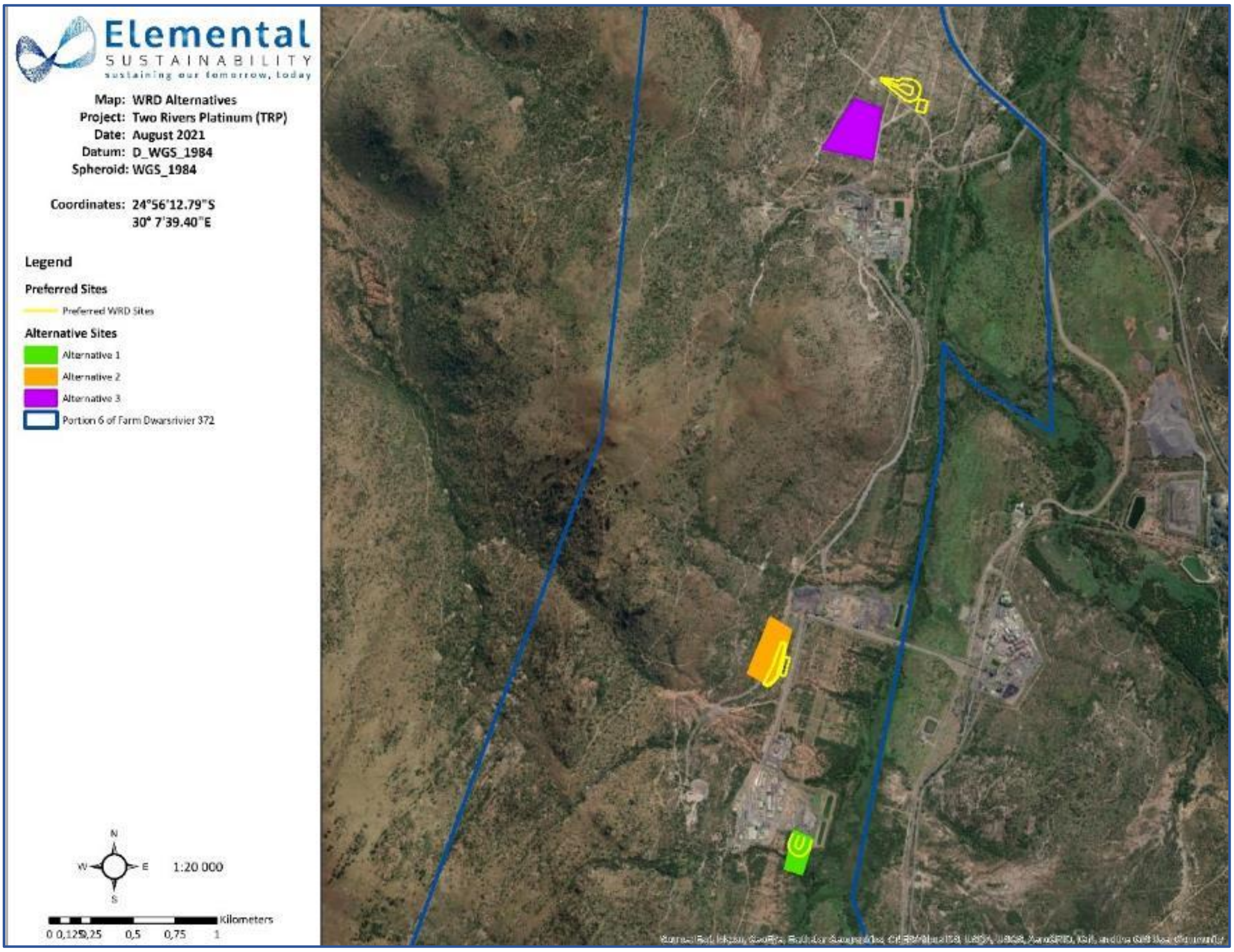


Figure 8: Two Rivers Platinum – Waste Rock Dumps Project Layout

3.3. EXISTING AND PROPOSED ACTIVITIES

Two Rivers Platinum is the holder of the Mining Rights with the reference numbers (DMR 4/2003 OT 5/3/2/545 Initial Mining Right) and LP 30/5/1/2/3/2/1 (178) MR, approved in March 2003 and March 2013, respectively. A section 102 was approved in 2020 for the incorporation of LP (2125) PR and LP (165) MR into the exiting mining right. All existing authorisations are presented in Table 7.

The proposed activities are for the development of three (3) additional waste rock dumps and associated pollution control dams as described in Section 3.2.15.

4 POLICY AND LEGISLATIVE CONTEXT

Relevant South African legislation requires different authorisations prior to the commencement of the Two Rivers Platinum – Waste Rock Dump Project. Notwithstanding due cognisance taken of all applicable legislation, Table 8 details the relevant environmental authorisations, which are required.

Table 8: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended] • *Section 24* *Environment: Everyone has the right-* *(a) to an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-* *i. prevent pollution and ecological degradation;* *ii. ii) promote conservation; and* iii. *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*	The proposed development has the potential to harm the environment and poses a risk to the health and wellbeing of people. The development, however, also has the potential to secure sustainable development through reusing process products and thereby limiting the use of natural resources. The development will ensure that continuous employment can be ensure as the mine will be able to continue with the operations. The development of the WRD's is within the mining footprint area and minimal natural vegetation will be removed. The area will be rehabilitated after the LOM. The management and mitigation proposed by the specialist studies are included in this report. The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution is protected in terms of the proposed development activity.
National Environmental Management Act (No. 107 of 1998) [as amended] • *Section 28 (1)* *Duty of Care and responsibilities to minimise and remediate environmental degradation.*	The Applicant is the developer and overall responsibility of the mine rests with the Applicant, especially in terms of liabilities associated with the operational phase. The development of the WRD's is within the mining footprint area and minimal natural vegetation will be removed. The area will be rehabilitated after the LOM. The management and mitigation proposed by the specialist studies are included in this report. Financial provision will be made to ensure that the impact can be remediated after closure.
EIA Regulations, 2017 [as amended] *The proposed construction, operational and closure activities of the proposed development triggers the following listed activity that are listed in the EIA regulations for which a Scoping and Environmental Impact Assessment (EIA) process have to be conducted:* Listing Notice 1 and 3 have been triggered as well as GN633 for waste activity requiring a Waste Licence as well.	The project requires environmental authorisation; a NEMA application submitted to the DMRE (This application).
EIA Regulations *Chapter 4*: Application for Environmental Authorisation	The EIA Regulations, 2017 [as amended] prescribes inter alia:

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
Chapter 6: Regulation 39 to 44: Public Participation Part 3 Scoping and Environmental Impact Report (S&EIR) *Appendix 2*: Scoping Report *Appendix 3*: Environmental Impact Assessment Report *Appendix 4*: Environmental Management Programme *Appendix 5*: Closure Plan *Appendix 6*: Specialist Reports	• the manner in which public participation needs to be conducted as well as the requirements of a scoping and environmental impact assessment process and the content of a scoping report, environmental impact assessment report and environmental management programme. The content of specialist reports, closure plans and environmental audit reports are also provided.
Screening Tool On 5 July 2019, the Minister of Environmental Forestry and Fisheries published a notice requiring that when submitting an application for environmetal authorisation in terms of regulation 19 and 21 of the Environmental Impact Assessment Regulations, 2014 (as amended) (the EIA regulations), the applicant must submit the report generated by the National Web Base Screening Tool ("The Screening Tool") with the application.	The Screening Tool is submitted together with this application. The screening report is included in Appendix A13
Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended]	Sections 16 and 22. In terms of Section 102 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) an amendment to a mine's Environmental Management Programme (EMPR) for an existing mining right has been applied for.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] • *Section 16* *General duty in respect of waste management;* • *Section 17* *Reduction, re-use, recycling and recovery of waste* • *Section 18; and* *Extended producer responsibility; and* • *Section 21* *General requirements for storage of hazardous and general waste.*	The proposed additional waste rock dumps will require an integrated NEMA and NEM:WA application which will be launched with the DMRE (this application). The impact of the proposed developments is assessed in this report and the management, and mitigation measures are provided.
National Water Act, 1998 (Act No. 36 of 1998) [as amended] • *Section 3*	The Mine has an existing Integrated Water Use Licence (Licence No. 06/B41H/AJIGC/6098) for the following Section 21 water uses:

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
Regulation of flow and control of all water • *Section 19* *Prevention of pollution to watercourses* • *Section 21* *The water use activities associated with the proposed development requires compliance with the requirements of the NWA as listed under GN No. 19182. An application for an integrated water use license is lodged in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998) [as amended] to undertake the following activity:* • *Section 21(c): impeding or diverting the flow of water in a watercourse.* • *Section 21(g): disposing of waste in a manner which may detrimentally impact on a water resource.* • *Section 21(i): altering the bed, banks, course or characteristics of a watercourse*	– Section 21(a): Talking of water from a water resource – Section 21(b): Storage of water – Section 21(c): Impeding or diverting the flow of water in a watercourse – Section 21(g): Disposing of water in a manner which may detrimentally impact on a water resource – Section 21(i): Altering the bed, banks, course or characteristics of a watercourse – Section 21(j): Removing, discharging or disposing of water found underground Water management on the mine to be in line with the requirements of the site-specific Water Use Licence (WUL) and GN R704 National Water Act, 1998 (Act No. 36 of 1998). The activities will be included into the existing water use license.
Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals published in terms of NWA in Government Notice 267 of March 2017	The Regulations will be taken into consideration during the Water Use Licence Application process and will be utilised by the Wetland specialist to determine the impact of the mine on the wetland and pan areas. The C&I risk assessment will be in the format as required by the regulations.
Several General Authorisations have been published in terms of Section 39 of the NWA (various dates)	
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations • *Chapter 2, Sections 2 – 4* *Responsibilities of owner* • *Chapter 2, Sections 5 – 13* *Responsibilities of manager* • *Chapter 2, Sections 14 – 18;* *Documentation requirements* • *Chapter 2, Section 19 – 20 and 22 to 24* *Employee's rights and duties, and*	The proposed project activities may create an environment that is not safe and healthy for workers on and visitors to the site (if not managed correctly). The act provides for measures to prevent threats to the health and safety of humans in the development area.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
• *Chapter 2, Section 21* *Manufacturer's and supplier's duty for health and safety*.	
National Heritage Resources Act, 1999 (Act No. 25 of 1999) • *Section 44 (1); Preservation and protection of heritage resources;* • *Section 3 Types and ranges of heritage resources (i) (i);* *Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens*.	Protection of indigenous heritage resources on the property. A Heritage assessment has been undertaken for the project and the documents will be distributed to SAHRA for comments during the onset of the PPP Phase. The recommendations, mitigation and management measures from the Heritage specialist report have been included in the EIA and EMPr.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended] • *Section 32* *Control of dust* • *Section 34* *Control of noise*	Impacts on surrounding landowners need to be managed through dust and noise mitigation measures.
National Dust Control Regulations, 2013 (Government Notice 827 of 2013) • *Section 3* *Dust fall standard* • *Section 4* *Dust fall monitoring program* • *Section 6* *Measures for control of dust* • *Section 7* *Ambient air quality monitoring (PM10)* • *Section 8* *Offences* • *Section 9* *Penalties*	Dust fall out need to be monitored in accordance to the standards set out in the monitoring programme with the specified measures due to the Applicant being liable to offences and penalties associated with non-conformance to dust which may influence employees and surrounding landowners.
National Greenhouse Gas Emission Reporting Regulations, published in terms of NEM:AQA in Government Notice of July 2017	During operational phase the mine will be required to report in the prescribed format. As an underground mine the mine will registered to report on the GHG emissions.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] • *Section 12 (1)* *Duty of the landowner to prevent fire from spreading to neighbouring properties.*	Cautionary steps in avoiding the spread of fires to and from neighbouring properties.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended] • *Section 9* *Norms and standards* • *Section 27* *Delegation of power and duties* • *Section 30* *Financial accountability* • *Section 43* *Biodiversity management plans.*	Indigenous vegetation needs to be protected and managed in accordance with management measures set out in the management plans developed for the mine and the Applicant need to ensure he is aware of and covers his liabilities. An activity for removing and clearing of vegetation has been applied for within this application and no other vegetation clearance will be permitted other than that approved in terms of the EA when/if the Competent Authority makes its decision. A biodiversity assessment (Fauna and Flora) has been undertaken and the recommendation, mitigation and management measures as identified by the specialist have been included in the EIA and EMPr
Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014) • *Notice 2* *Exempted Alien Species in terms of Section 66 (1)* • *Notice 3* *National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11* • *Notice 4* *Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12*	It is the responsibility of the Applicant to ensure that all prohibited plant and animal species are eradicated as far as possible. Alien and Invasive species need to be managed and prevented throughout the Life of Mine and closure phase. An alien invasive control management plan has been developed by the mine and is being implemented by the mine.
Conservation of Agricultural Resources Act (No. 43 of 1983) • *Section 5* *Prohibition of spreading of weeds* • *Section 12* *Maintenance of soil conservation works and maintenance of certain states of affairs* • *Section 16*	Listed invader/alien plants occurring on site which requires management measures to be implemented to strive to maintain the status quo environment, especially through the guidelines provided by the Regional Conservation Committee.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
Regional Conservation Committees	
Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended] • *Section 2* *Declaration of grouped hazardous substances* • *Section 4* *Licensing;* • *Section 16* *Liability of employer or principle* • *Section 9 (1)* *Storage and handling of hazardous chemical substances* • *Section 18* *Offences*	The Applicant must ensure the safety of people working with hazardous chemicals (specifically fuels), as well as safe storage, use and disposal of containers during the on-site operational phase together with the associated liability should non-compliance be at the order of the day
Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) • *Section 4* *Duties of persons who may be exposed to hazardous chemical substances* • *Section 9A (1)* *Penalties*	Hazardous substances will be stored and utilised on the TRP's site. Non-compliance to management measures will result in prosecution of the Application in terms of his liabilities to the socio-economic environment. .
Mining and Biodiversity Guideline (2013)	The Act, regulation and guideline have informed project planning and will be taken into account in the assessment and mitigation of impacts.
Draft National Biodiversity Offset Policy, 2017	No biodiversity offset is required for the project.
Waste Classification and Management Regulations and Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill, 2013 (Government Notice 634 – 635 of 2013) promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended]; and Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015)	The underground mining area produces general and hazardous waste which needs to be managed and disposed of according to best practices such as recycling, safe storage, etc. Stockpiling of waste rock and disposal of tailings will take place on the existing approved waste disposal facilities (WRD and TSF, respectively) of the mine, and the additional waste rock dumps, for which this application is being submitted.
National Norms and Standards for the Storage of Waste, published in terms of	The purpose of the norms and standards is to –

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
NEM:WA in Government Notice 926 of 2013	a. Provide a uniform national approach relating to the management of waste storage facilities. b. Ensure best practice in the management of waste storage facilities; and c. Provide minimum standards for the design and operation of ne waste storage facilities. Management of the waste storage facility will be in line with the requirements.
National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste, published in terms of NEM:WA in Government Notice 1093 of 2017	The purpose of this Norms and Standards is to provide a uniform national approach relating to the management of waste facilities that sort, shred, grind, crush, screen, chip or bale general waste. The waste rock dump is not regulated under this Norms and Standards. No general waste will be processed in terms of these norms and standards on the mining area.
Guideline on the Need and Desirability, Department of Environmental Affairs, 2017	This guideline has been taken into account as part of project planning. The 2017 Guideline has been used within this process. The Need and Desirability of the project is motivated based on the requirements of the guideline.
NEMA: Government Notice. 805 Companion Guideline on the Implantation of the Environmental Impact Assessment Regulations, 2010, October 2012.	The application for Environmental Authorisation is submitted in terms of the EIA Regulations.
NEMA: GN. 807 Public Participation Guideline, October 2012.	Consultation with Interested and Affected Parties and Communities.
Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, 2017	This guideline has informed the public participation process for the project. Public Participation for the project has been undertaken in terms of the guideline and other relevant requirements.
Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations, 2015 (Notice 1147 of 2015) • *Regulation 5: Scope of financial provision* • *Regulation 6: Method for determining financial provision* • *Regulation 12: Preparation and submission of plans and reports*	An applicant must determine the financial provision through a detailed itemisation of all activities and cost, calculated based on the actual cost of implementation of the measures required. A closure report that complies with the requirements of GNR 1147 has been undertaken by a specialist (Appendix 17).
Regulations on use of Water for Mining and Related Activities Aimed at the Protection of Water Resources, 1999 (Notice 704 of 1999). • *Regulation 4: Restrictions on location of mining activities* • *Regulation 7: Protection of water resources* • *Regulation 12: Technical investigation and monitoring.*	Every person in control of a mine or activity must take measures to manage water in an effective manner as prescribe by the regulation.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
NEM:AQA: GNR 283. National Atmospheric Emissions Reporting Regulations, 2015. *For purposes of these Regulations, emission sources and data providers are classified according to groups A to D listed in Annexure 1 to these Regulations.* Section 5(3): *For purposes of these Regulations, emission sources and data providers are classified according to groups A to D listed in Annexure 1 to these Regulations.*	Any person, that holds a mining right or permit in terms of the MPRDA. Emissions report must be made in the format required for NAEIS to the relevant air quality officer.
List of Activities which Result in Atmospheric Emissions, published in terms of NEM:AQA in Government Notice 893 of 2013 (as amended)	The proposed mining activities will not trigger any of the activities.
National Dust Control Regulations, 2013 (Government Notice 827 of 2013)	Dust fallout is monitored in accordance with the standards set out in the monitoring programme with the specified measures due to the Applicant being liable to offences and penalties associated with non-conformance to dust which may influence employees and surrounding landowners. Gravimetric dust fallout monitoring is taking place at the mine, the monitoring system will be maintained as the areas where the waste rock will be located is within the monitoring network area already.
National Greenhouse Gas Emission Reporting Regulations, published in terms of NEM:AQA in Government Notice of July 2017	Not required for the mine.
Noise Control Regulations (The Republic of South Africa, 1992) published in terms of Section 25 of the Environment Conservation Act (Act no. 73 of 1989)	The regulations define the following • Controlled areas; and • Disturbing noise Limits are provided for rating levels for outdoor noise. To be utilised by the noise specialist to determine the impact and mitigation measures.
National Guideline on minimum information requirements for preparing Environmental Impact Assessments for mining activities that require environmental authorisation, published in terms of NEMA in Government Notice 86 of 2018.	This guideline has been taken into account as part of project planning.
Deeds Registries, 1937 (Act No. 47 of 1937) [as amended]	The Registration of servitudes and deed titles for any project which may require servitude registration
South African Mining Charter	Focuses on sustainable transformation of the mining industry. TRP- WRD Project as indicated in the introduction is compliant with the BEE requirements. Social management and mitigation measures, developed as part of the SIA and committed to in the Social and Labour Plan (SLP), is aligned to the Mining Charter

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
National Development Plan 2030 (2010)	The National Development Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality by 2030. The core elements of a decent standard of living identified in the plan are: • housing, water, electricity and sanitation; • safe and reliable public transport; • quality education and skills development; • safety and security; • quality health care; • social protection; • employment; • recreation and leisure; • clean environment; and • adequate nutrition The Act, development plans, development frameworks and bylaws have informed project planning and the need and desirability of the project and will be taken into account in the assessment and mitigation of impacts.
New Growth Path (2010) Recent draft placed out for comment – not yet promulgated	South Africa has embarked on a new economic growth path in a bid to create 5 million jobs and reduce unemployment from 25% to 15% over the next ten (10) years. The plan aims to address unemployment, inequality and poverty by unlocking employment opportunities in South Africa's private sector and identifies seven job drivers. These job drivers have the responsibility to create jobs on a large scale. The seven key economic sectors or "job drivers" for job creation are listed below: • infrastructure development and extension: Public works and housing projects; • agricultural development with a focus on rural development and specifically • "Agro-Processing"; • mining value chains; • manufacturing and industrial development (IPAP); • knowledge and green economy; • tourism and services; and • informal sector of economy

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
	The Act, development plans, development frameworks and bylaws have informed project planning and the need and desirability of the project and will be taken into account in the assessment and mitigation of impacts. The Minister of Economic Development presented on the New Growth Path preliminary medium-term review. He stated that prior to the adoption of the NGP employment stood at 13 638 000 jobs, after the NGP the statistics showed 15 545 000 jobs that have been created thus far. Therefore, since the adoption of the NGP the net jobs created were 1.9 million. Of the number of new jobs created the private sector contributed 1 146 000 and government and its utilities contributed just about 749 000 jobs. The NGP focused on channelling growth in various sectors in the economy, infrastructure absorbing a significant amount of funding to secure jobs and create new ones. Through the investment funding of R109.1 billion 200 000 direct jobs in projects monitored by the PICC resulted. In the agricultural sector, R1.2 billion was invested by DRDLR last year to recapitalise 414 land reform farms and support 1 357 poor farmers. Drought relief was provided by government to 53 607 smallholders farmers (R795 million) and 78 863 farmers, Coca-Cola also set up a fund for emerging farmers to procure at least 80% apples, pears and grapes for fruit used to make Appletizer. In Mining, 56% increase in investment was made for the six-year period post the NGP compared to pre-GDP in real terms, therefore, the total jobs in mining increased by 118 000 to 329 000. Steel production fell by 33% between 2008 and 2015 due to the slow global growth rate and strained labour relations. In the manufacturing sector jobs declined by 293 000 between 2008 and 2010 as the result of the 2008 financial crisis, but the sector has been growing slowly linked to the global market recovery. However, the release of the StatsSA's Quarterly Labour Force Survey today revealed that the South African official unemployment rate has increased to 27.6%, and the expanded unemployment rate increased to 38%, translating to 9.9 million unemployed people in South Africa. While the increase is marginal, it is indicative of an economy which is stagnant and shedding jobs at an alarming rate. This is compounded by a National Government that is devoid of a credible, long-term plan for jobs and the economy.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
National Framework for Sustainable Development (2008)	The purpose of the National Framework on Sustainable Development is to enunciate South Africa's national vision for sustainable development and indicate strategic interventions to re-orientate South Africa's development path in a more sustainable direction. It proposes a national vision, principles and areas for strategic intervention that will enable and guide the development of the national strategy and action plan.
National Spatial Development Perspective (2006)	The NSDP 2006 provides a framework for a focused intervention by the State in equitable and sustainable development. It represents a key instrument in the State's drive towards ensuring greater economic growth, buoyant and sustained job creation, and the eradication of poverty. Employment opportunities, direct and in-direct will be provide by the proposed mine.
Limpopo Integrated Development Plan (2020 – 2021)	The Limpopo Integrated Development Plan (IDP) framework focuses specifically on issues of sustainable job creation, reducing inequality and defeating poverty through "a restructuring of the South African economy to improve its performance in terms of labour absorption as well as the composition and rate of growth". Mining has been identified as a key sector as this relates to practical employment drivers. The development frameworks have informed project planning and the need and desirability of the project and will be taken into account in the assessment and mitigation of impacts during the EIA phase.
Sekhukhune District Municipality IDP (2021 – 2022)	One of the key areas of planning for the Sekhukhune District Municipality's IDP (2021 – 2022) includes the minerals cluster, with a focus on addressing the major constraints impeding accelerated growth and development of the mining sector. The development frameworks have informed project planning and the need and desirability of the project and will be considered in the assessment and mitigation of impacts during the EIA phase.
Tubatse Local Municipality IDP (2021 – 2022)	The TLM IDP (20121 – 2022) identifies mining are continuing to present the greatest economic opportunity in the area to a sustainable base; whereby the local economy and the area develops at a significant pace. The development frameworks have informed project planning and the need and desirability of the project and will be considered in the assessment and mitigation of impacts during the EIA phase.
All other relevant national, provincial, district and local municipality legislation and guidelines that may be applicable to the application. Some of these are discussed in the next section but will be discussed in detail within the EIA / EMPR report.	

5 NEED AND DESIRABILITY OF THE ACTIVITIES

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location.)

This section will examine the need and desirability of the proposed expansion project and will examine the importance of platinum group metals (PGMs) operations.

5.1. THE IMPORTANCE OF PLATINUM GROUP METALS AS A RESOURCE

Two Rivers Platinum (TRP) is established mine with surface processing plants, waste storage facilities and two decline shafts (i.e., North and Main). The underground mining activities produce approximately 22 000 tons RoM monthly. At the current operational rate and Life of Mine plan, additional waste rock dump facilities will be required to accommodate the projected tonnage and ensure that the mine is kept operational.

The main benefits of the proposed Two Rivers Platinum – Waste Rock Dump (Amendment) Project are:

- Extending the life of mine resulting in increased job security to employees
- Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees
- Contribution to the economic welfare of the surrounding community by creating working opportunities, in-house training to the regional population, creation of school and sport facilities, education and housing assistance and medical and clinical facilities
- Contribution to the upliftment of living standards and the health and safety of the local community
- The project will result in the continued economic mining of a known resources, and
- The net benefit to South Africa is a product produced for the world commodity market, earning South Africa the necessary foreign exchange and capital needed for a healthy economy and further capital investments in development projects for the long-term future of the country.

The proposed project is aligned with the objectives of the MPRDA (Act 28 of 2002):

- To promote economic growth and mineral development in the Republic
- To promote employment and advance the social and economic welfare of all South Africans
- To ensure that the nation's mineral resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development, and
- To ensure that mining developments contribute towards the social-economic development of the area in which they are operating.

The Department of Environmental Affairs (DEA) published a Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2017. The key components are listed and discussed below:

- Securing ecological sustainable development and use of natural resources; and
- Promoting justifiable economic and social development.

According to DEA's (2017) Guideline on Need and Desirability, in order to describe the need for a development, it must be determined whether it is the right time for locating the type of land use and/or activity being proposed. To describe the desirability for a development, it must be determined, whether it is the right place for locating the type of land use and/or activity being proposed. Need and desirability can be equated to the concept of wise use of land which can be determined through asking the question: "what is the most sustainable use of land?" Considering the above, the need and desirability of an application must be addressed separately and in detail answering *inter alia* the questions as indicated in Table 8.

Table 9: Need and Desirability Considerations

Securing ecological sustainable development and use of natural resources		
1. 1.1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? How were the following ecological integrity considerations taken into account? 1.1.1 Threatened Ecosystems, 1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4 Conservation targets, 1.1.5 Ecological drivers of the ecosystem, 1.1.6 Environmental Management Framework, 1.1.7 Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The following specialist studies have been conducted in support of this application: • Engineering Designs and Geotechnical Investigation • Surface Water (Hydrology) Assessment and Aquatic Assessment • Wetlands Assessment • Terrestrial Ecology (Fauna and Flora) Assessment • Visual Impact Assessment • Archaeological and Cultural Heritage Impact Assessment Scan • Palaeontological Assessment Exemption Letter, and • Closure and Rehabilitation Plans (including Financial Provisioning) The entire study area is classed as a Critical Biodiversity Area 1 (CBA1) In terms of flora, of the 278 species previously recorded for the area, six (6) are Species of Conservation Concern (SCC) in terms of their Red List status. Two additional flora species were listed for the project area in the Environmental Screening Tool Report. From the POSA data obtained, Gladiolus reginae (Red List Status: CR) and Polygala sekhukhuniensis (Red List Status: VU) have a moderate likelihood of occurrence on the project footprint. Of the 46 plant species recorded in the studied area during the site survey, four (4) have medicinal uses and one (1) species, Sclerocarya birrea (Marula), is protected in terms of the NFA. None of the floral species recorded during the site survey are listed in the ToPS list, or the LEMA. With regards to fauna, five (5) mammalian species, four (4) avifaunal, one (1) reptilian species have a red listed status identified on the SANBI database for the region, pentad or QDS relevant to the mining project. Mammals protected or regulated under LEMA have been found to occur. In terms of the faunal investigation, Vegetation Unit 1 (VU) is the only area thought to represent sensitive habitat that could support other regional SCC.

		The impacts associated with the activities range from Medium-Low to Medium-High prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Very Low or Low. In terms of DWS Risk Assessment, all aspects of the activities fall within the medium risk category, thereby triggering a requirement for a Water Use Licence. Based on the findings of the assessment, it is concluded that the impact can be mitigated to an acceptable level through the application of mitigation measures provided, and adherence to general good practice The conclusions of these studies, and the identified impacts and mitigation measures stemming there from are included in the EIA and EMPR (this report).
1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The impacts associated with the activities range from Medium-Low to Medium-High prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Very Low or Low, with some impacts associated with hydrology and terrestrial ecology rated Medium to High. All three proposed Waste Rock Dumps are situated within the regulated area of a watercourse (100 m) as defined by GN509 of 2016, promulgated in terms of the NWA. A Water Use Licence Application (WULA) for these activities will be submitted in terms of the National Water Act, 1998 (Act No. 36 of 1998) and thereby be regulated by additional monitoring and rehabilitation features to ensure that mitigation and management measures will be implemented for these sensitive systems.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Mitigation and management measures prescribed will aid to avoid and lower any possible impacts that may result from the development. Final rehabilitation will restore land capability and land use to pre-mining state where possible, and in accordance with the final approved land use. A WULA will be submitted in terms of the National Water Act, 1998 (Act No. 36 of 1998), in terms of which hydrological sensitivities will be further regulated by additional monitoring and rehabilitation features to ensure that mitigation and management measures will be implemented for these sensitive systems.

		Positive impacts include continuation of current mining operations, which will have the associated impact of continued socio-economic contribution locally and regionally as this regard continued employment, support of local businesses, and implementation of the Social and Labour Plan (SLP). The Life of Mine is proposed for the period of 20 years and therefore, a period of 25 years is proposed for in this document. This will include active mining, as well as the post-closure monitoring and rehabilitation required to obtain a closure certificate.
1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	General and hazardous waste will be generated during construction of the additional waste rock dumps. Wastes that may cause soil contamination could originate from construction vehicles used in the construction of the proposed waste rock dumps. All waste must be kept in designated areas and disposed of to a licensed landfill facility. Regulations for soil clean-up and management is prescribed in the approved EMP.
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	An Archaeological and Cultural Heritage Impact Assessment Scan was undertaken for the TRP – Waste Rock Dump Project. The findings have concluded that impacts on sites of archaeologic and cultural interest is not expected.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The mine is an existing operation, removing a known resource (platinum group metals) within the designated area. This cannot be reversed. The study area has been transformed as noted in the specialist investigations, with the additional waste rock dumps planned to be constructed within the TRP approved mining right area to ensure the continuation of current mining operations. TRP is an established, operating mine. Through implementing good practice, environmental management measures and mitigation measures, it will ensure that both humans and the environment are not negatively affected by the development.
1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity	TRP is an approved, operational mine, with approval for the use of renewable natural resources via the approved Integrated Water Use Licence (WUL), EA's and EMPr's. Additional water uses identified above, not already licenced it terms of the approved IWUL, and required in terms of the additional waste rock dumps, will be licensed in terms of the National Water Act.

	restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (Note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life). 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	Stormwater management, and the water stemming from the waste rock facilities will be captured in the PCD infrastructure and re-used and recycled for dust suppression. This will alleviate the requirement for clean make-up water to be sourced from groundwater. The additional waste rock dumps will ensure the continuity of the (established, operational) Two Rivers Platinum Mine where the PGMs are currently being mine.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts? 1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2 What is the level of risk associated with the limits of current knowledge? 1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The Environmental Risk Assessment for all environmental features has been included with Section 13 of this report. Geotechnical Investigation, Surface Water (Hydrology) Assessment, Aquatic Assessment, Wetland Assessment, Fauna and Flora Assessment, Archaeological and Cultural Heritage Impact Assessment Scan, Visual Impact Assessment, and Closure and Rehabilitation Plans (including Financial Provisioning) was completed for the project to ensure that the impacts of these aspects have been properly assess and will be catered for within the Environmental Management Programme (EMPr).

		Further additional existing specialist studies have also been consulted, as relevant to the specific project. Adherence to these management measures will mitigate and manage predicted impacts. The level of risk has been informed by these specialist studies and feedback from the I&APs, to date. A section regarding limitations of the studies has been included in the EIA/EMP report and will be available for the Competent Authorities to consider, as well. It is noted that this project ensures continuity of a current mining operation.
1.9	How will the ecological impacts, resulting from this development, impact on people's environmental right in terms following. 1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2 Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Dust and visual pollution can increase if not managed correctly. Water pollution can increase, if impacts are not managed effectively, but with the proper mitigation and good practice environmental management measures, it will result in minimal impacts. These impacts have been assessed, and detailed prevention and mitigation measures have been recommended (refer to Section 15 of this report).
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?	Ecological aspects and specialist impact assessments have been included in the document and risk assessments utilised to guide the Environmental Management Program.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The environmental risk assessment for all environmental features has been assessed and included in the EIA/EMPr.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological	Geotechnical, Hydrology, Aquatic Ecology, Wetlands, Terrestrial Ecology (Fauna and Flora), Heritage Assessment, Visual Impact, and Closure Plan specialist studies have been undertaken for the project to ensure the impacts of these aspects have been properly assessed and have been catered for within the Environmental Management Programme (EMP). The studies have assisted with the development of a management plan to secure ecological integrity and a healthy biophysical environment.

	considerations?	
1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Cumulative impacts may be the accumulation of all the existing, historic and proposed mining activities within the project area, which may result in negative impacts. However, if Two Rivers Platinum Mine implements the mitigation measures and management measures correctly, cumulative negative impacts as a result of the combined PGMs mining of the area will be managed optimally.
“Promoting justifiable economic and social development”		
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations? 2.1.1 The IDP (and its sector plans’ vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area, 2.1.2 Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.), 2.1.3 Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and 2.1.4 Municipal Economic Development Strategy (“LED Strategy”).	Community/society priorities are officially expressed through public documents including the provincial growth and development strategy and spatial development framework documents. The TRP project falls within the Greater Tubatse Municipality and forms part of the Greater Tubatse Municipality LED Strategy. Four programmes for economic development have been identified and comprise: (1) Sector Development (2) Economic Infrastructure Support (3) Social Development, and (4) Institutional/Governance Reform. The projects that have been identified in the LED are aimed at economic development by ensuring job opportunities are created, jobs security is created, skills development takes place and that opportunities are created for SMME development. Mining plays an important part in the sector development of the LED strategy. Mines contribute towards the socioeconomic development of the region through social-upliftment and job creation as primary agents. It is noted that this project ensures continuity of a current mining operation.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs? 2.2.2. Implementation on Social labor Plan (SLP)	Also refer to the comments made above. The proposed project will benefit society and the surrounding communities both directly and indirectly by ensuring the continuity of the current TRP mining operation, thereby contributing to the continuing job security at the proposed operation and through the extraction of mineral resources and beneficiation of mineral resources within Limpopo. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees.

		The proposed development will also ensure local economic development through the implementation of projects identified in the Social and Labour Plan, by ensuring the continuation of the current TRP mining operation. TRP is fully committed to implementing development plans and projects that will facilitate local community and rural development in the area surrounding its project, in line with the provisions of the Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to comments made above. All aspects and comments received from I&APs during the process have been reasonably addressed and incorporated into the EIA/EMPr. Local economic growth and work opportunities will be the main benefits from the project if approved, as the proposed waste rock dumps will secure the continuing operation of the approved TRP mine, and may thereby address some of the physical, psychological, development, cultural and social needs, and is in-line with the local municipality and national goals of development and transformation .
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	The main benefits of the proposed Two Rivers Platinum – Waste Rock Dump (Amendment) Project are: • Extending the life of mine resulting in increased job security to employees • Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees • Contribution to the economic welfare of the surrounding community by creating working opportunities, in-house training to the regional population, creation of school and sport facilities, education and housing assistance and medical and clinical facilities • Contribution to the upliftment of living standards and the health and safety of the local community • The project will result in the continued economic mining of a known resources, and • The net benefit to South Africa is a product produced for the world commodity market, earning South Africa the necessary foreign exchange and capital needed for a healthy economy and further capital investments in development projects for the long-term future of the country. The project is aligned with the objectives of the MPRDA (Act 28 of 2002) • To promote economic growth and mineral development in the Republic, • To promote employment and advance the social and economic welfare of all South Africans.

2.5	In terms of location, describe how the placement of the proposed development will; 2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other, 2.5.2. reduce the need for transport of people and goods, 2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport), 2.5.4. compliment other uses in the area, 2.5.5. be in line with the planning for the area, 2.5.6. for urban related development, make use of under-utilised land available with the urban edge, 2.5.7. optimise the use of existing resources and infrastructure, 2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement), 2.5.9. discourage "urban sprawl" and contribute to compaction/densification, 2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs, 2.5.11. encourage environmentally sustainable land development practices and processes 2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.), 2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential), 2.5.14. impact on the sense of history, sense of place and heritage of	Alternatives have been assessed during the EIA phases, with the findings of specialist studies, comments from the I&APs to date and resource studies having been taken into account to determine alternatives for the project. All additional comments from I&APs will be taken into consideration in the final report to be submitted to the Competent Authority for adjudication.

	the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and 2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	
2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts? 2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge? 2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Gaps and limits in knowledge have been given within the EIA/EMPR document and where appropriate a pre-cautionary approach has been applied. Gaps and limitations have been properly assessed and addressed. Limitations as described by the specialists have also been included within Section 11.2. The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions. In fact, the project would have a positive impact in terms of ensuring continuity of the existing mining operation, thereby positively impacting employment security for the years to come and supporting various community indicatives through the Social Labour Plan. The gaps in knowledge related to water uses associated with waste rock dumps and associated pollution control dams requirements, will need to be addressed once the WUL process is undertaken, and therefore the risk may be argued as Medium (with implementation of mitigation measures).
2.7	How will the socio-economic impacts, resulting from this development impact, on people's environmental right in terms following: 2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	Refer to all aspects regarding the Socio-Economic environment, benefits and disadvantages. All of the relevant aspects have also been addressed within the EIA/EMPR and may be viewed within the Impact Assessment, Management and Mitigation tables as contained within this document.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g., over utilisation of natural resources, etc.)?	The area where the project is proposed, is located within an approved mining right area. The Land Use and Capability has been described within this document. Refer to the baseline environment section (Section 10)
2.9	What measures were taken to pursue the selection of the "best	Health and Safety considerations have been included in the measures taken to pursue the best practicable

	practicable environmental option" in terms of socio-economic considerations?	environmental options in terms of socio-economic considerations, such as implementation of the mitigation measures for dust, noise and visual management and mitigation. No other socio-economic considerations are relevant, except for work creation for local communities within the area, but these will be same for any footprint chosen. The environmental features and impacts, known resource and financial restraints associated with mining (specific resource) were the deciding factors concerning the best suited option. Also refer to the impact assessment and mitigation measures in 13.2 and 13.6 of this report.
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to the impact assessment and mitigation measures in Section 13.2 and 13.6 of this EIAR / EMPr. The mine will be in line with the regulatory requirements and provide financial provision to ensure that the mitigation measures proposed can be carried out. All alternative scenarios have been discussed in this EIAR / EMPR.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	The main benefits of the proposed Two Rivers Platinum – Waste Rock Dump (Amendment) Project are: • Extending the life of mine resulting in increased job security to employees • Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees • Contribution to the economic welfare of the surrounding community by creating working opportunities, in-house training to the regional population, creation of school and sport facilities, education and housing assistance and medical and clinical facilities • Contribution to the upliftment of living standards and the health and safety of the local community • The project will result in the continued economic mining of a known resources, and • The net benefit to South Africa is a product produced for the world commodity market, earning South Africa the necessary foreign exchange and capital needed for a healthy economy and further capital investments in development projects for the long-term future of the country. The project is aligned with the objectives of the MPRDA (Act 28 of 2002) • To promote economic growth and mineral development in the Republic, • To promote employment and advance the social and economic welfare of all South Africans.

		By conducting a Scoping and Environmental Impact Assessment Process, the Applicant ensures that equitable access has been considered. Refer to the impact assessment and mitigation measures 13.2 and 13.6 of this EIA and EMPR.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Disturbances in terms of noise, dust, waste and Health and Safety have been assessed according to a Risk Matrix and included within this report. Mitigation and Management measures are prescribed for every possible impact which may result from the environmental authorisation being granted.
2.13	What measures were taken to: 2.13.1. ensure the participation of all interested and affected parties, 2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, 2.13.3. ensure participation by vulnerable and disadvantaged persons, 2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means, 2.13.5. ensure openness and transparency, and access to information in terms of the process, 2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and 2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	Public Participation has been conducted in accordance with the guidelines and NEMA Regulations. All comments received during the Scoping phase have been included in the Final Scoping. Comments for EIA phase has been included in this EIA / EMP report and also in the Comments and Response report attached as Appendix 5. The Comments and Response report was for the Final EIA. Public participation was done for the Scoping Report and the Draft EIA/EMPr (this report) that contains all the comments received during the entire project. This will inform the Competent Authority of all aspects and concerns from the public and other commenting authorities. All comments from registered I&AP's will be included in the Final Report as required by the NEMA Regulations.
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g., a mixture of low-, middle-, and high-income housing opportunities) that is	Refer to comments made above, and refer Section 8 of this EIAR / EMPr, describing the public participation process to be implemented for the waste rock dump project.

	consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	The Applicant is currently executing an approved Social Labour Plan for the Two Rivers Platinum mine, of which this project being applied for, will form part of.
2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Two Rivers Platinum has an Environmental, Health and Safety Policy in place, together with Standard Operating Procedures (SPOs) which regulate activities on the mining area. All workers and contractors are required to abide to the policies and framework as specified. It is anticipated new short-term jobs may be created through the construction phase of this project, and that existing jobs will be sustained for a longer period of time.
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects: 2.16.1. the number of temporary versus permanent jobs that will be created, 2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area), 2.16.3. the distance from where labourers will have to travel, 2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and 2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	Refer to comments made above. An existing Social Impact Assessment is in place, and an approved (2018) SLP is in place and being implemented.
2.17	What measures were taken to ensure: 2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and 2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	The applicant is in the process of applying for the following aspects across different legislation requirements: • WUL (Department of Human Settlements, Water and Sanitation –DHSWS – to be initiated for the inclusion of this process). • All legislation that has been incorporated within this process was discussed within the Section regarding Policy and Legislative Content, above.
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to comment above as these aspects have already been addressed within previous discussions. Also, Refer to Section 8 of this EIA/ EMP Report, describing the public participation process to be implemented for the proposed project, as well as Section 15 discussing the impact assessment. The Applicant has an approved Social and Labour Plan in place.

2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Yes, for a sensitive environment (which is almost always associated with mining) all impacts have been addressed optimally as best possible. Refer to the impact assessment and mitigation measures in Section 15 of this EIAR / EMP Report.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Mitigation and management measures have been described for all environmental aspects identified and is incorporated into the EMPr. The Closure report has been updated and is submitted as part of this EIAr/EMPr.
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Alternatives and analysis have already been addressed above, refer to comments made.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to comments made above regarding positive and negative socio-economic impacts. Other projects in relation/adjacent to the application footprint also include PGMs mining. Cumulative impacts have been discussed where relevant and are not easily accurately quantifiable.

6 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

This section provides a short discussion for the timeframes and scheduling for the implementation of the various project phases.

The authorisation for the waste management facilities is required for a period of twenty-five (25) years. Two Rivers Platinum is an existing approved mine, take has already been established and is an operational mine. The additional waste rock dump facilities and associated pollution control dams being applied for, are required to accommodate the projected tonnage, based on the current Life of Mine plan.

Table 10: Timeframes for the Two Rivers Platinum – Waste Rock Dump Project

	Activity	Timeframe	Comments
1	**Regulatory Authorisations**		
1.1	Submission of the Environmental Impact Assessment (EIA) and Environmental Management Programme report (EMPr)	Currently underway	The EIA and EMPr for the Two Rivers Platinum – Waste Rock Dump Project was initiated after acceptance of the Scoping Report. All surface structures such as the access road, adit, ROM stockpile, power and water supplies, and the surface water management structures established for existing TRP Mine will be utilised by this Project area
1.2	Integrated Water Use Licence (WUL) application	Currently underway	The Two Rivers Platinum – Waste Rock Dump Project will require a WUL for the additional three (3) waste residue stockpiles (Waste Rock Dumps) and associated pollution control dams.
1.3	Waste Management Licence (WML) application	Currently underway	The Two Rivers Platinum – Waste Rock Dump Project will require a WUL for the additional three (3) waste residue stockpiles (Waste Rock Dumps).
1.4	Social and Labour Plan	Completed	Two Rivers Platinum has an approved Social and Labour Plan in place (2018 – 2022).
2	**Infrastructure**		
2.1	Access to the waste rock dumps	Existing	Access to the waste rock dumps will be via existing established access roads. TRP is an existing operational mine, with well-established access and haul roads in place.
2.2	Power supply	Existing	Eskom's supply of 33kV to TRP is in place and continues to be adequate for the mine.
2.3	Water supply	Existing	No additional water supply is required for the additional three (3) waste rocks.

7 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

Note : This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

This section presents all alternatives considered, identifies those which are considered for scoping, and comparatively assesses those carried through into EIA phase. The identification of alternatives is a key aspect of the success of the scoping and EIA process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider and assess. There are, however, some significant constraints that must be taken into account when identifying alternatives for this project. Such constraints include social, financial and environmental issues, which will be discussed in the evaluation of the alternatives. Alternatives can typically be identified according to:

- Location alternatives
- Process alternatives
- Technological alternatives, and
- Activity alternatives (including the no-go option).

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. As mentioned in Section 5, the need for the proposed project includes the following key drivers:

- The importance of platinum group metals as a resource, and
- The continued livelihood of community members working at the mine.

The alternatives are described, and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical, as well as environmental, perspective. The no-go option is also assessed herein. Alternatives can also be distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and or scoping phases of the EIA process. Incremental alternatives typically arise during the EIA process and are usually suggested as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be strived to seek alternatives that maximises efficient and sustainable resource utilisation and minimise any negative impacts on the bio-physical and socio-economic environments.

7.1. MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND ALTERNATIVES

The details of the alternatives considered are described in the sections below. The main motivation for all alternatives is based on the fact that Two Rivers Platinum is an existing operational mine.

7.2. DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED

With reference to the site plan provided (refer to Appendix 3) and the location of the individual activities on site, provide details of the alternatives considered with respect to:
(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

According to the DEA (2017), Guideline on Need and Desirability and Guidelines on Assessment of Alternatives and Impacts, Department of Environmental Affairs, feasible and reasonable alternatives must be identified for a development as required by the NEMA EIA Regulations and applicable to EIA. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. Alternatives form a vital part of the initial assessment process through the consideration of modifications to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development's scope of work is amended. It is vital that original as well as amended alternative identification, investigation and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be a strive to seek alternatives that maximises efficient and sustainable resource utilisation and minimises any negative impacts on the bio-physical and socio-economic environments.

The following alternatives were investigated as feasible alternatives. Analysis of the alternatives are presented below in Table 11. A full description is presented below.

Table 11: Alternative Analysis

<table>
<tr><td>TYPE OF ALTERNATIVE: Location</td><td>ALTERNATIVE EXPLANATION:
Develop on an alternative property
Develop on alternative sites on the same property/properties</td></tr>
<tr><td colspan="2">Location alternatives are presented in section 7.2.2.4 below.

As the mine is an existing approved mine, the alternatives considered were limited by the space available within the mining area and the distance away from the shaft areas.</td></tr>
<tr><td>TYPE OF ALTERNATIVE: Activity</td><td>ALTERNATIVE EXPLANATION:
Develop an alternative activity e.g., Incineration of waste vs. landfill disposal, abstraction of water vs. re-use/recycling of water.</td></tr>
<tr><td colspan="2">The mine is a current operational mine with well-established mining methods. To extract the ore, waste rock will also be mined as the seam is not sufficient that only the seam can be mined. The waste rock will be utilised for rehabilitation.

No alternative activities are investigated in this report as no feasible alternative are currently not available.</td></tr>
<tr><td>TYPE OF ALTERNATIVE:</td><td>ALTERNATIVE EXPLANATION:
Adapt architectural and/or engineering designs.</td></tr>
</table>

Design	
No design alternative has been investigated. The WRD's have been designed to accommodate the quantity of waste rock that will be produced during the LOM. The WRD's have been design after the preferred sites have been identified. The site alternatives are included in Section 7.2.2.4	
TYPE OF ALTERNATIVE: Layout	**ALTERNATIVE EXPLANATION:** ***Adapt spatial configurations of an activity on any particular site e.g., Locate manure dams away from water resources.***
The layout alternatives are discussed in Section 7.2.2.4	
TYPE OF ALTERNATIVE: Technological	**ALTERNATIVE EXPLANATION:** ***Adapt methods or processes that can be implemented to achieve the same goal e.g., Introduction of bacteria rather than chemicals to wastewater.***
The mine is a current operational mine with well-established mining methods. To extract the ore, waste rock will also be mined as the seam is not sufficient that only the seam can be mined. The waste rock will be utilised for rehabilitation. No technology alternatives were assessed as part of this report	
TYPE OF ALTERNATIVE: Demand	**ALTERNATIVE EXPLANATION:** ***The demand for products and/or services can be met by other means e.g. The demand for paper can be met through deforestation or rather by efficient and viable recycling.***
The layout alternatives are discussed in Section 7.2.2.4. The sites have been identified based on the LOM calculation as the Waste rock to be produced during the LOM.	
TYPE OF ALTERNATIVE: Input	**ALTERNATIVE EXPLANATION:** ***Implement different input materials and/or sources e.g., Utilisation of woodchips for fuelling boilers rather than electricity.***
No input alternatives were identified or are assessed in this application.	
TYPE OF ALTERNATIVE: Routing	**ALTERNATIVE EXPLANATION:** ***Implement alternative routes for linear developments such as power line servitudes, transportation, and pipeline routes e.g., Elongate and divert a railway line to exclude a sensitive environment.***
No Routing alternatives has been identified in this assessment as the internal road network is already established and will require no new roads.	
TYPE OF ALTERNATIVE: Transport	**ALTERNATIVE EXPLANATION:** ***Method of transportation of product or ore.***
No Transport alternatives were identified all waste rock will be conveyed to surface from the underground area from where the waste rock will be loaded into trucks and trucked to the WRD's.	
TYPE OF ALTERNATIVE: Scheduling and Timing	**ALTERNATIVE EXPLANATION:** ***Adapt the order and/or scheduling of a number of measures which plays a part in a program as it will influence the overall effectiveness of the end result.***
The mine has only 9 months of waste rock dump space available and thus no schedule or timing alternative was identified	

or considered.	
TYPE OF ALTERNATIVE: **Scale**	**ALTERNATIVE EXPLANATION:** ***Adapt the scale of an activity ex. 15 vs. 35 housing units, 12m² vs. 0.5km².*** ***P.S. Scale and magnitude is interrelated.***
The alternative in terms of scale and location is discussed below in section 7.2.2.4. The optimal size for each of the waste rock dumps were identified during the planning and scoping phase.	
TYPE OF ALTERNATIVE: **Magnitude**	**ALTERNATIVE EXPLANATION:** ***Adapt the magnitude which is directly related to the extent of an activity.*** ***P.S. Scale and magnitude is interrelated. An activity may be very small scale but can pose an extensive magnitude ex. Destroying an extremely sensitive wetland on a very small scale could result in a magnitude of such as destroying the whole wetland and/or ecological system.***
The alternative in terms of magnitude and location is discussed below in section 7.2.2.4. The optimal size for each of the waste rock dumps were identified during the planning and scoping phase.	
TYPE OF ALTERNATIVE: **No-Go**	**ALTERNATIVE EXPLANATION:** ***The option of not undertaking and implementing the activity at all.***
See section below for no-go alternative	

7.2.1. Feasible Alternatives

The following alternatives were investigated as feasible alternatives:

- The site on which the waste rock dumps are to be located (site and layout alternatives)
- The mining method including other technology alternatives
- Activity alternatives
- Design alternatives, and
- Not implementing the mining activities (No – Go alternative).

7.2.2. Site Alternatives

7.2.3. Suitable Mining Areas

Two Rivers Platinum is an existing, operational underground mine. Site alternatives for the proposed additional waste rock dumps are discussed in section 7.2.2.4 (below) . The alternatives are limited to the existing mining area and the sensitive environments in the surround area.

7.2.4. Details of Mining Methods Alternatives (including Technology Alternatives)

Two Rivers Platinum is an existing, operational underground mine. This EIA/EMP report is specific to the application for the additional three (3) waste rock dumps, and as such, no alternate mining methods are discussed in this report.

7.2.5. Activity Alternatives

Two Rivers Platinum is an existing, operational underground mine. Process alternatives to the proposed waste rock dumps include sale of waste rock, and improved mining methods have been considered. However, no market is currently available for the sale of waste rock. Alternate layouts of the waste rock dumps were investigated during the EIA process as presented in Figure 10.

7.2.6. Design and Layout Alternatives

Please refer to Section 7.2.2.1 to 7.2.2.3 above; TRP is an existing, operational underground mine. Regarding the three additional waste rock dumps being applied for, the options evaluated are discussed below.

The available tonnage that can be accommodated at the current waste dump east of the Main Decline Office Complex, as surveyed in October 2020, based on the design specifications at a height of 14m is 73Kt, gives the current Waste Dump a life of nine (9) months, based on an anticipated deposit rate of 8 000 tons per month.

Based on the current LoM plan, a further 747Kt will be generated, leaving a required 673Kt to be hauled and packed on surface in addition to the current available capacity. These tons include waste tons generated by both Main and North Declines and a Merensky Waste Decline system with an allowance of 20%.

Table 12 below shows the footprint areas required at various heights.

Table 12: Waste Rock Dump Footprint Requirements

Scenario	Height (m)	Area (m^2)	Area (HA)	L x W (m)
1	14	30 476	3.05	175 x 175
2	20	22 184	2.22	149 x 149
3	25	18 239	1.82	135 x 135
4	30	15 570	1.56	125 x 125
5	35	13 638	1.36	117 x 117
6	40	12 171	1.22	110 x 110

The Alternatives considered for the additional waste rock dump facilities are presented in Figures 9, 10 and 11, with the preferred alternative presented in Table 12. These scenarios, numbered on the plans below relates to the heights indicated in the table above.

Alternative 1:

This scenario entails the natural extension of the current facility towards the South. The main advantage of this option is the reduced hauling distance of waste on surface when compared to Alternative 2. A disadvantage is that this option will extend over a water course that diverts surface water from the Main Decline infrastructure. This water course will be required to be diverted around the footprint of the proposed extension.

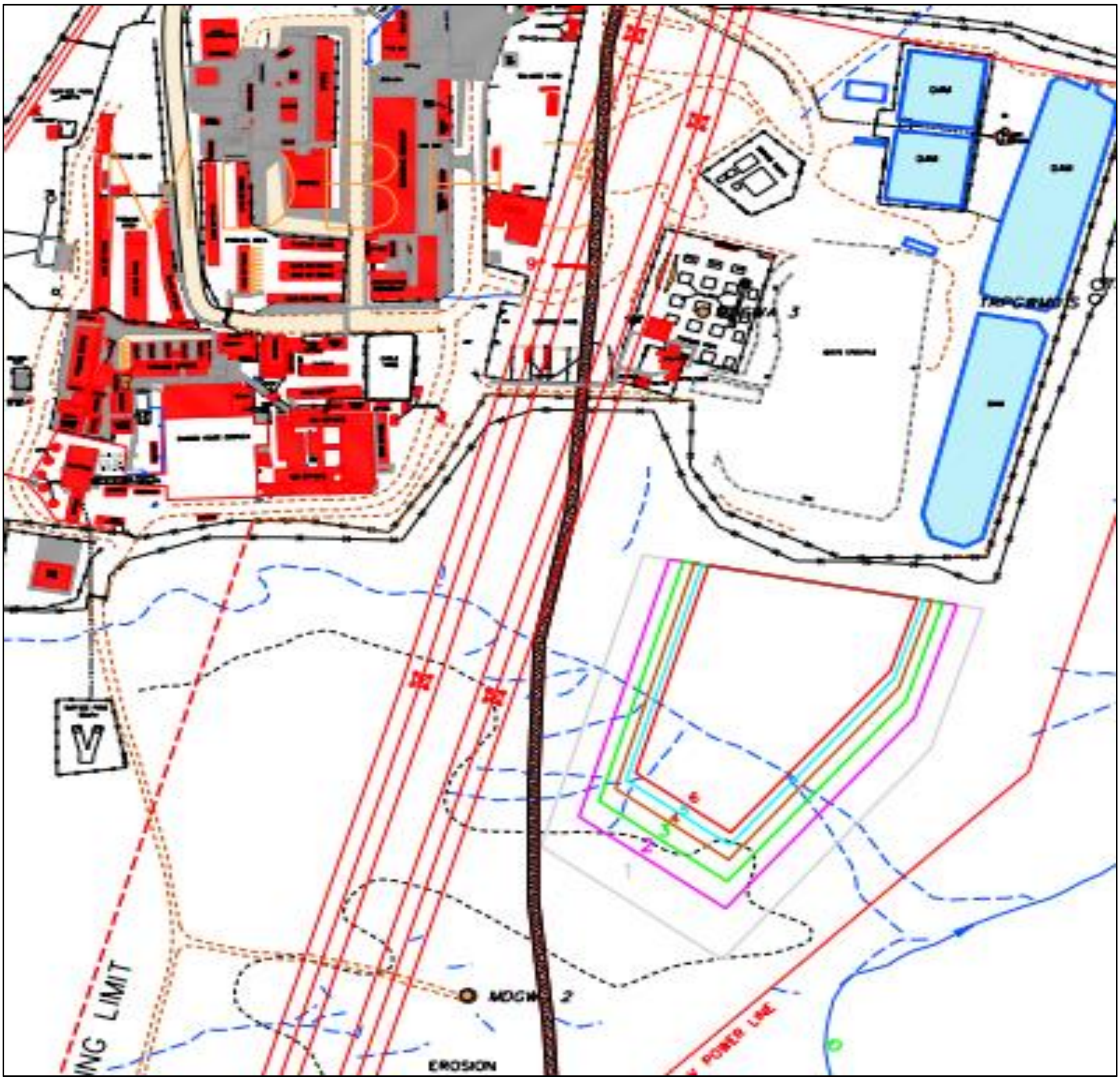


Figure 9: Alternative 1: Extension of Current Facility

Alternative 2:

For this option, the North Decline “Open Pit” area is considered. Access haul roads are established to this area, as it was previously used to stockpile ore from North Decline. The main disadvantage of this option is the distance to haul the waste, which will be mainly generated from Main Decline and the Merensky project.

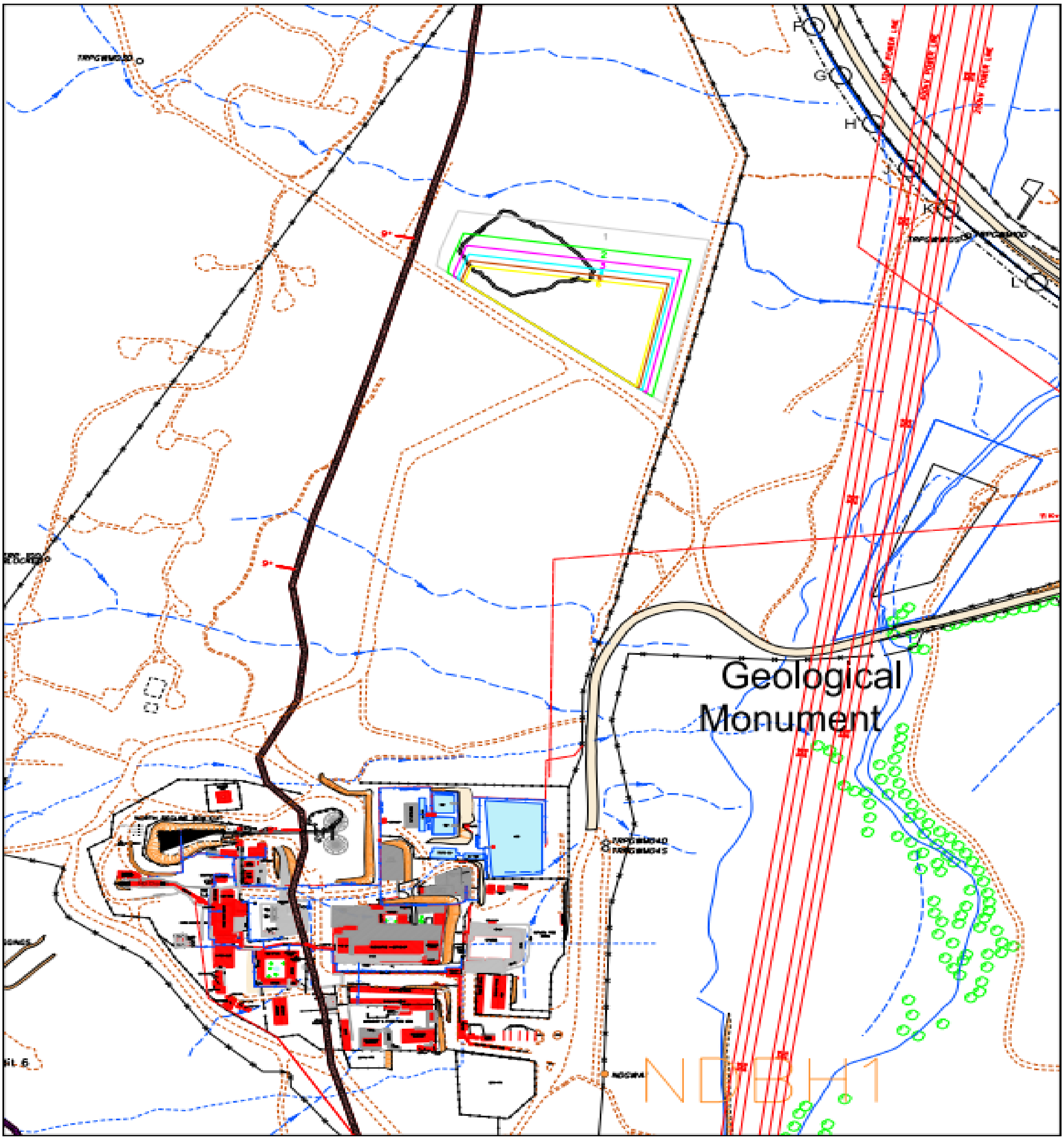


Figure 10: Alternative 2: North Decline "Open Pit"

Option 3:

For this option, the open area adjacent to the South Shaft will be utilized for the Merensky development. The main disadvantage of this option is the distance to haul the waste which will be mainly generated from Main Decline and the Merensky project.

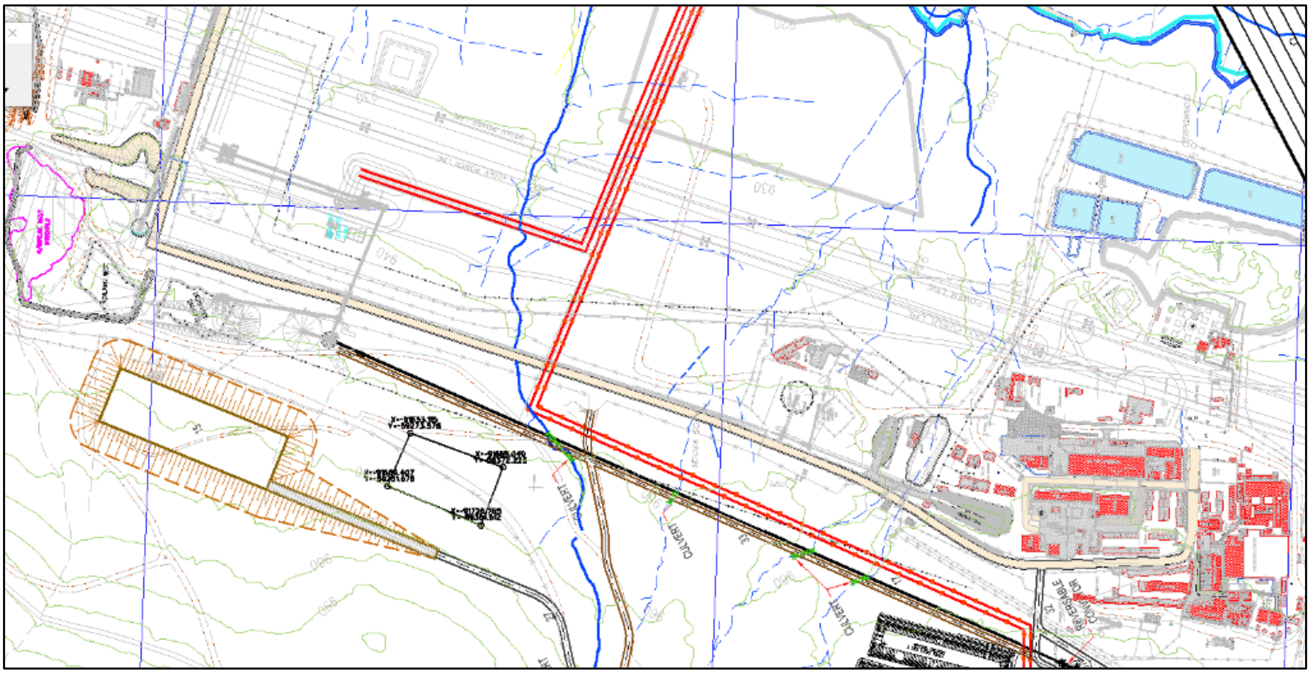


Figure 11: Alternative 3 – South Shaft

Alternative 4: Preferred Alternative

The refereed alternative as described in this report is a combination of three alternatives above. The preferred alternative consists out of the development of twee WRD and the extension of the existing WRD.

- Waste Rock Dump 1: Approximately 1.10 ha (expansion of existing WRD)
- Waste Rock Dump 2: Approximately 1.95 ha
- Waste Rock Dump 3: Approximately 1.40 ha

The preferred alternative is presented in Figure 12 below. The alternative takes the quantity of waste rock that will be provided during the LOM into consideration as sufficient space is available in the three dumps to accommodate the ROM waste rock for the LOM. The sensitive areas (vegetation, water sources and biodiversity) are largely avoided, and the severity of the impact is reduced. The alternative areas and the preferred sites are presented in Figure 12.

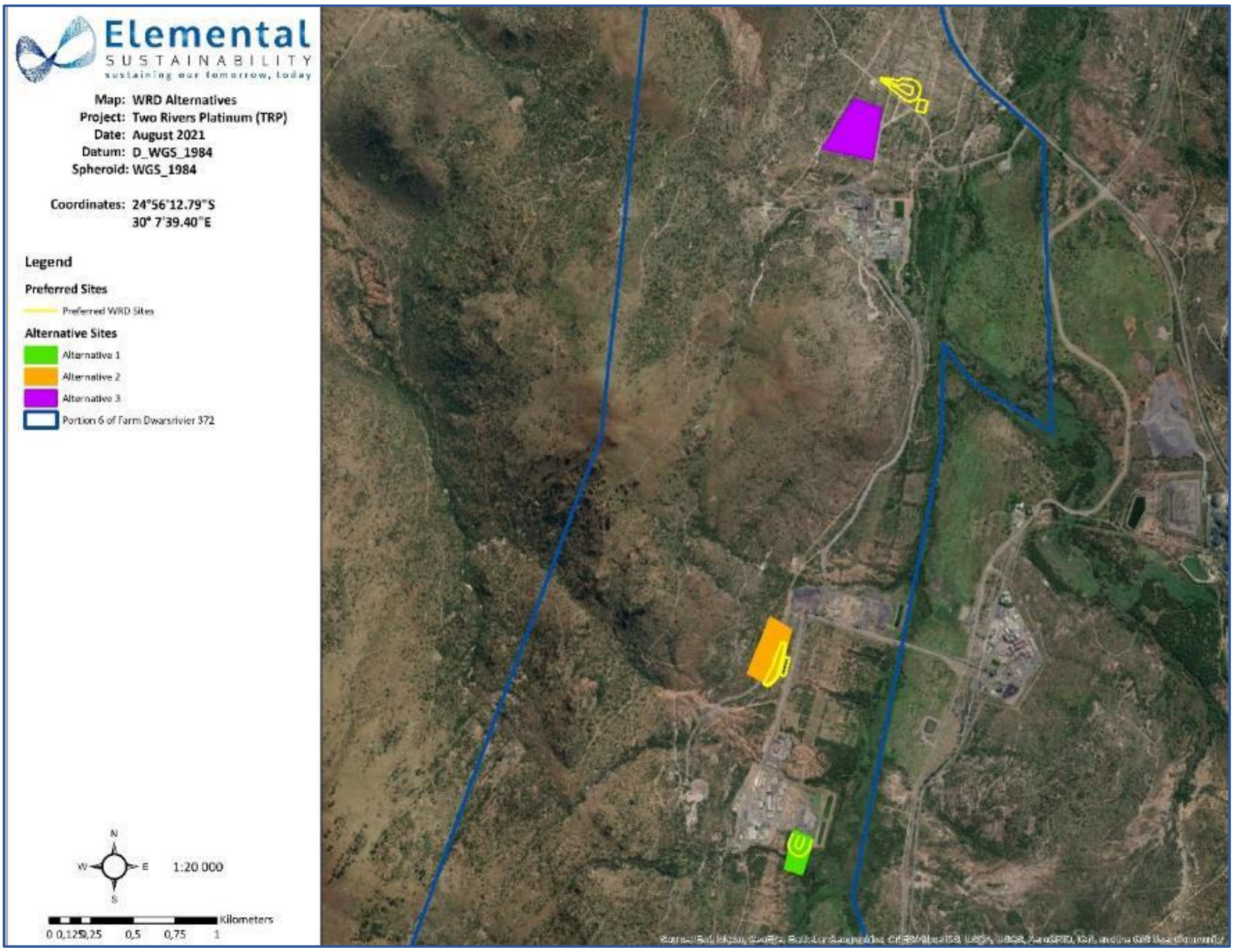


Figure 12: Two Rivers Platinum – Waste Rock Dumps Project Layout

7.2.7. Details of Activity Alternatives

The alternatives considered and discussed in the above sections, including location, mining method and process alternatives have culminated into the identification of the preferred development alternatives as presented above. The preferred alternatives are assessed in this report.

7.2.8. No-Go Option

The no-go option refers to the alternative of the waste project not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment and the status quo of the area will remain, which is the conditions of the current environment without any deviations or expansions. The no-go option will impact the ability of the mine to continue operation.

The implications of the no-go option, evaluated as part of the EIA, focused on comparing potential impacts from the waste rock dump project with the status quo and will be particularly relevant should it be found, that detrimental impacts cannot be managed to an acceptable level.

The proposed waste rock dumps are located within the existing mining right of TRP, which has already been impacted on by the current activities. Granting the environmental authorisation for the waste rock dump project will allow TRP to continue with the mining activities, thereby extending the Life of Mine, and concomitantly extending the employment period of the current employees, whilst continuing to boost the local economy through the sourcing of supplies. The proposed development, therefore, has the potential to provide many socio-economic benefits to the local and regional communities.

7.2.9. Sensitivity Planning Approach

This alternative emphasises resource protection and uses stringent mitigation measures to minimise identified adverse impacts. This alternative will use specialist planning and evaluation of the following in order to avoid impacting on consolidated sensitive environmental features:

- Waste rock dump placement, and
- Pollution control dam placement

This alternative will allow for the TRP Waste Rock Dump Project whilst protecting identified consolidated sensitive environmental features as indicated in the consolidated sensitivity map. The concept of *in-sit*u conservation to account for potential residual impacts may also be explored.

8 DETAILS OF PUBLIC PARTICIPATION PROCESS FOLLOWED

Describe the process undertaken to consult interested and affected parties including public meetings and one-on-one consultation.
Note: The affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land).

This section describes the public participation process (PPP) undertaken for the project in line with Chapter 6 of the EIA Regulations (2014) [as amended]. The process is undertaken to ensure compliance with the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA) and the Environmental Impact Assessment Regulations (2014) [as amended]. The intention of the PPP was to inform Interested and Affected Parties (I&APs), in sufficient detail, of the EIA/EMPR in order that I&APs may contribute meaningfully to the EIA process.

The PPP to date has included notification of I&APs through distribution of a Background Information Document (BID), placement of newspaper advertisements and placement of site notices. A key aspect of public consultation is the notification of landowners, occupiers and users within, and adjacent to, the application area. Further information with regards to the PPP is provided below. All proof of public participation undertaken by during the scoping and EIA phase is included in Appendix 4 and Appendix 5.

8.1. INTERESTED AND AFFECTED PARTY (I&AP) DATABASE

As part of the PPP, an I&AP database (See Appendix 5-i) has been developed for the project. I&APs identified for the project include:

- Surrounding landowners, land users, adjacent landowners and communities
- Non-Governmental Organisations (NGOs) and associations

- Parastatals, and
- Government Authorities

8.1.1. Commenting Authorities

The Government Authorities notified and consulted with regards to the Two Rivers Platinum – Waste Rock Dump Project included, but was not limited to, the following:

- Department of Mineral Resources and Energy (DMRE);
- Department of Human Settlements, Water and Sanitation (DHSWS).
- Department of Environmental Affairs and Forestry;
- Department of Agriculture Forestry and Fisheries.
- Department of Rural Development and Land Reform (DRDLR)
    - Limpopo Department of Environment, Economic Development and Tourism
- South Africa Heritage Resource Agency (SAHRA);
- Limpopo Heritage Resources Authority;
- Greater Tubatse Local Municipality;
- Sekhukhune District Municipality;
- Tribal Authorities; and
- Ward Councillor/s

8.1.2. Decision-Making Authorities

The decision-making authorities with regards to the Two Rivers Platinum – Waste Rock Dump Project are:

- Department of Mineral Resources and Energy (DMRE), and
- Department of Human Settlements, Water and Sanitation (DDSWS)

8.1.3. Local Authorities

The Local Authorities consulted with regards to the Two Rivers Platinum – Waste rock Dump Project include:

- Sekhukhune District Municipality, and
- Greater Tubatse Local Municipality

I&APs who attended meetings and /or submitted contact details have been registered on the I&AP database. The latest copy of the database, including the update for the EIA phase is included in Appendix 5-i. The database has been updated on an on-going basis throughout the process.

8.2. INITIAL NOTIFICATIONS – SCOPING PHASE

The PPP commenced on 29th April 2021, with an initial call to register, review and commenting on the Draft Scoping Report for a period of 30 days, ending on 31st May 2021. The initial notifications were provided in the following manner:

8.2.1. Advertisements and Site Notices

An advertisement announcing the Project Initiation/Commencement was placed in the “Steelburger” newspaper on the 29th April 2021. A copy of the initial advertisement placed is included in Appendix 4-i.

Site notices, introducing the Two Rivers Platinum – Waste Rock Dump Project, were placed at appropriate accessible locations within and around the Two Rivers Platinum Mine on 21 April 2021. The site notices have been placed in conspicuous areas that are accessible by the public at the boundary. The site notices include a short background to the proposed project, the locality of the project, information on the activities that are being applied for and details of how the Environmental Assessment Practitioner (EAP) can be contacted to provide any comments. A copy of the site notice is included under Appendix 4-ii and proof of the site notices placement is presented in Appendix 4-iii.

8.2.2. Background Information Document (BID)

A Background Information Document (BID), which contains the basic facts about the Two Rivers Platinum – Waste Rock Dump Project, was provided to identified stakeholders and I&APs during the Scoping Phase. The BID included, as a minimum, the following information:

- A project description
- A locality map
- An outline of the environmental process being followed
- The details of the public participation process, and
- The contact details of the appointed EAP.

The BID and distribution of the BID's are presented in Appendix 4-iv.

8.2.3. Public Meetings

Due to the restrictions, as a result of COVID-19, and as per the requirements of the Disaster Management (Act 57 of 2002), and all regulations thereunder, no public open day was held for the scoping phase. However, to provide a further opportunity for I&APs to review the available documentation for the project for the scoping phase, I&APs were notified via the site notices and advertisements that Zoom meetings, Microsoft Team Meetings, Skype, and/or phone calls with I&AP's will be undertaken, on request. Notes of the Zoom, Microsoft Team, Skype, and/or phone calls are included in the Final Scoping Report (Please note that during the Scoping Phase, no such meetings were requested).

Due to the current COVID regulations, no open day is being held during the EIA public review period. Landowners/ stakeholders and registered I&APs will be invited to book online meetings time slots through Project Teams/Zoom or Skype. The discussions held for the online meetings will be noted and included in the final EIAR/EMPR (this report).

8.3. DETAILS REGARDING THE REVIEW OF THE DRAFT SCOPING REPORT

8.3.1. I&AP Review of the Scoping Report

The Scoping Report was made available for a period of 30 days from 29th April to 31st May 2021. Hard copies of the Scoping Report were submitted to all organs of state and relevant authorities. All comments received from I&AP's and organs of state; as well as the responses sent were included in the final Scoping Report submitted to the Competent Authority (CA).

8.3.2. DMRE Review of the Scoping Report

On completion of the 30-day review period, a Final Scoping Report was compiled which included comments received during the I&AP review period. The report was submitted to the DMRE for review on 3 June 2021. The Final Scoping was acknowledged by the DMRE on 1st July 2021.

8.3.3. Specialist Studies

As part of the EIA phase for the Two Rivers Platinum – Waste Rock Dump Project, the following specialist studies were undertaken and are included within the Appendices of this report.

- Geotechnical Investigation
- Surface Water (Hydrology) Assessment and Aquatic Assessment
- Wetland Assessment
- Terrestrial Ecology (Fauna and Flora Assessment)
- Archaeological and Cultural Heritage Impact Assessment Scan
- Palaeontological Exemption Letter
- Visual Impact Assessment
- Closure and Rehabilitation Plans (including Financial Provisioning), and
- Engineering Designs

For the description of the baseline information, the following existing specialist studies, conducted between 2010 and 2020, was used as reference. These studies are not included as appendices to this report.

- Soil, Land Use and Land Capability (Terra Africa Environmental Consultants, 2013)
- Noise (Ben van Zyl Acoustic Consultant, 2010)
- Waste Classification (GCS Environmental Engineering, 2015 and 2020), and
- Archaeological Assessment (Tobias, 2018)

8.4. PUBLIC REVIEW OF THE ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT REPORT – FIRST DRAFT REPORT

This section describes the PPP undertaken to date in line with Chapter 6 of the EIA Regulations (2014) (as amended). The process is undertaken to ensure compliance with the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA) and the Environmental Impact Assessment Regulations (2014) [as amended]. The intention of the PPP was to inform I&APs, in sufficient detail, of the proposed project in order for the I&APs to contribute meaningfully to the EIA process.

The PPP included notification of I&APs through the distribution of a Background Information Document (BID), placement of newspaper advertisements and placement of site notices. A key aspect of public consultation is the notification of landowners, occupier and users within and adjacent to the application area. More detail in this regard to the process followed is provided below.

All proof of public participation undertaken during the scoping phase is included in Appendix 4. The PPP undertaken (and updated during the process) during the EIA phase is provided in Appendix 5.

The following section will be set out according to the Chapter 6 NEMA Regulations (Government Gazette No. 326 of 7 April 2017):

8.5. SECTION 41: PUBLIC PARTICIPATION PROCESS

The public participation process that was undertaken for the EIA phase is described in the following sections. The public participation plan is attached in Appendix 5(iv).

8.5.1. Section 41, Subregulation 2(a) – Site Notices

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

a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—

i. the site where the activity to which the application or proposed application relates, or is to be undertaken, and

ii. any alternative site

6 site notices, in English, with the required information, as set out in Regulation 41(2), were erected within and surrounding the Two Rivers Platinum – Waste Rock Dump Project area on 7th September 2021. The site notices were placed in conspicuous areas that are accessible by the public at the boundary. The site notices included a short background to the proposed project, the locality of the project, information on the activities that are being applied for and details of how the Environmental Assessment Practitioner (EAP) can be contacted to provide any comments.

8.5.2. Section 41, Subregulation 2(b) – Written Notice

b) giving written notice, in any of the manners provided for in section 47D of the Act, to —

i. *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*

ii. *owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*

iii. *the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;*

iv. *the municipality which has jurisdiction in the area;*

v. *any organ of state having jurisdiction in respect of any aspect of the activity; and*

vi. *any other party as required by the competent authority.*

8.5.3. Written Notice

Written notices have by one of the means as specified in Section 47D will be utilised to notify all registered I&AP's of the availability of the Draft EIA/EMPr for public review.

8.5.4. Section 41, Subregulation 2 (c), (d) & (e) – Advertisements

c) *placing an advertisement in—*

i. *one local newspaper; or*

ii. *any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;*

d) *placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and*

e) *using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to—*

i. *illiteracy;*

ii. *disability; or*

iii. *any other disadvantage.*

An advertisement will be placed in the local newspaper prior to the start of the EIA PPP phase of the project. The advertisement will be placed on 7th September 2021, containing the information as required by the regulations.

The advertisement, in English, will been placed in the local newspaper (Steelburger) advising all interested and affected parties and stakeholders that the project has entered the EIA phase and that the Draft EIA/EMPr is available for public review. Information in the advertisement included a short project background (including the project and Applicant's name), project location, nature of the activity, information regarding the availability of the reports for review and contact details for the relevant EAP where I&APs could send comments/concerns.

Copies of all advertisement placed to date have been included in Appendix 4-i for the Scoping Report and Appendix 5-ii for the EIA, of this Environmental Impact Assessment Report.

8.5.5. Section 41, Subregulation 3

3) A notice, notice board or advertisement referred to in subregulation (2) must—

a) *give details of the application or proposed application which is subjected to public participation; and*

b) *state—*

i. *whether basic assessment or S&EIR procedures are being applied to the application;*

ii. *the nature and location of the activity to which the application relates;*

iii. *where further information on the application or proposed application can be obtained; and*

iv. *the manner in which and the person to whom representations in respect of the application or proposed application may be made.*

As indicated above, both the site notice and the adverts included all information as per the requirements of Section 41, Subregulation 3.

Site notices, in English, have been erected around the boundary of the Two Rivers Platinum – Waste Rock Dump Project on 7th September 2021 (Appendix 5-iii).

The EAP's contact number and email address were stated on the posters. Comments/concerns and queries were encouraged to be submitted in either of the following manners:

- Electronically (email);
- Telephonically; and/or
- Written letters.

8.5.6. Section 41, Subregulation 4

4) A notice board referred to in subregulation (2) must—

a) *be of a size of at least 60cm by 42cm; and*

b) display the required information in lettering and in a format as may be determined by the competent authority.

Site notices have been erected around the boundary of the Two Rivers Platinum – Waste Rock Dump Project and were at least 60cm by 42 cm (A2). A locality map has been included on the site notice. Refer to Appendix 5-iii for the site notice placements and a copy of the site notice that has been placed.

8.5.7. Section 41, Subregulation 5, 6 and 7

5) *Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that—*

a) *such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and*

b) *written notice is given to registered interested and affected parties regarding where the—*

   i. *revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b);*

   ii. *revised environmental impact assessment report or EMPr as contemplated in regulation 23(1)(b); or*

   iii. *environmental impact assessment report and EMPr as contemplated in regulation 21(2)(d);*

   may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.

6) When complying with this regulation, the person conducting the public participation process must ensure that

a) *information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and*
b) *participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.*

All relevant facts in respect of the application, have been made available to registered I&APs. The Environmental Impact Assessment Report with the Environmental Management Programme Report, including specialist work has been made available for public review and comment for a period of 30 days from 8th September – 8th October 2021.

One (1) hard copy of the report was submitted to the SED Coordinator.

A hard copy of the report was placed at the Security Gate entrance of Two Rivers Platinum. Due consideration and notification were given to the risks associated with hard copies of the report and hand sanitiser was provided together with the report for use by members of the public.

The report also be made available on Dropbox, an electronic format, and the link was sent to registered I&AP's.

7) *Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.*

When the WUL process is undertaken, the process will be undertaken as per the requirements of the regulations in terms of the NWA and I&APs will have an opportunity to comment on the documentation.

8.6. SECTION 42: REGISTER OF INTERESTED AND AFFECTED PARTIES

8.6.1. Interested and Affected Party (I&AP) Database

A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of—

a) *all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;*
b) *all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and*
c) *all organs of state which have jurisdiction in respect of the activity to which the application relates.*

As part of the PPP, the I&AP database, which has been developed in the scoping phase, has been continuously updated for the project. A copy of the updated database is included as Appendix 5-i in the Environmental Impact Assessment and Environmental Management Programme Report.

8.7. SECTION 43: REGISTERED INTERESTED AND AFFECTED PARTIES ENTITLED TO COMMENT ON REPORTS AND PLANS

8.7.1. I&APs and Commenting Authorities

43) 1) A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

Stakeholders who were captured/registered on the database for the project included the following:

- The owners or persons in control of the land where the proposed mining is to be undertaken (if different than applicant);
- The occupiers of the property where the development is to be undertaken;
- The owners and occupiers of land adjacent to the mining area;
- Provincial and local government (relevant local and district municipalities);
- Organs of state, other than the authorising authority, such as the Department of Agriculture, Forestry and Fisheries (DAFF – now grouped with Environmental Affairs, forming DFFE since 2021), having jurisdiction in respect of any aspect of the proposed project;
- Relevant residents' associations, rates payers' organisations, community-based organisations and NGOs;
- Environmental and water bodies, forums, groups and associations; and
- Private sector (business, industries) in the vicinity.

8.7.2. Decision-making Authorities

The decision-making authorities includes the:

- Department of Mineral Resources and Energy (DMRE); and
- Department of Human Settlements, Water and Sanitation (DHSWS) – (Water Use License).

I&APs who submitted contact details have been registered on the I&AP database. The database has been updated on an on-going basis throughout the process and included as Appendix 5-i to the Environmental Impact Assessment and Environmental Management Programme Report.

8.8. ENVIRONMENTAL AUTHORISATION AND MINING RIGH APPLICATION

- Notification:

All potential I&APs were notified in English by means of an advertisement, site notices and/or notification letter and were requested to register as an I&AP for the Two Rivers Platinum – Waste Rock Dump Project.

- Environmental Impact Assessment Phase:

1) The draft EIAR/ EMPR inclusive of all the specialist studies, was made available for public review for 30 days from 8th September – 8th October 2021. Registered I&APs were notified of the availability of the EIAR. The report will be made available electronically via a downloadable link on Dropbox. A hard copy of the report was made available at the Two Rivers Platinum Mine.
2) Copies of the EIAR will be submitted to stakeholders and government departments for review.
3) All communication received during the environmental impact assessment phase will be included as an Appendix in the Final EIAr to be submitted to the DMRE.

8.9. SECTION 44: COMMENTS OF INTERESTED AND AFFECTED PARTIES TO BE RECORDED IN REPORTS SUBMITTED TO COMPETENT AUTHORITY

8.9.1. Public Meetings and Open Days

Due to the current COVID regulations, no open day is being held during the EIA public review period. Landowners/ stakeholders and registered I&APs will be invited to book online meetings during the 30-day public review period through Project Teams/Zoom or Skype. The discussions held for the online meetings will be noted and included in the final EIAR/EMPR (this report).

During the EIA phase, the purpose of the online meetings will be to present the findings of the specialist reports to the public and to address any concerns that I&APs may have with regards to the project. As per GNR 43412 (5 June 2020), the EAP and Applicant will ensure that all reasonable measures are taken to identify potential I&APs for purposes of conducting public participation on the application; and to ensure that, as far as is reasonably possible, taking into account the specific aspects of the application-

(a) information containing all relevant facts in respect of the application or proposed application is made available to potential I&APs; and

(b) participation by potential or registered I&APs has been facilitated in such a manner that all potential or registered I&APs are provided with a reasonable opportunity to comment on the application or proposed application.

The Applicant and EAPs, in addition to the methods contained in Chapter 6 of the EIA Regulations, or as part of reasonable alternative methods proposed in terms of regulation 41(2)(e) of the EIA Regulations, may make use of the following non-exhaustive list of methods:

- emails, websites, Cloud Based Services, or similar platforms, direct telephone calls, virtual meetings, newspaper notices, community representatives, distribution of notices at places that are accessible to potential I&APs.

Hard copies or electronic versions of reports may be made accessible through any of the following non-exhaustive list of methods:

- websites, Zero Data Portals, community or traditional authorities, Cloud Based Services, provided that all registered I&APs have access to the reports.

As indicated above hard copies of the report will be made available at the entrance to the Two Rivers Platinum Mine. The registered I&AP's will also be provided with an electronic copy of the report, via a Dropbox link. A hard copy was provided to the Two Rivers Platinum SED Coordinator. (Due consideration and notification was given to the risks associated with hard copies of the report and sanitiser will be provided with the report, for use by members of the public).

8.9.2. Summary of Issues Raised by I&APs from Public Participation

(Complete the table summarizing comments and issues raised, and reaction to those responses)

Salient points may be summarised (but are not limited) to the following (Initial Scoping commenting period: 29th April to 31st May 2021).

- Employment opportunities at Two Rivers Platinum Mine

Comments received until the compilation of the Draft EIA report are listed below and have been discussed in this section. Please see Appendix 5-vii for a full comments and responses report. The comments received all focused on potential employment opportunities at the Two Rivers Platinum Mine.

8.10. WAY FORWARD

All comments received from I&APs and organs of state and responses have been addressed in a transparent manner and are included in the Comments and Response Report (Appendix 5-vii), in the final Environmental Impact Assessment and Environmental Management Programme Report herewith submitted to the Competent Authority (CA). Any additional comments received after submission will be forwarded to the DMRE (if received after commenting period).

8.10.1. DMRE Review of Environmental Impact Assessment and Environmental Management Programme Report – Finalised Report

After the 30-day public review period, all comments received will be address and incorporated into the Final EIA report. This report will then be submitted to the Department of Mineral Resources and Energy for consideration. The Department will make a decision and approve or reject the Environmental Authorisation based on the contents of the final report submitted.

8.11. ISSUES RAISED BY I&APs

8.12. Summary of Issues Raised by I&APs from Public Participation

(Complete the table summarizing comments and issues raised, and reaction to those responses)

A summary of the comments received during the Scoping phase are listed below. All comments received during the EIA phase will be included, and the comments addressed as required by the regulations. Please see Appendix 4-v for the complete Scoping Phase Comments and Response Report.

- The comments received all focused on potential employment opportunities at the Two Rivers Platinum Mine.

9 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES

(The environmental attributeS described must include socio- economic, social, heritage, cultural, geographical, physical and biological aspects)

No alternatives changes have been found which will influence the general baseline environmental conditions experienced. The baseline environment as described below, are the Environmental attributes as associated for the proposed development.

10 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITE: BASELINE ENVIRONMENT

(Its current geographical, physical, biological, socio- economic and cultural character)

This section of the EIA/EMP Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area, as well as specialist reports undertaken for the Two Rivers Platinum – Waste Rock Dump Project.

10.1. GRADIENT AND LANDSCAPE CONTEXT

The TRP site is located between two ridges approximately 5 km to the east of the Dwars River and Klein Dwars River confluence. The area is characterised by gentle slopes running in southerly direction towards the Springkaanspruit. The elevation ranges from 900 mamsl (metres above mean sea level) in the northern extent of the project area to 960 mamsl in the southern and eastern extent of the project area.

The surrounding area comprises of undulating, mountainous terrain, where elevations range from 1 900 mamsl in the Schurinksberg range in the east to 800-1 000 mamsl in the Steelpoort, Dwarsrivier and Klein-Dwarsrivier river valleys. The elevation rises steeply to 1 600 m to the west and south west of the Dwarsrivier valley, on the western periphery of the Dwarsrivier farm.

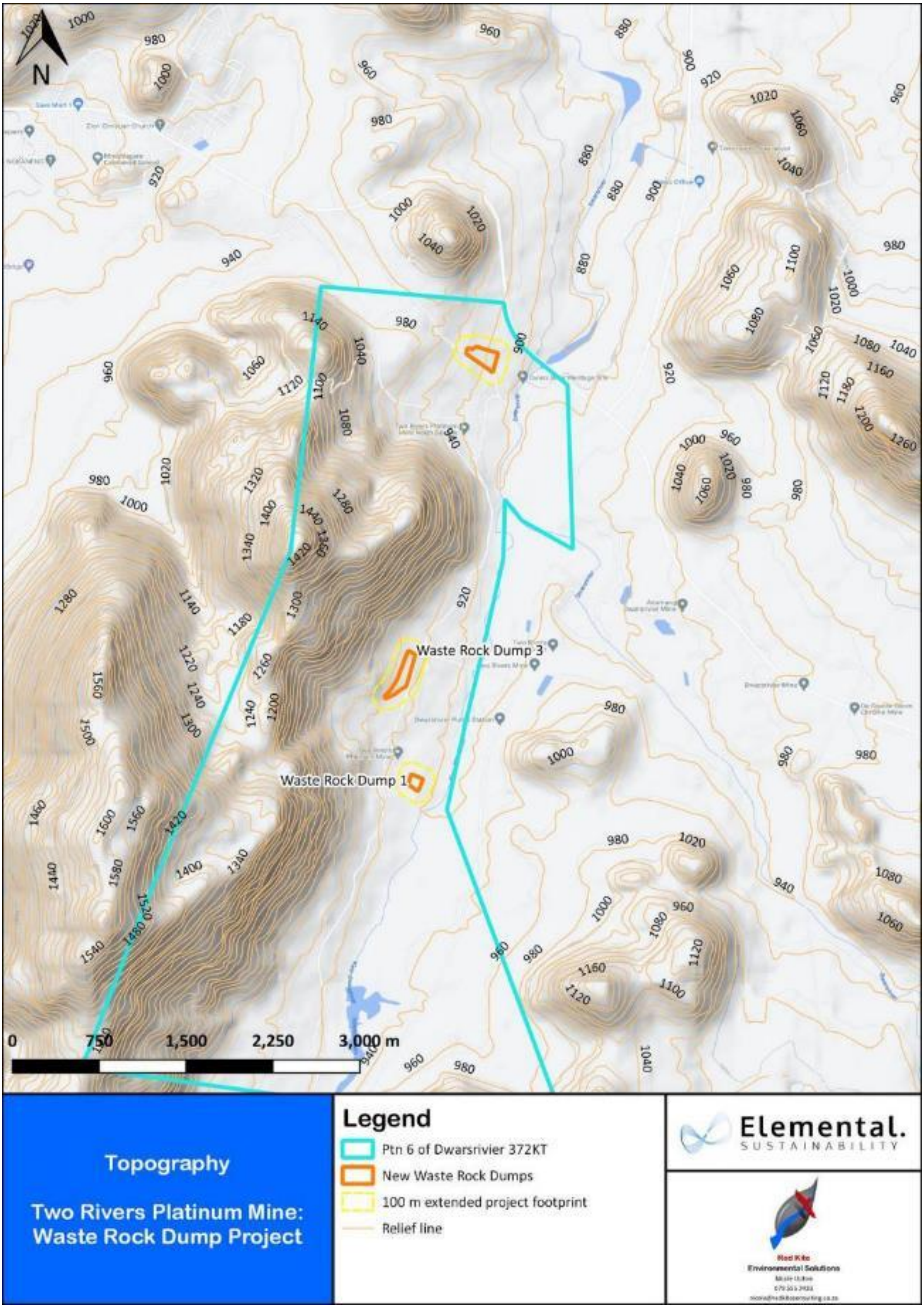


Figure 13: Site Topography

10.2. GEOLOGY

Reference is made to the Preliminary Engineering Designs Report (August 2021), and the Hydrogeological Assessment undertaken Aquatox Consulting (March 2021), which were used to inform the geological assessment (refer to Appendix 6 and 7 respectively).

10.2.1. Regional Geology

The Two Rivers Platinum – Waste Rock Dump project falls within the 2430 Pilgrims Rest 1:250 000 geology series maps.

The Bushveld Complex is divided into five limbs, the eastern, western, far western, northern, and the south-western limbs. The principal platinum group element (PGE)-bearing reefs in the Bushveld Complex are the Merensky Reef (MR), the UG2, and the Platreef. These are located within the Rustenburg Layered Suite (RLS) of the Bushveld Complex. The MR and the UG2 occur prominently throughout the Western and Eastern Limbs, while the Platreef is restricted to the Northern Limb. PGE mineralisation in the Bushveld Complex is dominated by Pt and Pd, with a Pt/Pd ratio on the order of 4.5 and 2.1 for the MR and the UG2, respectively.

The Two Rivers Platinum mine is located on the eastern limb of the Bushveld Complex in the Rustenburg Layered Suite and the Dwars River Sub-suite. The geology of the Dwars River Sub-suite compromises primarily anorthosite and norite with thin localized layers of chromite and pyroxenite. The strata dips to the west.

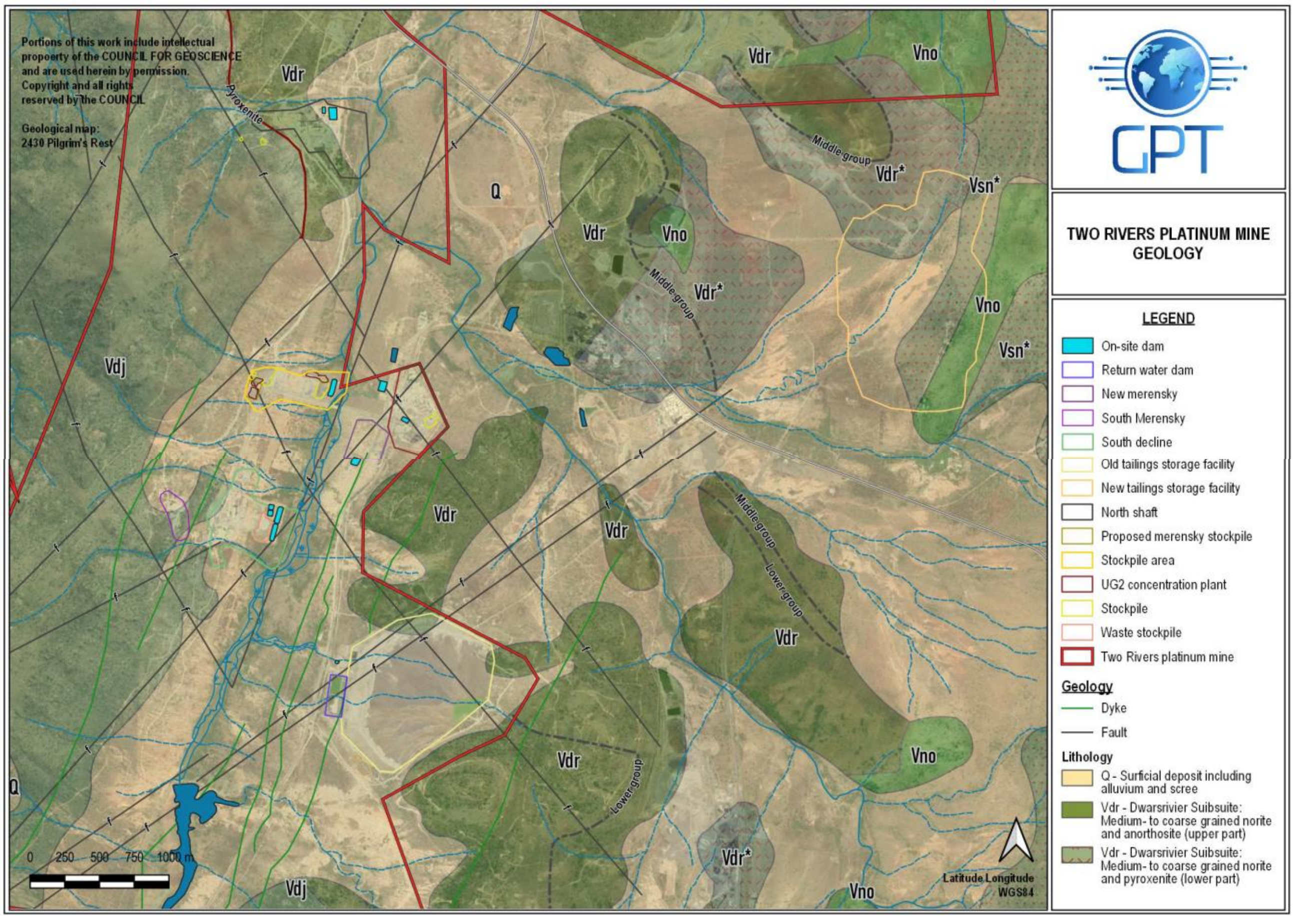


Figure 14: Regional Geology Map (1:250 000 geology series map)

10.2.2. Local Geology

The Eastern Limb of the Bushveld Complex is an arcuate body, with exposures of the RLS occurring over a distance of 220 km. On the basis of major geological structures (faults) within the Eastern Limb, it is subdivided into the Western, Central and Southern sectors. The 3 km-wide Steelpoort lineament forms the boundary between the Southern and the Central sectors, with TRP located within the Southern sector, on the farm Dwarsriver 372KT. The rock package associated with the MR in the Bushveld Complex is a very distinctive sequence comprising of a lower anorthosite or norite, overlain by a thin chromitite. This is typically followed by an overlying feldspathic pyroxenite of variable grain size (< 5 cm) and variable thickness (< 40 cm). Additional chromitite layers may occur within and at the top of this pegmatitic pyroxenite. A feldspathic pyroxenite of normal grain size, <10 m thick, lies above the pegmatitic pyroxenite. Overlying this is a thin norite, followed by an upper anorthosite up to 12 m thick. At TRP, the MR consists of an interval of pyroxenite bounded by a thin basal and upper chromitite stringer. The pyroxenite varies in thickness from 0.9 m to over 3 m, and is predominantly a 'normal pyroxenite' with an average grain size of 2 mm. Four MR facies types are recognised at TRP, based on pyroxenite thickness, presence or absence of chromitite stringers, and the pattern of PGE mineralisation. Of these, Reef facies 2 is the most dominant throughout the mining lease area, and was therefore targeted for trial mining. It has an average thickness of 2.7 m, and fairly uniformly distributed PGE mineralisation.

The UG2 of the Bushveld Complex is a platiniferous chromitite layer developed some 20 to 400 m below the MR. It is usually about 1 m thick (but can vary from 0.4 to 2.5 m), and consists predominantly of chromite, with relatively minor orthopyroxene and plagioclase. At TRP, the UG2 varies in thickness from 1.2 to 1.4 m, with an average of about 1m. Below it is a pegmatoidal pyroxenite, and above it is a melanorite. This melanorite (averaging 20 cm thick) separates the UG2 from the overlying 'Leader 2' chromitite seam, which is between 3 and 6 cm thick. Leader 2 is in turn overlain by a feldspathic pyroxenite (typically 25 cm thick), and this is followed by the 'Leader 1'chromitite layer (20 cm thick). Two UG2 reef facies types are observed at TRP, being (i) 'normal reef' as described above and (ii) 'split reef', consisting of laterally persistent lenses of fine- to medium-grained pyroxenite, that separates the UG2 into sublayers (Mabuza 2006). PGE mineralization in the UG2 at TRP typically peaks at the base of the UG2.

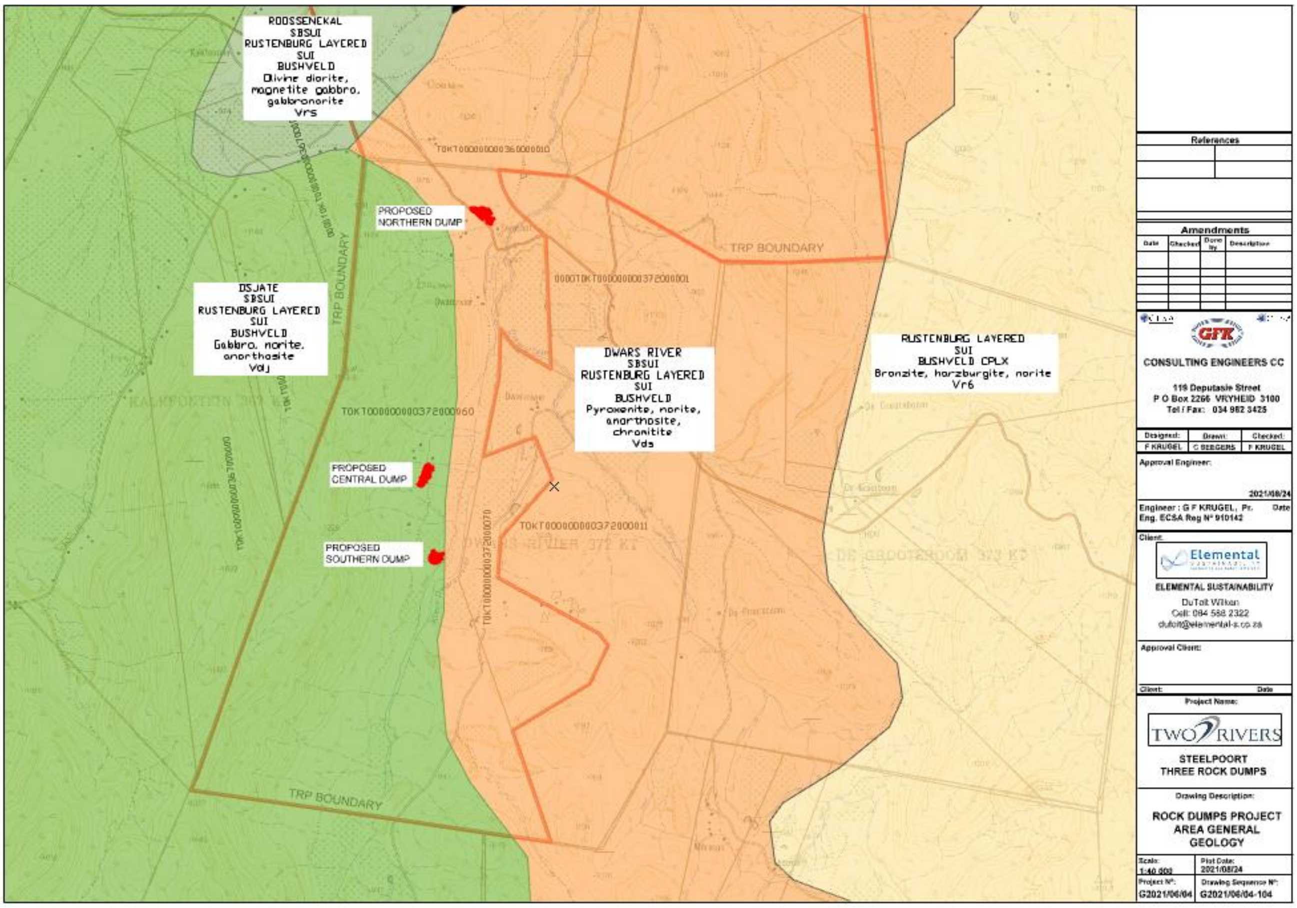


Figure 15: Local Geology Map

10.3. CLIMATE

The project area is situated on the eastern escarpment on the border of the Highveld and Northern Transvaal climatic zones (Schulze, 1974). The climate can generally be defined as sub-humid and can be locally described as normally hot and dry.

The temperatures are highest from October to March, peaking in January where daytime temperatures average around 32°C. Hot days during January reach an average high of 37°C. The temperatures are the lowest form May to August, with temperatures dropping at night to 8°C during the month of July. During June and July, cold nights may drop to temperatures as low as 3°C. The below graph indicates the modelled monthly averages and peaks for both day and night times for the Steelpoort region.

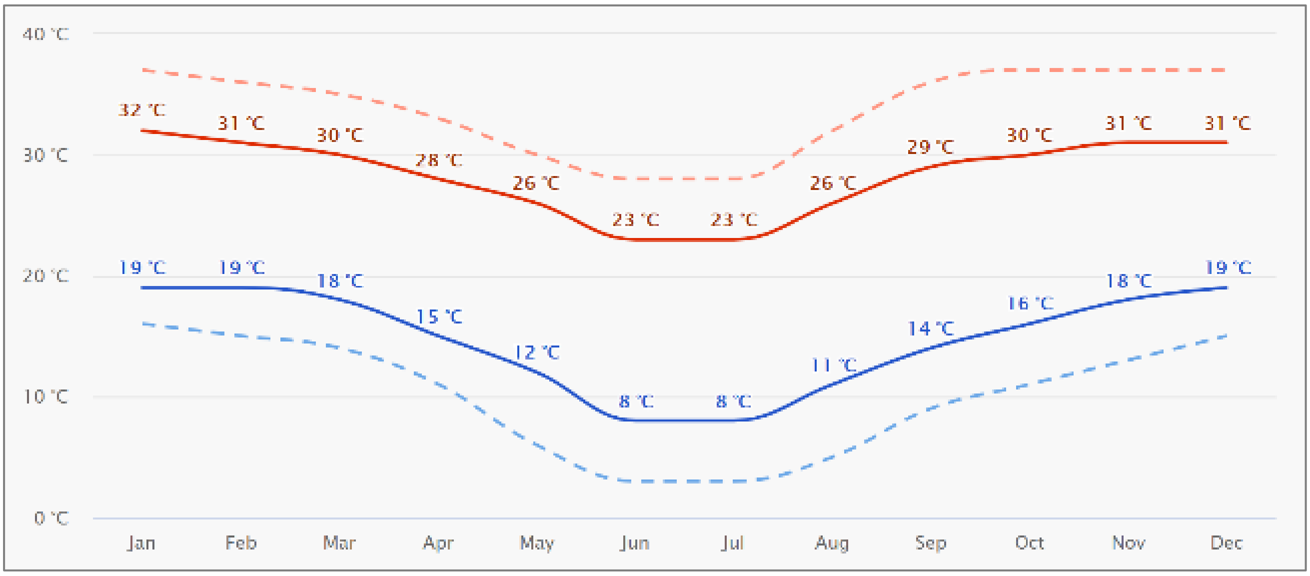


Figure 16: Average Monthly Temperatures (Meteoblue)

The highest rainfall occurs during the warm, summer months of October to March, peaking in January while colder months, April to September receive limited rainfall. Most of the rainfall results from thunderstorms and short duration bursts can be expected. Most of the thunderstorms occur in the late afternoons and evenings. The below figure depicts the average rainfall per month, with the maximum average of 61 mm during December, and the lowest average of 2 mm during June and July. The below graph indicates the modelled monthly average rainfall for the Steelpoort region.

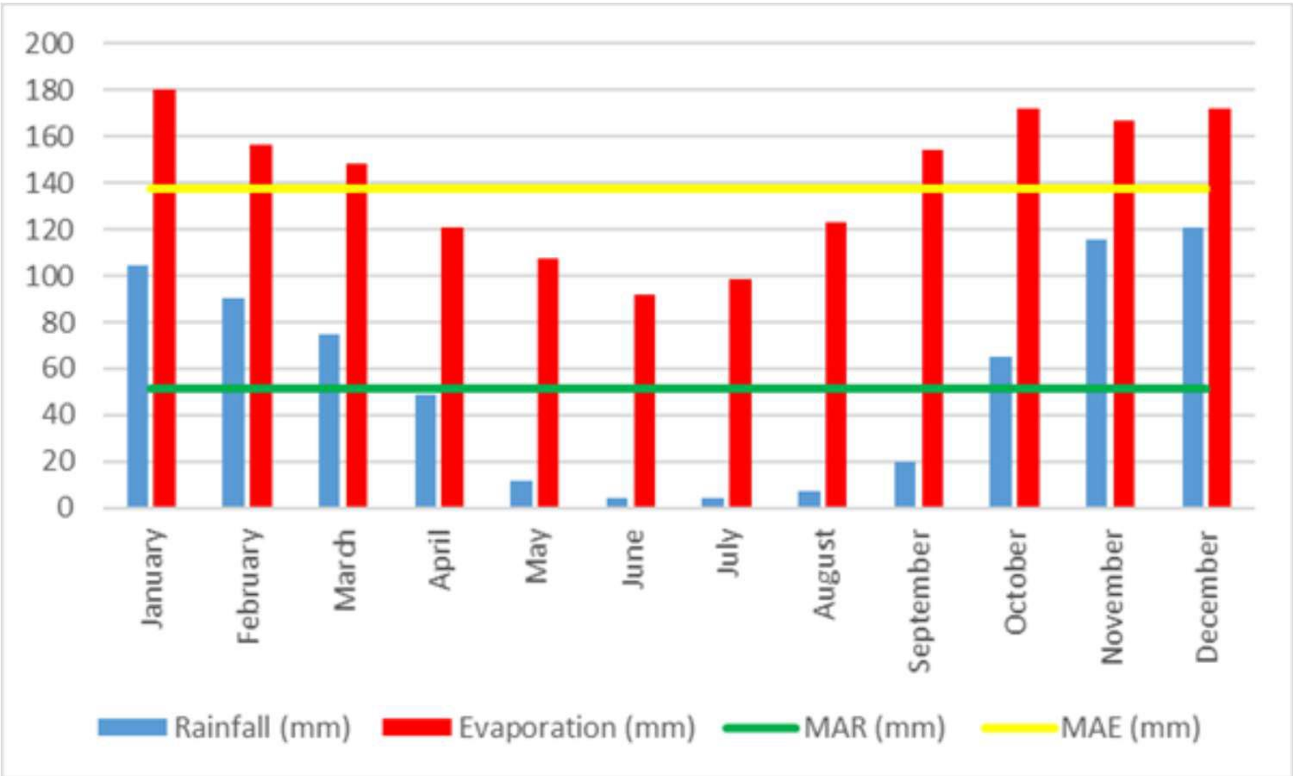


Figure 17: Climatic Data

The below table provide the WR2012 evaporation and precipitation data specific to the B41G and B41H quaternary catchments within the Olifants Water Management Area, where the three additional waste rock dumps will be located. Both quaternary catchments fall within the 4A evaporation zone and the B4B rainfall zone.

Table 13: Catchment specific precipitation and evaporation data (WR2012)

WMA	Quaternary Catchment	Catchment Area (km^2)	Precipitation (mm/a)	Evaporation (mm/a)
Olifants	B41G	442	650	1500
	B41H	410	610	1600

10.4. ENGINEERING DESIGN AND GEOTECHINICAL ASSESSMENT

Updated engineering designs were completed for the Two Rivers Platinum – Waste Rock Dump Project in August 2021. A copy of the report is included in Appendix 6.

The approximate centre coordinates of the three proposed rock dumps are as follows:

- Northern site (north of North Shaft) 24°54' 30.66"S 30° 6' 1.09"E
- Central site (west and between South Decline and Stockpile area) 24°56' 9.65" S 30° 5' 35.80"E
- Southern site (just south of South Decline) 24°56' 40.91"S 30° 5' 40.18"E

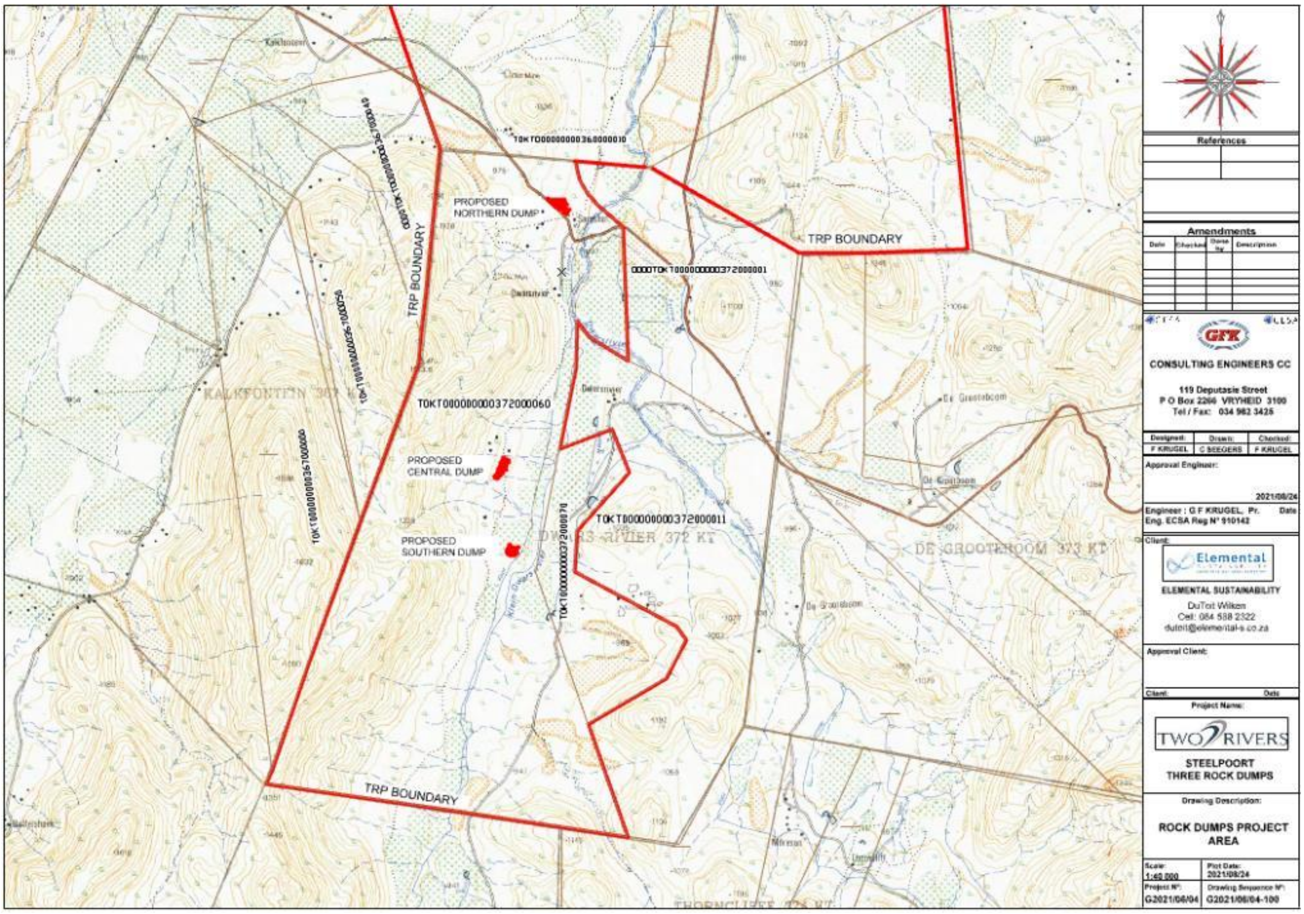


Figure 18: 1:50 000 Map 2430 CC with proposed three new Rock Dumps and TRP boundary

10.4.1. Barrier Designs

10.4.2. Waste Rock Dump Pads

A waste assessment conducted, indicates that the waste rock dumps pose a Low Risk. Hence, Class D barriers are proposed for the Waste Rock Dumps (WRDs) pads consisting of the following:

- Strip vegetation and topsoil for stockpiling and use where grass needs to be planted/established.
- Rip approximate 150 mm deep, water if required to Optimum Moisture Content (OMC), and compact with heavy vibrating roller to minimum 95% of Mod AASHTO.

10.4.3. Pollution Control Dams

Class C double barrier system is required for the Pollution Control Dams (PCDs), with concrete silt traps where stormwater enters the PCDs, consisting of the following:

- Underdrainage system with a leakage monitoring, consisting of 110mm diameter perforated drain pipes placed in a herringbone pipe system where applicable, discharging to a collector drain.
- A 300mm thick clay layer consisting of two 150mm layers compacted to minimum 95% Proctor density at OMC. Results of a geotechnical investigation to determine permeability of in-situ material were not available at report writing. In the event that available material is found to be not impermeable enough, it is proposed the increase the HDPE membrane to minimum 2 mm thick.
- HDPE geomembrane liner, minimum 1.5 mm thick or 2 mm as described above, textured one side on 1:3 embankment slopes.
- As the LOM is approximately 22 years, a 150mm thick ash-cement protection layer on at least the side walls to serve as an UV protection layer and extend the life of the geomembrane is recommended.
- Ballast bags filled with minimum 30kg sand, evenly spaced on a 4m x 4m grid on the PCD basin or the same 150 mm thick ash-cement protection as for the sides.

Grass lined channels with stone pitching, where required, will collect stormwater emanating from the dumps. The channels will also have berms on the natural veld side of the channels to prevent water from the surrounding natural veld to enter the channels. No “clean” water channels will be required to divert water from the surrounding areas away from the dumps due to the topography at the dumps. The berms on the natural veld side of the channels collecting water from the dumps will be sufficient to prevent storm water from the surrounding natural veld to enter the channels.

10.4.4. Channels and Berms

Class D barriers are motivated for the rock dumps (Appendix 6 and Appendix 8b); therefore grass – lined stormwater channels only with stone pitching where required to prevent erosion, are proposed e. No dedicated clean water channels would be required due to the specific topography at the dumps. The channels will have berms on the natural veld side of the channels, which will be sufficient to prevent clean water from the natural veld to enter the channels leading to the PCDs.

10.4.5. Facilities Size and Capacity

10.4.6. Rock Dump Volume

The following compacted volumes will be achievable given the requirement for sufficient buffers from streams assuming average slopes of 1:1.5 (angle of repose is approximately 1:1.4)

North dump: 167 000 m^3

Central dump: 26 000 m^3

South dump: 120 000 m^3

Total: 313 000 m^3

10.4.7. Required Pollution Control Dam Size

The required sizes for the PCDs are as follows:

- PCD North: 2500 m^3 storage capacity + 300 m^3 dead storage in PCD = 2800 m^3
- PCD Central: 1900 m^3 storage capacity + 200 m^3 dead storage in PCD = 2100 m^3

For the South Dump, the existing PCD will be used. An insignificant addition due to the proposed extension of the existing dump is predicted of approximately 2 m^3 per day.

10.4.8. Safety and Hazard Classification

According to Government Notice R. 139 of 24 February 2012 a dam with a capacity of less than 50 000 m^3 and less than 5 m high embankment falls outside the Dam Safety Regulations. The hazard classification of the infrastructure can be determined as follows:

Table 14: Hazard Classification (Government Gazette Nov 2014 no 38209)

Number of Residents in zone of influence	Number of workers in zone of influence	Value of third party property in zone of influence	Depth to underground mine workings	Classification
0	1 – 10	0 – R2m	>200m	Low hazard
<10	11 – 100	R2m – R20m	50m – 200m	Medium hazard
>10	>100	>R20m	<50m	High hazard

10.4.9. Waste Rock Dumps

The angle of repose of the rock is approximately 36 degrees. For potential capacity purposes an angle of repose of 33,7 degrees (1:1,5) has been assumed to be conservative. At slopes of 1: 1.5 the rock dumps will be stable, but it is proposed to ensure it will remain stable under seismic conditions of minimum 0,1 g as well. In terms of Hazard rating, the hazard rating can be regarded as low.

10.4.10. Pollution Control Dams

Due to the fact that the maximum wall/embankment heights above Natural Ground Level (NGL) of all the proposed PCDs are lower than 5m above NGL and the capacities all less than 50000 m^3, the structures all fall outside the safety categorization criteria of DWS Dam Safety.

In terms of Hazard rating, there are no existing or planned underground works/mining in any significant proximity of the mention structures to the best knowledge of the author (needs to be confirmed). Together with the expected number of residents and workers working in the influence zone of the surface structures and the value of third-party property in the zones of influence, the hazard rating can be regarded as low in the opinion of the author.

10.4.11. Facility Buffers

Each proposed dump is flanked by a non – perennial stream. The dump toes will be approximately further than 40m from the streams and the channel edges 32m from the streams. However, the PCDs will contain water for longer periods and therefore the PCDs will be constructed 100m away from the non – perennial streams and will have Class C liners, with underdrainage systems for leakage detection. The northern edge of the PCD required for the Central Rock Dump cannot be further than 100m m from a road culvert on the north, but is further than 32 m from the road culvert. It will be possible to pump any water that leak, back into the PCDs. The proposed Waste Rock Dumps, including stormwater collection channels, will be outside the 1:100 m flood lines (Figures Figure 19, Figure 20 and Figure 21 below).

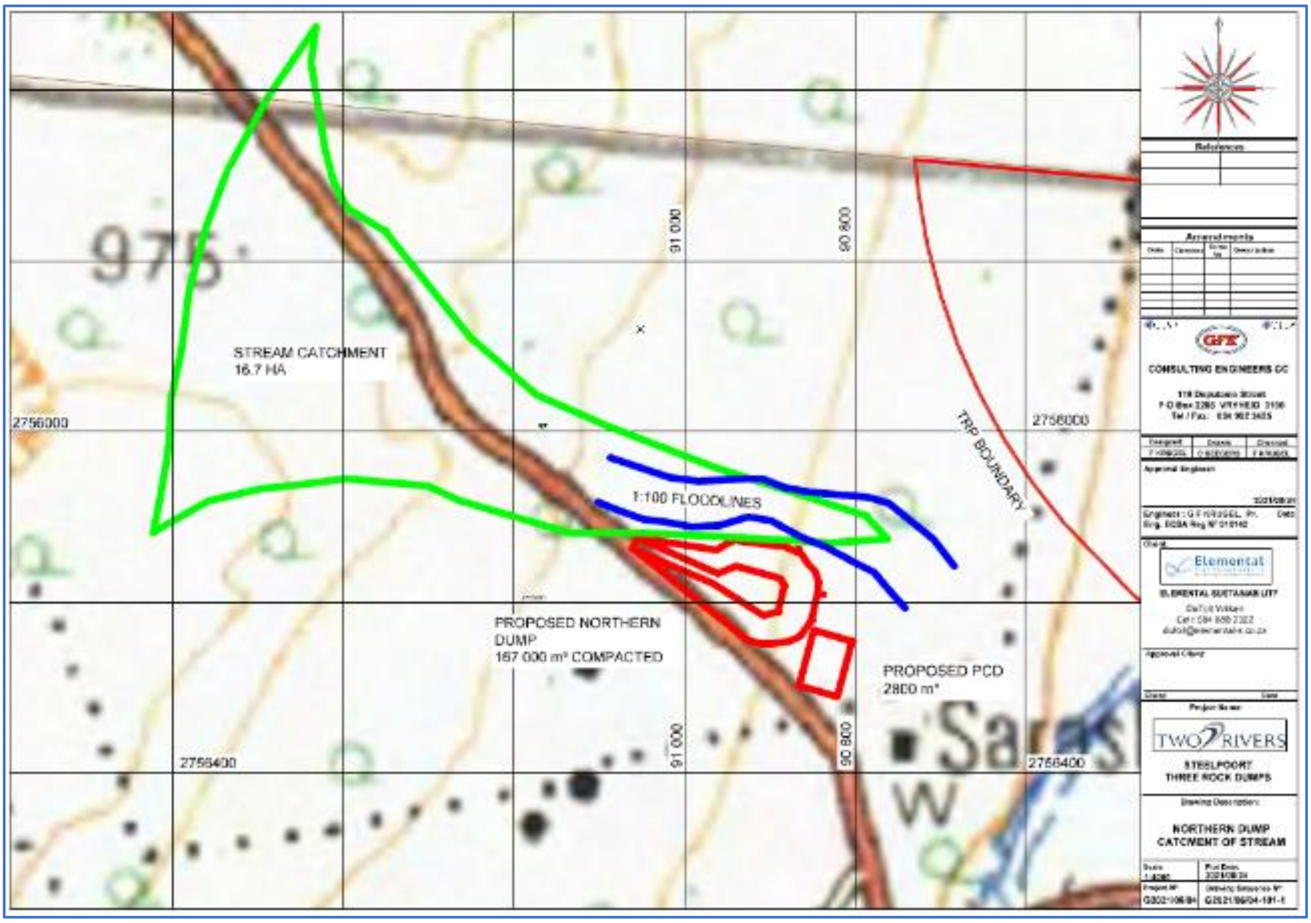


Figure 19: Northern Waste Rock Dump with 1:100-year flood lines

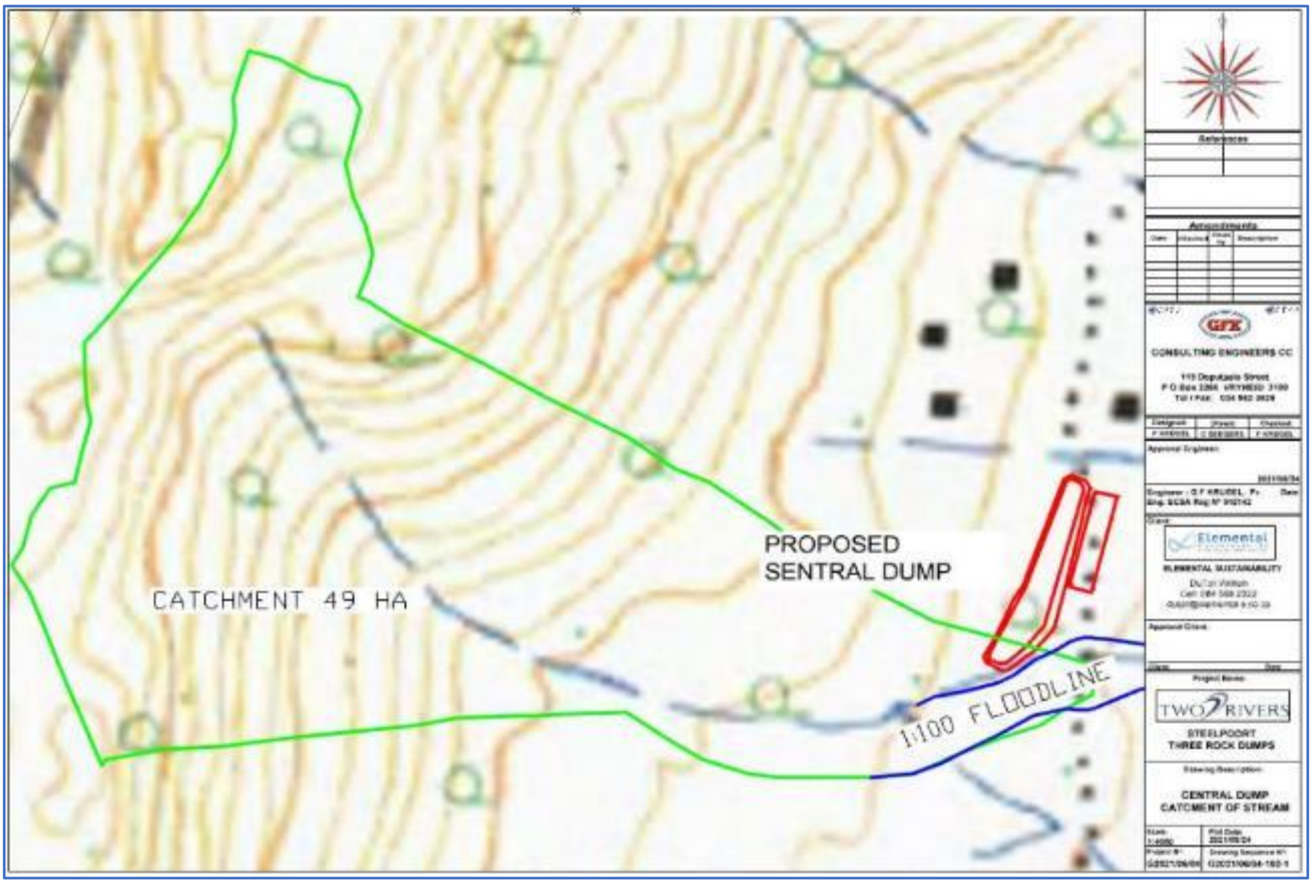


Figure 20: Catchment of non-perennial stream adjacent to the Central Waste Rock Dump

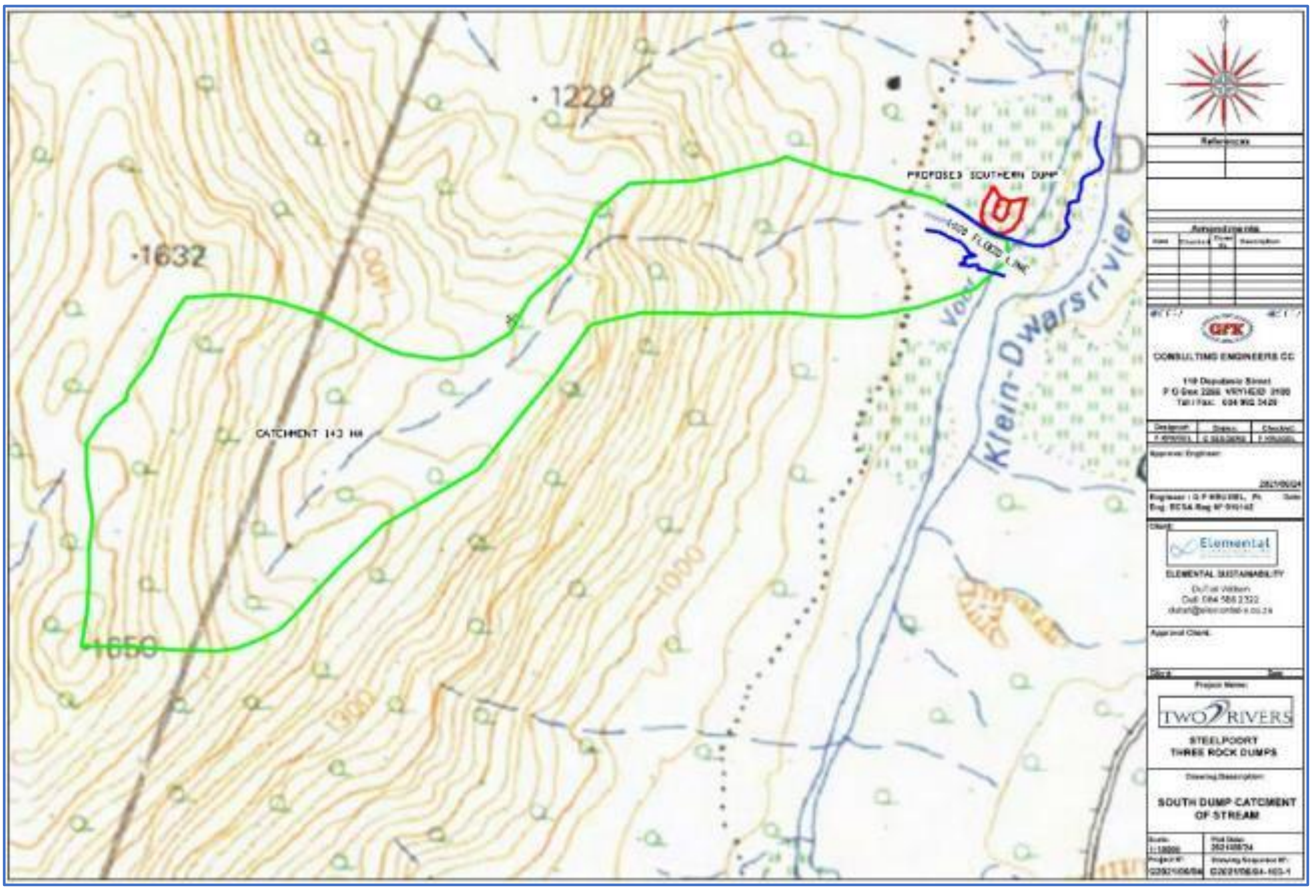


Figure 21: South Waste Rock Dump indicating 1:100 flood lines

10.5. GROUNDWATER (HYDROGEOLOGY)

A hydrogeological model assessment was undertaken for the Two Rivers Platinum – Waste Rock Dump Project. A copy of the report is included in Appendix 7.

10.5.1. Hydrogeology

According to the 1:500 000 General Hydrogeological Map, the Rustenburg Layered Suite rocks typically act as secondary aquifers (intergranular and fractured rock aquifers with average yields ranging between 2-5 l/sec). However, the multi-layered weathering system present on these rocks could prove to have up to two aquifer systems present in the form of a shallow, saprolitic aquifer with a weathered, intergranular soft rock base associated with the contact of fresh bedrock and the weathering zone, and a fractured bedrock aquifer.

Rocks belonging to this RLS are characterised by a well-developed igneous layering and various rock units which form part of it, have a fairly uniform composition and may be traced over appreciable distances. The RLS consists mainly of mafic rocks including norite, gabbro, magnetite gabbro, anorthosite, pyroxenite and others. The groundwater potential is generally good with 42% of the successful boreholes yielding >2 l/s. Water occurs mainly in deeply weathered and fractured mafic rocks. Due to the relative high permeability of the weathered and fractured rock, these basins can be extremely good aquifers. Problems have been experienced in some of the mines outside the map area where large volumes of water are intercepted in fractured anorthosite at depths of 300m. Water is also obtained in fault and associated shear or fracture zones, contact zones and dyke contacts. The borehole yield analysis reveals that approximately 27% of 119 boreholes documented yield between 2 – 5 l/s, 26% yield between 0.5 – 2 l/s, 23% between 0.1 – 0.5 l/s, and 15% are stronger than 5 l/s. The median borehole yield is 1.0 l/s and the maximum encountered was 25 l/s.

The water within this unit is not suitable for domestic use due to the average nitrate level being above the maximum allowable limit for potable water. One EC measurement was also above the maximum allowable limit with corresponding high chloride and magnesium values. This point is, however, an anomaly and may be due to local contamination. The water displays a magnesium-bicarbonate-chloride character and appears to be slightly alkaline.

10.5.2. Hydrocensus

In July 2020 (Shangoni), a hydro census was performed on and around the study areas to identify groundwater users, groundwater potential and baseline data. During the hydro census, all available details of boreholes and borehole-owners were collected in a 5km radius from the mine. Where possible, information was collected on water use, water levels and yields of boreholes, etc. This information was used to assess the risk posed by the mining activities on the groundwater regime and users thereof. The following parameters, where possible, were captured during the hydro census:

- XYZ Coordinates
- Existing equipment
- Current use
- Future use
- Yield
- Drill depth

- Static/dynamic water level
- Water quality – in particular, samples were selected to study the effect of nitrate pollution.

10.5.3. Groundwater Levels

Groundwater levels were measured during the hydro census survey conducted in July 2020. Six (6) privately used boreholes, thirty-six (36) monitoring boreholes owned and operated by TRP, and fourteen (14) monitoring boreholes from adjacent mines were surveyed during the field hydro census in July 2020. One fountain (H35-F0487) was identified on a private land user's property, 4.5 km west of the mine. Two monitoring boreholes, TRPGWM06s and TRPGWM06d, monitoring the weathered and fractured aquifer, respectively were recorded as artesian.

Static water levels within the fractured aquifer range between 0 and 79.10 meters below surface (mbs) with an average of 17.01 mbs, while water levels within the shallow weathered aquifer range between 0 and 12.01 mbs with an average of 5.61 mbs. The substantial difference in water levels noted between the shallow and deeper aquifers may be an indication of hydraulically disconnected aquifers. However, due to the highly heterogenous and fractured nature of hard rock aquifers, some connectivity may be present at places.

All privately owned boreholes are located to the west of the mining area and most of these boreholes recorded relatively deep-water levels of between ~30 to ~50 mbs. Several monitoring boreholes were also drilled by TRP within this area and recorded levels of similar depth.

From the water levels taken from the deep and shallow boreholes it is noted that the privately owned boreholes to the west are tapping the deeper fractured aquifer and that the water levels are substantially lower compared to the monitoring boreholes at the mine. The cause of the lower water levels is unknown but could be caused by a dewatering drawdown effect (transient flow and dewatering model was outside the scope of this investigation).

Hydraulic heads in mamsl were calculated and plotted against surface topography (in mamsl). A fair correlation of 0.94 is evident for the boreholes with some outliers present. These outliers were recorded for the privately owned and TRP monitoring boreholes located to the west, approximately 5 km, from the mine. When these were removed a near perfect fit of 0.997 was achieved. It can therefore be assumed with relative accuracy that the shallow and deeper fractured aquifers in vicinity of TRP mimic surface water flow directions. The reason for the lower water levels to the west ('outliers') is currently unknown but suspected to be caused by a dewatering cone of depression, the quantification of which was outside of the scope of this investigation.

Water level data was also made available from the monitoring database managed by the client. The TRPGWM boreholes were drilled in a series of pairs to monitor the shallow-weathered and deep-fractured boreholes. For the most part, the weathered and fractured water levels are dissimilar and therefore are hydraulically disconnected from each other. In some instances, the fractured aquifer display piezometric heads, with some being artesian (i.e. TRPGWM06S & D) indicating a confined water table at depth.

Within some boreholes the weathered and fractured aquifer display similar water levels and fluctuations, which may indicate that the weathered aquifer is not well developed everywhere. The weathered aquifer could also be shallower than the 10- and 30 mbs as inferred by previous specialists. It also indicates that the shallow aquifer is better developed in the Klein Dwars River flood plain and in the valley areas (Golder, 2016).

10.5.4. Groundwater Recharge Calculations

Recharge to the shallow, unconfined aquifer was calculated using the RECHARGE program developed by the Institute for Groundwater Studies at the University of the Free State, South Africa. The calculated recharge percentage equates to approximately 5%.

10.5.5. Groundwater Quality

During the hydro census, samples were taken from selected boreholes and analysed for hydrochemical quality (Figure 22). The water results are compared with the maximum recommended concentrations for domestic use as defined by the SANS 241-1: 2015 target water quality limits. The SANS 241-1: 2015 standard is applicable to all water services institutions and sets numerical limits for specific determinants to provide the minimum assurance necessary that the drinking water is deemed to present an acceptable health risk for lifetime consumption.

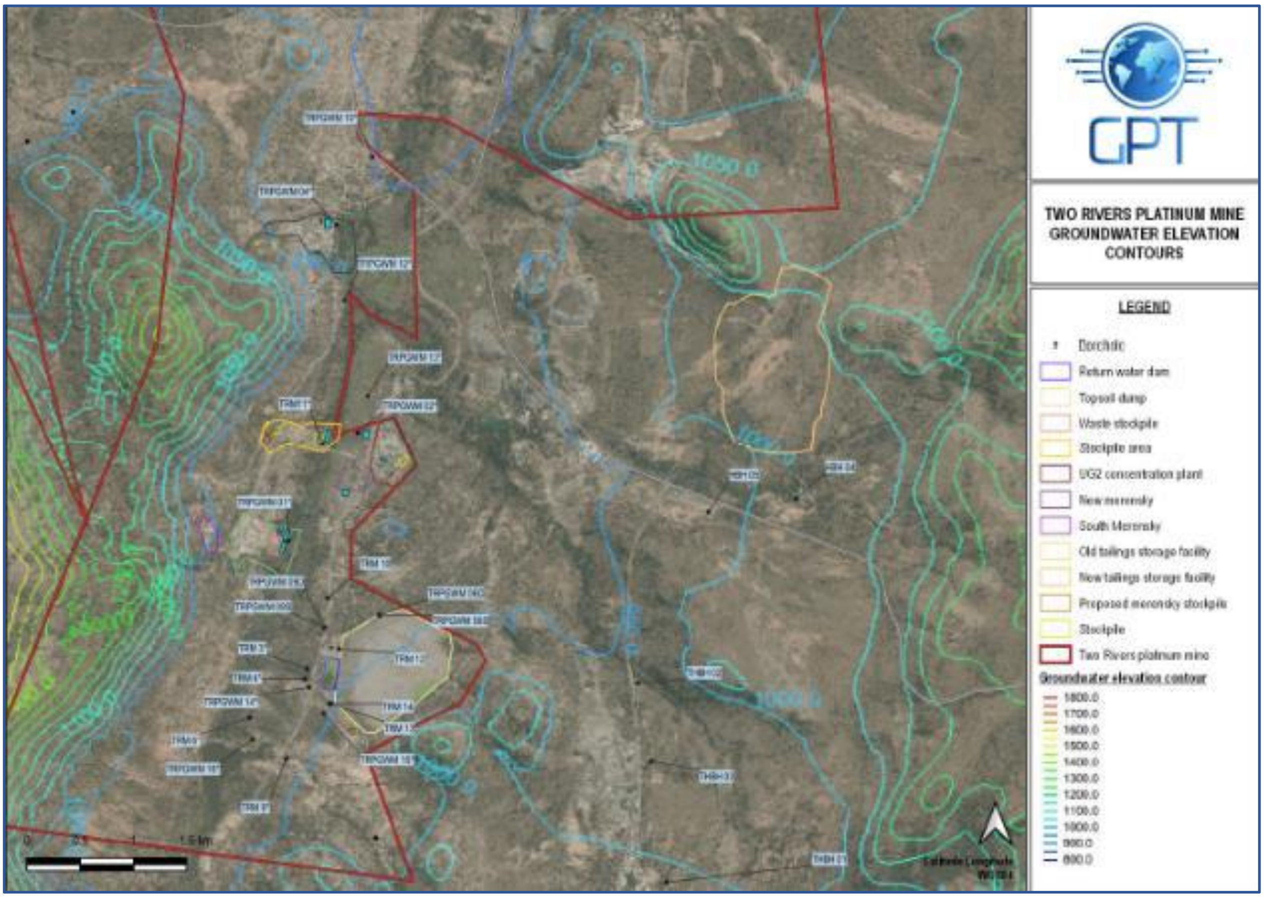


Figure 22: Contoured Water Levels of the Water Table Aquifer

10.5.6. Groundwater Quality vs SANS Standards

The following observations were made in terms of the existing boreholes:

- Nitrate as N concentrations are elevated in TRPGWM01D, TRPGWM02D, TRPGWM04S and
- TRPGWM10D. This might be due to the presence of explosive residue in the return water dams where theses boreholes are located.
- Sulphate exceeded the aesthetic limits but not the chronic health limits in TRPGWM06D, TRPGWM06S, TRPGWM14D, TRPGWM16S, TRPGWM15D, TRPGWM15S
- Conductivity exceeded the limits in TRPGWM04S
- TDS Exceeded the limits in TRPGWM04D, and TRPGWM04S
- The limits for chloride were exceeded in TRPGWM04S
- The limits for sodium were exceeded in TRPGWM14S

The pie diagrams (Figure 23) show both the individual ions present in a water sample and the total ion concentrations in meq/l or mg/l. The scale for the radius of the circle represents the total ion concentrations, while the subdivisions represent the individual ions. The data suggest that the majority of boreholes in and around the active mining area has a Na-Mg, Cl-SO4 signature, indicating contamination form mining and related activities.

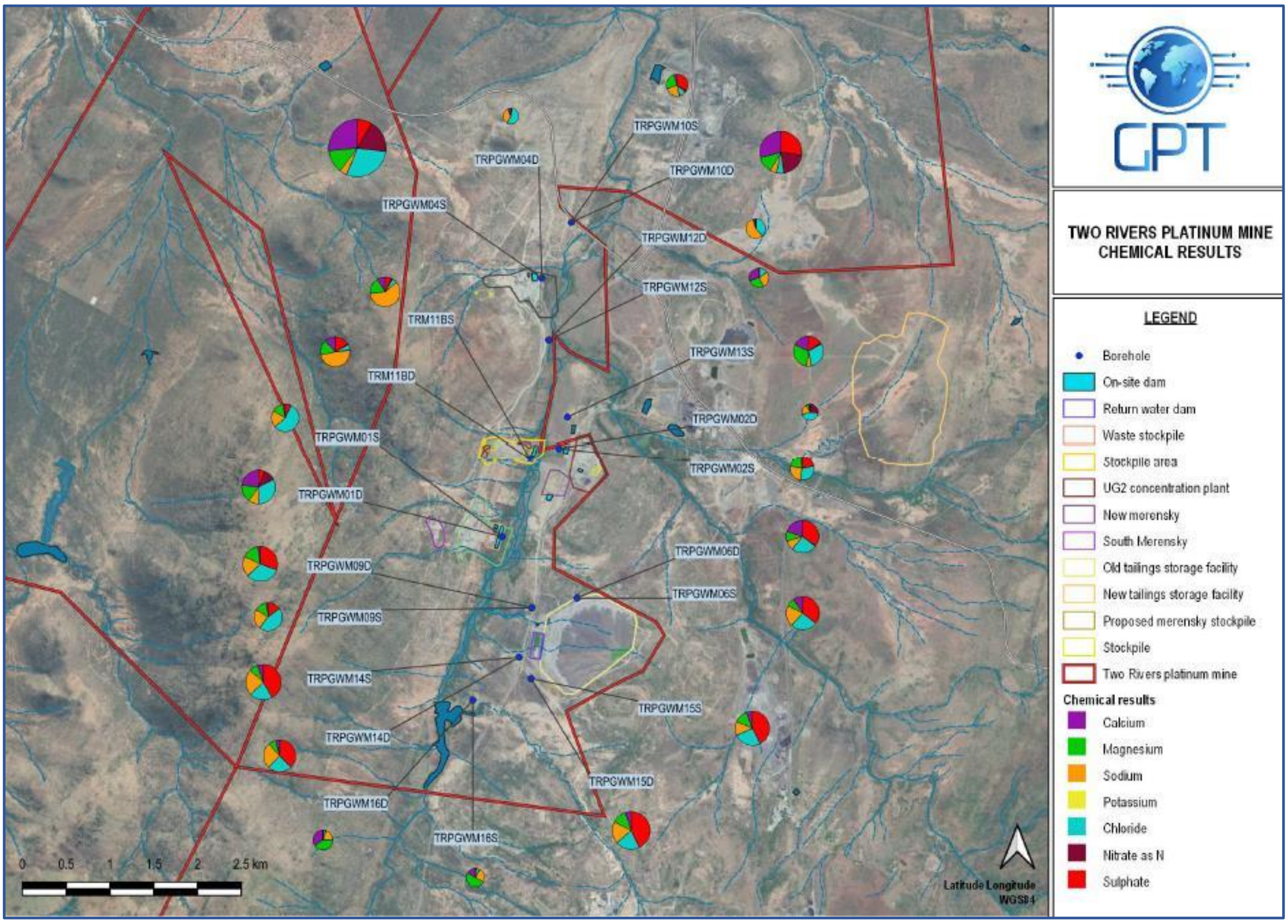


Figure 23: Pie Diagrams for Groundwater Chemistry

10.5.7. Aquifer Characterisation

The term aquifer refers to a strata or group of interconnected strata comprising of saturated Earth material capable of conducting groundwater and of yielding usable quantities of groundwater to boreholes and /or springs (Vegter, 1994). In the light of South Africa's limited water resources, it is important to discuss the aquifer sensitivity in terms of the boundaries of the aquifer, its vulnerability, classification and finally protection classification, as this will help to provide a framework in the groundwater management process.

10.5.8. Aquifer Vulnerability

Aquifer vulnerability assessment indicates the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer. Stated in another way, it is a measure of the degree of insulation that the natural and man-made factors provide to keep contamination away from groundwater.

Vulnerability is high if natural factors provide little protection to shield groundwater from contaminating activities at the land surface.

Vulnerability is low if natural factors provide relatively good protection and if there is little likelihood that contaminating activities will result in groundwater degradation.

The following factors have an effect on groundwater vulnerability:

- Depth to groundwater: Indicates the distance and time required for pollutants to move through the unsaturated zone to the aquifer.
- Recharge: The primary source of groundwater is precipitation, which aids the movement of a pollutant to the aquifer.
- Aquifer media: The rock matrices and fractures which serve as water bearing units.
- Soil media: The soil media (consisting of the upper portion of the vadose zone) affects the rate at which the pollutants migrate to groundwater.
- Topography: Indicates whether pollutants will run off or remain on the surface allowing for infiltration to groundwater to occur.
- Impact of the vadose zone: The part of the geological profile beneath the Earth's surface and above the first principal water-bearing aquifer. The vadose zone can retard the progress of the contaminants.

The Groundwater Decision Tool (GDT) was used to quantify the vulnerability of the aquifer underlying the site using the below assumptions.

- Depth to groundwater below the site was estimated from water levels measured during the hydro
- census inferred to be at mean of ~12.63 mbgl;
- Groundwater recharge of ~873.6 mm/a (6 % recharge);
- Bushveld vadose zone;
- Gradient of 5.8% were assumed and used in the estimation.

The aquifer vulnerability for a contaminant released from surface to a specified position in the groundwater system after introduction at some location above the uppermost aquifer was determined using the criteria described below and assuming a worst-case scenario:

- Highly vulnerable (> 60), the natural factors provide little protection to shield groundwater from contaminating activities at the land surface.
- Medium Vulnerable = 30 to 60%, the natural factors provide some protection to shield groundwater from contaminating activities at the land surface, however based on the contaminant toxicity mitigation measures will be required to prevent any surface contamination from reaching the groundwater table.
- Low Vulnerability (< 30 %), natural factors provide relatively good protection and if there is little likelihood that contaminating activities will result in groundwater degradation.

Aquifer Vulnerability: The GDT calculated a vulnerability value of 49%, which is medium.

10.5.9. Aquifer Classification

The aquifer(s) underlying the subject area were classified in accordance with "A South African Aquifer System Management Classification, December 1995." The main aquifers underlying the area were classified in accordance with the Aquifer System Management Classification document. The aquifers were classified by using the following definitions:

- Sole Aquifer System: An aquifer which is used to supply 50% or more of domestic water for a given area, and for which there is no reasonably available alternative sources should the aquifer be impacted upon or depleted. Aquifer yields and natural water quality are immaterial.
- Major Aquifer System: Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good (Electrical Conductivity of less than 150 mS/m).
- Minor Aquifer System: These can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large quantities of water, they are important for local supplies and in supplying base flow for rivers.
- Non-Aquifer System: These are formations with negligible permeability that are regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer unusable. However, groundwater flow through such rocks, although imperceptible, does take place, and needs to be considered when assessing the risk associated with persistent pollutants.

Based on information collected during the hydro census it can be concluded that the aquifer system in the study area can be classified as a "Minor Aquifer System", based that these can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability.

In order to achieve the Aquifer System Management and Second Variable Classifications, as well as the

Groundwater Quality Management Index, a point scoring system as presented in Table 15 and Table 16 was sed.

Table 15: Ratings – Aquifer System Management and Second Variable Classifications

Aquifer Management System Classification		
Class	**Points**	**Study Area**
Sole Source Aquifer System:	**6**	
Major Aquifer System:	**4**	
Minor Aquifer System	**2**	**2**
Non-Aquifer System	**0**	
Special Aquifer System	**0 – 6**	
Second Variable Classification (Weathering / Fracturing)		
Class	**Points**	**Study Area**
High	**3**	
Medium	**2**	**2**
Low	**1**	

Table 16: Ratings – Groundwater Quality Management (GQM) Classification System

Aquifer Management System Classification		
Class	**Points**	**Study Area**
Sole Source Aquifer System:	**6**	
Major Aquifer System:	**4**	
Minor Aquifer System	**2**	**2**
Non-Aquifer System	**0**	
Special Aquifer System	**0 – 6**	
Aquifer Vulnerability Classification		
Class	**Points**	**Study Area**
High	**3**	
Medium	**2**	**2**
Low	**1**	

In terms of Aquifer Characterisation, the aquifer under investigation can be classified as a “Minor Aquifer System”. The aquifer vulnerability can be regarded as “medium”. The aquifer protection classification is “Medium.”

10.5.10. Aquifer Protection Classification

A Groundwater Quality Management Index of 4 was estimated for the study area from the ratings for the Aquifer System Management Classification. According to this estimate a medium level groundwater protection is required for the aquifer. Reasonable and sound groundwater protection measures based on the modelling will therefore be recommended to ensure that no cumulative pollution affects the aquifer, even in the long term. DWA’s water quality management objectives are to protect human health and the environment. Therefore, the significance of this aquifer classification is that measures must be taken to limit the risk to the following environments: The protection of the underlying aquifer and the numerous pans and wetlands situated within and outside the mining rights area.

10.5.11. Discussion

Monitoring data and historic information that was made available indicate an already impacted groundwater system. The activities are surrounded by historical and current mining operations that reflects a heavily altered and complex regional groundwater system influenced by multiple sources. The current regional groundwater conditions are therefore mostly a result of cumulative impacts from historical and current mining activities.

Waste rock classification to date indicates that the waste rock marginally classifies as a Type 3 waste based on total concentrations as well as the leachable concentrations. However, it is evident that the waste rock will not produce a significant leached contaminant stream, nor pose any risks to the receiving environment. It is our professional opinion that the environmental setting does not suggest that this material presents any significant environmental risks, and therefore does not need an underliner.

10.6. WASTE ROCK MATERIAL CLASSIFICATION

Information from existing Waste Classification and Characterisation (June 2020) specialist report was utilised, supplemented by the Addendum to the Waste Classification Report (August 2021) the copies of which are included in Appendix 8a and Appendix 8b, respectively. The information was further supplemented by the existing Hydrogeological Model Assessment (Appendix 7) conducted in March 2020.

Waste rock stockpiles on surface consist of non-ore bearing rock removed from underground. This rock is not exposed to mineral extraction processes but is removed from the underground via mechanical means, after which it is stockpiled in current Waste Rock Dumps on site. Two Rivers Platinum requires three (3) additional Waste Rock Dump facilities to ensure continuity of mining operations.

10.6.1. Risk Assessment and Waste Classification

The National Norms and Standards for the Assessment of Waste for Landfill Disposal, published in GN 635 of 2013, prescribe the requirements for the assessment of waste, prior to disposal to landfill. These regulations were promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) prior to its amendments.

Although these regulations may not specifically apply to residue stockpiles and residue deposits, the requirements thereof have been considered as a guideline when assessing leach potential. GN 635 requires that all wastes that are to be disposed of in landfills, be assessed in terms of composition and leaching properties. The total concentrations, and leachable concentrations, of specified analytes, are used to assess the waste. These values were then compared to leachable concentrations thresholds (LCT) and total concentration thresholds (TCT), to determine the waste "type".

There are five waste types, numerically ordered from Type 0 to Type 4. Type 0 waste being most hazardous in respect of landfilling risk, and Type 4 being the least hazardous. The waste types are determined as shown in Table 17 below.

Table 17: GN 635 – Waste Classification

Leachable Concentration	Total Concentration	Waste Type
LC ≤ LCT0	TC ≤ TCT0	Type 4
LCT0 < LC ≤ LCT1	TC ≤ TCT1	Type 3
LCT1 < LC ≤ LCT2	TC ≤ TCT1	Type 2
LCT2 < LC ≤ LCT3	TCT1 < TC ≤ TCT2	Type 1
LCT3 ≤ LC	TCT2 < TC	Type 0

The National Norms and Standards for Disposal of Waste to Landfill, gazetted in GN 636 of 2013, stipulate the applicable landfill classes for disposal of each waste type, as presented in Table 18. It must be noted that the Regulations Regarding The Planning And Management Of Residue Stockpiles And Residue Deposits, 2015, GN.R 632 of 2015, subsequently amended by GN 990 of 2018, stipulate the means by which the pollution control, mitigation, and management measures must be determined for residue deposits and stockpiles. The liner requirements from GN 636 are used here as a guideline.

Table 18: Landfill Requirements Based on Waste Type (GN 636)

Waste Type	Landfill Requirements
Type 0	The disposal of Type 0 waste to landfill is not allowed. The waste must be treated and re-assessed in terms of the Norms and Standards for Assessment of Waste for Landfill Disposal.
Type 1	Type 1 waste may only be disposed of at a Class A landfill designed in accordance with Section 3(1) and (2) of these Norms and Standards, or, subject to Section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a Hh/HH landfill, as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., Department of Water Affairs and Forestry, 1998).
Type 2	Type 2 waste may only be disposed of at a Class B landfill designed in accordance with Section 3(1) and (2) of these Norms and Standards, or, subject to Section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a GLB+ landfill, as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).
Type 3	Type 3 waste may only be disposed of at a Class C landfill designed in accordance with Section 3(1) and (2) of these Norms and Standards, or, subject to Section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a GLB+ landfill, as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).
Type 4	Type 4 waste may only be disposed of at a Class D landfill designed in accordance with Section 3(1) and (2) of these Norms and Standards, or, subject to Section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a GLB landfill, as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).

A waste rock sample from the Main Decline (WRMD01) was collected from TRP and submitted to Aquatico Laboratory for assessment and classification in 2020, based on the conjecture that the sample is representative of its respective waste stream. The waste rock was assessed, in accordance with the leaching criteria in the National Norms and Standards for the Assessment of Waste for Landfill Disposal, published in GN 635 of 2013. The waste rock sample was leached, in accordance with the requirements for mono-disposal of nonputrescible waste.

Results from the leach test exceeded the relevant LCT0 values for Total Chrome (Cr), Manganese (Mn), and Nickel (Ni). All other analytes are below the LCT0 values (Appendix 8). In terms of the Total Concentration Threshold Leach, Copper (Cu) exceeded the TCT0 limit. All other analytes are below the LCT0 values (Appendix 8).

Based on the requirements as set out in Table 15, the waste rock should be classified as Type 3, based on the leach results, implying that a Class C liner is applicable. However, based on the risk to the environment an exemption application is made in terms of Regulations 3 and 4 of the National Exemption Regulations (No R.994) read with Section 24M(3) of National Environmental Management Act (Act No 107 of 1998) and Section 74 of the NEM: Waste Act (Act No 59 of 2008) and specifically requests exemption from complying with GNR. 636.

10.6.2. Motivation for Exemption and Reclassification of Waste Rock Material

The exemption to re-classify the waste as Type 4 waste, that requires a Class D liner is based on the following:

Table 19: Motivation for Exemption and Reclassification

Risk		Motivation
1	TCT and LCT values	– Very low TCT and LCT concentration tested in the waste with only Total Chrome (Cr), Manganese (Mn), and Nickel (Ni) exceeding the LCT0 value and Copper (Cu) exceeding the TCT0 value.
2	Environmental Conditions	– The waste will be a mono-disposal and no other waste will be disposed at the facility, possessing a very low risk to the environment. – No acid generation will take place in the environment and the waste has a high pH of 9.29. As no acid will be generated by the environment or the waste no additional leaching is expected.
3	Stormwater management	– A stormwater management system will be constructed to collect all the water generated through runoff from the WRD. The water will be contained in a pollution-controlled dam (PCD). The PCD will be lined with a Class D performance liner and will be designed to contain the 1:50 flood event.
4	Surface and groundwater	– The WRD's will be outside of the 1:100 flood line and more than 32m away from any water sources. – Based on the geohydrological report the waste rock holds a very low risk to cause pollution. – The waste will not cause acid formation and will not result in the formation of AMD. The waste has a very low leaching potential and is alkaline.
5	Existing WRD	– An existing waste rock dump is present on the mining area. The monitoring results for the mine indicated that the WRD has a very low potential to cause pollution and no significant pollution has been observed that emits from the WRD.

10.6.3. Analysis and Discussion

In respect of lining for the proposed WRD facilities at TRP, it is recommended that an equivalent Class D liner be approved, in cognisance of the risks assessed, in particular:

- Low risk to cause surface or groundwater pollution
- Pollution management to be implemented as proposed by the Engineering report
- The findings of the waste type analysis.
- The leach results for Waste Rock.
- No Risk of Acid formation or AMD.
- Existing monitoring results for the site, which span over seven years.

The geohydrological specialist study (Aquatox_2021) concluded that: “ The geological formations were considered in conjunction with the analysis. Waste rock classification to date indicates that the waste rock marginally classifies as a Type 3 waste based on total concentrations as well as the leachable concentrations. However, it is evident that the waste rock will not produce a significant leached contaminant stream, nor pose any risks to the receiving environment. It is our professional opinion that the environmental setting does not suggest that this material presents any significant environmental risks, and therefore does not need an underliner.”

According to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), GG36784, GNR 634 National Norms & Standards for the Assessment of Waste for Landfill Disposal (2013) (Chapter 4(9)): Motivation can be submitted to demonstrate that the waste management activity, including associated storage and handling, can be implemented and conducted consistently and repeatedly in a controlled manner without unacceptable impact on, or risk to, the environment or health.

Annexure1(2)(a)(viii) indicates that excavated earth material not containing hazardous waste or hazardous chemicals do not require classification in terms of Regulation 4(1), nor assessment in terms of Regulation 8(1)(a). As the waste rock is excavated earth material which were not exposed to the chemical beneficiation process this material does not contain hazardous chemicals, the specialist concludes that no synthetic liner is required for the additional Waste Rock Dumps (Table 20).

The following recommendation must be implemented to ensure that the risk to the environmental remain very low:

- The stormwater management system to be implemented as recommended by the Engineering report.
- The monitoring program to be maintained and the new PCD’s should be included into the monitoring network.
- The Waste rock, where possible should be utilised of rehabilitation and closure of the declines to limit the amount of Waste Rock that will remain on surface after closure.
- The WRD’s should be shaped and topsoil to be placed as a capping over the WRD’s during rehabilitation for closure.

Table 20: Waste Classification of Waste Rock Dump Material

Waste Classification	DWAF Guideline Class	GHS Class	Waste Type
Waste Rock 	**Class C – to be reclassified as Class D based on motivation for exemption**	**Type 3 Low Risk– to be reclassified as Type 4 based on motivation for exemption**	**Non - hazardous**

10.7. SURFACE WATER (HYDROLOGY)

Reference is made to the Surface Water Assessment undertaken by Redkite Environmental Solutions and was used to inform this section regarding the surface water environment. Refer to Appendix 9 for a copy of the report.

10.7.1. Methodology

The study included a desktop study which provided the majority of the surface water and climate baseline information, water quality data comparison, a site survey to assess the condition of the watercourses and associated riparian vegetation on site and the application of rating criteria to assess the impacts of the proposed project on the surface water system.

A field survey was conducted in May 2021. The field survey was supplementary to the desktop analysis and served as a fatal flaw analysis to determine whether there are any major ecological concerns with regard to the project.

10.7.2. Water Quality

All water samples collected during the site visit were submitted to a SANAS Accredited Laboratory for analysis.

Water samples were collected at sites considered to be representative of potential impacts related to the proposed project and to minimise as far as practical the inclusion of impacts related to water uses and users not associated with the Applicant. Two samples were obtained, one upstream of the project site, within the Klein-Dwars River, and the second downstream of the operation within the Dwars River.

Table 21: Water quality sampling location information

Monitoring Point	Location Description	Coordinates
TRP US1	Upstream of operations – Klein Dwars River	24°59'8.46"S, 30°04'52.90"E
TRP DS1	Downstream of operations – Dwars River	24°54'10.46"S, 30°06'36.08"E

The parameters to be analysed were based on the type of mining undertake (PGMs), the receiving environment and the potential impacts from the Two Rivers Platinum – Waste Rock Dump Project to the surface water environment.

Water quality analysis results are compared to the DWAF Water Quality Guidelines – Aquatic Ecosystems (1st Edition, 1996), as well as the Resources Quality Objectives (RQO) set out for the applicable catchment as per the Government Gazette GN 639, 7 September 2018 (No.41887).

10.7.3. Catchments

The project site falls within the Olifants Water Management Area (WMA) and the Upper Olifants Sub-WMA. The major rivers include Elands River, Wilge River, Steelpoort River, Olifants River and Letaba River.

The project falls within Steelpoort River tertiary catchment, covering 7200 km^2, and consists of three subbasins: the Upper Steelpoort, Central Steelpoort and Lower Steelpoort subbasins. TRP's mining operations are located in the Central Steelpoort subbasin.

10.7.4. Surface Water Quality

The Olifants WMA, also referred to as the Olifants River System, includes the Olifants River catchment (tertiary drainage regions B11, B12, B20, B31, B32, B41, B42, 52, B52, B60, B71, B72 and B73). Two Rivers Platinum – Waste Rock Dump Project falls within the B41 (Steelpoort River) tertiary catchment, specifically within the B41G and B41H quaternary catchments.

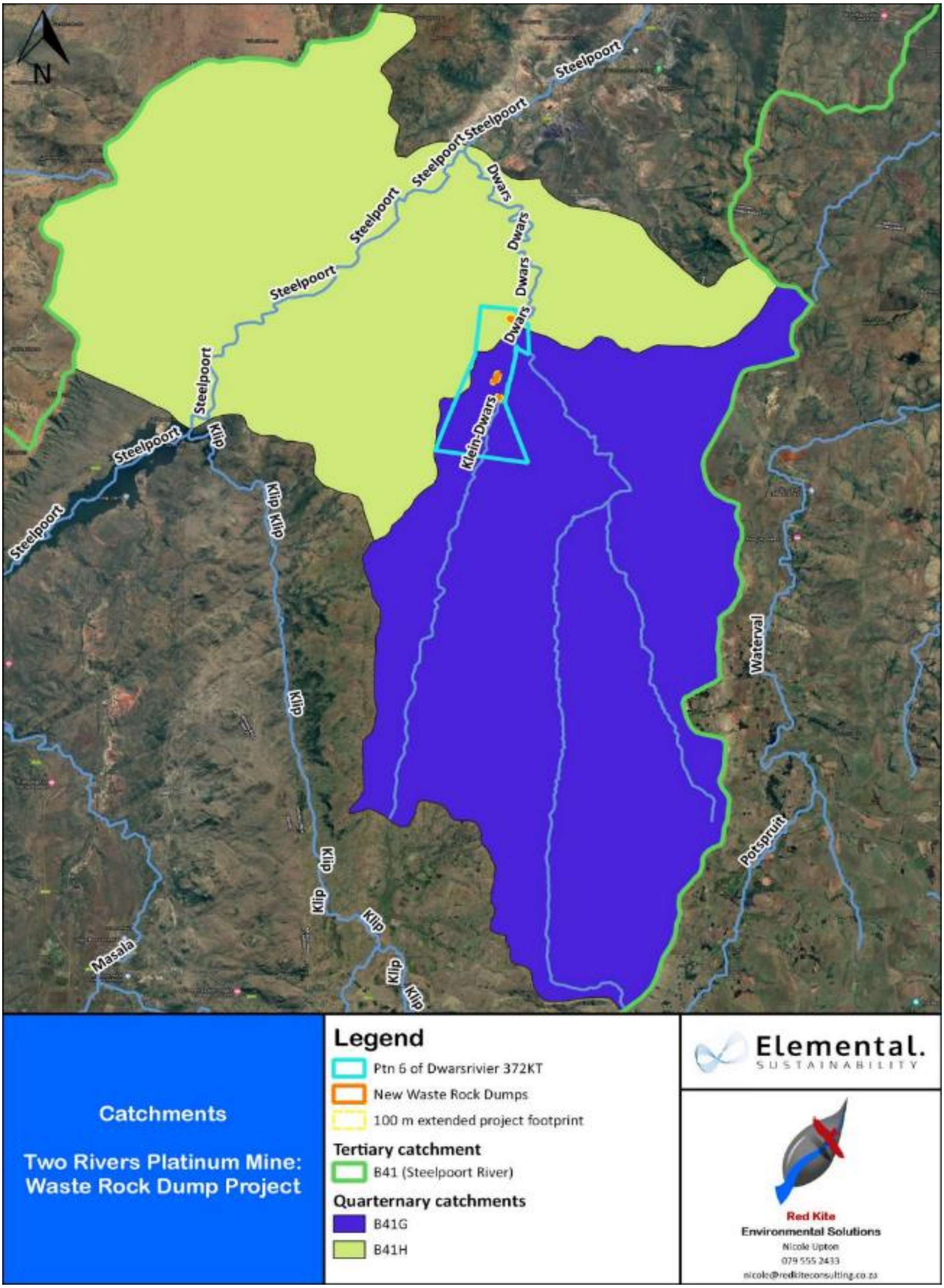


Figure 24: Catchments Quaternary View

10.7.5. Riparian Vegetation

Riparian areas refer to watercourses, rivers or streams and does not specifically cater for wetland zones. The vegetation structure associated with the riparian zones associated with the project area exhibits moderate to high disturbance and impacts from mining, human and vehicle movement, watercourse diversions, road crossings and culverts.

Various obligate and facultative wetland species occur in the riparian zones associated with the rivers associated with the project area i.e., the perennial Klein Dwars and Dwars Rivers. The dominant riparian species include: *Phragmites mauritianus*, *Schoenoplectus brachyceras*, *Digitaria eriantha*, *Setaria sphacelata*, and *Phragmites australis*.

While noting the slightly denser vegetation within the immediate vicinity of the non-perennial tributaries of the Klein Dwars and Dwars Rivers, no riparian zone was identified, in relation to the surrounding vegetation. The plant growth immediately adjacent to the drainage line represents the vegetation present in the general area, and are not considered indicators of riparian conditions.

Figure 25: Riparian Areas

The table below lists the flora species identified in riparian zones of the Klein Dwars and Dwars Rivers during the site assessment.

Table 22: Plant Species Identified in Riparian Areas

Species	Common name	Ecology
Combretum erythrophyllum	River bushwillow	
Cynodon dactylon	Couch grass	
Digitaria eriantha	Common finger grass	Facultative wetland
Eragrostis racemosa	Narrow heart love grass	Facultative wetland
Gomphocarpus fruticosus	Milkweed	
Heteropogon contortus	Spear grass	
Leersia hexandra	Rice grass	Obligate
Melia azedarach	Syringa	NEMBA: AIP
Phragmites australis	Common reed	Facultative wetland
Phragmites mauritianus	Steekriet	Facultative wetland
Schoenoplectus brachyceras		Obligate
Setaria sphacelata	Golden bristle grass	Facultative wetland
Themeda triandra	Red grass	
Typha capensis	Bulrush	Obligate wetland

10.7.6. Current Surface Water Users

With regards to the current TRP mining operation, water is required for mining purposes, dust suppression, irrigation, the Concentrator Plant, as well as for potable water for drinking, and other domestic uses.

The sources of water used by TRP includes groundwater/mine water, borehole water, river water, rainfall and runoff, as well as external water that is trucked in.

Water users downstream of the project area include agricultural activities predominantly for irrigation, small urban areas, rural communities, and other mining activities.

10.7.7. Surface Water Quality

The water quality data obtained from the samples taken during the field survey (one upstream and one downstream) of the project area, were compared to the Target Water Quality Ranges, where available, as set out in South African Water Quality Guidelines (Volume 7): Aquatic Ecosystems (Department of Water Affairs and Forestry, 1996).

Refer to Table 10 or the location of the water quality sampling points. The sampling point upstream of the project site was located within the Klein-Dwars River, and the second sampling point downstream of the operation, was located within the Dwars River. Table 23 below provide the analysis of the sampling results.

Table 23: Results of Water Quality Analysis

Variable	TWQR	TRP US1	TRP DS1
pH – value @ 25^{0}C	< 5% deviation	8.1	8.2
TDS	< 15% deviation	198	234
Nitrate (N)	< 15% deviation	<0.1	11
Nitrite (N)	< 15% deviation	<0.05	<0.05
Aluminium (Al)	0.01	0.213	0.172
Arsenic (As)	0.01	<0.001	<0.001
Total Chromium (Cr)	0.01	<0.025	<0.025
Hexavalent Chromium (Cr)	0.007	<0.010	<0.010
Manganese (Mn)	0.18	0.044	<0.025

Form the results in Table 23 above, only aluminium levels exceeded the Acute Effect Value (AEV). The solubility of aluminium in water is strongly pH dependent. At intermediate pH values, it is partially soluble and probably occurs as hydroxy- and polyhydroxo- complexes Elevated concentrations of bio-available aluminium in water are toxic to a wide variety of organisms. In acidic waters, aluminium is generally more toxic over the pH range of 4.4 - 5.4, with maximum toxicity occurring about pH 5.0 - 5.2.

Table 24 below provides the Resource Water Quality Objectives (RWQOs) for the Dwars River (DWA_EWR1) as per the Government Gazette GN 639, 7 September 2018 (No.41887).

Table 24: RWQO for the Catchments (DWS 2018)

Variable		RWQO
Major Ions	Mg	< 50 mg/ℓ
	SO^4	< 30 mg/ℓ
	Na	< 25 mg/ℓ
	Cl	< 20 mg/ℓ
	Ca	< 45 mg/ℓ
Physical Variables	EC	< 55 mS/m
	pH	7.0 - 8.7
	Temperature	Variation of 2 °C or 10% from background average temperature.
	Dissolved Oxygen	> 7.0 mg/ℓ
	Turbidity	Minor silting of instream habitats acceptable.
Nutrients	TIN	5 1.0 mg/ℓ
	PO_4-P	< 0.025 mg/ℓ
Response Variables	Chl-a Phytoplankton	< 20 ug/ℓ
	Chl-a Periphyton	< 21 mg/m2
	Ammonia	< 43.75 ug/ℓ.
	Atrazine	< 48.75 ug/ℓ
	Fluoride	< 0.7 ug/ℓ

10.7.8. Surface Water Quantity

10.7.9. Mean Annual Runoff

The Mean Annual Runoff (MAR) for the Olifants WMA, sourced from the National Water Resources Strategy (NWRS) 2nd Edition (DWS, 2013), equates to 2 040 million m^3/a. Approximately 481 million m^3/a occurs within the Middle Olifants Sub-WMA, with 396 million m^3/a occurring in the Steelpoort Sub-WMA.

The MAR of Quaternary Catchments B41G and B41H, within which the TRP – Waste Rock Dump Project is located, equates to 24.5 million m^3/a, and 26.1 million m^3/a, respectively. The results are summarised in the Table 25 (Government Gazette Vol.639, 7 September 2018 (No.41887)).

Table 25: Mean Annual Run-off for the relevant Quaternary Catchments

Catchment	River/s	NMAR (MCM)
B41G	Klein-Dwars and Upper Dwars River	24.5
B41H	Upper Dwars River	26.1

10.7.10. Wetlands

The farm falls within the Topographical Quarter Degree Squares of 2430CC. Google Earth images were studied in order to determine the position of possible wetlands and/or riparian zones in the study area. All possible watercourses were subsequently surveyed in order to determine the delineation thereof. The method described by the Department of Water Affairs and Forestry (DWAF, 2005) was followed in the delineation of the wetlands and riparian zones in the study area.

The study site falls within the Olifants Water Management Area and is situated within Quaternary Catchment B41G. The site consists mainly of mining related activities and infrastructure, with large sections of natural vegetation scattered throughout the area. The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located. The study site falls within the Olifants Water Management Area and is situated within Quaternary Catchment B41G. According to the National Wetland Map (NWM) (2018) database, the study area does not overlap with any wetlands, however, the NFEPA database indicates a Channelled Valley-bottom wetland within 500m of Waste Rock Dump 1 and 3. Refer to Section 10.9 for a discussion on the Wetlands Assessment undertaken.

10.7.11. Aquatic Ecology

Refer to Section 10.8 for the Aquatic Ecology Report compiled by Enviridi Environmental Consultants.

10.7.12. Sensitivity

Buffer zones have been shown to perform a wide range of functions and have therefore been widely proposed as a standard measure to protect water resources and their associated biodiversity. These include:

(i) maintaining basic hydrological processes
(ii) reducing impacts on water resources from upstream activities and adjoining land uses, and
(iii) providing habitat for various aspects of biodiversity.

The buffer zone identified in this report serves to highlight an ecologically sensitive area in which activities should be conducted with this sensitivity in mind.

Various site-specific factors were considered in the calculation of the buffer zone for the water resources associated (within 100 m) of the TRP – Waste Rock Dump Project area, as per the methodology of “Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries. Consolidated Report” by the WRC (Macfarlane *et al* 2015). Consequently, a 20m operational buffer is recommended for the proposed Waste Rock Dumps footprint areas (refer to sensitivity map, Figure 26 and Figure 27 below).

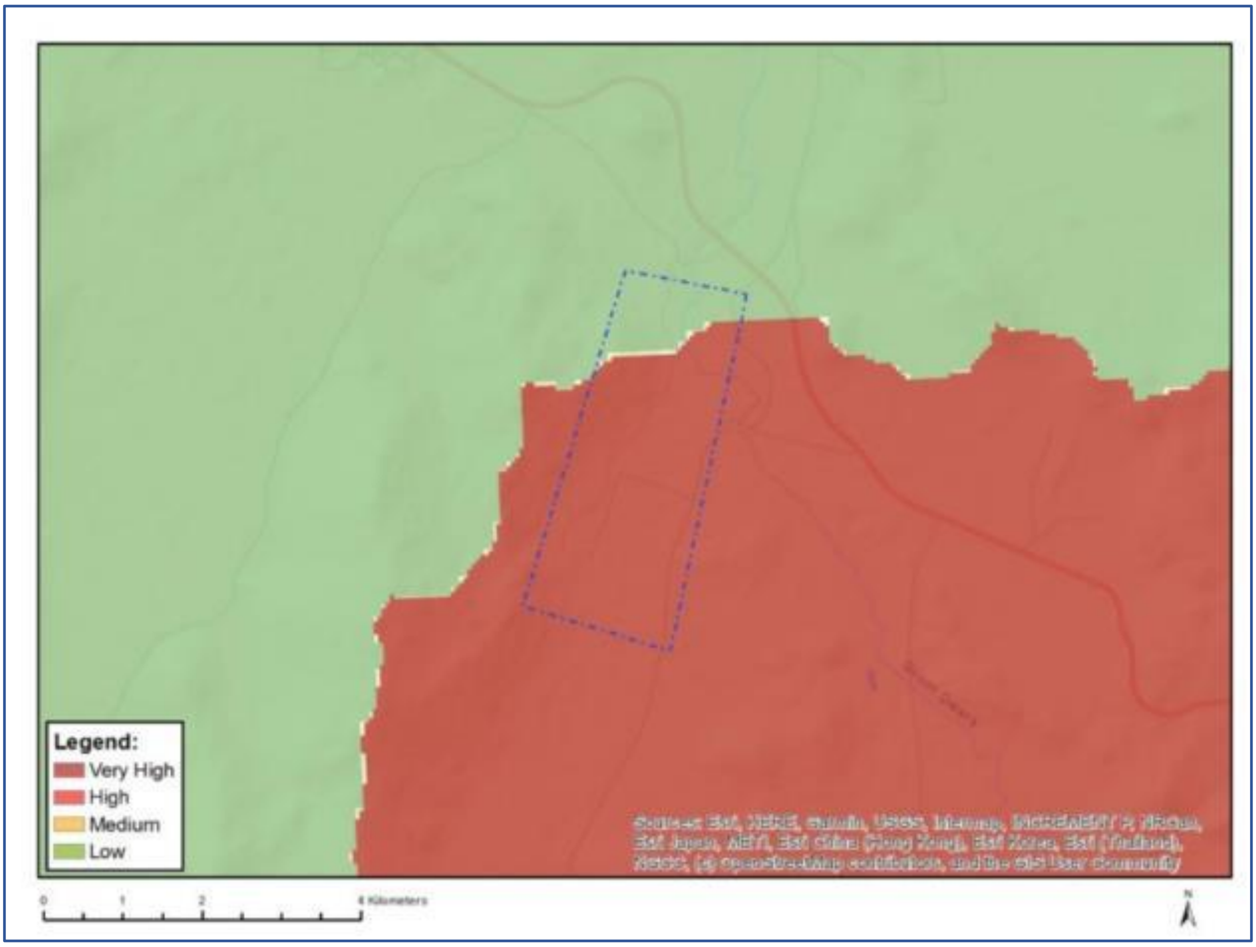


Figure 26: Aquatic Biodiversity Sensitivity as per Screening Tool Report for the specific sections of River – Required to be included based on new GN 320 Regulations (March 2020)

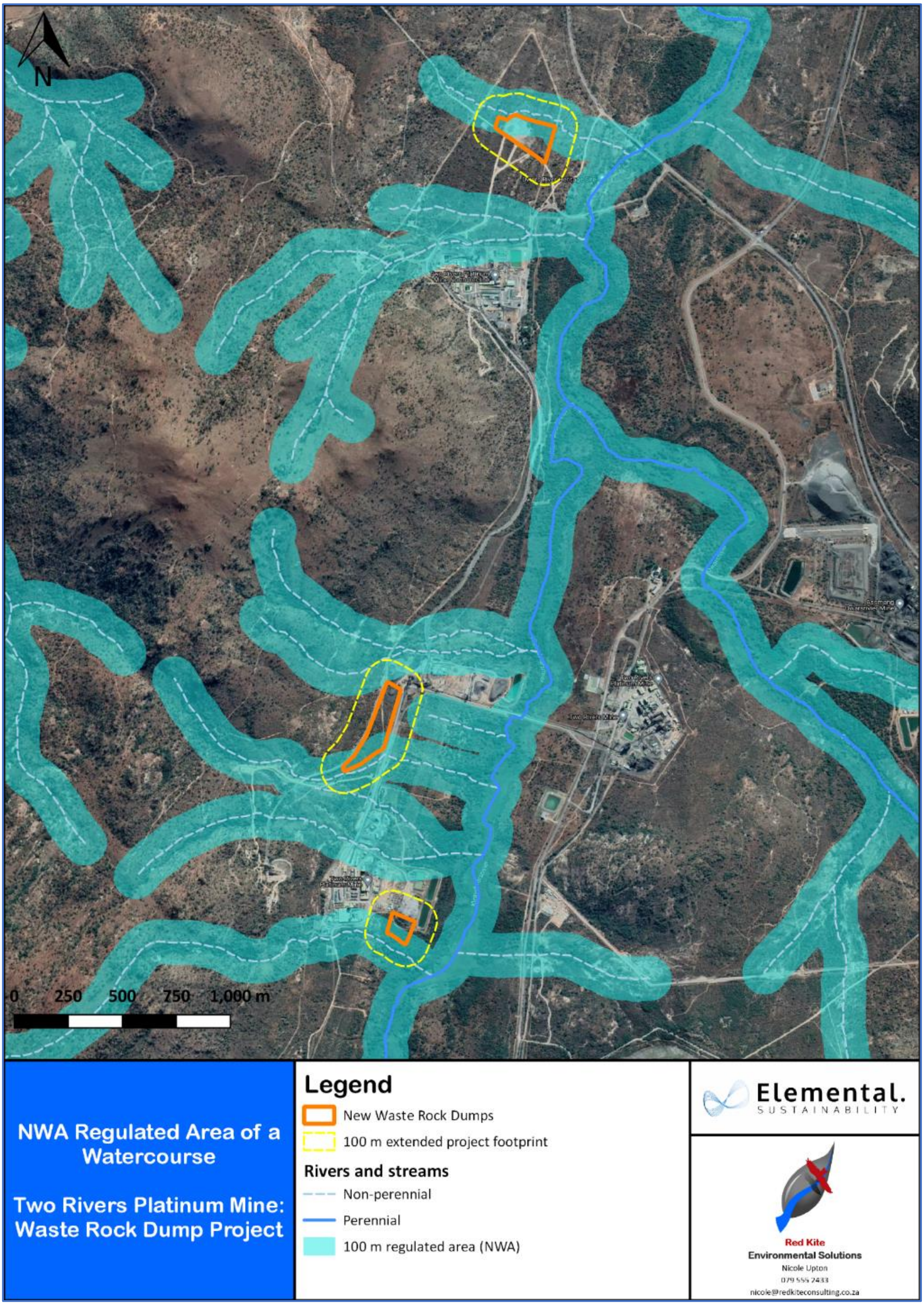


Figure 27: 100m Regulated Area for Watercourses in terms of the NWA

10.8. AQUATIC ECOLOGY

The Aquatic Ecological Assessment was undertaken by Enviridi Environmental Consultants and is attached as Appendix 10.

10.8.1. Methodology

10.8.2. Data Gathering and Site Selection

A holistic approach was followed, and an attempt was made to link local hydrological, water quality and environmental studies to regional and national concerns, regulations and management strategies.

A site visit was conducted in order to obtain information on normal flow rates, river health and potential factors that could influence the surface water environment and thereby the aquatic ecology:

- To obtain an impression of the study area and surroundings;
- To define the characteristics of all the drainage patterns and containment of surface water in the area;
- To obtain an impression of the catchment i.e., the size, shape and slope and baseline conditions;
- To obtain the baseline aquatic ecological baseline for the river system and feasibility of future monitoring;
- To obtain an impression of the practical implications of managing the surface water environment.

10.8.3. Desktop Assessment

A desktop assessment was done using existing GIS database information and Google Earth™ imagery. Data available for the Water Management Area, the catchment, the promulgated Resource Quality Objectives (RQOs) and data as sourced from the Department of Water and Sanitation (DWS) were utilised to gain an understanding of the background baseline against which the field data could be compared. These will all be in the hydrological surface water report and study conducted (Red Kite Environmental Solutions (Pty) Ltd, 2021) for which this report will be an appendix.

10.8.4. GIS Information Sourced and Used

This assessment was conducted to determine which water resources are available in and around the proposed development areas.

The desktop assessment looked at the Screening tool reports generated for the areas, and the sensitivity was confirmed during the filed visit. In addition, the following Geographical Information Systems (GIS) data sets were used throughout this document.

Table 26: GIS Data Sets used in the Desktop Assessment and Age of Data Utilised

Data Set	Provider	Date
Location of infrastructure, footprint of activities	Client	April 2021 with revisions made June 2021
1:50 000 Topographic map	Surveyor general	2008
Water Resources of Southern Africa 2012	Water Research	2015

Data Set	Provider	Date
Study (WR2012 (Baily & Pitman, 2015)): Various .shp files	Commission	
NFEPA: River_FEPA.shp	SANBI/CSIR	July 2011
NFEPA: NFEPA_Rivers.shp	SANBI/CSIR	July 2011
NFEPA: Fishsanc.shp	SANBI/CSIR	July 2011
NFEPA: Fishsanc_All_Spp.shp	SANBI/CSIR	July 2011
NFEPA: ESA_FishSupportAreas.shp	SANBI	2011 & 2014
National Freshwater Ecosystem Priority Areas: FEPA_subWMA.shp	SANBI	July 2011
National Freshwater Ecosystem Priority Areas: FEPA_WMA.shp	SANBI	July 2011
NFEPA: NFEPA_Wetlands.shp	SANBI	July 2011
River Ecosystem threat status (NBA 2018)	(CSIR, 2018)	2018 – Directly obtained from CSIR in October 2020
National wetland 5 and Confidence map	(CSIR, 2018)	2018 – Directly obtained from CSIR in October 2020
Artificial wetlands	(CSIR, 2018)	2018 – Directly obtained from CSIR in October 2020
DWS web site for information on Water quality data and rainfall data.	DWS	Refer to Tables where information is provided in this report. Climate.org has also been utilised
FBIS Data	DWS	Retrieved 2021 – updated continuously
Various internet information sources as referenced in the document		

10.8.5. Site Visit

A site visit was conducted on the 21st of April 2021 which could be described as a wet season assessment. Watercourses were assessed, including Upstream and Downstream points for both streams present and assessed. Water quality sampling and biomonitoring protocols formed part of the assessments.

10.8.6. Data Obtained and Results

The project site falls within the Olifants Water Management Area (WMA) within Drainage Region B. Major rivers include the Elands, Wilge, Steelpoort, Olifants and Letaba river systems. Many dams are present within this Water Management Area.

10.8.7. Eastern Bankenveld (Ecoregion 9)

Several large rivers have their sources in the region, e.g., Vet, Modder, Riet, Vaal, Olifants, Steelpoort, Marico, Crocodile (west), Crocodile (east) and the Great Usutu (DWS, 2005).

This ecoregion is generally characterised by mountainous environments with the North-Eastern Mountain Grassland and Mixed bushveld being dominant in the area. The large rivers that are associated with the ecoregion includes the Olifants, Elands, and Steelpoort River and their associated tributaries (DWS, 2005).

Other general characteristics are as follows:

- Moderate to moderately high Mean Annual Precipitation
- Predominantly medium Drainage densities
- Medium to high stream frequencies although limited in some areas
- Slopes <5%, 20%, 20-50% in limited areas
- Mostly moderate median annual simulated runoff
- Mean annual temperature is Moderate
- Size = 20098.8 km^2

Table 27presents the ecoregion attributes for the Eastern Bankenveld Ecoregion 9.

Table 27: Ecoregion attributes for Eastern Bankenveld Ecoregion (Department of Water Affairs, 2005)

Main attributes	Eastern Bankenveld
Terrain morphology: Broad division (dominant types in bold (Primary)	Plains; Low Relief; (very Limited) Plains; Moderate Relief Lowlands; Hills and Mountains; Moderate to High Relief; (limited) Open Hills; ‘Lowlands; Mountains; Moderate to High Relief;(limited) Closed Hills; Mountains; Moderate and High Relief
Vegetation types (Dominant types in bold)	Sour Lowveld Bushveld; Mixed Bushveld; Clay Thorn Bushveld (Limited); Rocky Highveld Grassland; Moist Sandy Highveld Grassland; North Eastern Mountain Grassland; Patches Afromontane Forest
Altitude (mamsl) (secondary)	500-2300
MAP (mm) (modifying)	300 to 1000
Coefficient of Variation (% of annual precipitation)	<20 to 34
Rainfall concentration index	55 to >65
Rainfall seasonality	Early to Mid-Summer
Mean annual temp. (°C)	10 to 22
Mean daily max temp. (°C) February	18 to 30
Mean daily max temp. (°C) July	12 to 24
Mean daily min. temp. (°C): February	8 to 20
Mean daily min. temp. (°C): July	0 to 8
Median annual simulated runoff (mm) for quaternary catchment	20 to 150; 200 to >250

For an investigation, aquatic macro invertebrates are sampled using the SASS5 (South African Scoring System) method (refer to Table 28). As previously mentioned, this method is not designed for use in wetland habitats; this method is used to determine river health by sampling aquatic macro invertebrates and calculating a score based on the taxa found and their related sensitivity towards pollution.

Table 28: Reference scores applicable to a study area

EC	Ecological Category	Description
A	Natural	Unmodified natural
B	Good	Largely natural with few modifications
C	Fair	Moderately modified
D	Poor	Largely modified
E	Seriously modified	Seriously modified
F	Critically modified	Critically or extremely modified

10.8.8. Integrated Unit of Analysis and Resource Quality Objectives

The TRP – Waste Rock Dump Project area falls with the Steelpoort Integrated Unit of Analysis (IUA) as presented in Figure 28 below. Figure 29 shows the closest EWR site i.e., the Olifants EWR9.

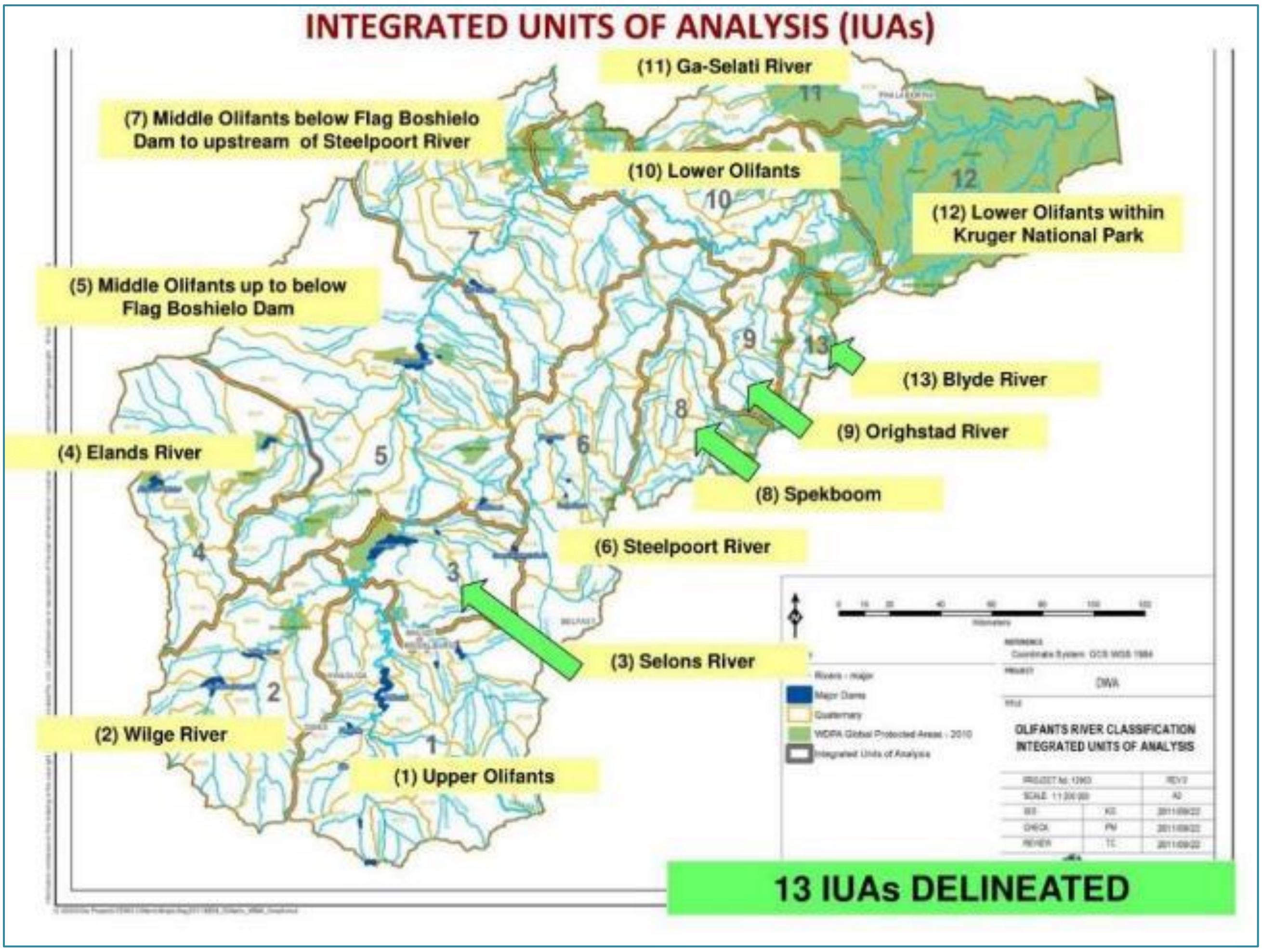


Figure 28: Integrated Unit of Analysis – Showing Area in IUA 6 – Steelpoort IUA

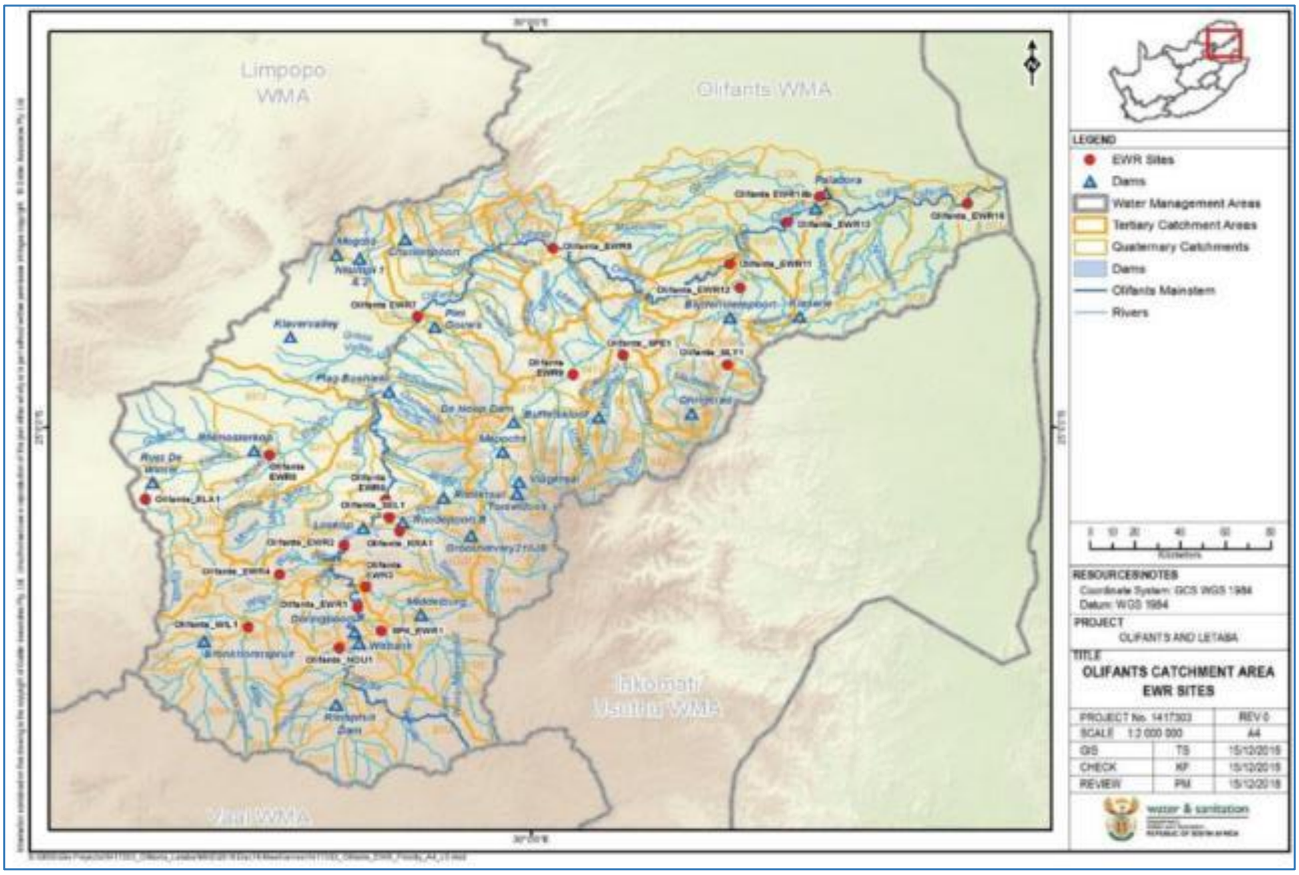


Figure 29: EWR Sites

10.8.9. Resource Quality Objectives

According to Government Notice 466 of 22 April 2016 (National Water Act, 1998 (Act No.36 Of 1998) "Classes and Resource Quality Objectives (RQOs) of Water Resources for the Olifants Catchment - (DWS, 2016)), the following information presented in Table 29 – Table 32, is promulgated for the specific Quaternary Catchments association with the Two Rivers Platinum – Waste Rock Dump Project area.

Table 29: Water Resources Classes per IUA and Ecological Categories per Biosphysical Node

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural MAR (million m3/a)	EWR as % of natural MAR 1)
6 Steelpoort River Catchment	**III**	HN54	B41A	One node at outlet of B41A. Included: Grootspruit (outlet of quaternary) Langspruit, including Lakenvleispruit and Kleinspruit	C	41.9	20.78
		OLI-EWR2 (Rapid site)	B41B	Steelpoort	C	63.5	20.78
		HN56	B41C	Masala (confluence with Steelpoort), including Tonteldoos and Vlugkraal)	C	-	-
		HN57	B41D, B41E	Steelpoort (inflow to De Hoop Dam)	C	117.0	20.78
		HN58	B41F	Draaikraalspruit (confluence with Klip)	B	-	-
		OLI-EWR4) (Rapid site)	B41F	Klip	C	5.2	12.44
		HN60	B41G	Kraalspruit (confluence with Groot Dwars)	B	-	-
		HN61	B41G	Klein Dwars (Confluence with Groot Dwars)	D	-	-
		HN62	B41G	Upper reaches of Dwars (before mining impacts)	C	24.5	13.33
		DWA-EWR1	B41H	Dwars (existing)	B/C	31.4	19.41
		HN64	B41H	Steelpoort	D	-	-
		EWR site – 9	B41J	Steelpoort	D	120.2	7.97
		EWR site – 10	B41K	Steelpoort (confluence with Olifants – outlet of IUA6)	D	336.6	7.43

Table 30: Integrated Unit of Analysis (IUAs) and Resource Quality Objectives (RQOs) as per Quaternary Catchment (Quality)

RIVER WATER QUALITY										
IUA	**Class**	**River**	**RU**	**Node**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**
UA	III	Steelpoort (EWR site - EWR10) (existing) (confluence with Olifants - outlet of IUA6)	RU66	64	D	Quality	Nutrients	Nutrients should be maintained to support the ecosystem.	Phosphate (PO_4)	≤ 0.020 mg/L P
				66	D	Quality	Toxins	Toxics should be minimised to reduce the risk	F*	≤ 2.00 mg/L
									Al*	≤ 0.063 mg/L
									As*	≤ 0.058 mg/L
									Cd hard*	≤ 1.6 µg/L
									Cr(VI)*	≤ 68 µg/L
									Cu hard*	≤ 4.9 µg/L
									Hg*	≤ 0.53 µg/L
									Mn*	≤ 0.680 mg/L
									Pb hard*	≤ 5.8 µg/L
									Se*	≤ 0.013 mg/L
									Zn*	≤ 14.4 µg/L
									Chorine*	≤ 1.8 µg/L free Cl
									Endosulfan*	≤ 0.08 µg/L
									Atrazine*	≤ 48.8 µg/L

Table 31: Resource Quality Objectives for River Riparian zone habitat for IUA

IUA	Class	River	RU	REC	RQO	Numerical Limits
Steelpoort River catchment	III	Steelpoort	66	D	Instream habitat must be in a largely modified or better condition to support ecosystem processes. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Toxics must be minimised to reduce the risk of human health and ecosystem impairment.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)
			64	D	Instream habitat must be in a largely modified or better condition to support ecosystem processes. Instream biota must be in a largely modified or better condition. Low and high flows must be suitable to maintain the river habitat and ecosystem condition. Water quality: Toxics must be minimised to reduce the risk of human health and ecosystem impairment.	Instream Habitat Integrity category: ≥ D (≥ 42) Fish ecological category: ≥ D (≥ 42) Macro-invertebrate ecological category: ≥ D (≥ 42) Instream Ecostatus category: ≥ D (42) Hydrological category: ≥ D (≥ 42) Water Quality category: ≥ D (≥ 42)

Table 32: Resource Quality Objectives for River Riparian Zone Habitat in Olifants Catchment

IUA	Class	River	RU	REC	RQO	Numerical Limits
6. Steelpoort River catchment	III	Steelpoort	66	D	The riparian zone must be in a largely modified or better condition. Riparian vegetation must be in a largely modified or better condition. Low and high flows must be in a largely modified or better condition.	Riparian Zone Habitat Integrity category ≥ D (≥ 42) Riparian Ecostatus category: ≥ D (≥ 62) Hydrological category ≥ D (≥ 62)
			64	C/D	The riparian zone must be improved to be in a better than largely modified condition. Riparian vegetation must be maintained in a largely modified or better condition Low and high flows must be in a largely modified or better condition.	Riparian Zone Habitat Integrity category ≥ C/D (≥ 58) Riparian Ecostatus category: ≥ D (≥ 42) Hydrological category ≥ D (≥ 42)

10.8.10. Freshwater Biodiversity Information System – Background Water Quality

Freshwater Biodiversity data as available on the Freshwater Biodiversity Information System (FBIS) for the Klein Dwars and Dwars and surrounds by DWS, and the following background regional data is provided.

Two (2) points gave historic recorded data in the Klein Dwars River (dated 2008):

- B4DWAR-DWARS (Upstream) - K2-below Two Rivers mine; and
- B4KDWA-DWAR4 (Downstream) - K4- below Two Rivers Mine

Twenty-two (22) Invertebrate species have been historically recorded within the Upstream site, while thirteen (13) aquatic invertebrates were found associated with the Downstream regions. No fish species have been recorded in either the Up- or Downstream points reference points.

Table 33: Reference SASS Scores available on FBIS maintained by DWS

	B4KDWA-DWAR4 (Downstream)	B4DWAR-DWARS (Upstream)
SASS Score	73	115
Number of Taxa	13	22
ASPT	5.62	5.23

10.8.11. Surface Water Quantity

Surface water quantity Resource Quality Objectives have been published in the Government Gazette Notice for the Olifants Water Management Area as indicated in Table 34 below:

Table 34: Surface Water Quantity Resource Quality Objectives

RIVER WATER QUANTITY												
IUA	**Class**	**River**	**RU**	**Node**	**REC**	**Component**	**Sub Component**	**RQO**	**Indicator/ measure**	**Numerical Limits**		
UA	III	Upper reaches of Dwars (before mining impacts)	RU62	62	C	Quantity	Low Flows	Low flows must be maintained for ecosystem functioning	EWR maintenance low and drought flows: Dwars River in B41G VMAR = $24.41x10^6 m^3$ PES=C category	Maintenance low flows (m^3/s) (Percentile)		Drought flows (m^3/s) (Percentile)
										Oct	0.061 (60)	0.2 (99)
										Nov	0.095 (80)	0.22 (99)
										Dec	0.121 (70)	0.25 (99)
										Jan	0.142 (70)	0.26 (99)
										Feb	0.179 (70)	0.265 (99)
										Mar	0.158 (70)	0.04 (99)
										Apr	0.145 (70)	0.08 (99)
										May	0.118 (70)	0.03 (90)
										Jun	0.094 (70)	0.15 (99)
										Jul	0.072 (70)	0.15 (99)
										Aug	0.061 (70)	0.15 (99)
										Sep	0.056 (70)	0.16 (99)

10.8.12. Resource Quality Objectives: Quantity

Resource Quality Objectives (RQOs) are defined for each prioritised RU for every IUA in terms of water quantity, habitat and biota, and water quality.

Resource Quality Objectives for each Resource Unit (RU) are applicable from the date signed off, unless otherwise specified by the Minister. RQOs (quantity) provides an indication of the hydrological RQOs for rivers expressed in terms of flow at the ecological water requirement (EWR) sites. These summarised statistics are representative of the required flow regime in the river where the variability is dependent on the seasonal and temporal pattern of natural flow conditions. The mean monthly flows represent low flow requirements for all the months.

10.8.13. Normal Dry Weather Flow

The site was visited in April 2021 high-flow season. Four (4) sites were assessed, and two (2) sites were found to be suitable for SASS during current conditions, and these results have been calculated and scored in terms of SASS.

Follow up studies during the bi-annual monitoring programme (once EA/WML is approved) will need to establish long term trend and data for the rivers based on seasonal variation to increase confidence of data obtained during the baseline assessment.

10.8.14. Surrounding Surface Water Uses

The area was mainly utilised by large scale mining and community land. The area was found to consist of largely natural areas and impacted areas (mining). Mining impacts (polluted run-off, leaching and pollution plumes) and those created by local communities, such as overgrazing, trampling, littering and pollution (and associated sedimentation) are the main impacts created by the surrounding land users.

10.8.15. Characteristics of the Sub-Quaternary Reach

The following data of the catchment, presented in Table 35 below, forms part of the literature available for the specific streams utilised for SASS5 monitoring.

Table 35: Information provided on River Health Programme for the Sub Quaternary Reach (SQR)

<table>
<tr><th>SQ Reach</th><th>PES Category Median</th><th>Mean EI Class</th><th>Mean ES Class</th><th>Length Km</th><th>Stream Order</th><th>Default EC</th></tr>
<tr><td colspan="7">B41G-00685 / B41G010000 (US & DS)</td></tr>
<tr><td>B41G-00685 – Upstream and Downstream Point in Reach</td><td>Largely Modified – Class D</td><td>Moderate</td><td>High</td><td>27,4</td><td>1,0</td><td>B</td></tr>
<tr><td colspan="7">The reach is characterized by the following:
The Reach spans an area of 27.4 km;
The Present Ecological State (PES) has been rated Largely Modified (Class D);
The Ecological Importance of the reach has been rated Moderate; twelve (12) species of fish are expected in the reach;
The Ecological sensitivity is rated High with very high invertebrate responses to changes in physico-chemical parameters, changes in flow sensitivity;
The reach fall into a FEPA and Fish Support Area</td></tr>
</table>

- Large/High instream modifications have been recorded in the reach;
- Historic anthropogenic impacts recorded in the reach include:
  - Small: Canalization, Exotic vegetation, Inundation, Runoff/effluent: Irrigation, Grazing / trampling, Vegetation removal.
  - Moderate: Agricultural lands, Crossings low water, Erosion, Roads, Sedimentation, Small dams (farm).
  - Large: Abstraction (run-of river)/increased flows.
  - Serious: Mining, Runoff/effluent: Mining.

Fish species recorded within this reach:

- *Amphilius uranoscopus* (Stargazer (Mountain Catfish) – Least Concern
- *Labeobarbus marequensis* (Largescale Yellowfish) – Least Concern
- *Barbus motebensis* (Marico barb) – Near Threatened
- *Barbus neefi* (Sidespot barb) – Least Concern
- *Barbus trimaculatus* (Threespot barb) – Least Concern
- *Clarias Gariepinus* (African sharptooth catfish) – Least Concern
- *Barbus unitaeniatus*
- *Chiloglanis pretoriae* (Shortspine Suckermouth (Rock Catlet)) – Least Concern
- *Labeo molybdinus* (Leaden Labeo)- Least Concern
- *Oreochromis Mossambicus* (Mozambique Tilapia) – Near Threatened
- *Pseudocrenilabrus Philander* (Southern mouth-brooder) – Least Concern
- *Tilapia Sparrmanii* (Banded tilapia) – Least Concern

According to the NBA2018 data, the following has been provided within Table 36for the Sub Quaternary Reach.

Table 36: National Biodiversity Assessment (2018) Data for the SQR(s)

Field Name	Description	Data Applicable for Dwars / Klein-Dwars River (NBA 2018)
Representative Points		
Order	River order	1
Mainstem	Mainstem = 1 is a quaternary mainstem; the rest of the 1:500,000 rivers are tributaries that are nested within quaternary catchments	0
Flow	Flow variability	Permanent
River Type	River type used by NFEPA which comprises the level 1 ecoregion number followed by the flow	Permanent (D) Upper Foothills
PES 1999	Present ecological state 1999 with desktop modification	Class B: Largely Natural
River Condition	River condition used by NFEPA A or B is considered intact and able to contribute towards river ecosystem biodiversity targets.	AB
FFRREGION	The lumped ecoregion into which free-flowing rivers fall, used to achieve representation of free-flowing rivers across the country	N/A
Flagship Status	Flagship free-flowing rivers as identified through an expert review process	Not marked as a Flagship River
PES 2018	NBA 2018 Ecological condition category. The process involved using the Department of Water and Sanitation (DWS, 2014) Present Ecological State/Ecological Importance/Ecological Sensitivity (PES/EI/ES), also referred to as PES/EIS data, which included mainstems and tributaries at a sub-quaternary level. This desktop data was updated with data that became available between 2011 and 2017 from Reserve or Ecological Water Requirement (EWR) and Water Resource Classification System (WRCS) studies.	Class D: Largely Moderately Modified PES as per NBA 2018 Assessment

NBA 2018 ETS	Ecosystem threat status (ETS) of river ecosystem types: this was based on the extent to which each river ecosystem type had been altered from its natural condition.	Critically endangered (CR) Ecosystem threat status (ETS)
NBA 2018 EPL	Ecosystem protection level (EPL) of river ecosystem types: river ecosystem types in protected areas needed to be in good condition rivers (A or B ecological category) to be considered as protected.	Poorly Protected

Figure 30below, depicts the sites surveyed during the site assessment.

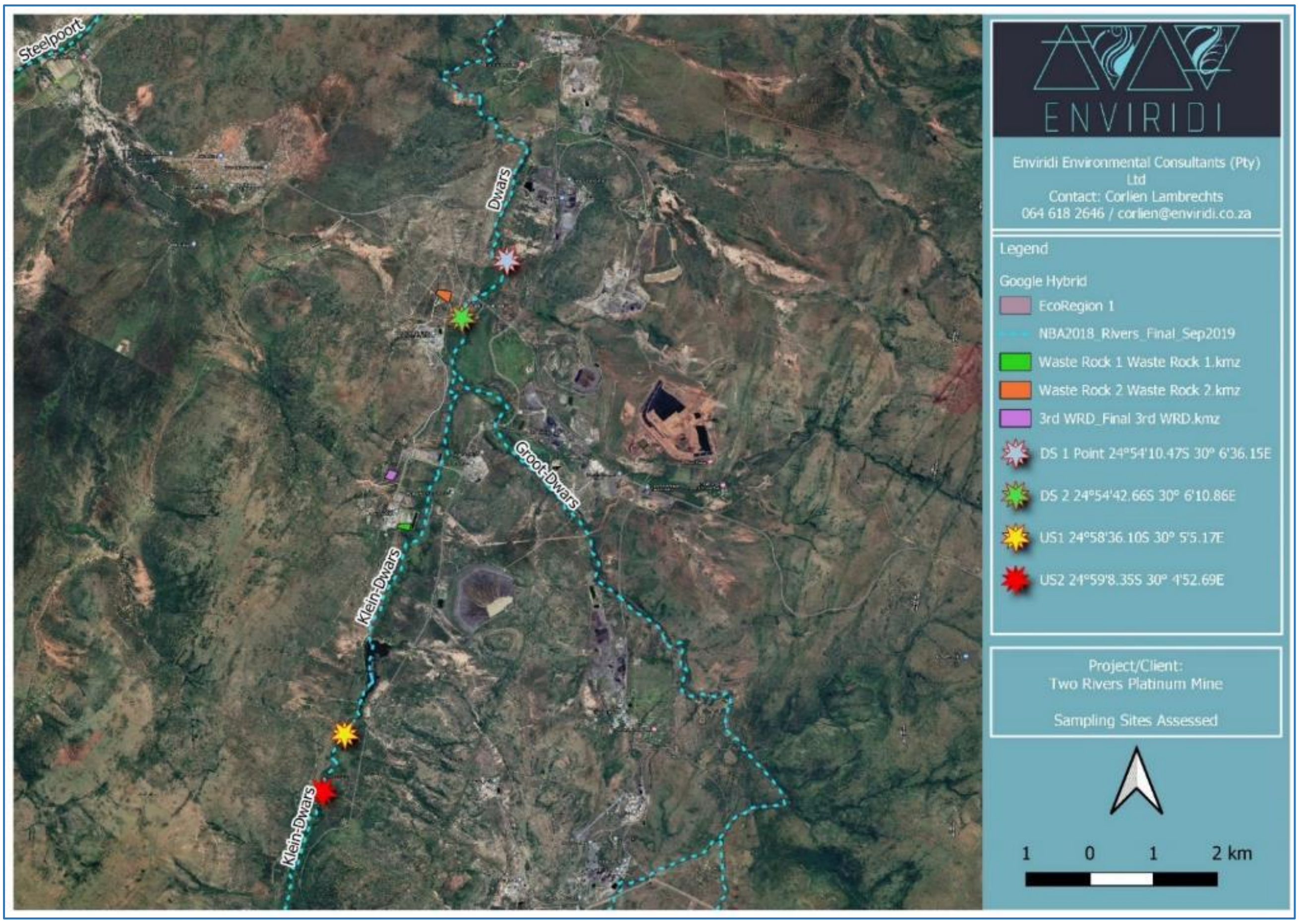


Figure 30: Sites Surveyed during Site Assessment and to be included in the Monitoring Framework

10.8.16. Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) project is a multi-partner project between the CSIR, the Water Research Commission, the South African National Biodiversity Institute, the Department of Environmental Affairs, the South African Institute of Aquatic Biodiversity and South African National Parks. The project responds to the reported degradation of freshwater ecosystem condition and associated biodiversity, both globally and in South Africa. It uses systematic conservation planning to provide strategic spatial priorities for conserving South Africa's freshwater biodiversity, within the context of equitable social and economic development (Nel, et al., 2011).

The project has three inter-related components:

- A technical component to identify a national network of freshwater conservation areas;

- A national governance component to align DEA and DWA policies and approaches for conserving freshwater ecosystems; and
- A sub-national governance and management component that conducts case studies to demonstrate how NFEPA outcomes can be implemented (Nell *et al,* 2011).

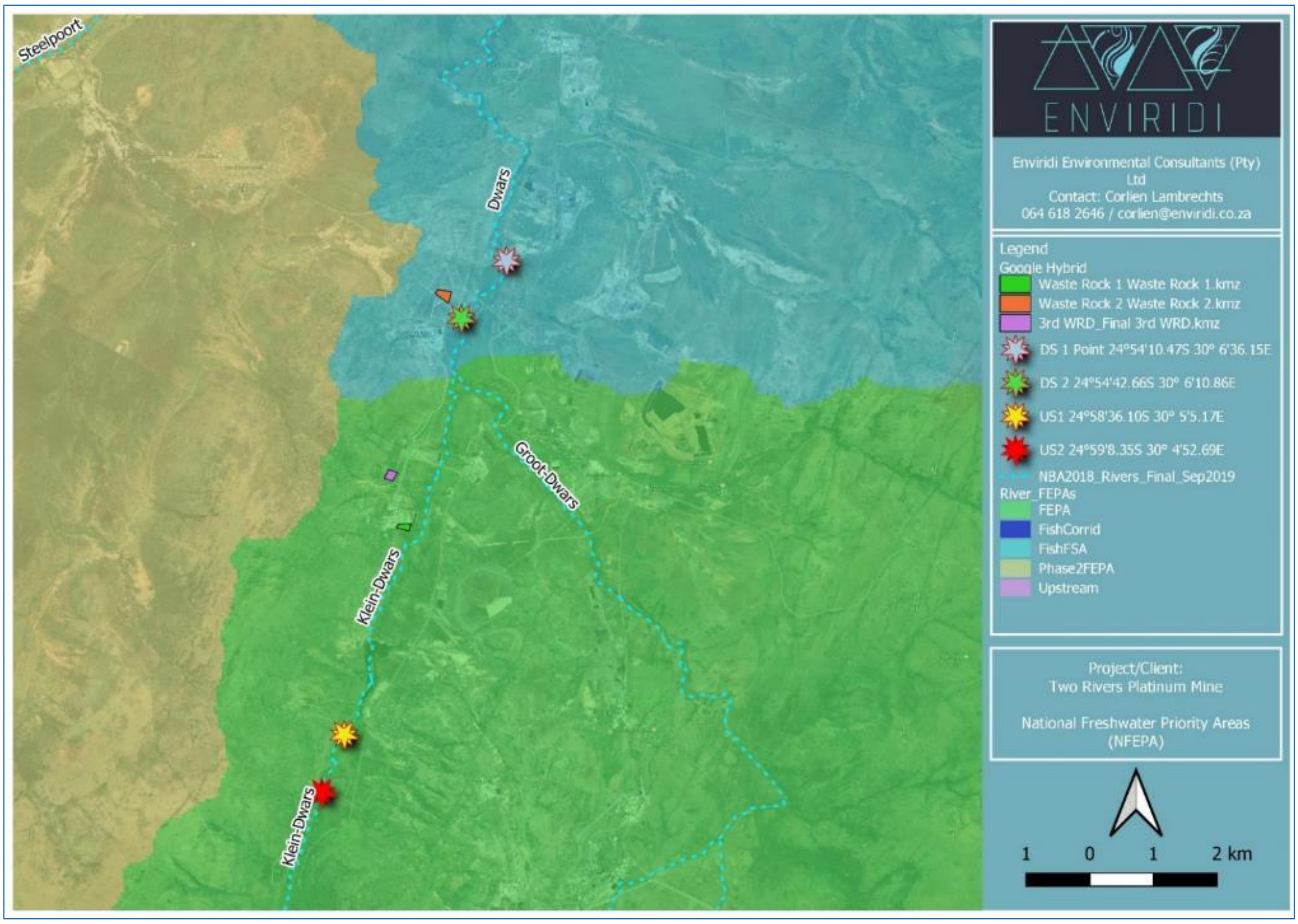


Figure 31: River Freshwater Ecosystem Priority Areas

10.8.17. Vegetation Groups

The project area is located within the Sekhukhune Mountain Bushveld.

<u>Sekhukhune Mountain Bushveld</u>

The Sekhukhune Mountain Bushveld ecosystem is distributed across mountains and undulating hills above the lowlands of the SVcb 27 Sekhukhune Plains Bushveld, including the steep slopes of the Leolo Mountains, Dwars River Mountains (except areas of Gm 19 Sekhukhune Montane Grassland) and Thaba Sekhukhune, as well as the undulating small hills in the valley of the Steelpoort River up to and along the Klip River flowing past Roossenekal.

The vegetation type comprises predominantly dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes, with open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs.

A list of expected common and dominant species includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Trees:** *Acacia nigrescens, Acacia senegal* var. *leiorhachis* (d), *Combretum apiculatum* (d), *Kirkia wilmsii* (d), *Terminalia prunioides* (d), *Vitex obovata* subsp. *wilmsii* (d), *Ziziphus mucronata* (d), *Bolusanthus speciosus*, *Boscia albitrunca*, *Brachylaena ilicifolia*, *Combretum molle*, *Commiphora mollis*, *Croton gratissimus*, *Cussonia transvaalensis*, *Hippobromus pauciflorus*, *Ozoroa sphaerocarpa*, *Pappea capensis*, *Schotia latifolia*, *Sterculia rogersii, Aloe marlothii* subsp. *marlothii*.
- **Shrubs:** *Dichrostachys cinerea* (d), *Euclea crispa* subsp. *crispa* (d), *Combretum hereroense*, *Euclea linearis*, *Pavetta zeyheri*, *Tinnea rhodesiana*, *Triaspis glaucophylla, Elephantorrhiza praetermissa* (d), *Grewia vernicosa* (d), *Asparagus intricatus*, *Barleria saxatilis*, *B. senensis*, *Clerodendrum ternatum*, *Commiphora africana*, *Hermannia glanduligera*, *Indigofera lydenburgensis*, *Jatropha latifolia* var. *angustata*, *Melhania prostrata*, *Phyllanthus glaucophyllus*, *Psiadia punctulata*, *Rhus keetii*, *Rhynchosia komatiensis, Aloe castanea* (d), *A. cryptopoda* (d), *Clematis brachiata* (d), *Rhoicissus tridentata* (d), *Acacia ataxacantha, Sarcostemma viminale*.
- **Graminoids:** *Aristida canescens* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Setaria lindenbergiana* (d), *Themeda triandra* (d), *Aristida transvaalensis*, *Cymbopogon pospischilii*, *Diheteropogon amplectens*, *Enneapogon scoparius*, *Loudetia simplex*, *Panicum deustum*, *Setaria sphacelata*.
- **Herbs:** *Berkheya insignis* (d), *Commelina africana* (d), *Cyphostemma woodii*, *Kyphocarpa angustifolia*, *Senecio latifolius, Hypoxis rigidula*, *Sansevieria hyacinthoides, Huernia stapelioides*.

Biogeographically Important Taxa include (([N]Northern Sourveld endemic, [CB]Central Bushveld endemic, [SK]Sekhukhune endemic):

- *Lydenburgia cassinoides*[SK]
- *Rhus sekhukhuniensis*[SK]
- *Euclea sekhukhuniensis*[SK]
- *Petalidium oblongifolium*[CB]
- *Plectranthus venteri*
- *Rhus batophylla*[SK],
- *Asparagus sekukuniensis*[SK]
- *Rhoicissus sekhukhuniensis*[SK]
- *Chlorophytum cyperaceum*[SK], *and*
- *Raphionacme chimanimaniana*

Endemic Taxa include:

- *Acacia ormocarpoides*
- *Euphorbia sekukuniensis, and*
- *Plectranthus porcatus.*

<u>Geozones</u>

Upper sites in Ecoregion 1 include those in the Source zone, Mountain Headwater Stream, Transitional and

Upper Foothill (Class A- D), while lowland sites include Lower foothill and Lowland zones (Class E-F). The sampling points are located within Lower foothills.

Table 37: Geozones in accordance with RQIS

A	High gradient mountain stream
B	Mountain stream
C	Transitional zone
D	Upper foothills *(DS Point)*
E	Lower foothills *(US Point)*
F	Lowland river

10.8.18. Integrated Habitat Assessment System (IHAS)

The Integrated Habitat Assessment System (IHAS) results for the sites assessed for the Klein Dwars and the Dwars Rivers are provided int Table 38 and Table 39 below.

Table 38: Integrated Habitat Assessment Survey - IHAS Results

SURVEY	April 2021 – HIGH FLOW	
Sites Assessed	**Suitability**	**Flow**
US 1	Adequate	Moderate Flow
US 2	Access restricted	Moderate Flow – but deep during assessment. Area restricted in terms of access for safety reasons near mine entrance
DS 1	Adequate	Moderate Flow
DS 2	Not adequate - wetlands	Only wetland seepage present during assessment

Table 39: Macroinvertebrate Habitat Assessment and Biotype Availability Results

Biotope	Upstream (US) Points		Downstream (DS) Points	
High Flow - 2021	**US 1**	**US 2**	**DS 1**	**DS 2**
Stones in current (SIC)	4	N/A	N/A	0
Stones out of current (SOOC)	0	N/A	N/A	0
Bedrock	3	N/A	N/A	2
Aquatic vegetation	3	N/A	N/A	1
Marginal vegetation in current	3	N/A	N/A	5
Marginal vegetation out of current	0	N/A	N/A	0
Gravel	0	N/A	N/A	0
Sand	2	N/A	N/A	0
Mud	4	N/A	N/A	4
Total	19	N/A	N/A	12
Total Score – Biotope Adequacy (%)	42%	N/A	N/A	26%

10.8.19. Interpretation of the Results

Different points could be utilized for the purpose of the baseline condition. US and DS points to be compared against each other and one sample per each reach (US versus DS) had been obtained for comparison. Table 40 to Table 43 below present the results of the assessment.

Table 40: Upstream Point US of the Klein-Dwars River

Sampling Area – Upstream	
DWS corresponding name	**B41G-00685 / B41G010000 (US & DS)**

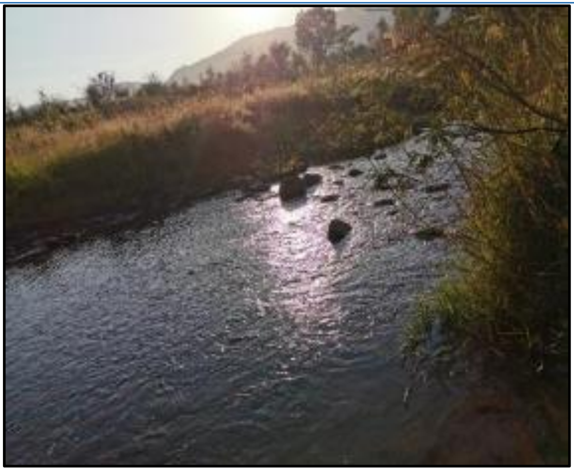
Site Name		Upstream Point (April 2021)	
Upstream Photograph		Downstream Photograph	
 **Figure 32: Upstream photograph at sampling point**		 **Figure 33: Downstream photograph of sampling point**	
Site Description		Wetland dominated tributary with minimal open sections. Conditions currently not ideal for Aquatic sampling.	
Impacts on the water environment observed		No visible impacts observed, besides dense vegetation predominant at this site.	
GPS		24°58'36.10"S 30° 5'5.17"E	
Reference PES as per SQR		Class D: Largely Modified	
High Flow 2021	SASS Score	No of Taxa	ASPT
SASS 5 Results	N/A	N/A	N/A
2021 Result		N/A	

Table 41: Upstream Point US 2 of the Klein Dwars River

Sampling Area – Upstream	
DWS corresponding name	**B41G-00685 / B41G010000 (US & DS)**
Site Name	Upstream Point (April 2021)
Upstream Photograph	Downstream Photograph
 **Figure 34: Upstream sampling point**	 **Figure 35: Downstream sampling point**
Site Description	Flow moderate and water shallow, sediment/sand visible as dominant biotope. Water seemed visibly polluted or impacted.
Impacts on the water environment observed	Anthropogenic disturbances associated with easy access and road crossing. Water had an opaque whitish colour
GPS	24°59'8.35"S 30° 4'52.69"E
Reference PES as per SQR	Class D: Largely Modified

High Flow 2021	SASS Score	No of Taxa	ASPT
SASS 5 Results	61	11	5.55
2021 Result	Class D: Largely Modified		

Table 42: Downstream 1 Point US of the Dwars River

Sampling Area – Upstream	
DWS corresponding name	**B41G-00685 / B41G010000 (US & DS)**
Site Name	Downstream Point – DS 1 (April 2021)
Upstream Photograph	Downstream Photograph
 **Figure 36: Upstream photograph at sampling point**	 **Figure 37: Downstream photograph of sampling point**
Site Description	Domestic cattle impacts sighted such as trampling in some sections. River had adequate biotopes and water clear.
Impacts on the water environment observed	Anthropogenic disturbances associated with easy access
GPS	24°54'10.47"S 30° 6'36.15"E
Reference PES as per SQR	Class D: Largely Modified

High Flow 2021	SASS Score	No of Taxa	ASPT
SASS 5 Results	86	14	6.14
2021 Result	Class C: Moderately Modified		

Table 43: Downstream Point – DS 2 in Dwars River- Only Photographs taken for reference

Sampling Area – Downstream	
DWS corresponding name	**B41G-00685 / B41G010000 (US & DS)**
Site Name	Downstream Point – DS 2 (April 2021)
Upstream Photograph	Downstream Photograph
	

Figure 38: Upstream photograph at sampling point		Figure 39: Downstream photograph of sampling point	
Site Description		Well defined channel to the north of development representing at bridge and entry cordoned off with fencing as it is close the mine entrance	
Impacts on the water environment observed		Motor vehicle waste related substances and spills.	
GPS		24°54'42.66"S 30° 6'10.86"E	
Reference PES as per SQR		Class D: Largely Modified	
High Flow 2021	SASS Score	No of Taxa	ASPT
SASS 5 Results	N/A	N/A	N/A
2021 Result		Not sampled	

According to the River Health Programme: South African Scoring System (SASS) Data interpretation guidelines of 2007, the project forms part of the Highveld bioregion – combined biological zone, data within each spatial group was plotted with ASPT as a function of the SASS score. This is based on a relationship whereby SASS score and number of taxa were positively correlated with the number of biotopes sampled (Dallas, 2007).

This method allows natural variation in the SASS biotopes sampled to be taken into account. The section below categorises the different biological bands within each spatial group and provides the ecological categories.

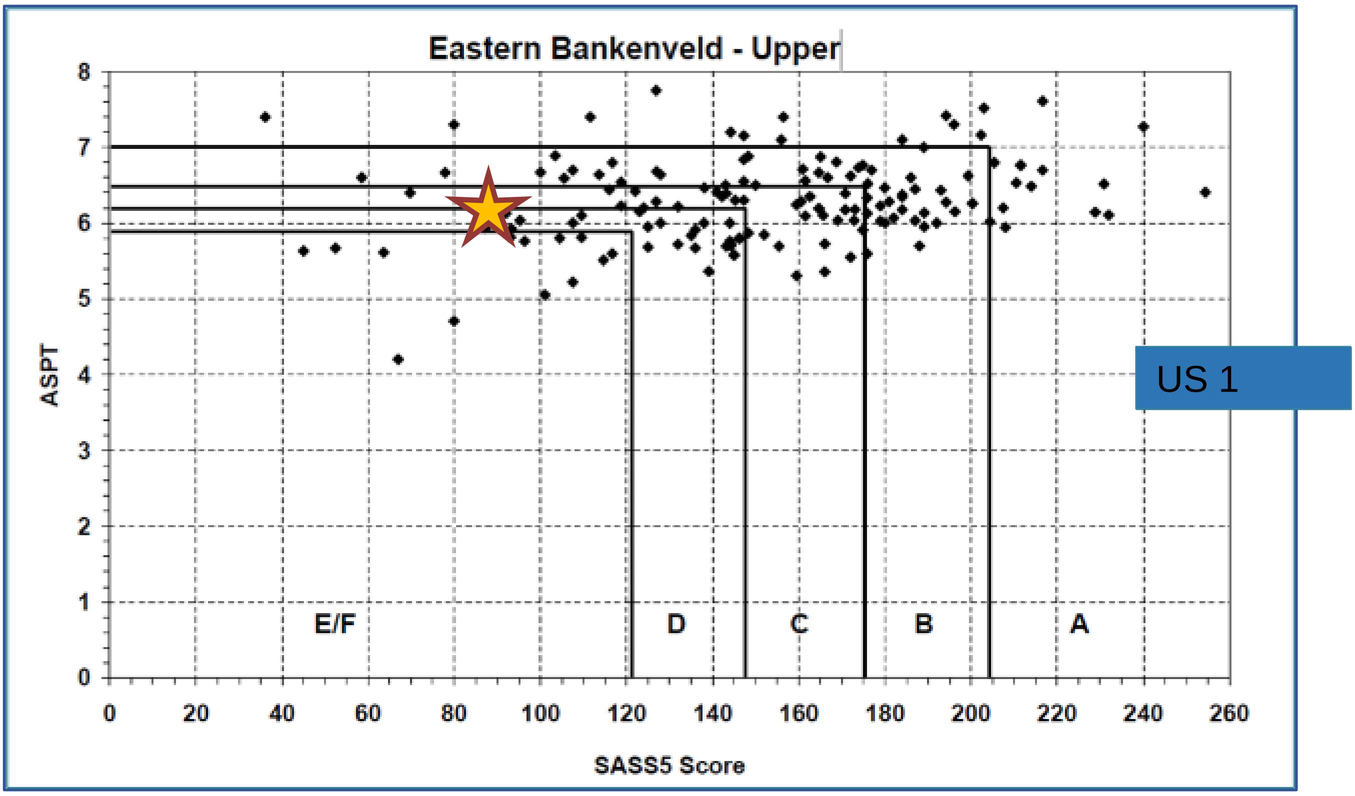


Figure 40: SASS5 classification for the sites in the Upper Bankenveld (Class D Geozone – Upper)

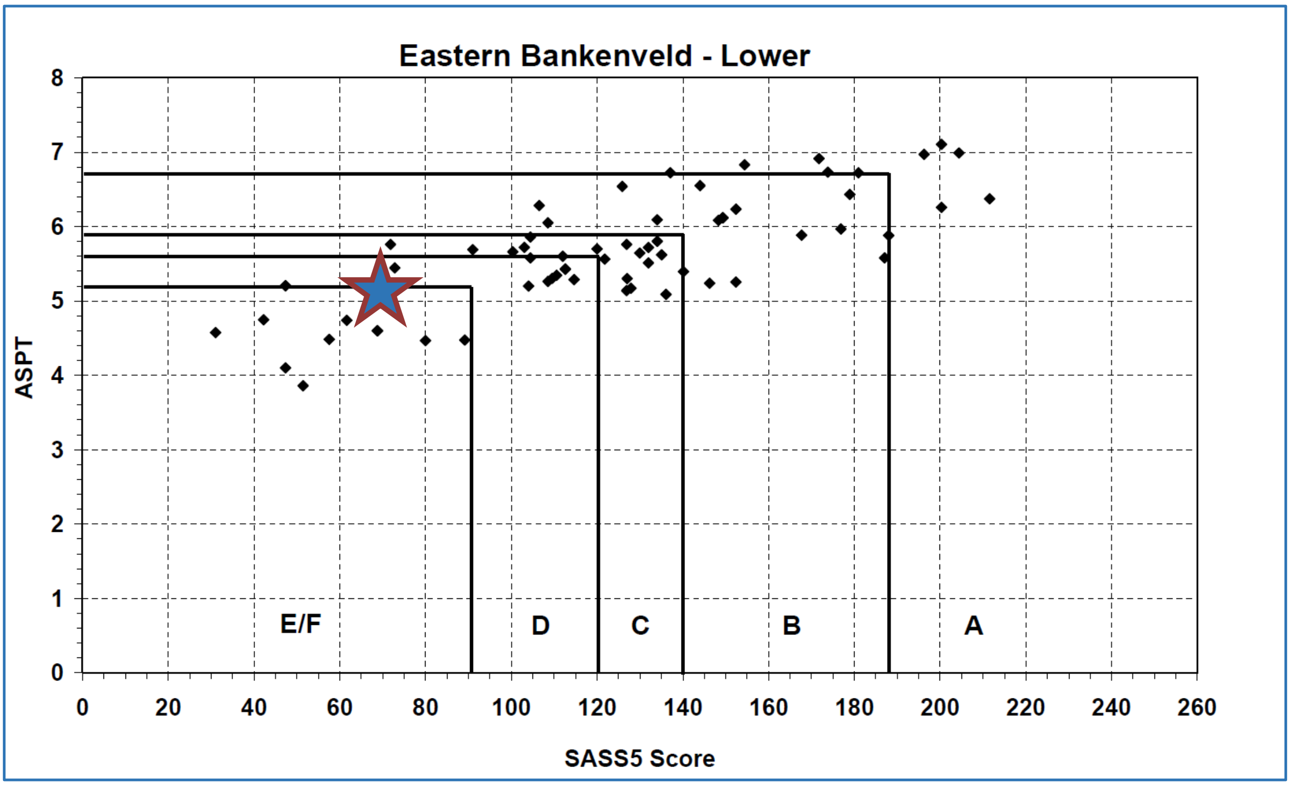


Figure 41: SASS5 classification for the sites in the lower Eastern Bankenveld (Class E Geozone– Lower)

ASPT and SASS5 Scores applicable for the Ecoregion and future monitoring data should be compared against these (Figure 34 and Figure 35) to obtain the Health Class applicable for the sections subjected to biomonitoring. The current classes as per Biomonitoring are as follows:

- Both Upstream and Downstream point sampled compare well, the Upstream point scoring a Class D, and the Downstream scoring a Class C. The downstream point was visibly less impacted and based on observations this could be as a result of the wetland type habitats found between the sampling points, filtering the water and taking up chemical constitutes.
- If future monitoring is conducted, it is recommended that all sites be revisited and monitored regularly to obtain seasonal data.

10.9. WETLANDS

Reference is made to the Wetland Impact Assessment, used to inform the wetland delineation and is attached as Appendix 11.

10.9.1. Methodology

10.9.2. Literature Review

A desktop assessment, supported by a site assessment conducted in April 2021, was undertaken and included the investigation of aerial photography, GIS databases, government records and previous studies, as well as literature reviews pertaining to the Waste Rock Dump Project area to determine the theoretical importance and sensitivity of the aquatic ecosystems involved. The study site was mapped using Geographical Information

Systems (GIS) (e.g. ArcGIS) to better understand the layout and structure of the surrounding environment. The following data sources and GIS information provided in Table 44was utilised

Table 44: Data Sources and GIS Information consulted to comprise the desktop assessment

Data	Source	Date of Data Source
Latest and Historic Google Earth ™ imagery	Google Earth PRO™ On- line	2019
Vegetation Map of South Africa, Lesotho and Swaziland	SANBI	2018
DEA National Landcover	SANBI	2015
Limpopo Conservation Plan	SANBI	2013
National Wetland Classification System	SANBI	2011
National Freshwater Ecosystem Priority Area maps and database	Water Research Commission, Implementation: Manual and Maps for FEPA area / SANBI	2011
National List of Threatened Ecosystem	SANBI	2011
NBA Terrestrial Formal Protected Areas	SANBI	2011 / 2018
National Wetland Map (NWM)	SANBI	2018

10.9.3. Data Analysis

The methods and tools utilised as part of the wetland assessment are summarised in Table 45 below.

Table 45: Summary of Recommended Assessment Tools for Rivers and Wetlands

Aquatic Element	Method	Tool	Applicable to Study
Rivers	Delineation	A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005). Updated manual for identification and delineation of wetlands and riparian areas (DWAF, 2008)	Yes
	Classification	National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al*, 2014).	Yes
	River Condition / Present Ecological State (PES)	DWAF IHI (Index of Habitat Integrity) Tool (Kleynhans, 1996) for rivers / Quick Habitat Integrity Model (Seaman *et al*, 2010)	Yes
	River Ecological Importance and Sensitivity (EIS)	DWAF Riverine EIS tool (Kleynhans, 1999)	Yes
Wetlands	Delineation	A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005).	No
	Classification	National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa (Ollis *et al*, 2014).	No
	Wetland Condition / Present Ecological State (PES)	Level 1 WET-Health Tool (Macfarlane *et al*., 2009)	No
	Wetland Functional/Ecosystem Services Assessment	Level 2 WET-EcoServices Assessment Tool (Kotze *et al*., 2009)	No
	Wetland Ecological Importance and Sensitivity (EIS)	DWAF Wetland EIS Tool (Duthie, 1999)	No

10.9.4. Receiving Environment

Freshwater ecosystems are typically linear features that are connected over regional scales in the landscape and embedded in the terrestrial matrix. Furthermore, freshwater ecosystems are typically located at topographical low points in the landscape, thereby collecting and conveying materials (water, dissolved matter and particulate matter) from within their entire catchment (UN Environment, 2018). It is thus important to first contextualise the onsite freshwater ecosystems in terms of local and regional setting, and conservation planning. An understanding of the biophysical and conservation context of the site assists in the assessment of the importance and sensitivity of the onsite freshwater ecosystems, the setting of management objectives and the assessment of the significance of anticipated impacts.

10.9.5. Topography

The TRP site is located between two ridges approximately 5 km to the east of the Dwars River and Klein Dwars River confluence. The area is characterised by gentle slopes running in southerly direction towards the Springkaanspruit. The elevation ranges from 900 mamsl (metres above mean sea level) in the northern extent of the project area to 960 mamsl in the southern and eastern extent of the project area.

The surrounding area comprises of undulating, mountainous terrain, where elevations range from 1 900 mamsl in the Schurinksberg range in the east to 800-1 000 mamsl in the Steelpoort, Dwarsrivier and Klein-Dwarsrivier river valleys. The elevation rises steeply to 1 600 m to the west and south west of the Dwarsrivier valley, on the western periphery of the Dwarsrivier farm.

10.9.6. Geology and Soils

Rocks mainly ultramafic intrusives of the lower, critical and main zones of the eastern Rustenberg Layered Suite of the Bushveld Igneous Complex (Vaalian). Three subsuites (zones), namely Croydon, Dwars River and Dsjate consist mainly of norite, pyroxenite, anorthosite and gabbro, and are characterised by localised intrusions of magnetite, diorite, dunite, bronzitite and harzburgite. Soils are predominantly shallow, rocky and clayey. Glenrosa and Mispah soil forms are common, with lime present in low-lying areas. Rocky areas without soil are common on steep slopes. The Dwars River Valley is characterised by prismacutanic horizons with melanic structured diagnostic horizons. Around Steelpoort red apedal, freely drained soils occur and these deeper soils include Hutton, Bonheim and Steendal soil forms.

10.9.7. Land Use and Land Cover

The site consists mainly of mining related activities and infrastructure, with sections of natural vegetation scattered throughout the area (Figure 42). The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located.

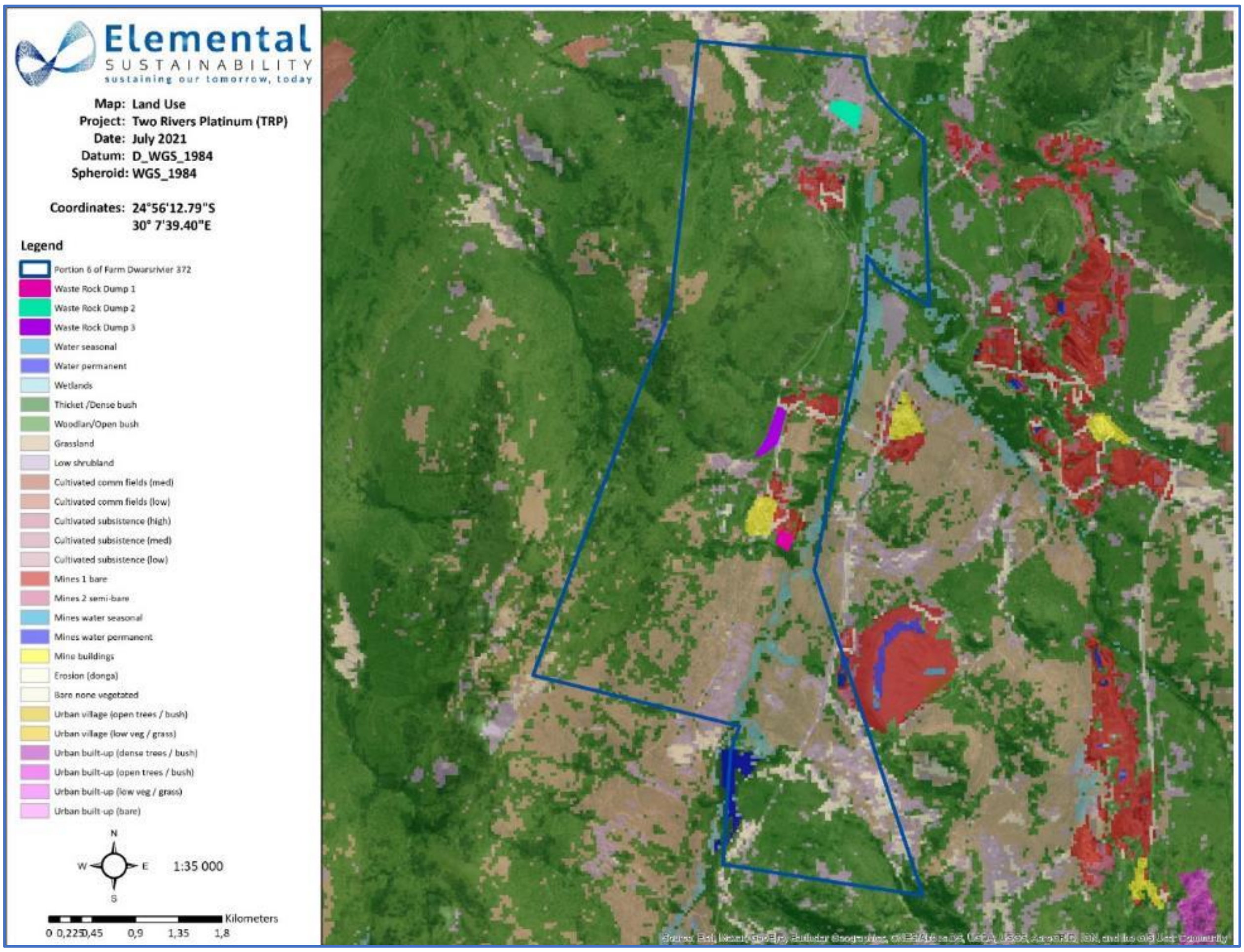


Figure 42: Current Land Use associated with the study area and surrounding environment

10.9.8. Broad Vegetation Types

The TRP-WRD project area lies within the Savannah biome, in the Central Bushveld Bioregion. The area is located within the Sekhukhune Mountain Bushveld (Figure 43).

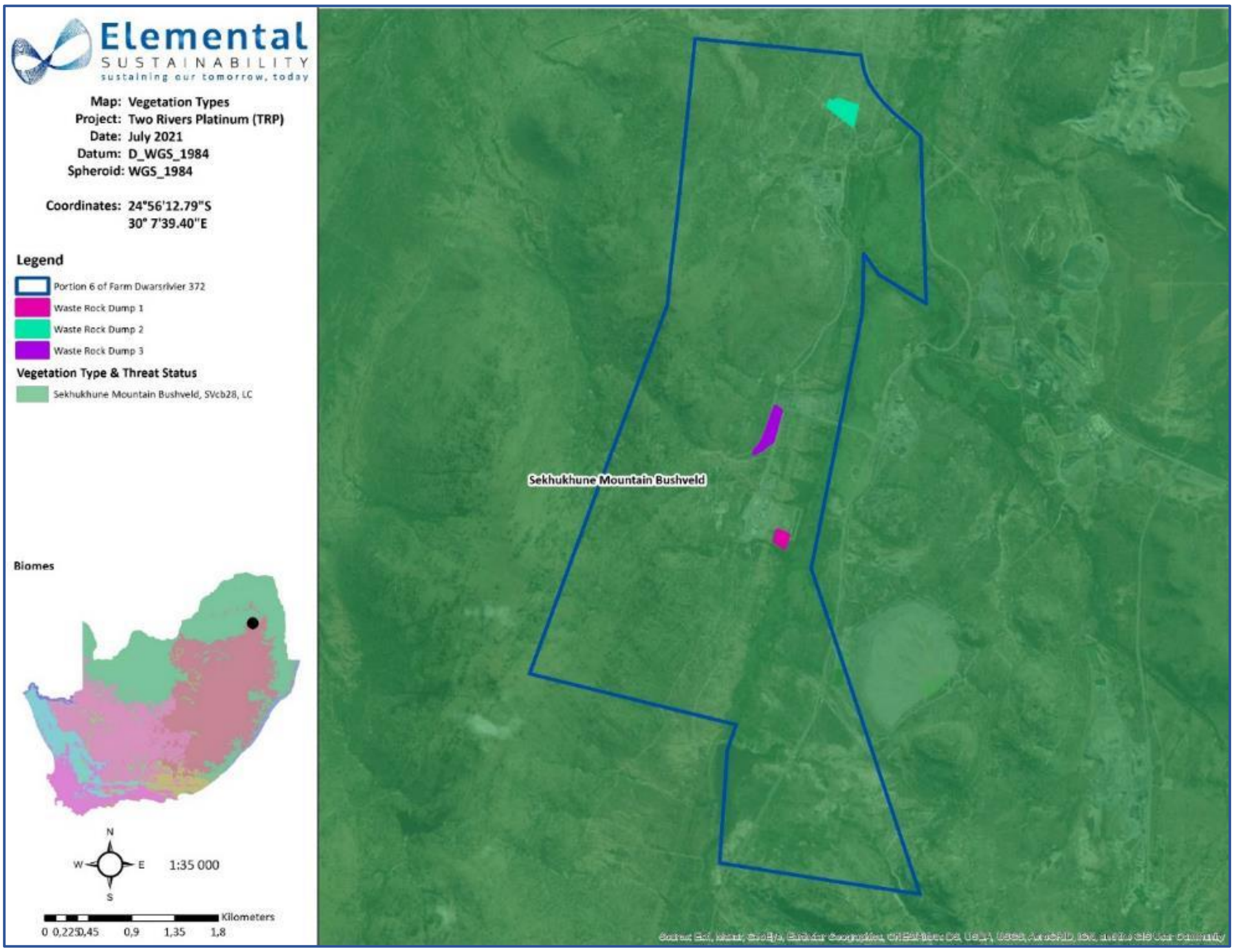


Figure 43: Vegetation Types associated with the study site situated within the Savanna Biome

10.9.9. National Freshwater Ecosystem Priority Area (NFEPA)

The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion within which the TRP – Waste Rock Dump Project will be located. The study site falls within the Olifants Water Management Area and is situated within Quaternary Catchment B41G (Figure 44). According to the National Wetland Map (NWM) (2018) database, the study area does not overlap with any wetlands, however, the NFEPA database indicates a Channelled Valley-bottom wetland within 500m of Waste Rock Dump 1 and 3.

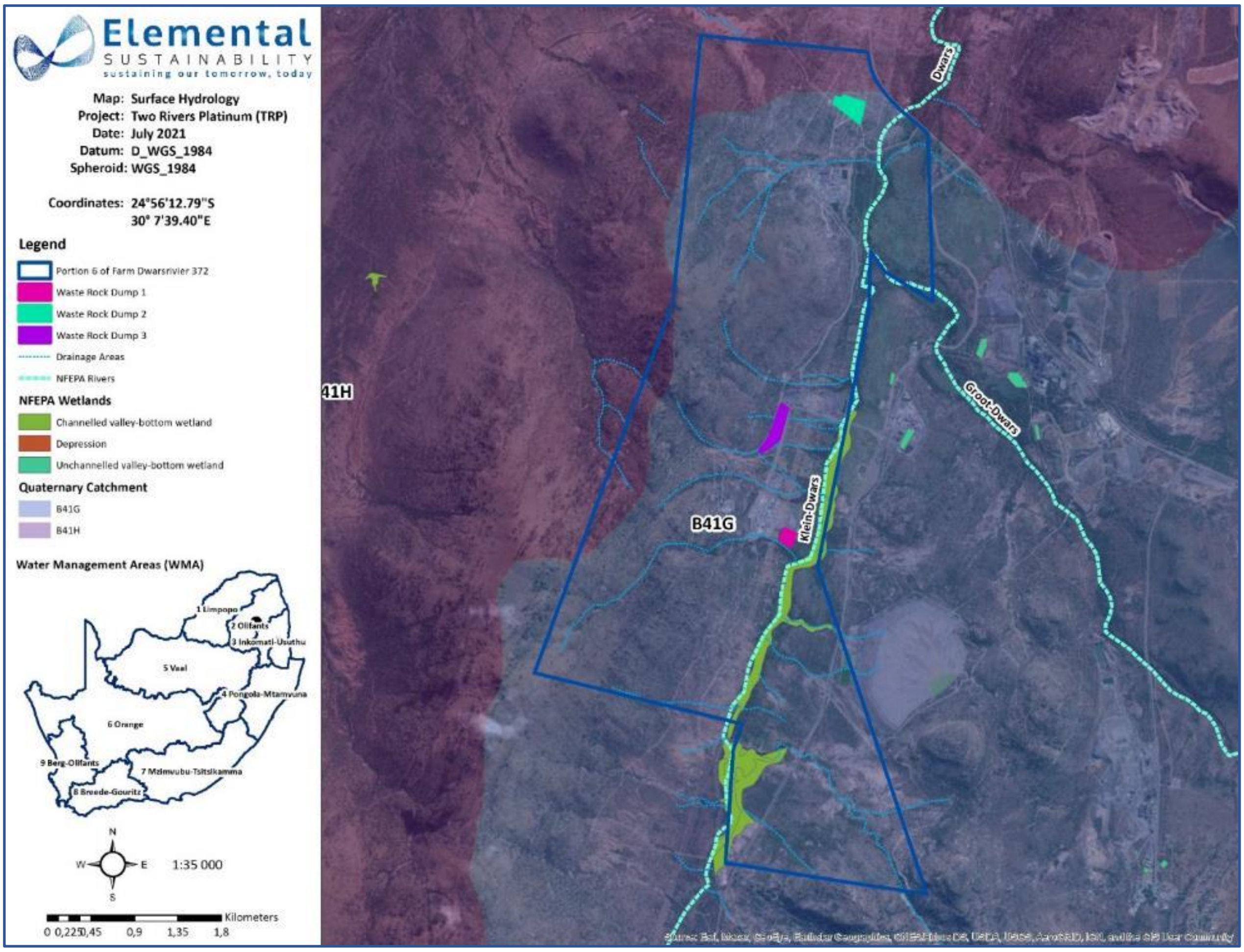


Figure 44: Quaternary Catchment B41G and forms part of the Olifants Water Management Area

10.9.10. Critical Biodiversity Areas

The entire study area is classed as a Critical Biodiversity Area 1 (CBA1). According to the Technical Guidelines for CBA Maps, CBA1 are irreplaceable sites. These areas are required to meet biodiversity pattern and/or ecological processes targets (Figure 45).

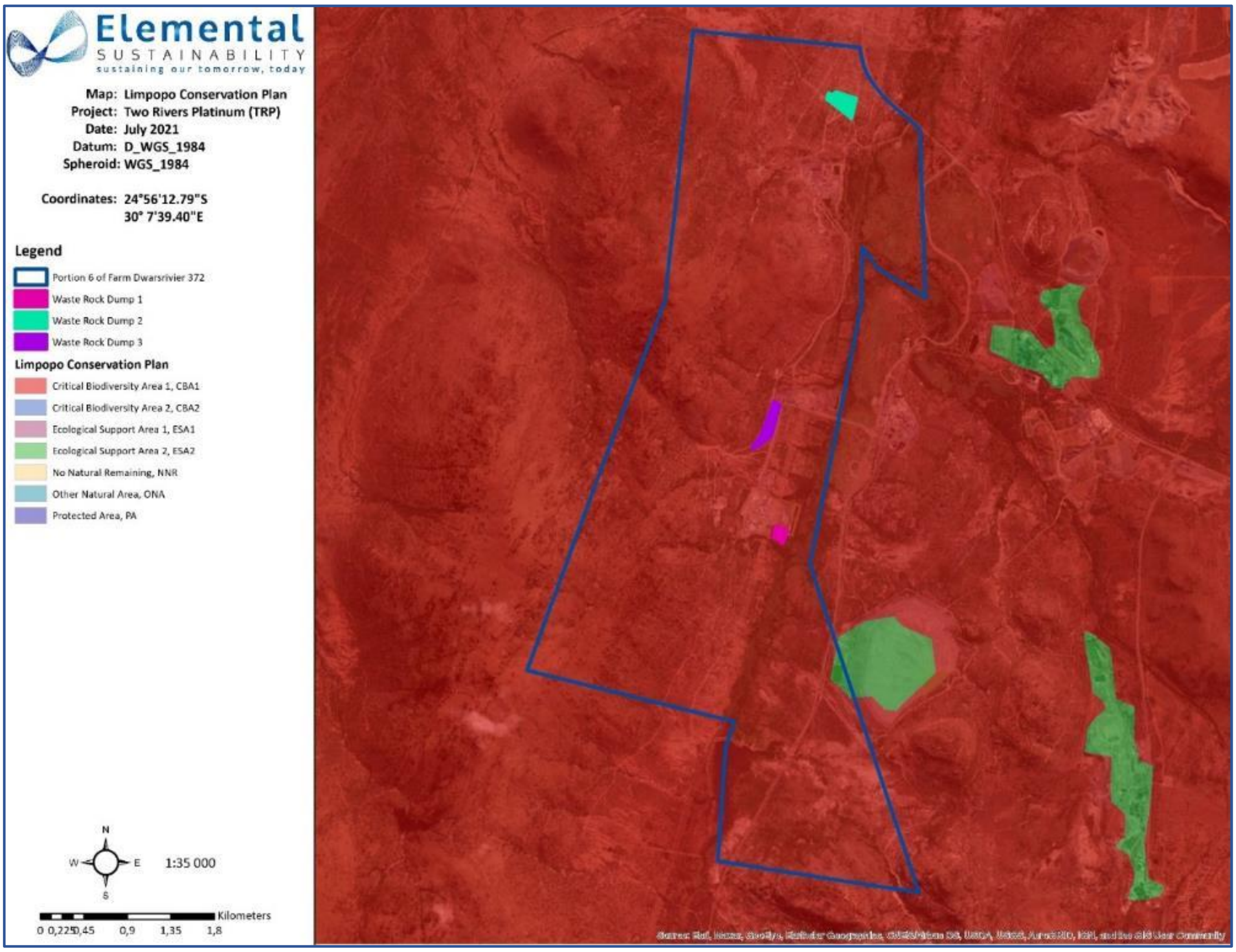


Figure 45: The Critical Biodiversity Areas associated with the study site according to the Limpopo Conservation Plan Database (2013)

10.9.11. Screening Tool

Refer to Figure 46, in accordance with the National Screening Tool, which needs to be considered as per minimum requirements for the Aquatic Biodiversity related assessment.

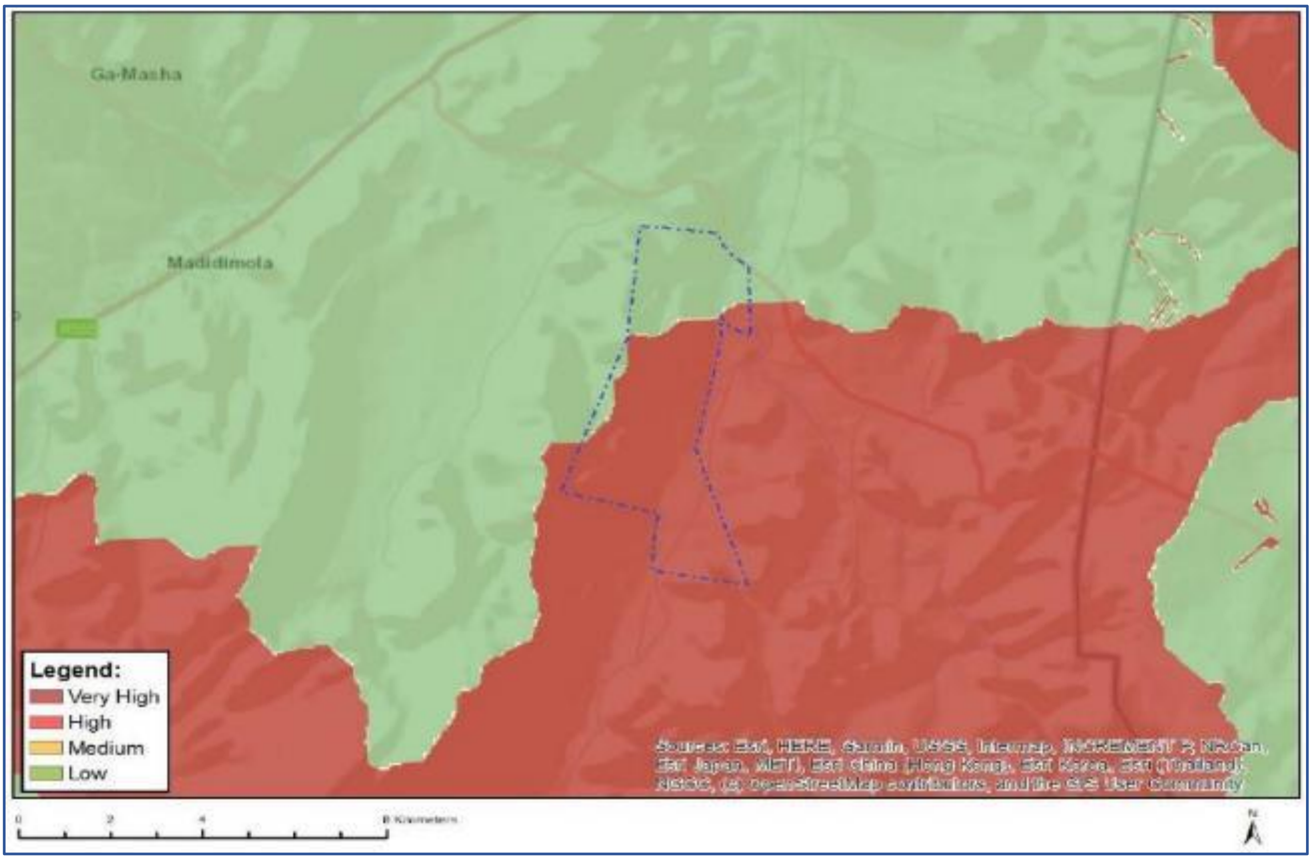


Figure 46: Aquatic Biodiversity Sensitivity – National Screening Tool

10.9.12. Watercourse Assessment

10.9.13. Land Use and Ecological State

Three (3) study sites were identified in a 100m area surrounding the Waste Rock Dumps (Figure 47 - 49). Study site 1 is the area surrounding WRD1, study site 2 surrounds WRD2 and study site 3 surrounds WRD3. The proposed DWS regulated area of 100m for rivers and 500 m for wetlands was consulted to show all relevant watercourses on the study site and beyond, to natural breaks in the system (for example a road). All watercourses within 100m of the Waste Rock Dumps were delineated and assessed.

Study Area 1 (WRD1)

An existing Waste Rock Dump is in operation at this site, and it is proposed to be extended towards the south. This proposed area for WRD1 is within 100m of a drainage area and within 500m from a wetland. The site is drained by the Klein-Dwars River.

Study Area 2 (WRD2)

No natural habitat remains in this area and has been cleared for previous stockpiling. One drainage area was noted within 100m of the proposed dump. Within 500m another drainage area was noted. The site is drained by the Dwars River.

Study Area 3 (WRD3)

The area surrounding the proposed site for WRD3 is largely natural, with several drainage areas within 500m. One of which is within 100 m of the proposed WRD3 site. Several roads traverse the drainage areas. Impacts from mining activities in close proximity to the watercourses, human and vehicle movement, watercourse diversions, road crossings and culverts are the main causes of degradation of the natural environment.

10.9.14. Watercourse Classification and System Characterisation

The watercourse assessment focused on the three study sites, with an extended footprint of 100m**.** Several Non-Perennial Episodic Streams (Drainage Areas) were delineated and assessed within the 100m study area of each Waste Rock Dump Project site. The current study follows the same approach by classifying watercourses in terms of a functional unit recognised in the classification system proposed in SANBI (2009). The features identified during the site visit are described according to four Hydrogeomorphic Units (HGM units) (Table 46).

Table 46: Characterisation of the watercourse features of the study area

Feature	Level 1: System	Level 2: Regional Setting	Level 3: Landscape Unit	Level 4: Hydrogeomorphic (HGM) Unit
Non-Perennial Episodic Streams	**Inland System:** An aquatic ecosystem with no existing connection to the ocean.	**Ecoregion:** Eastern Bankenveld Ecoregion	**Slope:** located on the side of a mountain, hill or valley that is steeper than lowland or upland floodplain zones	**River:** A linear landform with clearly discernible bed and banks, which permanently or periodically carries a concentrated flow of water. **Inflow Drainage:** Active Channel

10.9.15. Present Ecological State (PES) Assessment for Riparian Areas

The Quick Habitat Integrity (QHI) Assessment and Riparian Vegetation Response Assessment Index (VEGRAI) scores calculated for the area is summarised in Table 47 and Table 48 below. The watercourses were assessed separately for each proposed Waste Rock Dump site, and on account of the similar surrounding vegetation and impacts thereof. The QHI score obtained for the watercourses are as follow:

- **WRD1 Episodic Stream: B/C – Largely Natural to Moderately modified.** A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.

- **WRD2 Episodic Stream: C – Moderately modified** A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.

- **WRD3 Episodic Stream: D – Largely modified.** A large loss of natural habitat, biota and basic ecosystem functions have occurred.

The Episodic Stream at WRD1 was scored largely natural, with little impacts on the section assessed. The main impacts on the section of the Episodic Stream assessed at WRD2 included the clearance of vegetation and roads traversing the stream, therefore a score Moderately Modified was calculated. The section of the Episodic Stream assessed at WRD3 was largely impacted by various road networks crossing the stream and a score of Largely Modified was obtained, although some sections remain natural.

The VEGRAI score calculated for the riparian areas on the study site, were as follows:

- **WRD1 Episodic Stream: C – Moderately Modified to Largely Modified**. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.

- **WRD2 Episodic Stream: D – Largely Modified**. A large loss of natural habitat, biota and basic ecosystem functions have occurred.

- **WRD3 Episodic Stream: D – Largely Modified**. A large loss of natural habitat, biota and basic ecosystem functions have occurred.

Table 47: QHI scores for the assessed drainage regions (Seaman *et al.* 2010)

Quaternary Catchment	River	Bed Modification (0-5)	Flow Modification (0-5)	Inundation (0-5)	Riparian / Bank Condition (0-5)	Water Quality Modification (0-5)	Desktop Habitat Integrity	Invertebrate Rating (0-5)	Fish rating (0-5)	Instream EC %	Instream EC	Vegetation Rating (0-5)	Ecostatus %	Ecostatus EC	Confidence (1-5)
B41G	WRD1 - Episodic Stream	1	1	1	2	2	**79,0**	1,5	1,5	**79,7**	**B/C**	**1**	**81,4**	**B/C**	3: Moderate
B41G	WRD2 - Episodic Stream	2,5	2,5	2,5	2	1,5	**66,0**	2	2	**68,7**	**C**	**3**	**62,4**	**C**	3: Moderate
B41G	WRD3 - Episodic Stream	3,5	4	3	3	3,5	**42,0**	3	3	**47,3**	**D**	2	**54,9**	**D**	3: Moderate

Table 48: VEGRAI results for the riparian areas (Kleynhans *et al*. 2008)

LEVEL 3 ASSESSMENT: WRD1 - Episodic Stream					
Metric Group	**Calculated Rating**	**Weighted Rating**	**Confidence**	**Rank**	**% Weight**
Marginal	80,0	22,9	3,3	2.0	40.0
Non-Marginal	76,3	54,5	3,3	1.0	100.0
	2.0				140.0
Level 3 VEGRAI (%)				77,3	
VEGRAI EC				**C**	
Average Confidence				3,3	
LEVEL 3 ASSESSMENT: WRD2 - Episodic Stream					
Metric Group	**Calculated Rating**	**Weighted Rating**	**Confidence**	**Rank**	**% Weight**
Marginal	45,6	13,0	3,3	2.0	40.0
Non-Marginal	52,5	37,5	3,3	1.0	100.0

	2.0				140.0
Level 3 VEGRAI (%)				50,5	
VEGRAI EC				**D**	
Average Confidence				3,3	
LEVEL 3 ASSESSMENT: WRD3 - Episodic Stream					
Metric Group	**Calculated Rating**	**Weighted Rating**	**Confidence**	**Rank**	**% Weight**
Marginal	63,3	18,1	3,3	2.0	40.0
Non-Marginal	52,1	37,2	3,3	1.0	100.0
	2.0				140.0
Level 3 VEGRAI (%)				55,3	
VEGRAI EC				**D**	
Average Confidence				3,3	

10.9.16. Watercourse Delineation and Buffer Zone Determination

All features were delineated on a desktop level with the use of digital satellite imagery and topographical maps. Portions of the features were then verified during the field survey according to the guidelines advocated by DWA (2005, 2008) and the watercourse/riparian delineations presented are regarded as a best estimate of the temporary and riparian zone boundaries based on the site conditions present at the time of assessment.

During the assessment, the following indicators were used to ascertain the boundaries of the wetland features:

- Terrain units were used as the primary indicator, as the drainage lines and depressions were the most likely areas through which water will flow. In some of the riparian areas, the presence of alien plant species made it difficult discern riparian / drainage line boundaries
- Vegetation, although transformed, was considered informative at many features, and
- Soil form was considered. The presence of mottles (soils with variegated colour patterns) was used as an indicator for wetlands and riparian boundaries in some instances. In some areas the mottling of soils did not provide an accurate delineation of boundaries, and as such the above-mentioned characteristics were used in conjunction to determine boundaries.

Calculated buffer zones were based on mining related activities and were calculated as follows (Table 47**- 49**):

Non-perennial Episodic Stream: 20m

The buffer zone identified serves to highlight an ecologically sensitive area in which activities should be conducted with this sensitivity in mind.

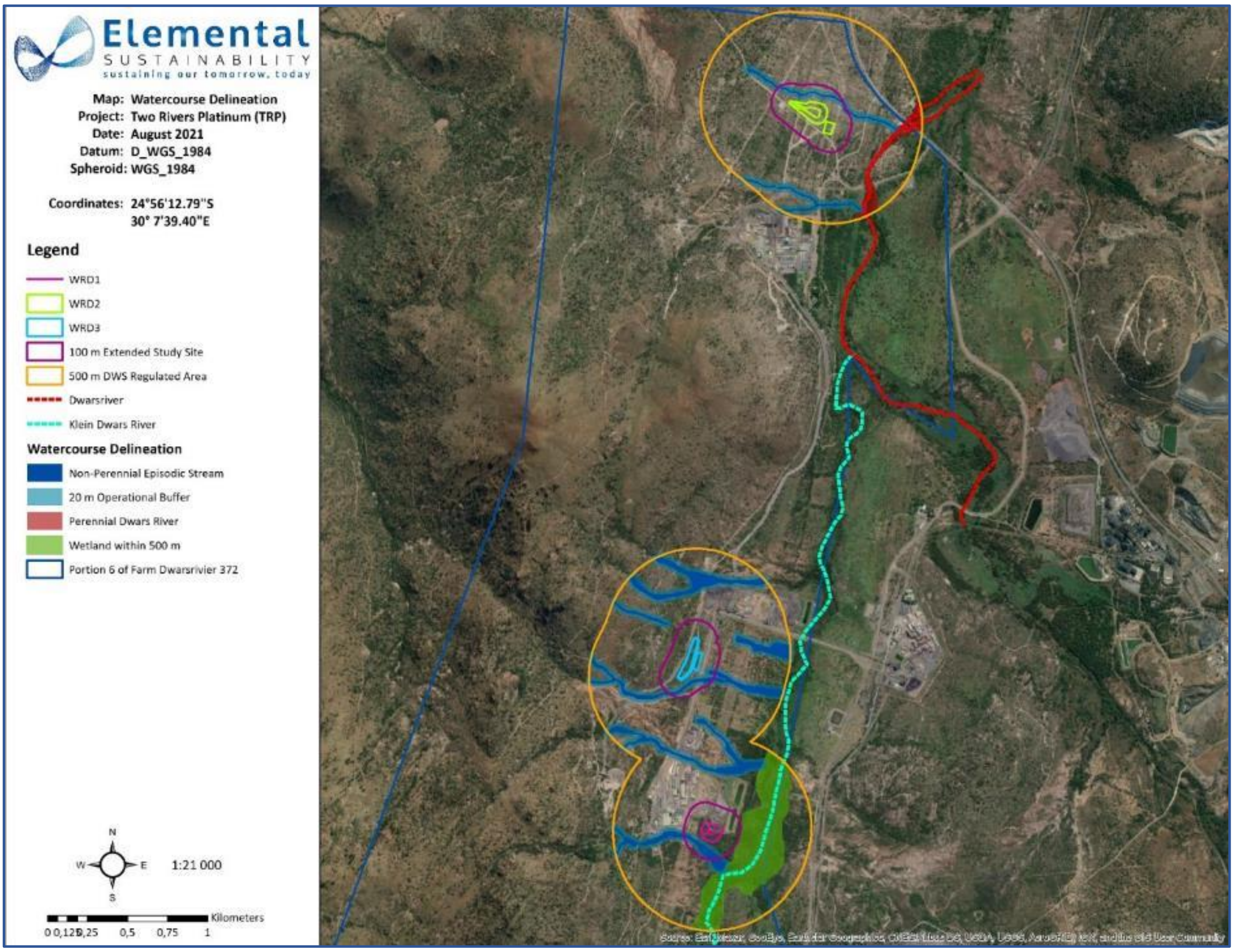


Figure 47: Delineated Watercourse Sensitivity Map

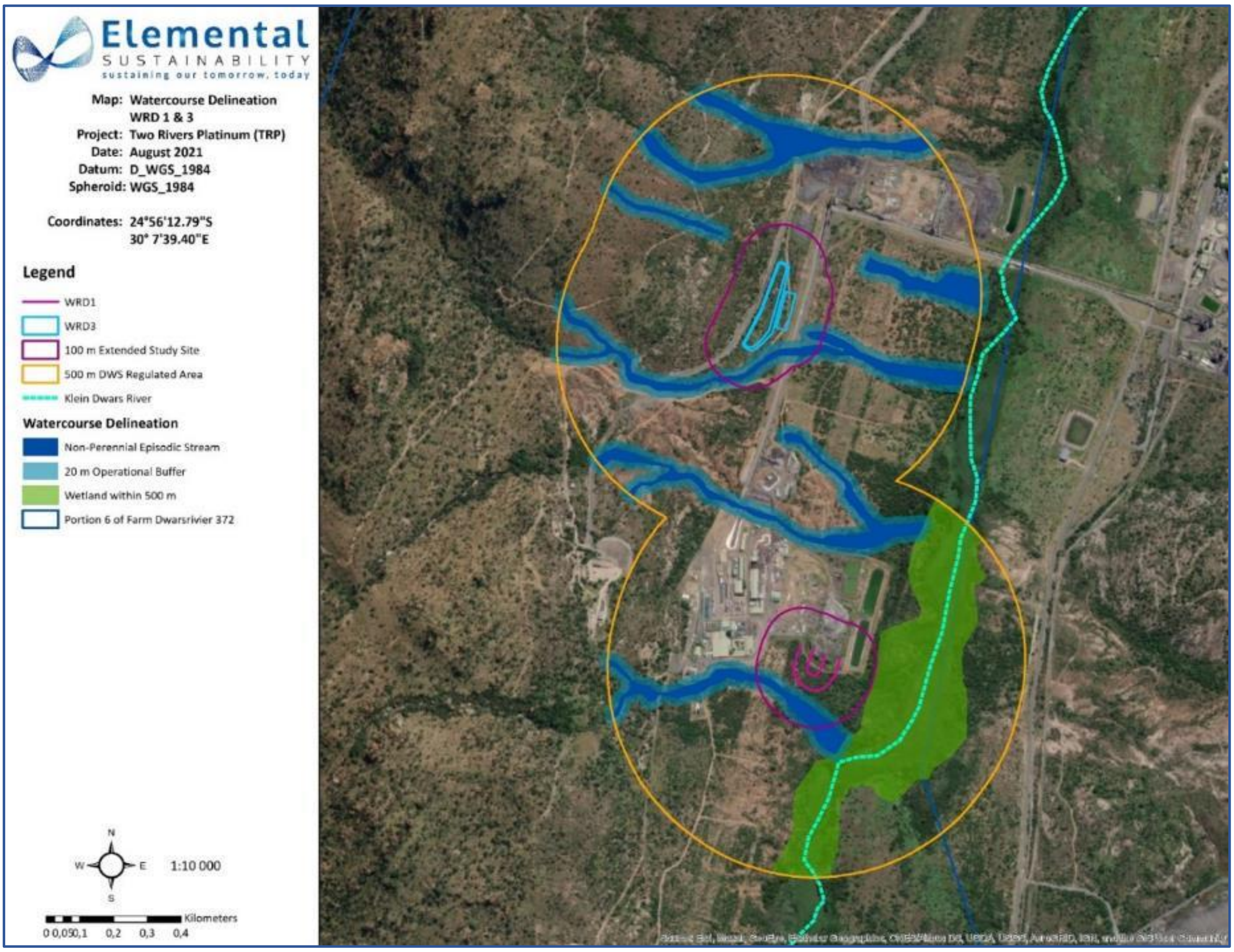


Figure 48: Delineated watercourses of WRD1 and WRD3.

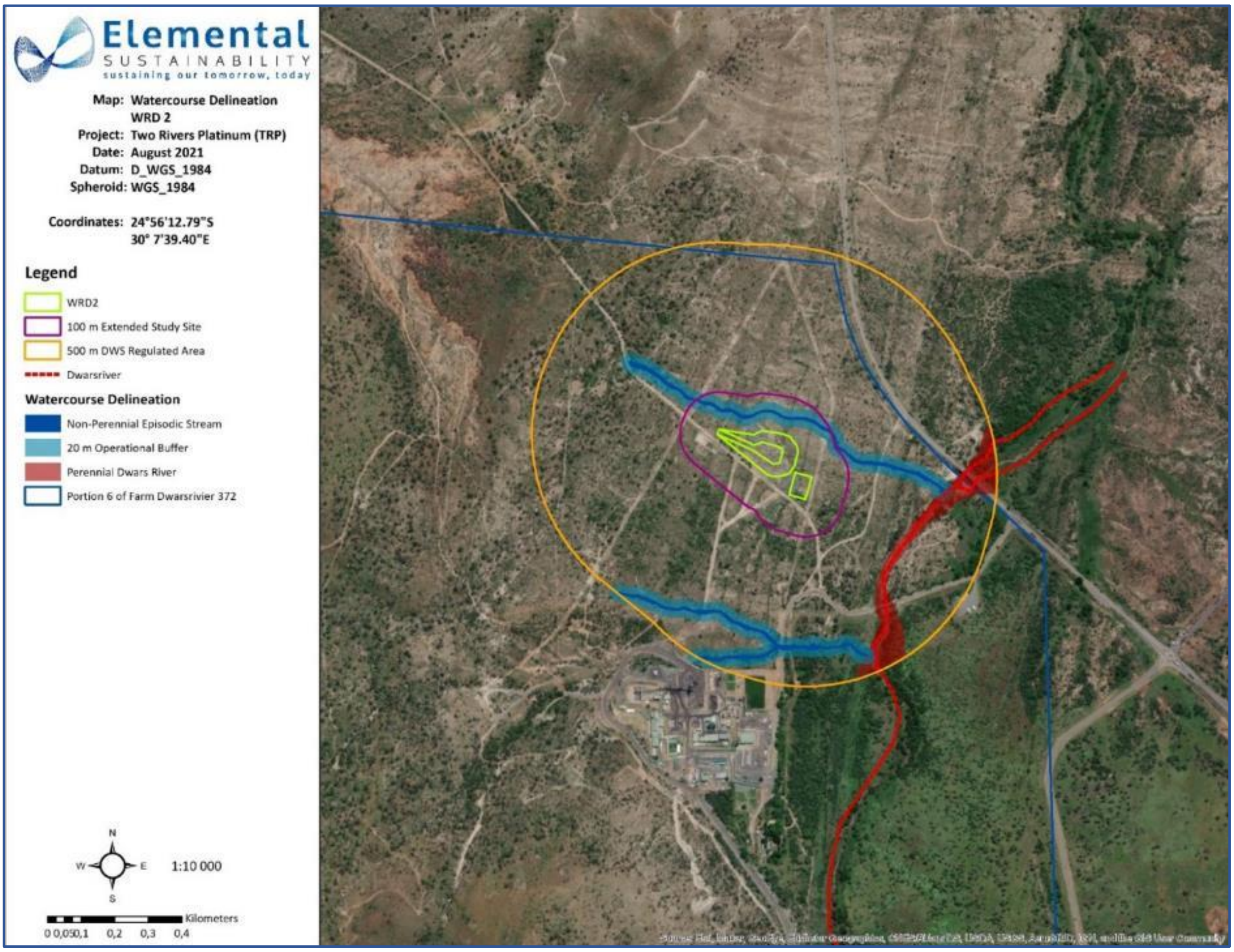


Figure 49: Delineated watercourses of WRD2.

10.9.17. Discussion

The overall PES Category for each watercourse was calculated. The loss of ecological integrity within the watercourses may be attributed to fragmentation occurring as a result of roads and other activities traversing the systems. The results are summarised in Table 49 below:

Table 49: Summary of Results

Classification	Scientific Buffer	QHI	VEGRAI	REC
WRD1 Episodic Stream	20 m	B/C	C	B
WRD2 Episodic Stream	20 m	C	D	C
WRD3 Episodic Stream	20 m	D	D	C

Various potential negative impacts associated with the activities are discussed in the impact assessment. The important factors relevant to the project are summarised below:

- The entire study area is classed as a Critical Biodiversity Area 1 (CBA1)
- In terms of NEMA Impact Assessment, the impacts associated with the activities range from Medium-Low to Medium-High prior to mitigation taking place. With mitigation fully implemented, the significance

of most impacts can be reduced to Very Low or Low.

- In terms of DWS Risk Assessment, all aspects of the activities fall within the medium risk category, thereby triggering a requirement for a Water Use Licence
- Based on the findings of the assessment, it is concluded that the impact can be mitigated to an acceptable level through the application of mitigation measures provided, and adherence to general good practice.

10.10. FLORA (PLANT LIFE)

Reference is made to the Terrestrial Ecological Assessment, which was conducted by Enviridi Environmental Consultants (Pty) Ltd. Refer to Appendix 12.

10.10.1. Methodology and Approach

It is important to note that many parts of South Africa contain high levels of biodiversity at species and ecosystem level. At any single site there may be large numbers of species or high ecological complexity. Sites also vary in their natural character and uniqueness and the level to which they have previously been disturbed. Assessing the impacts of a proposed project often requires evaluating the conservation value of the site relative to other natural areas in the surrounding area.

A simple approach to evaluating the relative importance of a site and the species found within it includes assessing the following:

- Is the site unique in terms of natural or biodiversity features?
- Is the protection of biodiversity features on site of national/provincial importance?
- Would development of the site lead to contravention of any international, national or provincial legislation, policy, convention or regulation?
- Is the site modified/disturbed in any way?

Thus, the general approach and angle adopted for this type of study is to identify any potential fauna species that may be affected by the proposed development. This means that the focus of this report will be on rare, threatened, protected and conservation-worthy species. The general approach adopted for this type of study is thus to identify any critical biodiversity issues that may lead to the decision that the proposed project cannot take place, i.e., to specifically focus on red flags and/or potential fatal flaws.

Biodiversity issues are assessed by documenting whether any important biodiversity features occur on site, including species, ecosystems or processes that maintain ecosystems and/or species. Rare, threatened, protected and conservation-worthy species and habitats are considered to be the highest priority, the presence of which is most likely to result in significant negative impacts on the ecological environment. The focus on national and provincial priorities and critical biodiversity issues is in line with National Legislation protecting environmental and biodiversity resources.

10.10.2. Literature Review and Desktop Study

A desktop assessment was conducted to establish whether any potentially sensitive species/receptors might occur on site. The South African National Biodiversity Institute's online biodiversity tool, ADU (Animal Demography Unit) Virtual Museum was used to query a species list for the Quaternary Degree Square (QDS) within which the study area is situated. Information regarding species of conservation concern was obtained prior to the field investigation. This was conducted by researching all available information resources including, but not limited to, the following:

- International Union for Conservation of Nature (IUCN) Red List of Threatened Species;
- The Endangered Wildlife Trust's Red List of Mammals of South Africa, Lesotho and Swaziland; and
- NEMBA List of Threatened or Protected Species (ToPS List).

To describe the overall site characteristics, and to identify points of interest within the site for evaluation, Google Earth Imagery and the 1:50 000 topographical maps were examined.

The importance of a desktop study is to provide a reference condition to determine the current state of the environment and to draw comparisons between the potential of the area and current degradation from surrounding land uses. Consequently, it was possible to identify potential areas of concern and to draw up a list of potential species that may be affected by the proposed development.

10.10.3. Field Investigation

A field investigation has been undertaken on the 21st of April 2021 to supplement and confirm several findings from the desktop study. This mainly served as a fatal flaw analysis to determine whether any major ecological concerns exist with regards to the study area surface infrastructure establishment.

During the field investigation the observed and derived presence of fauna associated with the recognised habitat types of the study site, were recorded. In addition, fauna was also identified by means of spoor, droppings, burrows, or shelters. No trapping or mist netting was conducted, as the scope of work did not require such intensive work.

10.10.4. Data Analysis

Information obtained during the desktop assessment and the field survey were analysed and compared. Data interpretation and conclusions made were deduced from knowledge, and available literature and case studies. The habitat availability for sensitive fauna species which was assessed throughout the study area were furthermore included in the analysis as well as the potential impact of the development on sensitive fauna species.

Geospatial analysis in terms of sensitive areas and known species distribution were used in comparison with the data gathered to make certain deductions. This will also aid the planning and positioning of the infrastructure as well as management for the various proposed development activities. Better protection will be awarded to sensitive areas that have unique species compositions or sensitive habitat types.

10.10.5. Regional Vegetation

The project area lies within the Savanna Biome, which is the largest biome in South Africa, covering 34.3% of the country (about 435 000 km^2). It is a mixture of grasses and trees or shrubs. The Savanna Biome stretches from the Kalahari in the north-west across to the lowveld in the north-east and southwards to the lowlands of KwaZulu Natal and the Eastern Cape. It is found from sea level to about 2 000 metres above sea level. More than 5 700 plant species grow in the Savanna Biome. They include various types of grasses (e.g., Rooigras) and trees like the Baobab, Mopane, Camel Thorn and Knob Thorn. Rain falls in summer and varies greatly across the region, from about 235 mm per year in the Kalahari to over 1000 mm per year in the east.

10.10.6. Broad Vegetation Description

The Two Rivers Platinum – Waste Rock Dump Project area is located within the Sekhukhune Mountain Bushveld.

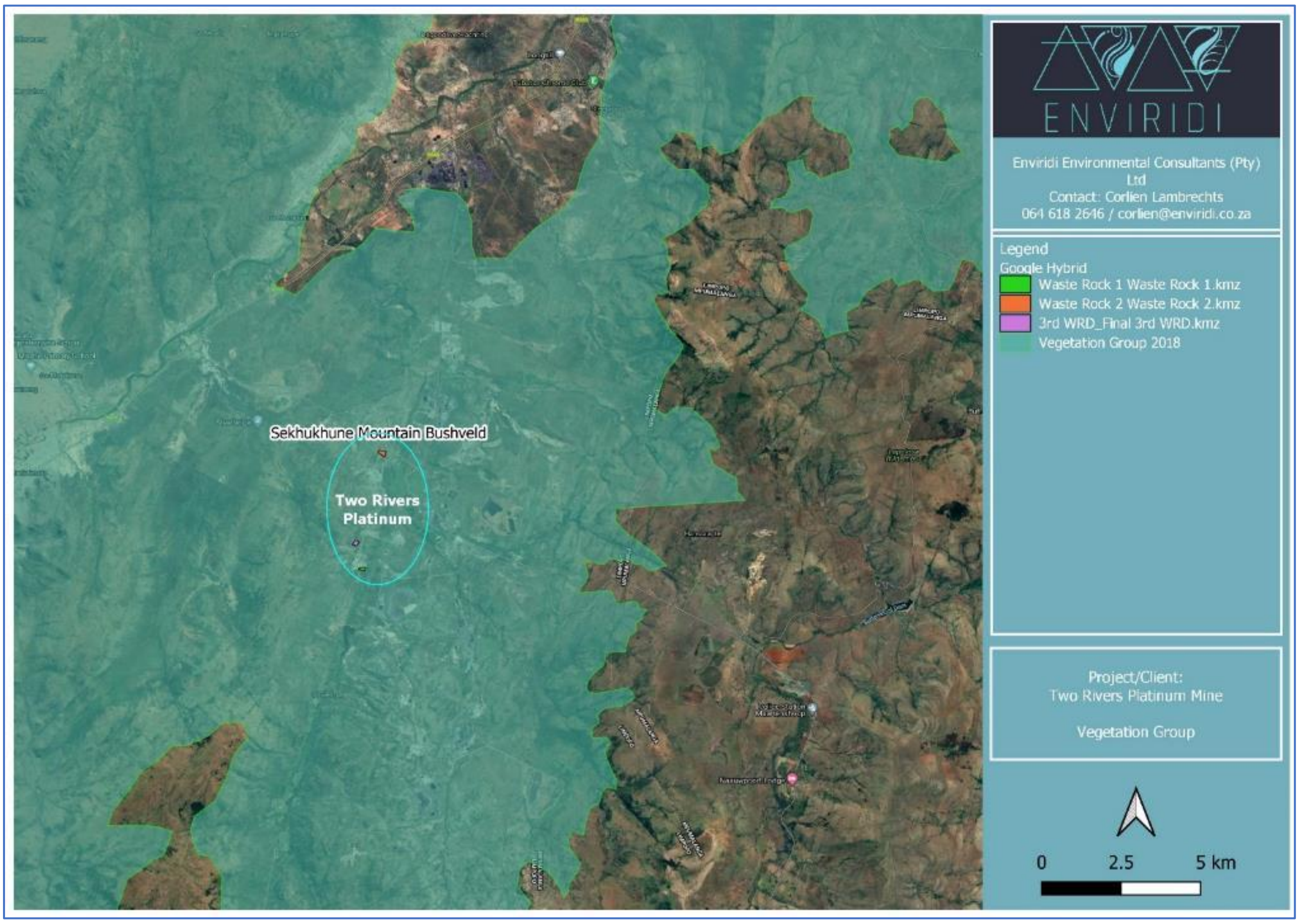


Figure 50: Vegetation Groups Applicable to the TRP – Waste Rock Dump Project

Sekhukhune Mountain Bushveld

The Sekhukhune Mountain Bushveld ecosystem is located in the Limpopo and Mpumalanga Provinces.

The vegetation type is characterised by dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. Open bushveld often associated with ultramafic soils on southern aspects. Bushveld on ultramafic soils contain a high diversity of edaphic specialists. Bushveld of mountain slopes generally taller than in the valleys, with a well-developed herb layer. Bushveld of valleys and dry northern aspects usually dense, like thicket, with an herb layer comprising many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs.

A list of expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Trees:** *Acacia nigrescens, Acacia senegal* var. *leiorhachis* (d), *Combretum apiculatum* (d), *Kirkia wilmsii* (d), *Terminalia prunioides* (d), *Vitex obovata* subsp. *wilmsii* (d), *Ziziphus mucronata* (d), *Bolusanthus speciosus*, *Boscia albitrunca*, *Brachylaena ilicifolia*, *Combretum molle*, *Commiphora mollis*, *Croton gratissimus*, *Cussonia transvaalensis*, *Hippobromus pauciflorus*, *Ozoroa sphaerocarpa*, *Pappea capensis*, *Schotia latifolia*, *Sterculia rogersii, Aloe marlothii* subsp. *marlothii*.
- **Shrubs:** *Dichrostachys cinerea* (d), *Euclea crispa* subsp. *crispa* (d), *Combretum hereroense*, *Euclea linearis*, *Pavetta zeyheri*, *Tinnea rhodesiana*, *Triaspis glaucophylla, Elephantorrhiza praetermissa* (d), *Grewia vernicosa* (d), *Asparagus intricatus*, *Barleria saxatilis*, *B. senensis*, *Clerodendrum ternatum*, *Commiphora africana*, *Hermannia glanduligera*, *Indigofera lydenburgensis*, *Jatropha latifolia* var. *angustata*, *Melhania prostrata*, *Phyllanthus glaucophyllus*, *Psiadia punctulata*, *Rhus keetii*, *Rhynchosia komatiensis, Aloe castanea* (d), *A. cryptopoda* (d), *Clematis brachiata* (d), *Rhoicissus tridentata* (d), *Acacia ataxacantha, Sarcostemma viminale*.
- **Graminoids:** *Aristida canescens* (d), *Heteropogon contortus* (d), *Panicum maximum* (d), *Setaria lindenbergiana* (d), *Themeda triandra* (d), *Aristida transvaalensis*, *Cymbopogon pospischilii*, *Diheteropogon amplectens*, *Enneapogon scoparius*, *Loudetia simplex*, *Panicum deustum*, *Setaria sphacelata*.
- **Herbs:** *Berkheya insignis* (d), *Commelina africana* (d), *Cyphostemma woodii*, *Kyphocarpa angustifolia*, *Senecio latifolius, Hypoxis rigidula*, *Sansevieria hyacinthoides, Huernia stapelioides*.
- **Biogeographically Important Taxa** (^{N}Northern Sourveld endemic, ^{CB}Central Bushveld endemic, ^{SK}Sekhukhune endemic): *Lydenburgia cassinoides*^{SK}, *Rhus sekhukhuniensis*^{SK}, *Euclea sekhukhuniensis*^{SK}, *Petalidium oblongifolium*^{CB}, *Plectranthus venteri*^{Z}, *Rhus batophylla*^{SK}, *Asparagus sekukuniensis*^{SK}, *Rhoicissus sekhukhuniensis*^{SK}, *Chlorophytum cyperaceum*^{SK}, *Raphionacme chimanimaniana*^{Z}.
- **Endemic Taxa:** *Acacia ormocarpoides, Euphorbia sekukuniensis, Plectranthus porcatus.*

<u>Sekhukhune Centre of Endemism</u>

The site forms part of the Sekhukhuneland Centre of Endemism (SCOE). Most of southern Africa's endemic plants are concentrated in only a few, relatively small areas, known as regions or centres of endemism. Sekhukhuneland have been identified through previous studies as one of the most important centres of endemism in the Mpumalanga and Limpopo Provinces. The centre falls within the rainfall shadow of the Drakensberg Escarpment, and it is relatively more arid than the areas to the east. The endemic plants of this area are primarily edaphic specialists that are derived from a unique ecology. The substrate consists of heavy soils derived from the norite, pyroxenite and anorthosite formations that predominate over the region. Endemics are both herbaceous and woody with endemism high in the Anacardiaceae, Euphorbiaceae, Liliaceae and Lamiaceae (Van Wyk & Smith, 2001). The site lies inside the Sekhukhuneland Centre of Endemism and the shallow, rocky areas of the development site can be considered especially sensitive as part of the centre of endemism and will almost certainly show similar vegetation patterns to the endemic regions, especially since the vegetation is still in a natural state. Other important attributes of this region's flora are summarized below:

Table 50: Attributes of the Sekhukhuneland Centre of Plant Endemism

Centre of Endemism Size:	5 449.4 km^2
Total Number of Species / Taxa	± 2 200

Endemic / Near endemic taxa:	>100
Rate of endemism:	4.5%
Area in Limpopo Province:	2 794 km^2
Proportion in Limpopo Province:	51.7%
Total % transformed:	28.57%

<u>Sekhukhune Mountainlands Ecosystem</u>

The Two Rivers Platinum – Waste Rock Dump Project area is located within a nationally threatened ecosystem, namely, the Sekhukhune Mountainlands (MP 9). Due largely to the uniqueness and endemic richness of this region, the Sekhukhune Mountainlands has been allocated an 'Endangered' status and is considered as a priority area for meeting explicit biodiversity targets; as defined in a systematic biodiversity plan (NEMBA 2011). Further to this, the area is recognised as a Priority Zone (North Eastern Escarpment) under SANBI for conservation initiatives.

This ecosystem covers an area of 121 000 ha, none of which is formally protected. The Sekhukhuneland Mountainlands are located between Roossenekal, Die Berg, and towards Steelpoort. Key biodiversity features include: Juliana's Golden Mole (*Neamblysomus julianae*) and Gunning's Golden Mole (*Neamblysomus gunningi*); eight threatened bird species including Blue Crane (*Anthropoides paradiseus*), Blue Korhaan (*Eupodotis caerulescens*) and Cape Vulture (*Gyps coprotheres*), Grey Crowned Crane (*Balearica regulorum*), Rudd's Lark (*Heteromirafra ruddi*), Southern Ground Hornbill (*Bucorvus leadbeateri*), Wattled Crane (*Bugeranus carunculatus*), Yellowbreasted Pipit (*Anthus chloris*); nineteen threatened plant species for example *Aloe fourei, Gladiolus rufomarginatus, Lydenburgia cassinioides, Resnova megaphylla, Scilla natalensis* and *Zantedeschia pentlandii;* and five vegetation types including Sekhukhune Montane Grassland, Sekhukhune Mountain Bushveld, Steenkampsberg Montane Grassland, Lydenburg Thornveld and Ohrigstad Mountain Bushveld. The ecosystem forms part of the Sekhukhuneland Centre of Endemism; it includes important sub-catchments, pans and wetlands.

10.10.7. Regional Conservation Assessments

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under NEMBA, lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature. The Sekhukhune Mountain Bushveld Vegetation Group is listed as "Least Threatened" in the "National List of Ecosystems that are Threatened and need of protection", which coincides with the threat status provided by the 2018 National Biodiversity Assessment.

However, as described in above, the Sekhukhune Mountain Bushveld forms part of the Sekhukhune Mountainlands (MP 9), which has been allocated an 'Endangered' status and is considered as a priority area for meeting explicit biodiversity targets as defined in a systematic biodiversity plan (NEMBA 2011).

There is one main conservation management plan for the province, namely the Limpopo Conservation Plan

(LCP). The LCP comprises two spatial components: maps of terrestrial and freshwater critical biodiversity areas (CBAs); and a set of land-use guidelines that are important for maintaining and supporting the inherent biodiversity values of these critical biodiversity areas.

10.10.8. Site Characteristics

The development falls within the 2430CC QDS feature, which has been included within this report. Information on plant species recorded for the Quarter Degree Squares (QDS) was extracted from the POSA online database hosted by SANBI. A list of plant species that have a high probability of occurring in the relevant QDS(s) is provided in Appendix 12 – Terrestrial Ecology Impact Assessment (as Appendix B: POSA Flora Species List for QDS).

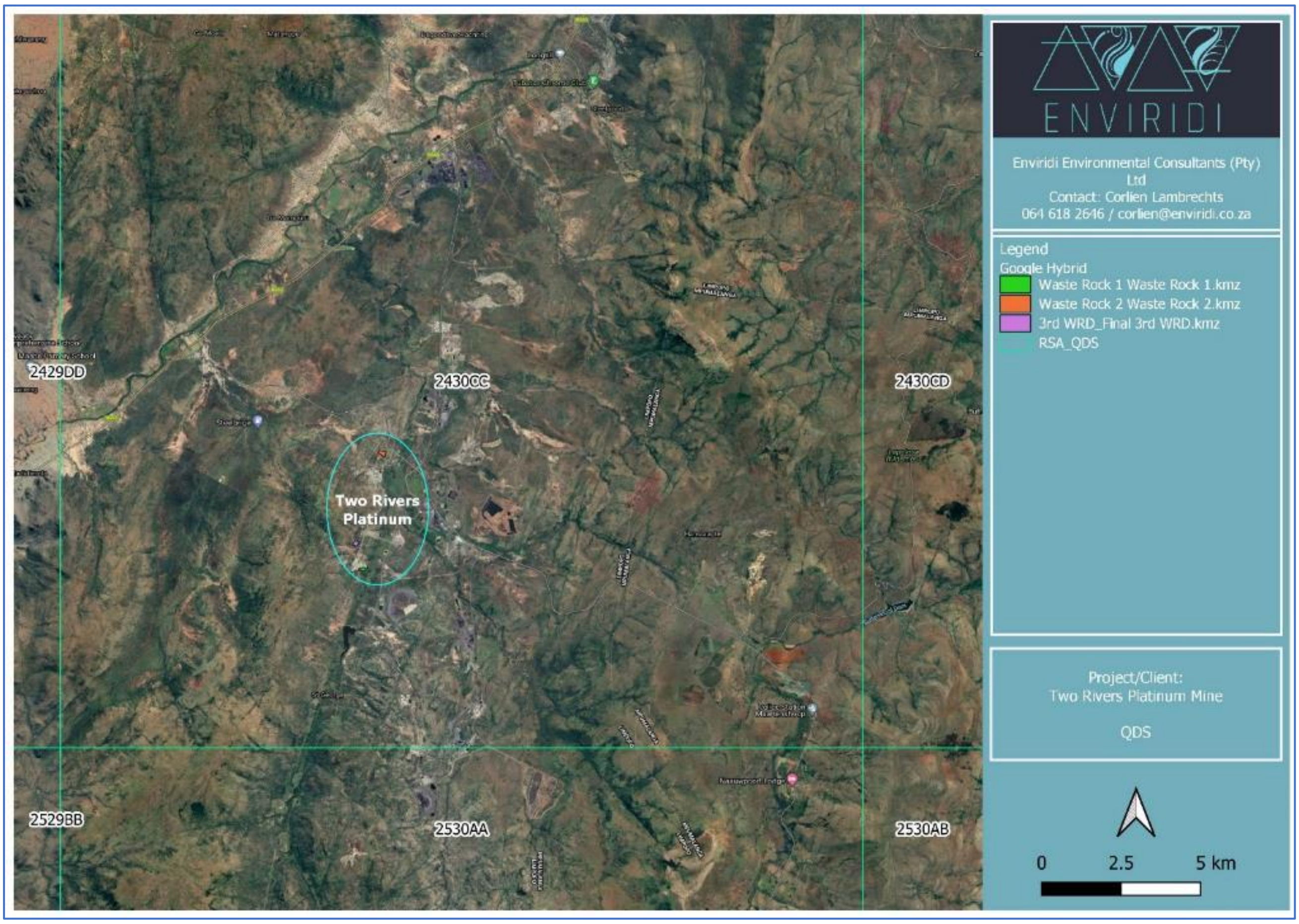


Figure 51: Quarter Degree Squares (QDS) – 2430CC

Within the National Threatened Ecosystems (2011 & 2018), the area falls within the Sekhukhune Mountain Bushveld, which has a status of Least Concern and is known to be Poorly Protected and the footprints of all three WRDs fall exclusively within this Vegetation Group.

As shown below, within Figure 52 all areas fall within Critical Biodiversity Areas 1 (CBA1) areas within the Limpopo Conservation Plan.

- **Critical Biodiversity Areas (1) (CBA1):** Irreplaceable Sites. Areas required to meet biodiversity pattern and/or ecological processes targets. No alternative Sites are Available to Meet targets. Maintain In a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state and manage for no further degradation.
- **Critical Biodiversity Area (2) (CBA2):** Best Design Selected Sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets. Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.
- **Ecological Support Areas (1) (ESA1):** Natural, near natural and degraded areas supporting CBAs by maintaining Ecological processes. Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.
- **Ecological Support Areas (2) (ESA2):** Areas with no natural habitat that is important for supporting ecological processes. Avoid additional / new impacts on ecological processes.
- **Other Natural Areas (ONA):** Natural and intact but not required to meet targets or identified as CBA or ESA. No management objectives, land management recommendations or land-use guidelines are prescribed.
- **No natural habitat remaining:** Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry, and human infrastructure. No management objectives, land management recommendations or land-use guidelines are prescribed.

The study area contains the following classes from the LCP:

- CBA1: Bushveld areas on the project footprint that appear to be intact (VU1 and VU2) fall within CBA1 areas. These areas were most likely denoted as CBAs due to the presence of habitat for SCC and the conservation importance of the ecosystem. Areas designated as VU3 in this study are totally transformed and should be considered as “no natural habitat remaining”.

Figure 52: Limpopo Conservation Plan (Terrestrial Biodiversity Assessment in terms of LCP)

10.10.9. Flora Assessment and Species List Compiled

Information on plant species recorded was extracted from the POSA online database hosted by SANBI, based on a 25 km x 25 km square surrounding the project area. A list of plant species that have previously been recorded in the aforementioned area is provided in Appendix 12 – Terrestrial Ecology Impact Assessment (Appendix B: POSA Flora Species List for QDS).

Information on plant species previously recorded for the project area was extracted from the POSA online database hosted by SANBI. A list of plant species that have previously been recorded in the project area is provided in Appendix 12 – Terrestrial Ecology Impact Assessment (Appendix C of the Assessment). The results indicate that 278 plant species have been recorded in the area queried, consisting of 72 families. The most prominent family is Fabaceae, with 27 species, followed by Asteraceae, with 20 species.

Table 51: Floral Species Summary for Area Queried (POSA)

Number of families	Number of species	SCC	Exotic
72	278	6	3

Of the 278 species previously recorded for the area, six are Species of Conservation Concern (SCC) in terms of their Red List status. Two additional flora species were listed for the project area in the Environmental Screening Tool Report.

The table below list the flora SCC previously recorded for the greater area along with the likelihood of the species occurring on the project footprint.

Table 52: Floral Species Summary Recorded for the Area on POSA

Species	Conservation	Likelihood of occurrence
Dicliptera fruticosa	Red List Status: NT	This species occurs on the Strydpoort Mountains to Ohrigstad, in savanna and open woodland, shady areas on rocky magnetite and dolomite slopes. This species is considered to have a **low likelihood of occurrence** on the project footprint.
Gladiolus reginae	Red List Status: CR	This species occurs in the Sekhukhuneland, Dwarsrivier and Steelpoort River valleys south of Kennedy's Vale, on dry, wooded rocky norite outcrops. This species is considered to have a **moderate likelihood of occurrence** on the project footprint.
Jamesbrittenia macrantha	Red List Status: NT	A Sekhukhuneland endemic with a very restricted range in the south-eastern parts of the region. Grassy slopes with other scattered shrubs, restricted to norite. This species is considered to have a **moderate to low likelihood of occurrence** on the project footprint.
Ledebouria dolomiticola	Red List Status: VU	This species is known from a single site in the Strydpoort mountains. This species is considered to have a **low likelihood of occurrence** on the project footprint.
Polygala sekhukhuniensis	Red List Status: VU	This species occurs on sparsely vegetated heavy metal rich soils on lower slopes and valley bottoms in the Sekhukhune Mountain Bushveld and Sekhukhune Plains Bushveld. This species is considered to have a **low likelihood of occurrence** in VU1, and a **moderate likelihood** of occurrence on VU2.
Protea parvula	Red List Status: NT	This species occurs in the Drakensberg Escarpment in Swaziland, Mpumalanga and KwaZulu-Natal from Mariepskop to Vryheid. This species is considered to have a **low likelihood of occurrence** on the project footprint.
Sensitive species 587	Red List Status: Rare	This species occurs in the Sekhukhuneland, Steelpoort River Valley and along the summit of the Leolo

Species	Conservation	Likelihood of occurrence
		Mountains as far as the Olifants River Valley, in closed woodland and thicket, in shallow norite soils on rocky outcrops among large boulders. This species is considered to have a **moderate to low likelihood of occurrence** in VU1.
Sensitive species 1167	Red List Status: VU	This species occurs on rocky hill sides and is restricted to the Mapoch region of Mpumalanga, mainly in the Roossenekal district. This species is considered to have a **low likelihood of occurrence** on the project footprint.

Ten (10) of the species recorded on POSA for the area are listed as protected in the LEMA:

- Aloe *longibracteata*
- *Aloe pretoriensis*
- *Ceropegia ampliata*
- *Ceropegia stapeliiformis*
- *Cyrtanthus stenanthus*
- *Elephantorrhiza praetermissa*
- *Haemanthus montanus*
- *Huernia stapelioides*
- *Huernia zebrina*
- *Orbea carnosa*

The POSA records for the area list one species protected in terms of the NFA, i.e., *Boscia albitrunca*.

None of the species recorded for the area are listed in terms of the ToPS list.

Three (3) exotic plant species were recorded on POSA for the area queried, none of which are listed as Alien Invasive Plant (AIP) species in NEMBA, 2004 (Act 10 of 2004).

Nineteen (19) species were found to possibly occur on site that have medicinal uses:

- *Brachylaena ilicifolia*
- *Buddleja saligna*
- *Carissa bispinosa*
- *Croton gratissimus*
- *Dichrostachys cinerea*
- *Diospyros lycioides*
- *Euclea undulata*
- *Gerbera piloselloides*
- *Hippobromus pauciflorus*
- *Lippia javanica*
- *Mystroxylon aethiopicum*
- *Olea capensis*
- *Olea europaea*
- *Rhamnus prinoides*
- *Scabiosa columbaria*
- *Senna italica*

- *Withania somnifera*
- *Xerophyta retinervis*
- *Ziziphus mucronata*

10.10.10. Flora Assessment Results

The study area is approximately 8.5 ha in extent. The proposed development footprint is situated in the Klein-Dwars River / Dwars River valley, between mountainous areas. The footprints areas are on average 930 mamsl, gently sloping toward the river. Various non-perennial tributaries of the Klein-Dwars and Dwars Rivers are located in the area, none of which are within 100 m of the project footprint.

Land uses, on and adjacent to the project area, currently consist of natural wilderness, old subsistence cropland, mining and related activities and infrastructure.

Vegetation units were identified according to plant species composition, previous land use and topography. The state of the vegetation of the proposed development varies from being natural to highly disturbed (transformed).

The following broad classification of Vegetation Units (VU) were found to occur on the proposed project footprint:

- Natural bushveld (VU1); and
- Moderately disturbed bushveld (VU2);
- Transformed) (VU3).

The vegetation units delineated for Waste Rock Dump 1, Waste Rock Dump 2 and Waste Rock Dump 3 are presented in Figure 53, Figure 54 and Figure 55 below, respectively. Table 52 lists the plant species identified for the VU during the site survey.

Figure 53: Vegetation Units Delineated – Waste Rock Dump 1

Figure 54: Vegetation Units Delineated – Waste Rock Dump 2

Figure 55: Vegetation Units Delineated – Waste Rock Dump 3

10.10.11. Vegetation Unit 1 (VU1)

The majority of the project footprint (3.48 ha) is located on VU1 and is composed of natural bushveld which has been subjected to relatively little disturbances to the vegetation structure and character.

The vegetation structure of VU1 appears to have moderate species diversity. The floral species composition of VU1 is considered to be representative of the vegetation composition of Sekhukhune Mountain Bushveld, as described by Mucina & Rutherford (2006). The bushveld is tall and dense, with a well-developed herb and graminoid layer.

The dominant land use of VU1 appears to be wilderness, with some impacts from immediately adjacent mining activities, gravel roads and impact associated with vehicle and foot traffic.

Dominant tree and shrub species in VU1 include: *Combretum hereroense* (Mouse-eared bushwillow), *Dichrostachys cinerea* (Sicklebush), *Euclea crispa* (Blue guarri), *Grewia* spp., *Peltophorum africanum* (African-wattle), *Terminalia prunioides* (Purplepod clusterleaf), *Vachellia nilotica* (Scented-pod thorn), *Vachellia tortillis* (Umbrella thorn), and *Ziziphus mucronata* (Buffalo thorn).

No AIP species were identified to occur on the project footprint.

Gladiolus reginae (Red List Status: CR) has a moderate likelihood of occurrence in VU1. This species was not identified to occur on the project footprint during the site survey.

The vegetation unit is classified as having a high sensitivity due to VU1 consisting of relatively undisturbed vegetation which is representative of the Sekhukhune Mountain Bushveld. VU1 has habitat present suitable for SCC and is considered to be of conservation importance, as denoted by its designation as CBA1 areas.

Figure 56: Photograph of General Characteristics of VU1

10.10.12. Vegetation Unit 2 (VU2)

Vegetation Unit 2 (VU2) occurs on 1.64 ha of the study site and is composed of natural bushveld which has been subjected to moderate disturbances to the vegetation structure and character.

The vegetation structure of VU2 appears to have moderate species diversity. The floral species composition of VU1 is considered to be representative of the vegetation composition of Sekhukhune Mountain Bushveld, as described by Mucina & Rutherford (2006). The bushveld is short and sparser, with a well-developed herb and graminoid layer.

The dominant land use of VU2 appears to be wilderness, with some impacts from immediately adjacent mining activities, gravel roads and impact associated with vehicle and foot traffic. The site was likely used historically for subsistence farming.

Dominant tree and shrub species in VU2 include: *Combretum hereroense* (Mouse-eared bushwillow), *Euclea crispa* (Blue guarri), *Grewia monticola* (Grey Donkeyberry), *Grewia occidentalis* (Crossberry), *Peltophorum africanum* (African-wattle), *Rhynchosia nitens* (Ferweelboontjie), *Searsia keetii* (Slender Karee), *Searsia pyroides* (Firethorn rhus) and *Terminalia prunioides* (Purplepod clusterleaf).

Two exotic species, *Tagetes minuta* (Tall khaki weed) and *Datura stramonium* (Common torn-apple) were identified to occur on the project footprint. Both species occurred along the edge of the exiting activities (VU3), adjacent to VU2.

Gladiolus reginae (Red List Status: CR) and *Polygala sekhukhuniensis* (Red List Status: VU) have a moderate likelihood of occurrence in VU2. Neither of these species were identified to occur on the project footprint during the site survey.

Figure 57: Photograph of General Characteristics of VU2

10.10.13. Vegetation Unit 3 (VU3)

Vegetation Unit 3 (VU3) occurs on the areas currently being used for waste rock dumps and mine residue stockpiles and is totally transformed. VU3 occurs on 3.38 ha of the study site. Most of the vegetation in this unit has been entirely removed. The vegetation unit is classified as having a low sensitivity due to the transformed state of the vegetation composition of the vegetation unit.

Figure 58: Terrain Associated with VU3

A total of 46 plant species were recorded in the studied area during the site survey, as detailed in Table 53 below. Of this number four have medicinal uses and two are exotic. One species, *Sclerocarya birrea* (Marula), is protected in terms of the NFA. None of the floral species recorded during the site survey are listed in the ToPS list, or the LEMA.

Table 53: Flora species identified during site survey

Species	Common name	Vegetation Unit	Conservation
Aloe marlothii	Mountain aloe	VU1	
Aristida adscensionis	Annual three-awn	VU2	
Aristida canescens	Pale three-awn	VU1, VU2	
Aristida diffusa	Iron grass	VU2	
Barleria senensis		VU1, VU2	
Blepharis subvolubilis	Eyelash flower	VU2	
Bolusanthus speciosus	Tree-wisteria	VU2	
Bothriochloa insculpta	Pinhole grass	VU1	
Brachiaria serrata	Velvet signal grass	VU2	
Cenchrus ciliaris	Blue buffalo grass	VU1	
Clerodendrum ternatum	Dwarf cat's whiskers	VU1, VU2	
Combretum apiculatum	Red bushwillow	VU1	
Combretum hereroense	Mouse-eared bushwillow	VU1, VU2	
Combretum zeyheri	Large-fruited bushwillow	VU1	
Commelina africana	Common yellow commelina	VU1, VU2	
Crotalaria monteroi	Small-leaved Rattle-pod	VU2	
Cussonia paniculata	Highveld cabbagetree	VU1	
Cynodon dactylon	Couch grass	VU2	
Datura stramonium	Common torn-apple	VU2	NEMBA: AIP Category 1b

Species	Common name	Vegetation Unit	Conservation
Dichrostachys cinerea	Sicklebush	VU1, VU2	Medicinal
Dicoma anomala	Fever bush	VU2	
Diheteropogon amplectens	Broad-leaved bluestem	VU2	
Dombeya rotundifolia	Wildpear	VU1	Medicinal
Ehretia rigida	Puzzlebush	VU1	Medicinal
Enneapogon scoparius	Bottlebrush grass	VU1, VU2	
Eragrostis chloromelas	Curly leaf	VU1, VU2	
Eragrostis patentipilosa	Footpath love grass	VU1	
Eragrostis superba	Saw-tooth love grass	VU1, VU2	
Eragrostis trichophora	Hairy love grass	VU2	
Euclea crispa	Blue guarri	VU1, VU2	
Euphorbia ingens	Common tree Euphorbia	VU1	
Fingerhuthia africana	Thimble grass	VU1, VU2	
Geigeria burkei	Knoppiesvermeerbos	VU2	
Grewia flava	Brandybush	VU1	
Grewia flavescens	Donkeyberry	VU1	
Grewia monticola	Grey donkeyberry	VU1, VU2	
Grewia occidentalis	Crossberry	VU1, VU2	
Gymnosporia buxifolia	Spikethorn	VU1	
Hermannia glanduligera		VU1, VU2	
Heteropogon contortus	Spear grass	VU1, VU2	
Hibiscus trionum	Bladder hibiscus	VU1	Exotic
Hyperthelia dissoluta	Yellow thatching grass	VU2	
Kirkia wilmsii	Mountain seringa	VU1	
Kyphocarpa angustifolia	Silky burweed	VU2	
Leonotis nepetifolia	Annual wild dagga	VU1	
Melhania prostrata		VU1, VU2	
Melinis repens	Natal red-top	VU2	
Panicum maximum	White buffalo grass	VU1	
Peltophorum africanum	African-wattle	VU1, VU2	
Polygala hottentotta	Small purple broom	VU2	
Rhynchosia nitens	Ferweelboontjie	VU2	
Sclerocarya birrea	Marula	VU1, VU2	NFA: Protected
Searsia keetii	Slender Karee	VU2	
Searsia pyroides	Firethorn rhus	VU2	
Senecio latifolius	Noxious ragwort	VU1, VU2	
Senegalia senegal	Slender three-hook thorn	VU1, VU2	
Setaria sphacelata	Bristle grass	VU1	
Stipagrostis hirtigluma	Blue bushman’s grass	VU1, VU2	
Tagetes minuta	Tall khaki weed	VU1, VU2	Exotic

Species	Common name	Vegetation Unit	Conservation
Terminalia prunioides	Purplepod clusterleaf	VU1, VU2	
Themeda triandra	Red grass	VU2	
Triaspis glaucophylla	Blue-leaved saucer-fruit	VU1, VU2	
Triraphis andropogonoides	Broom needle grass	VU2	
Urochloa mosambicensis	Bushveld signal grass	VU1	
Vachellia natalitia	Pale-bark sweet torn	VU2	
Vachellia nilotica	Scented-pod thorn	VU1	
Vachellia tortillis	Umbrella thorn	VU1	
Ziziphus mucronata	Buffalo thorn	VU1, VU2	Medicinal

10.11. FAUNA ASSESSMENT AND SPECIES LIST COMPILED

The faunal assessment was also conducted by Enviridi Environmental Consultants and is included in Appendix 12 of the EIAR and EMPr. The Virtual Museum and Animal Demography Unit (ADU) were used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2430CC QDS.

It is important to note that a QDS covers a large area: ±27 X 25 km (±693 km^2) and a pentad (SABAP2 Protocol) an area of ±8 X 7.6 km (±60.8 km^2), it is possible that suitable habitat will exist for a certain Red Data avifaunal species within this wider area surrounding the study site. However, the specific habitat(s) found on site may not suit Red Data species, even though it has been recorded for the QDS or pentad.

Species and habitat were identified as possibly sensitive within the framework of this study. Sensitive species were determined according to their close relationship and dependence on the vegetation type and habitat found to occur. Table 49 below lists all fauna species that are of conservation concern which were found during the desktop study. Only mammalian, reptilian and avifaunal species with a red listed status are known to occur where the new Two Rivers Platinum waste rock dump expansions are proposed.

Table 54: Fauna SCC found in 2430CC QDS

Species	Common name	Conservation status
Mammalian species		
Panthera pardus	Leopard	Vulnerable (2016) – **low likelihood of occurrence** on the project footprint.
Reptilian Species		
Platysaurus orientalis fitzsimonsi	FitzSimons' Flat Lizard	Near Threatened (SARCA 2014)
Avifaunal species		
Coracias garrulus	Roller, European	NT (Regional), LC Global
Ciconia abdimii	Stork, Abdim's	NT (Regional), LC Global
Sagittarius serpentarius	Secretarybird	VU (Regional), EN (Global) - As per Screening Tool Report

Species	Common name	Conservation status
Geronticus calvus	Ibis, Southern Bald	VU (Regional), VU (Global) - As per Screening Tool Report

10.11.1. Mammals

Two (2) mammal species were found to possibly occur within the QDS and four (4) others flagged in the Screening Tool Report. Five (5) of these six (6) species are included within the National Red Data List, however the listed QDS SCC is not likely expected on the specific footprint, but could possibly utilise the wider region as part of their range, since it has fairly large range requirements:

- Leopard (*Panthera pardus)* – Vulnerable (2016). Not expected on site, but rather may occur as part of larger range requirements associated with leopards
- Makwassie musk shrew (*Crocidura maquassiensis)* – Vulnerable (2016)
- Robert's Marsh Rat (*Dasymys robertsii)* – Vulnerable (2016)
- African wild dog (*Lycaon pictus)* – Endangered (2016). Not expected on site
- Sensitive Species 12 – Vulnerable (2016) - As per Screening Tool Report[2]

The *Panthera pardus* (Leopard) with a **low likelihood of occurrence** on the project footprint, has a wide habitat tolerance, including woodland, grassland savannah and mountain habitats but also occur widely in coastal scrub, shrubland and semi-desert (Hunter *et al*. 2013; Stein *et al*. 2016). Although Leopards occur in numerous protected areas across their range, the majority of the population occurs outside of protected areas, necessitating a need for improved conflict mitigation measures, trophy hunting management, non-lethal mitigation actions, centralized monitoring of trophy harvest and quality, issuing of permits as well as providing education programmes to ensure Leopards do not become locally threatened.[2] The Leopard's range may include the larger Sekhukhune areas, but will in effect not likely be expected on-site, with constant human activity and movement.

10.11.2. Avifaunal

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2), one hundred and twenty-three (123) bird species are listed for this area. Two (2) avifaunal SCC have been indicated for the specific pentad relevant to the development and two (2) other SCC flagged in the Screening Tool Report:

- Roller, European (*Coracias garrulus*) – Near Threatened (NT) (Regional), LC (Global)
- Stork, Abdim's (*Ciconia abdimii*) - NT (Regional), LC (Global)
- Secretary bird (*Sagittarius serpentarius*) – VU (Regional), EN (Global) - As per Screening Tool Report
- Ibis, Southern Bald (*Geronticus calvus*) – VU (Regional), VU (Global) - As per Screening Tool Report

10.11.3. Butterflies

Thirty-three (33) butterfly species were found for the 2430CC, all of which are categorized as Least Concern by SANBI.

10.11.4. Other Vertebrates

Nineteen (19) species of Dung beetles were recorded for the QDS, all not listed on the IUCN Red list. Three (3) Odonata species are known to occur within the area, all of which has a Least Concern rating. Two (2) species of Lacewing are known to occur within the region, with none marked as red listed on the SANBI Database.

10.11.5. Reptiles

Thirty-three (33) reptile species are recorded for the QDS, with the following one species having a red listed status:

- Fitz Simons' Flat Lizard (*Platysaurus orientalis fitzsimonsi)* - NT (SARCA 2014)

10.11.6. Amphibians

Eight (8) amphibian species were listed within this QDS and none of these species were red listed for the QDS.

10.11.7. Faunal Assessments Results

<u>Waste Rock Dump 1 (WRD1) Area</u>

WRD1 is found to be impacted and cleared by previous stockpiling activities in this region and almost no natural habitat is remaining is this section. No animal species or habitat remains in this specific area.

Figure 59: General Site Characteristics (WRD1) – Already impacted by Previous Usage of Material Stockpiles

<u>Waste Rock Dump 2 (WRD2) Area</u>

The site proposed for WRD2 is where a current WRD is established, and this dump is to be redesigned and extended towards the south of the dump. Natural habitat has been severely impacted within this footprint; however, a pristine natural area is found adjacent to the site.

Figure 60: General Site Characteristics (Waste Rock Dump 2) – Current WRD extension

<u>Waste Rock Dump 3 (WRD3) Area</u>

WRD3 is found in largely natural terrain and is characterised by sections of pristine natural environment and the sensitive mountain side found to the west of the fence. Drainage features are also found in this area and, although impacted by the roads found here, it remains mostly intact.


Figure 61: General Site Characteristics (Waste Rock Dump 3)
Mostly Natural Terrain and Habitat

Large sections of the area under investigation consisted of bushveld and savanna which land uses seemed to consist of wilderness, informal cattle grazing practices and mining impacts/terrain.

The faunal investigation provides a description of the ecological diversity in terms of species identification as well as the occurrence of threatened/sensitive species that is dependent on available habitat. During the desktop analysis, it was determined that several Red Data species were listed on the South African National Biodiversity database (SANBI) for the QDS that encompass the specific area.

Forty-six (46) species have been sighted, as listed in Table 55below and no national SCC species confirmed within the footprints. Mammals protected or regulated under LEMA have been found to occur, and these species should not be interfered with, nor relocated. Generally, the area was found to be visibly impacted (VU2 & VU3), with predominant mining activities prevalent in the surrounding area. Natural footprint areas (VU1) were also mostly fenced off from the current mining activities and these fences will have to be lifted and moved outwards for WRD1 and WRD3 and could therefore impact on sensitive habitat. In terms of the faunal investigation, Vegetation Unit 1 (VU) is the only area thought to represent sensitive habitat that could support other regional SCC.

Table 55: Species observed within and around the project area

Family	Species	Common Name	Sighting/Finding	Status and IUCN
Invertebrates and Butterflies				
Tenebrionidae	*Zophosis testudinaria*	Frantic tortoise Beetle (Koffie-pit)	Sightings	Least Concern
Bolboceratidae	*Meridiobolbus sp - likley Meridiobolbus faustus*	Dor Beetles	Sighting	Least Concern
Pyrrhocoridae	*Dysdercus nigrofasciatus*	Cotton Stainer	Sighting	Least Concern

Family	Species	Common Name	Sighting/Finding	Status and IUCN
Pyrgomorphidae	*Phymateus morbillosus*	Milkweed Locust	Sighting	Least Concern
Mantidae	*Epioscopomantis chalybea*	Grass Mantis	Sightings	Least Concern
Pamphagidae	*Hoplolopha sp.*	Saw-backed locust	Sightings	Least Concern
Pisauridae	*Perenethis simoni*	Nursery web spider	Sightings	Least Concern
Araneidae	*Gasteracantha versicolor*	Long-winged kite spider	Sightings	Least Concern
Araneidae	*Argiope australis*	Garden orb spider	Sightings	Least Concern
Agelenidae	Species unknown	Funnel-web spiders	Sightings	Least Concern
Nymphalidae - Satyrinae	*Bicyclus safitza*	Common Bush Brown	Sightings	Least Concern
Pieridae	*Colotis eris*	Banded Gold Tip	Sightings	Least Concern
Pieridae	*Belenois aurota*	Brown-veined white	Sightings	Least Concern
Nymphalidae	*Byblia ilithyia*	Spotted Joker	Sighting	Least Concern
Nymphalidae	*Danaus chrysippus*	African Monarch	Sighting	Least Concern
Nymphalidae	*Junonia hierta*	Yellow Pansy	Sightings	Least Concern
Reptiles				
No reptile species observed				
Amphibians				
No amphibian species observed				
Mammalians				
Cercopithecidae	*Papio ursinus*	Chacma baboon	Sightings during both field assessments	Least Concern (2016), Schedule 8 LEMA
Cercopithecidae	*Chlorocebus pygerythrus*	Vervet monkey	Sightings during both field assessments	Least Concern (2016), Schedule 8 LEMA
Leporidae	*Lepus saxatilis*	Scrub hare	Sightings and signs during both field assessments	Least Concern (2016), Schedule 4 LEMA (Game)
Hystricidae	*Hystrix africaeaustralis*	Cape porcupine	Sighting of quills near WRD 3	Least Concern (2016)
Bovidae	*Sylvicapra grimmia*	Grey duiker	Tracks and signs	Least Concern (2016), Schedule 4 LEMA (Game)
Bovidae	*Raphicerus campestris*	Steenbok	Dung	Least Concern (2016), Schedule 3 LEMA

Family	Species	Common Name	Sighting/Finding	Status and IUCN (Protected Wild Animals)
Avifaunal				
Turnicidae	*Turnix sylvaticus*	Common buttonquail	Sightings	Least Concern
Phasianidae	*Dendroperdix sephaena*	Francolin, Crested	Sightings	Least Concern
Laniidae	*Lanius collaris*	Fiscal, Southern	Sightings	Least Concern
Leiothrichidae	*Turdoides jardineii*	Arrow-marked Babbler	Sightings	Least Concern
Picidae	*Dendropicos fuscescens*	Cardinal Woodpecker	Sighting	Least Concern
Alcedinidae	*Halcyon senegalensis*	Kingfisher, Woodland	Sightings	Least Concern
Alaudidae	*Mirafra africana*	Rufous-naped Lark	Sightings	Least Concern
Sturnidae	*Acridotheres tristis*	Myna, Common	Sightings	Least Concern
Estrildidae	*Estrilda astrild*	Common waxbill	Sightings	Least Concern
Ploceidae	*Euplectes albonotatus*	Widowbird White-winged	Sightings	Least Concern
Phasianidae	*Pternistis swainsonii*	Spurfowl, Swainson's	Sightings	Least Concern
Numididae	*Numida meleagris*	Helmeted guineafowl	Feathers, Sightings	Least Concern
Ploceidae	*Plocepasser mahali*	White browed sparrow-weaver	Sightings	Least Concern
Nectariniidae	*Cinnyris talatala*	Sunbird, White-bellied	Sightings	Least Concern
Alaudidae	*Eremopterix leucotis*	Chestnut-backed sparrow-lark	Sightings	Least Concern
Viduidae	*Vidua funerea*	Dusky Indigobird	Sightings	Least Concern
Picidae	*Dendropicos fuscescens*	Woodpecker, Cardinal	Sightings	Least Concern
Dicruridae	*Dicrurus adsimilis*	Fork-tailed Drongo	Sightings	Least Concern
Leiothrichidae	*Turdoides bicolor*	Southern Pied Babbler	Sighting	Least Concern
Cuculidae	*Centropus burchelli*	Burchell's Coucal	Sightings	Least Concern
Upupidae	*Upupa africana*	Hoopoe, African	Sightings	Least Concern
Hirundinidae	*Riparia cincta*	Martin, Banded	Sighted	Least Concern
Ploceidae	*Ploceus intermedius*	Lesser masked weaver	Sighted	Least Concern
Ploceidae	*Euplectes afer*	Yellow-crowned bishop	Sighted	Least Concern

10.12. SENSITIVITY ANALYSIS FOR TERRESTRIAL ECOLOGY

Reference is made to the Terrestrial Ecological Assessment, which was conducted by Enviridi Environmental Consultants (Pty) Ltd. Refer to Appendix 12 and Appendix 13.

The objective of a sensitivity mapping exercise is to determine the location and extent of all sensitive areas that must be protected from transforming land uses. The site has been found to have medium sensitivity in general based on current condition and impacts already present.

The known Vegetation Groups, the Conservation plan and the field assessment were used as a general guideline to determine the conservation targets and current conservation of the area to be impacted by the activities, as per Figure 58 below.

The footprints have areas that is visibly impacted, but sections of WRD1 and WRD3 will expand into natural areas which is representative of CBA1. The areas chosen for the Two Rivers Platinum – Waste Rock Dump project are considered appropriate for the development since largest sections of the footprints proposed are located on already disturbed footprints.

The study area contains the following classes from the LCP:

- CBA1: Bushveld areas on the project footprint that appear to be intact (VU1 and VU2) fall within CBA1 areas. These areas were most likely denoted as CBAs due to the presence of habitat for SCC and the conservation importance of the ecosystem. The specialist is of the opinion that these areas are considered to be high sensitivity.

Gladiolus reginae (Red List Status: CR) and *Polygala sekhukhuniensis* (Red List Status: VU) have a moderate likelihood of occurrence on the project footprint. One species in terms of the NFA have been confirmed to occur on site (VU1 & VU2) during the field assessment.

VU1 and VU2 are classified as having a high sensitivity due to these Vegetation Units consisting of low to moderately disturbed vegetation which is representative of the Sekhukhune Mountain Bushveld. VU1 and VU2 have habitat present suitable for SCC and is considered to be of conservation importance, as denoted by their designation as CBA1 areas.

However, no substantial impacts to SCC are expected beyond the boundary of the preferred sites.

The De Hoop Dam Protected Environment is a Protected Area towards the west (6 km). The National Protected Areas Expansion Strategy (NPAES) focus areas (Mpumalanga Mesic Grasslands) is located towards the east (8 km) and south (4 km) of the Two River Platinum Mine. No Important Bird or Biodiversity Areas (IBAs) or other features are located within 10 km of the proposed sites.

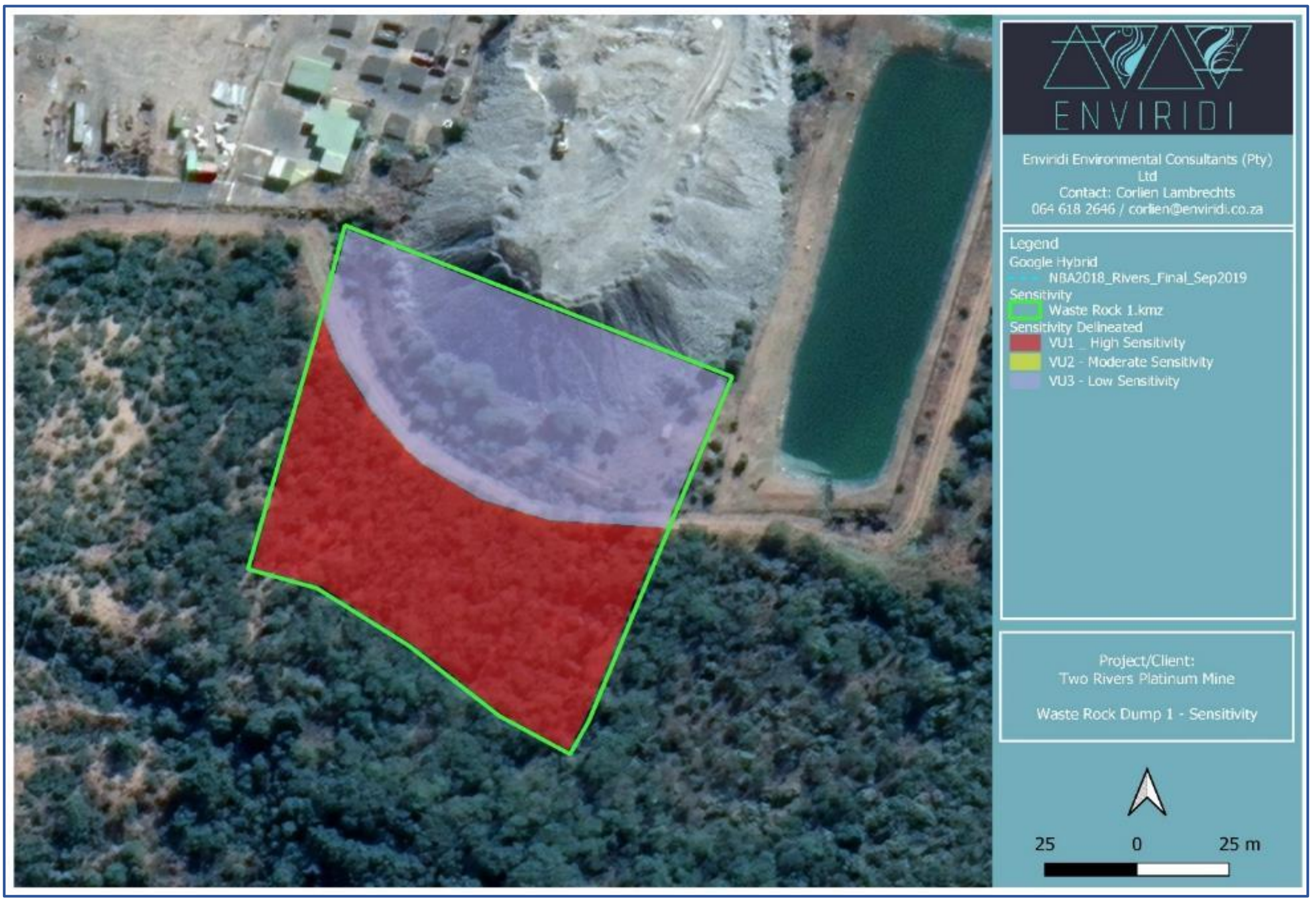

ENVIRIDI
Enviridi Environmental Consultants (Pty) Ltd
Contact: Corlien Lambrechts
064 618 2646 / corlien@enviridi.co.za
Legend
Google Hybrid
NBA2018_Rivers_Final_Sep2019
Sensitivity
Waste Rock 1.kmz
Sensitivity Delineated
VU1 _ High Sensitivity
VU2 - Moderate Sensitivity
VU3 - Low Sensitivity
Project/Client:
Two Rivers Platinum Mine
Waste Rock Dump 1 - Sensitivity
25
0
25 m

Figure 62: Sensitivity delineated according to habitat remaining condition thereof - WRD1

Figure 63: Sensitivity delineated according to habitat remaining condition thereof (including other ecological considerations) – WRD2

Figure 64: Sensitivity delineated according to habitat remaining condition thereof (including other ecological considerations) – WRD3

Opposed to the field supported sensitivity delineated above, the following is provided in accordance with the National Screening Tool (Figure 59, Figure 60 and Figure 61), which needs to be considered as per minimum requirements for Ecological and Terrestrial Biodiversity Assessments.

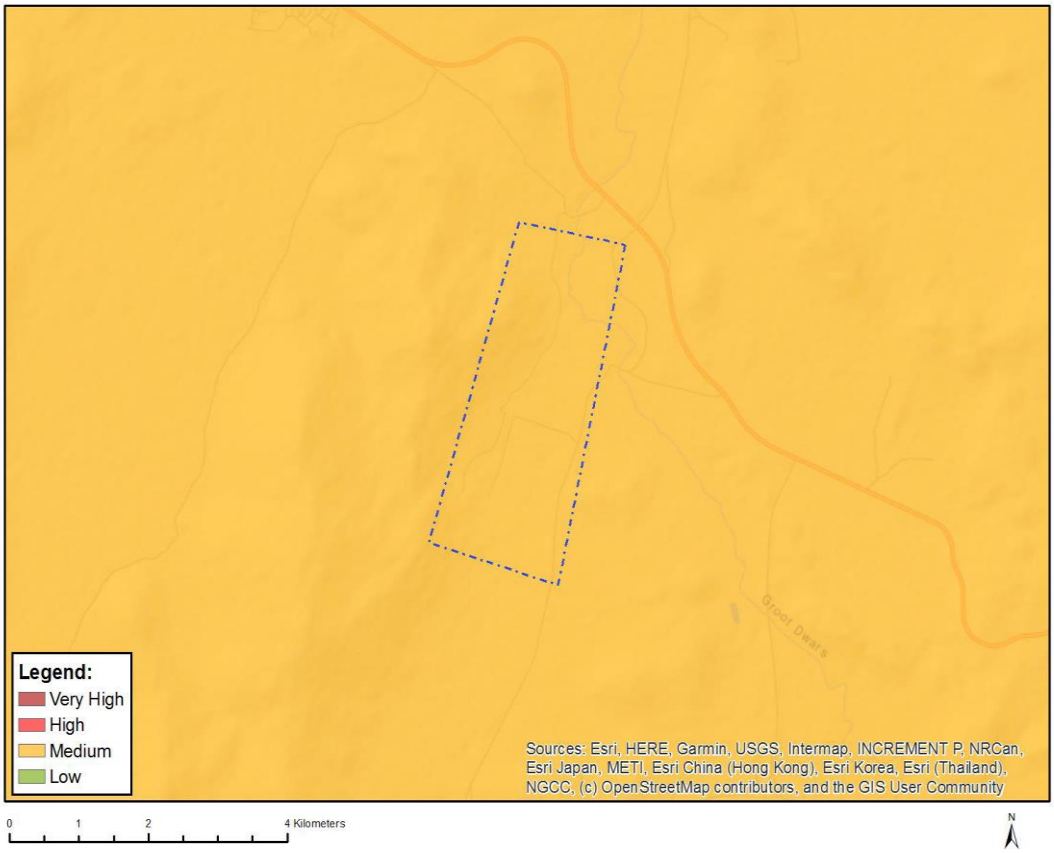


Figure 65: Animal Species Sensitivity – National Screening Tool – Categorised as Medium Sensitivity

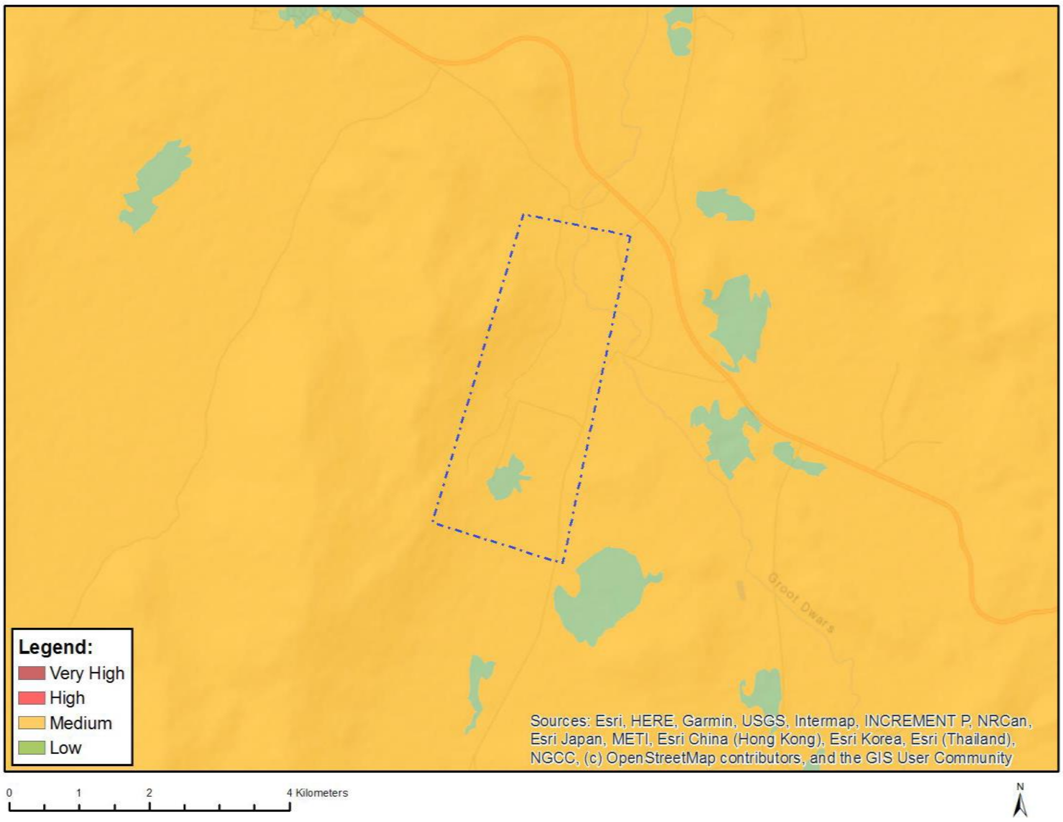


Figure 66: Plant Species Sensitivity – National Screening Tool – Categorised as Medium Sensitivity

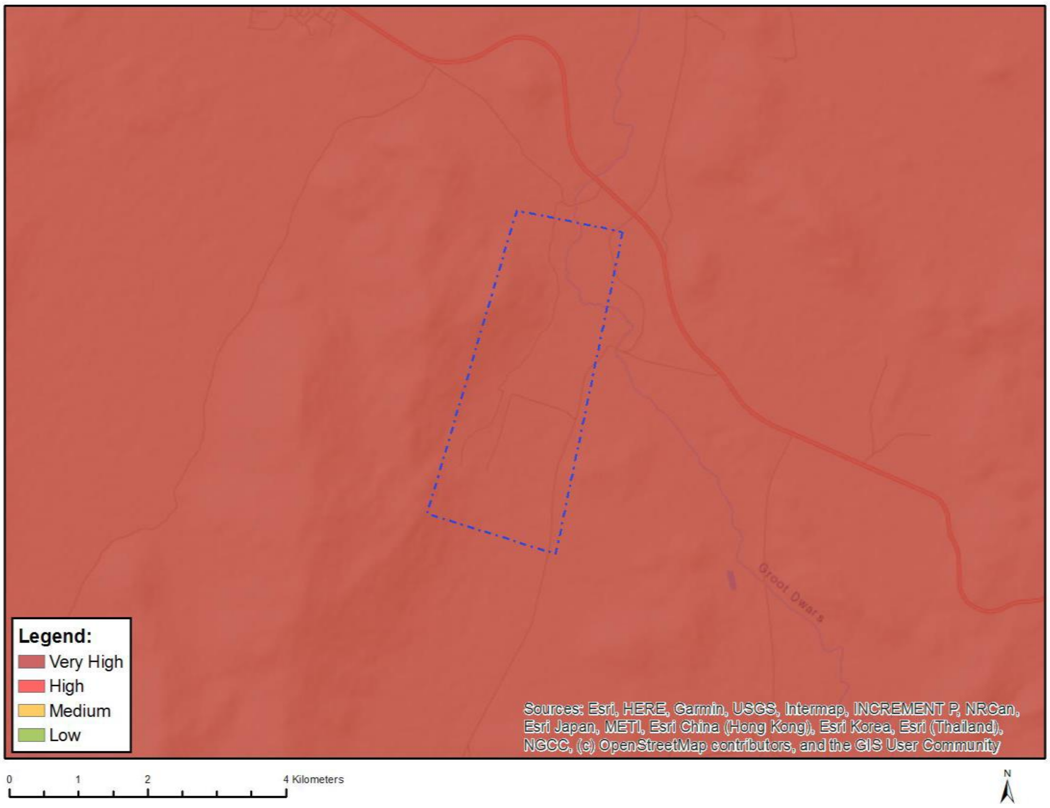


Figure 67: Terrestrial Biodiversity Sensitivity – National Screening Tool – Categorised as Very High Sensitivity

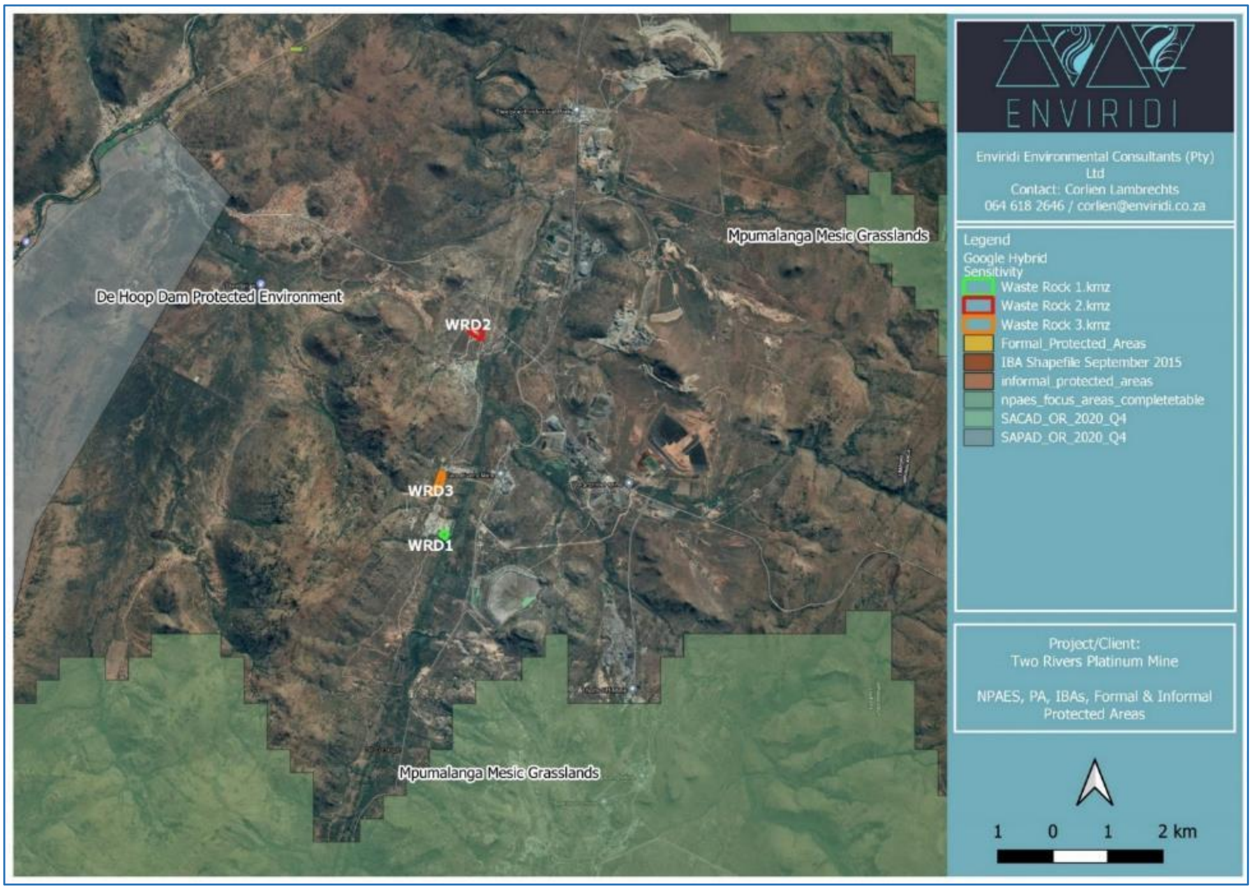


Figure 68: NPAES: Important Biodiversity and Birding Areas and Protected Areas (PAs and IBAs)

10.13. SOIL, LAND AND LAND CAPABILITY

Specialist studies were undertaken in 2001 – 2002, and again for the first expansion project in 2013. The following information was extracted from the EIA/EMP (GCS Water and Environmental Engineering (Pty) Ltd, 2013) and the EIA/EMP (Malan Scholes Consulting, 2018).

In the initial infield studies in 2001-2002 a total of thirteen (13) soil forms were identified in the study area (existing mine infrastructure) including: Hutton (Hu), Avalon (Av), Westleigh (We), Valsrivier (Va), Swartland (Sw), Sterkspruit (Ss), Sepane (Se), Bonheim (Bo), Glenrosa (Gs), Mayo (My), Mispah (Ms), Oakleaf (Oa) and Willowbrook (Wo).

In the study carried out in August 2002 on the Northern Decline Area, a total of four (4) soil forms were identified in the study area including: Hutton (Hu), Valsrivier (Va), Glenrosa (Gs) and Mispah (Ms). The soil forms Oakleaf, Valsrivier and Mispah dominate the existing mine infrastructure areas.

For the expansion of the TSF a specialist study was undertaken by TerraAfrica in 2013. For the investigation three different main soil groups were identified i.e. soil of the Mispah, Oudtshoorn and Rensburg soil forms. The site is dominated by very shallow rocky soils of the Mispah form (47.5% or 75.5 ha of the total study area) as well as soil with a dorbank horizon of the Oudtshoorn form (76.7 ha or 48.3%). The other soil form identified is that of the Rensburg form that consist of a vertical A-horizon overlying a G-horizon.

Soil was chemically analysed at a soil laboratory and was found to range from slightly acidic to mildly alkaline. High levels of calcium and magnesium were tested.

Two main land capability classes namely grazing and wilderness capability were identified for the footprint site and pipeline route. Grazing land capability included all the soil forms except soils from the Mispah soil form. The area has very low potential for irrigated and rainfed crop production due to the soil properties. The area has an average grazing capacity of 6-8 ha per large animal unit and the entire study area can carry approximately 20 head of cattle without resulting in veld degradation.

10.14. AIR QUALITY

Reference is made to the Air Quality Assessment, Airshed Planning Professionals (December 2012), for description of the baseline conditions (GCS Water and Environmental Consultants (Pty) Ltd, 2013) and the and the EIA/EMP (Malan Scholes Consulting, 2018).

The information contained in this section has been extracted from the above-mentioned 2012 assessment which was undertaken with a focus on the current Two Rivers Platinum operations. The sensitive receptors closest to the TRP mine (approximately 3km to the west of the Tailing Storage Facility) are two informal settlements, referred to as Village 1 and Village 2 in the air quality report and the residential areas of Ga-Mampuru, Kokwaneng, Madimola and Didingwe River Lodge.

Local source contributors to ambient PM_{10} (airborne particulates) concentrations in the vicinity of the study are:

- Domestic fuel burning and vehicle activity in residential areas/sensitive receptors close to the mine;
- Surrounding chrome and platinum mining activities;
- Cattle ranching in the Steelpoort Valley;
- Agricultural activities and limited cultivation in fertile areas adjacent to the Steelpoort River.

The surrounding chrome and platinum mining activities can be assumed to be significant source contributors in the area. The rock dumps, gravel roads, crushing of ore, possible open pit operations and tailings storage facilities associated with these mines produce dust which contributes to the overall atmospheric dust load in the area.

Standard measures to mitigate dust fallout includes implementing a speed limit of 30km/h which will serve a triple purpose: Reduce dust fallout, reduce exhaust emissions and ensure the safety of workers. Another mitigation measure is the implementation of dust suppression by means of spraying water on surrounding roads.

Information was added within this section from the current Dust Management Programme (Dustwatch for the period between July 2020 and July 2021. This will provide a current scope into the air quality before the new activity commences. The results were the following:

- The South Pot unit result was 855_mg/m^2/day in this period.
- The Middle Pot unit result was 953_mg/m^2/day in this period.
- The North Decline Pot unit result was 469_mg/m^2/day in this period.
- The result from the Tailings Dam unit was 1026_mg/m^2/day in this period.
- The Plant Area unit result was 605_mg/m^2/day in this period.

10.15. NOISE

Specialist Noise Assessment was undertaken in 2013, for the EIA/EMPr, as submitted for the existing mine and its expansion of the UG2 and Merensky reefs (Approved in 2015). The following information was extracted from the EIA/EMP (GCS Water and Environmental Engineering (Pty) Ltd, 2013) and the EIA/EMP (Malan Scholes Consulting, 2018).

Mining operations often emit significant noise levels which can present a nuisance and/or occupational health risk to mine workers and fauna within the mining area, and also to the surrounding land users, communities and fauna. The most sensitive receptors identified for the Two Rivers Platinum Mine include the mine workers, mining communities, surrounding communities including land users, permanent farm homesteads and settlements. The region is predominantly occupied by mining, tourism and agricultural land uses.

The main noise generation activities associated with the Two Rivers Platinum – Waste Rock Dump Project include the transportation of materials, and the offloading of materials. Noise generation can therefore be expected due to activities and actions as indicated above.

Environments which are recognised as being noise sensitive include residential areas, offices, educational facilities and health and church buildings. None of these sensitive environments exist in close proximity to the Two Rivers Platinum – Waste Rock Dump. The existing noise levels in the vicinity of the Two Rivers Platinum – Waste Rock Dump Project site include traffic on the R555 road as well as current mining and associated operational activities.

It will, however, still be important to implement a noise monitoring programme to monitor noise levels and implement mitigation measures should the set limits be exceeded.

10.16. VISUAL

Reference is made to the Visual Assessment undertaken by Elemental Sustainability and utilised to inform this section. Refer to Appendix 14 for a copy of the report.

10.16.1. Methodology

Visual effects assessment is concerned with how the surroundings of individuals or groups of people may be specifically affected by change in the landscape. This means assessing changes in specific views and in the general visual amenity experienced by particular people in particular places (GLVIA, 1996).

The following sequence was employed in this Visual Assessment Report:

1. Viewshed and viewing distance using GIS analysis up to 10km from the proposed mining activities.
2. To model the decreasing visual impact of the activities, concentric radii zones of 1km to 10km from the mine activities were superimposed on the viewshed to determine the level of visual exposure. The closest zone to the proposed activities indicates the area of most significant impact, and the zone further than 10km from the activities indicates the area of least impact. The visual ratings of the zones have been defined as follows:

    - <1km (very high)
    - 1 - 2km (high)
    - 2 - 5km (moderate), and
    - 5 -10km (low).

3. A Visual Analysis was conducted with the following parameters:
    - Visual Exposure and Viewing Distance
    - Viewpoints / Sensitive Receptors
    - Viewshed
    - Visual Absorption Capacity
    - Magnitude of Visual Impact

4. A Landscape Assessment included the following:
    - Landscape Integrity and Character
    - Landscape Scenic Quality
    - Landscape Sensitivity
    - Sense of Place

10.16.2. Affected Landscapes and Visual Analysis

This section provides a description of the status of the environment and affected landscape in which the activities are planned, as well as a visual analysis thereof. Visual representations of the land are presented to provide a better understanding of the visual absorption capacity and the sense of place of the proposed activities in question. This ultimately provides a baseline context for the visual impact assessment of the activities.

10.16.3. Triggers and Characterisation

The TRP – Waste Rock Dump Project fall within the Category 5 development which is associated with an expected moderate visual impact (Table 56). The proposed Waste Rock Dumps will potentially have a noticeable change on the quality and scenic appearance of the immediate environment. The development site for Waste Rock Dump 3 is situated in a mostly natural setting, and a noticeable change in the scenic quality will occur.

Table 56: Visual Impact Criteria Results

Visual impact criteria	
Very high visual impact expected:	Potentially significant effect on wilderness quality or scenic resources; Fundamental change in the visual character of the area; Establishes a major precedent for development in the area.
High visual impact expected:	Potential intrusion on protected landscapes or scenic resources; Noticeable change in visual character of the area; Establishes a new precedent for development in the area.
Moderate visual impact expected:	Potentially some effect on protected landscapes or scenic resources; Some change in the visual character of the area; Introduces new development or adds to existing development in the area
Minimal visual impact expected	Potentially low level of intrusion on landscapes or scenic resources; Limited change in the visual character of the area; Lowkey development, similar in nature to existing development
Little or no visual impact expected:	Potentially little influence on scenic resources or visual character of the area; Generally compatible with existing development in the area; Possible scope for enhancement of the area.

10.16.4. Landscape Assessment

In terms of landscape, the visual impact of the TRP – Waste Rock Dump Project is assessed against landscape scenic quality, landscape sensitivity and sense of place.

<u>Landscape Scenic Quality</u>

The scenic quality of the landscape is based on its value as a visual resource (Refer to Table 57). The visual resource value of the proposed areas for the Waste Rock Dumps is rated as moderate, which is defined by a common landscape that exhibits some positive character, but which has evidence of alteration /degradation/erosion of features resulting in areas of more mixed character. The site is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with, but change may not require special or particular attention to detail.

Table 57: Value of the landscape as a Visual Resource

High	Moderate	Low
Landscape Type		
Distinct landscape that exhibits a very positive character with valued features that combine to give the experience of unity, richness, and harmony. It is a landscape that may be of particular importance to conserve and which has a strong sense of place.	Common landscape that exhibits some positive character, but which has evidence of alteration /degradation/erosion of features resulting in areas of more mixed character.	Minimal landscape generally negative in character with few, if any, valued features. Scope for positive enhancement could occur.
Sensitivity: It may be sensitive to change in general and may be detrimentally affected if change is inappropriately dealt with.	**Sensitivity:** It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with but change may not require special or particular attention to detail.	-

10.16.5. Landscape Sensitivity

The landscape sensitivity change criteria as listed in Table 58 below indicates a landscape of medium sensitivity, which refers to a "*landscape of regional or local value, quality, or rarity, exhibiting some distinct features, considered tolerant of some degree of change e.g., within a locally designated landscape or with landscape elements of local importance".*

Table 58: Landscape Sensitivity to Change Criteria

Landscape Sensitivity	Classification of the Criteria
Low	Landscape of lower scenic quality, with few distinctive elements or valued characteristics and considered tolerant of a large degree of change e.g., out with any designated areas or within a degraded landscape.
Medium	Landscape of regional or local value, quality, or rarity, exhibiting some distinct features, considered tolerant of some degree of change e.g., within a locally designated landscape or with landscape elements of local importance.
High	Landscape of particularly highly valued character and scenic quality considered very susceptible to relatively small changes e.g., within a designated National Scenic Area, National Park, Garden or recognised as an iconic or important feature of the Mpumalanga landscape.

10.16.6. Sense of Place

Little change will be expected in the "sense of place" created by the predominant mining activities in the area. The addition of the Waste Rock Dumps to the existing mining related infrastructure, will not significantly affect the visual landscape and surrounding "sense of place" for agriculture and residential communities. Only a small change is expected at the proposed site for Waste Rock Dump 3, where a mountainous landscape with natural vegetation occurs.

10.16.7. Visual Analysis

Viewpoints / Sensitive Receptors

For the Waste Rock Dump Project sites, sensitive receptors were identified as the residents of the surrounding rural communities, other mining companies and the tar road that passes the three proposed Waste Rock Dump sites. Therefore, in accordance with Table 59below, the sensitivity of the receptors rated low. Reference points of the sensitive receptors (viewpoints) are indicated in Figure 69 – 71 below. These reference points were selected based on their distance and as central viewpoint of the specific receptor area.

Table 59: Categorisation of receptors

Sensitivity of receptors	Types of receptors
High	Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape; Important public sites used by many people; Tourist, Resident
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value); People travelling through or past the affected landscape in cars, on trains or other transport routes; Motorist
Low	The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view (i.e., office and industrial areas).

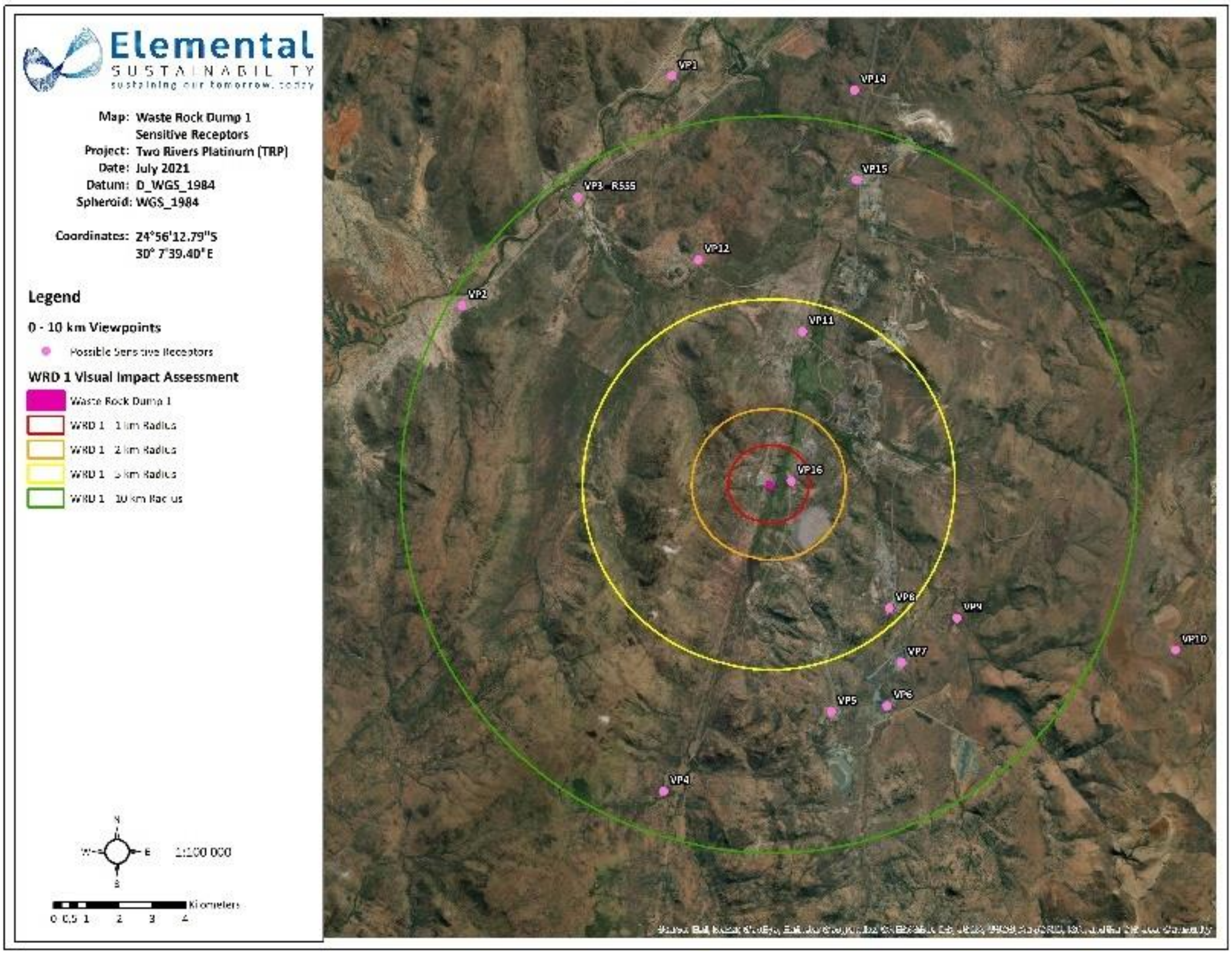


Figure 69: WRD1 - Surrounding Land Users and Sensitive Receptors (Viewpoints)

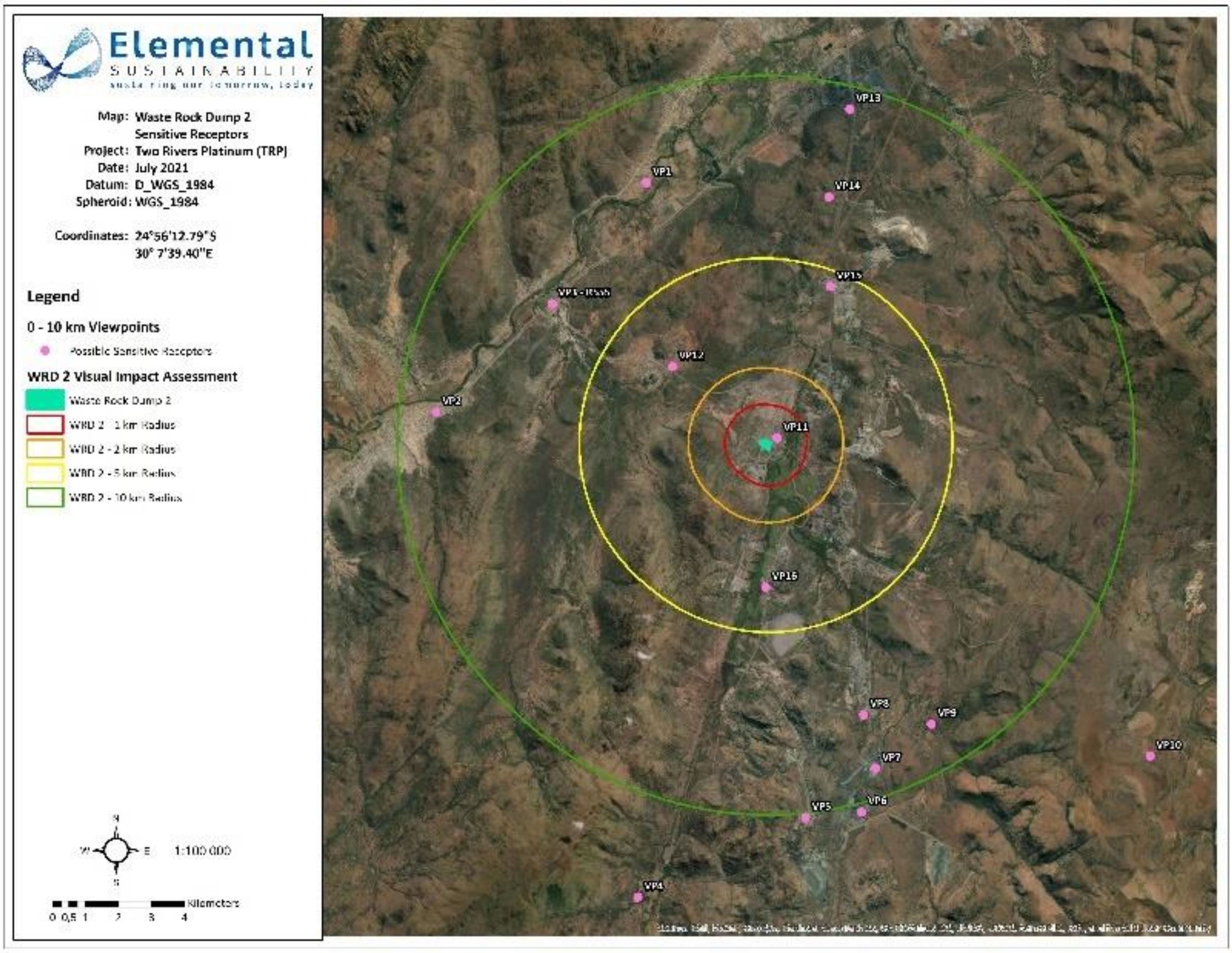


Figure 70: WRD2 - Surrounding Land Users and Sensitive Receptors (Viewpoints)

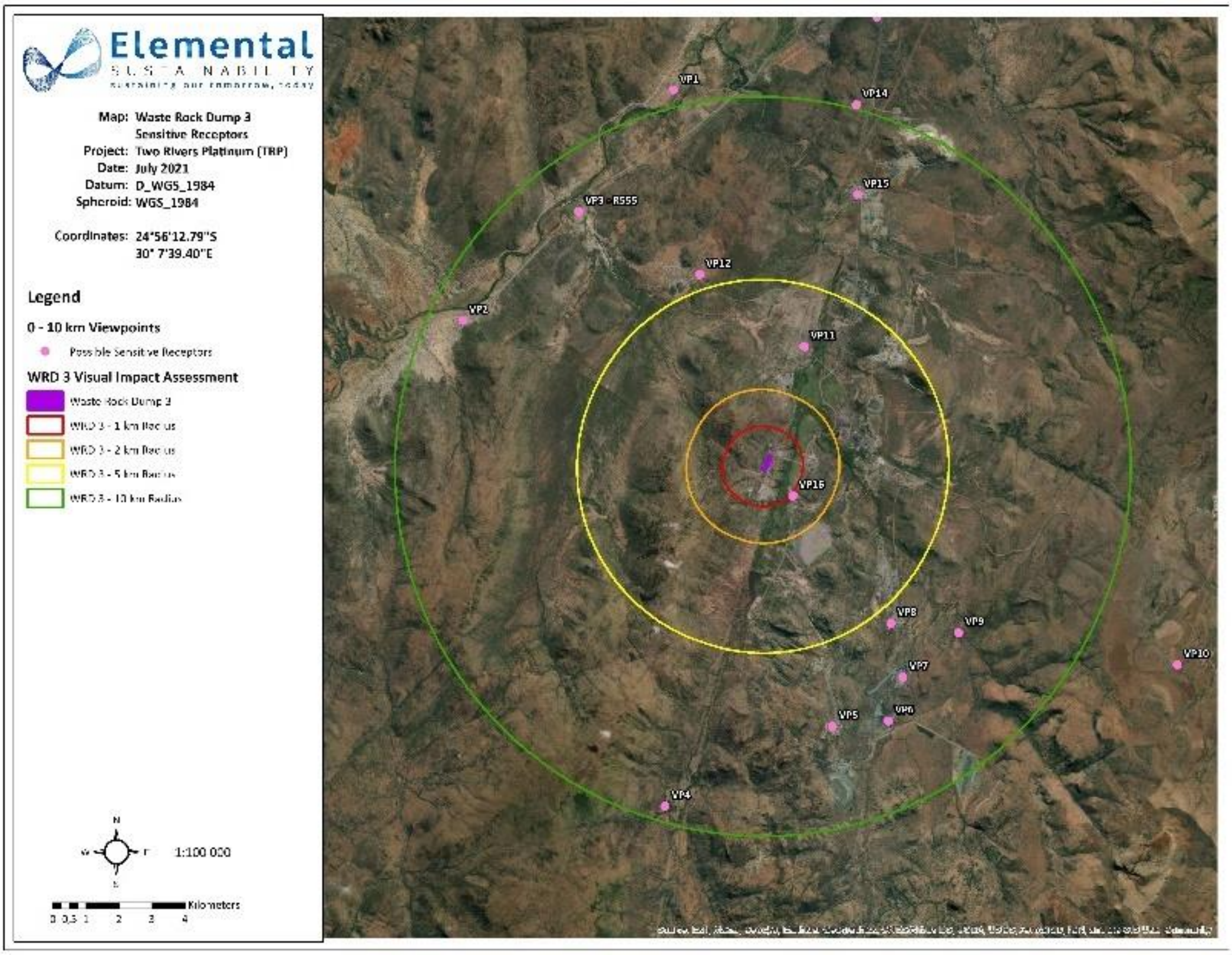


Figure 71: WRD3 - Surrounding Land Users and Sensitive Receptors (Viewpoints)

10.16.8. Visual Exposure and Viewing Distance

Visual impact of an object in the landscape diminishes at an exponential rate as the distance between the observer and the object increases. (Hull and Bishop, 1988). A 10km Zone of Influence was determined for the Waste Rock Dump Project sites. It is evident from the viewshed maps (**Figure 72 – 74**) that the proposed surface infrastructure visibility diminishes as the distance from the sites increases. Some of the visibility occurs within 0-2 km which results in a high visibility impact according to the impact table below (**Table 60**). Over 5 - 10 km the impact of the proposed infrastructure diminishes considerably due to the diminishing effect of distance and atmospheric conditions (haze) on visibility. In this study, viewpoints situated more than 5km away from the Waste Rock Dumps is rated N/A due the diminishing effect of visibility from the surrounding environment's topography and vegetation. Viewpoints 11 and 16 had the most sensitive viewing distance, however, both these viewpoints represent roads therefore the viewing time will be short.

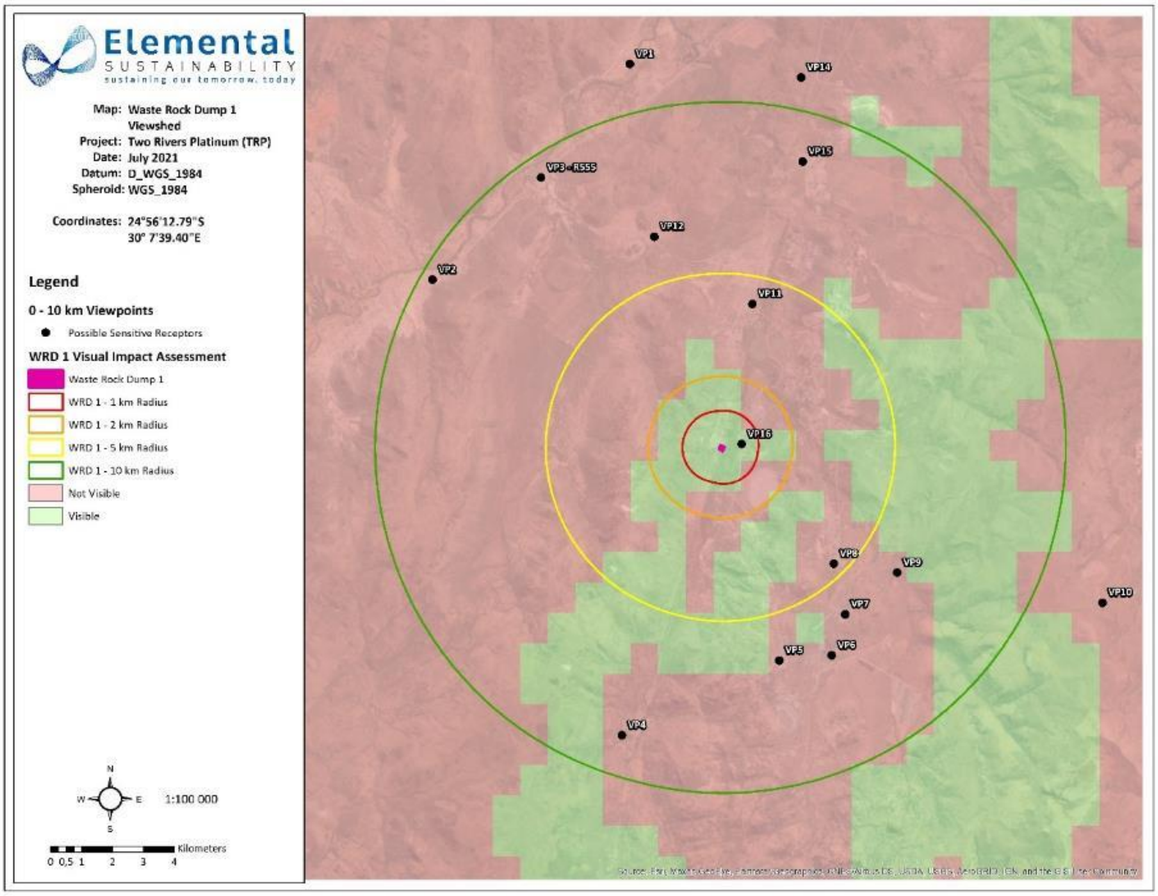


Figure 72: WRD1 - Viewshed Model of the 10km surrounding area

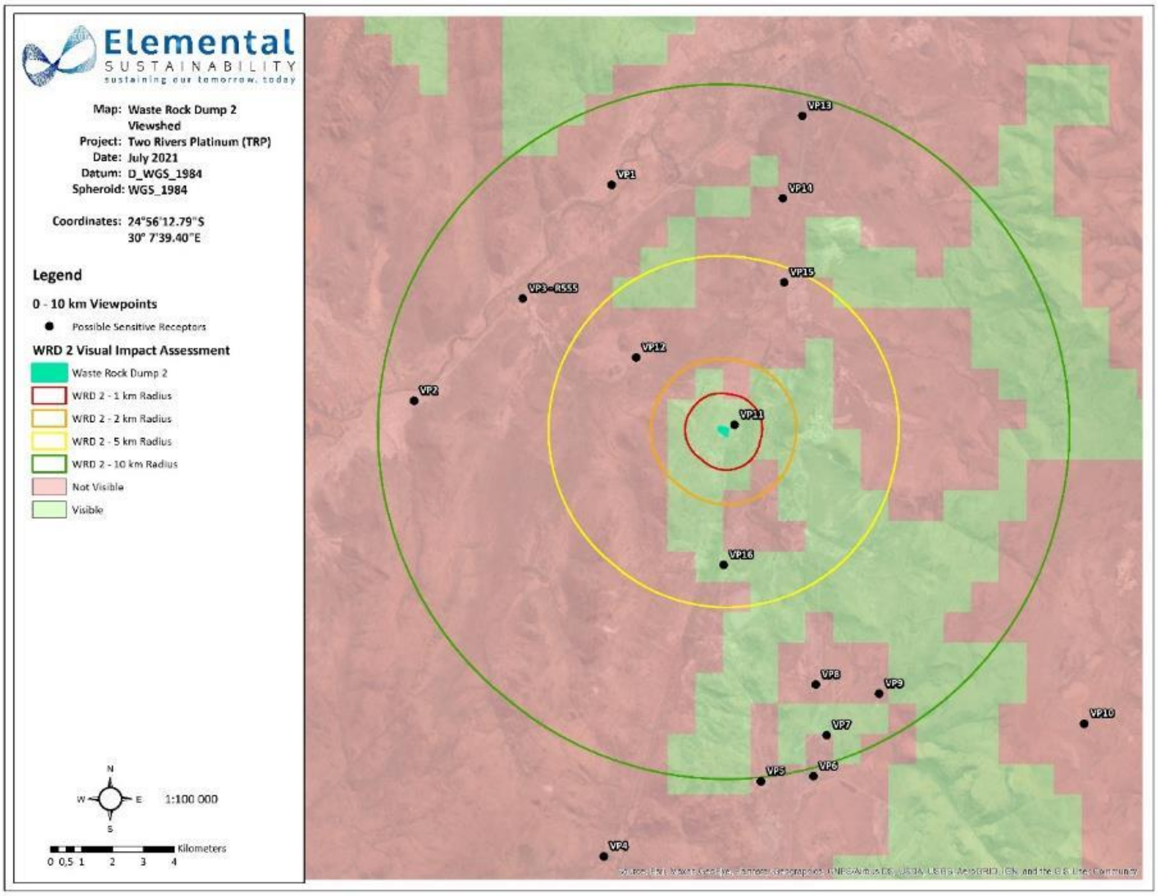


Figure 73: WRD3 - Viewshed Model of the 10km surrounding area

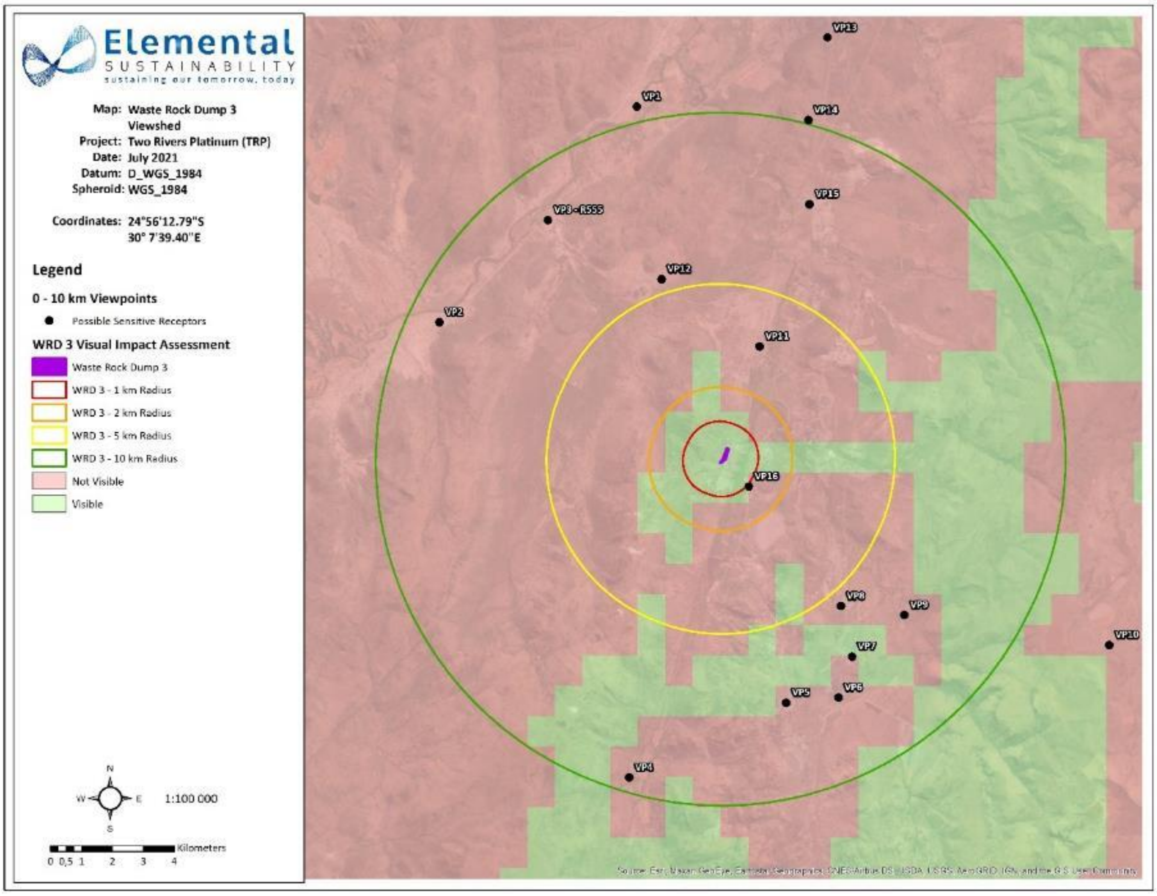


Figure 74: WRD3 - Viewshed Model of the 10km surrounding area

Table 60: Sensitive viewing distance from the boundary of the proposed Waste Rock Dump site.

	Viewing distance sensitivity	Viewpoints
High	Viewing distance that is between 0- 2km of the proposed development area	WRD1 – Viewpoint 16 WRD2 – Viewpoint 11 WRD3 – Viewpoint 16
Moderate	Viewing distance that is between 2-5km of the proposed development area	WRD1 – Viewpoint 8, 11 WRD2 – Viewpoint 12, 15, 16 WRD3 – Viewpoint 11
Low	Viewing distance that is 5km -10km of the proposed development area	N/A

The visibility of the infrastructure is categorised as low, due to the visibility covering less than 25% of the 10km zone of influence (**Table 61**).

Table 61: Viewshed Evaluation Criteria

High	>50% of Zone of Influence (ZOI) is visible
Moderate	25% - 50% of Zone of Influence (ZOI) is visible
Low	<25% of Zone of Influence (ZOI) is visible

10.16.9. Visual Absorption Capacity

The immediate project site, as well as most of the 10km surrounding area, is located in the Sekhukhune Mountain Bushveld (SVcb28) vegetation type (Mucina & Rutherford 2006/2018).

The Visual Absorption Capacity (VAC) of the receiving environment is deemed to be **High to Moderate** due to the following:

- **Moderate** - By virtue of the bushveld vegetation found on the proposed sites, as it will be able to act as visual and noise barriers.
- **High** - In terms of the position of the Waste Rock Dump Project sites relative to elevation and slope of terrain. The proposed areas are situated on undulating landform type with steep mountainous slopes in the surrounding areas.
- **Moderate** - In terms of existing built environment, most of the area surrounding the proposed Waste Rock Dump sites consist of existing mining activities with sections of natural vegetation present.
- **High** - The topography limits the view to a large extent.
- **Low** - The colour and contrast of the proposed operation is in contrast with the current natural colour of the area.
- **Moderate** - The landscape and associated environment is mainly disturbed by human settlements, farming and existing large-scale mining activities.
- **Moderate** - The Waste Rock Dumps would not be alien but will still be intrusive to the surrounding natural mountainous environment, especially WRD3.

10.16.10. Magnitude of Visual Impact

Table 62 below illustrates the magnitude of visual impact. It is derived by combining the ratings of each of the sections above (viewshed, viewing distance, visual absorption capacity, and sensitivity receptors). These results are based on worst-case scenarios i.e. (at full size and extent of the proposed mining infrastructure in the operational phase of mining) when the impact of all aspects is taken together. From the results presented below, it is evident that the visual impact of the TRP – Waste Rock Dump Project is expected to be Low to Moderate before mitigation measures are implemented.

Table 62: Magnitude of Visual Impact Results

Triggers & Category of Environment	Viewshed Analysis Results	Viewing Distance & Visual Exposure Results	Sensitive Receptors / Viewpoints	Visual Absorption Capacity Results
Moderate visual impact expected	**Low** <25% of zone of influence is visible	**Moderate** -Two sensitive receptors within 2 km and the rest more than 2 km from the proposed sites	**Low** – Includes people at their place of work and road users near the proposed sites	**High to Moderate**

10.16.11. Discussion

Visual impacts will result from the construction and operational phases of the Waste Rock Dumps Project, in terms of the viewshed, viewing distance and visual absorption capacity of the receiving environment. The construction and operational phase of the proposed project will have a Moderate visual impact on the natural scenic resources and surrounding land users. With the correct mitigation measures, the impact can be reduced to a having a less significant (Low) visual impact. Whilst tourism activities exist in the region, no major impacts are expected on the tourism industry as there are no major tourism attractions within 5 - 10km of the proposed areas.

10.17. ARCHAEOLOGY AND HERITAGE

Reference is made to the Archaeological Impact Assessment conducted by Agri Civils Geo-Tech and Heritage, and utilised to inform this section regarding archaeology and heritage. Refer to Appendix 15 for a copy of the report.

10.17.1. Methodology

Archaeological reconnaissance of the three demarcated waste rock dumps (WRD) areas was conducted in April 2021 through a combination of unsystematic and systematic pedestrian site surveys that lasted one day (Figures 65 – 67). Since the time of the survey, the boundaries of the three demarcated areas have changed slightly and access constraints were experienced at WRD 1 and 3. General site conditions were recorded via photographic record and the site was inspected on Google Earth, historical aerial imagery and topographical maps in order to identify potential heritage remains. One site was observed on the 1963 topographical map towards the northern boundary of WRD 3, but has subsequently completely been demolished. No potential sites were identified on historical topographical maps or aerial images within the boundaries of WRD 1 and 2. The historical topographical datasets, as well as the historical aerial photographs proved useful in terms of determining the presence of structures and features associated with the study area, as well as to determine the past land uses of the demarcated study areas. The total area inspected was 8.5 ha.

The reconnaissance of the area under investigation served a twofold purpose:

- To obtain an indication of heritage material found in the general area as well as to identify or locate archaeological sites on the area demarcated for development. This was done in order to establish a heritage context and to supplement background information that would benefit developers through identifying areas that are sensitive from a heritage perspective.
- All archaeological and historical events have spatial definitions in addition to their cultural and chronological context. Where applicable, spatial recording of these definitions were done by means of a handheld Global Positioning System (GPS) during the site visit.

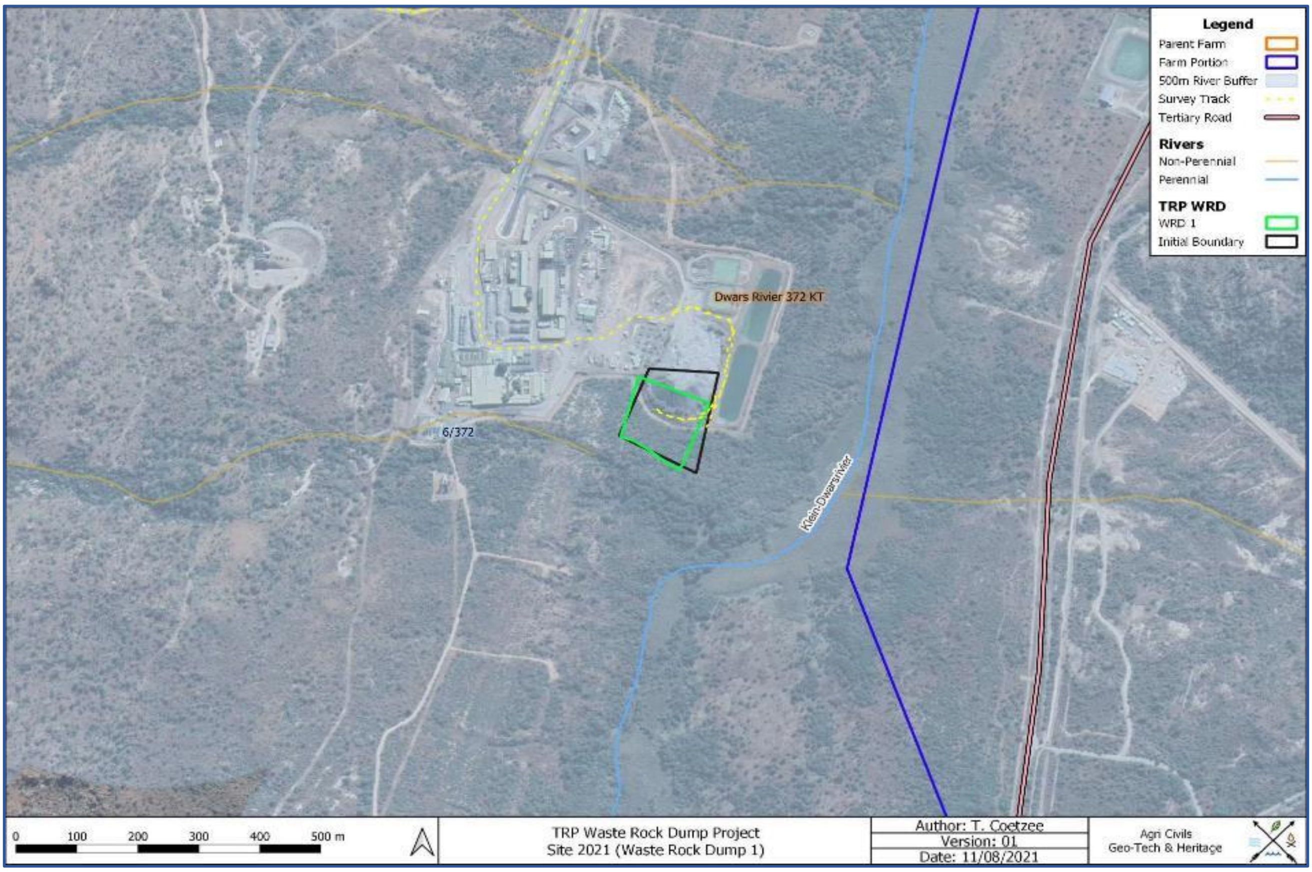


Figure 75: Waste Rock Dump 1 - Study Area

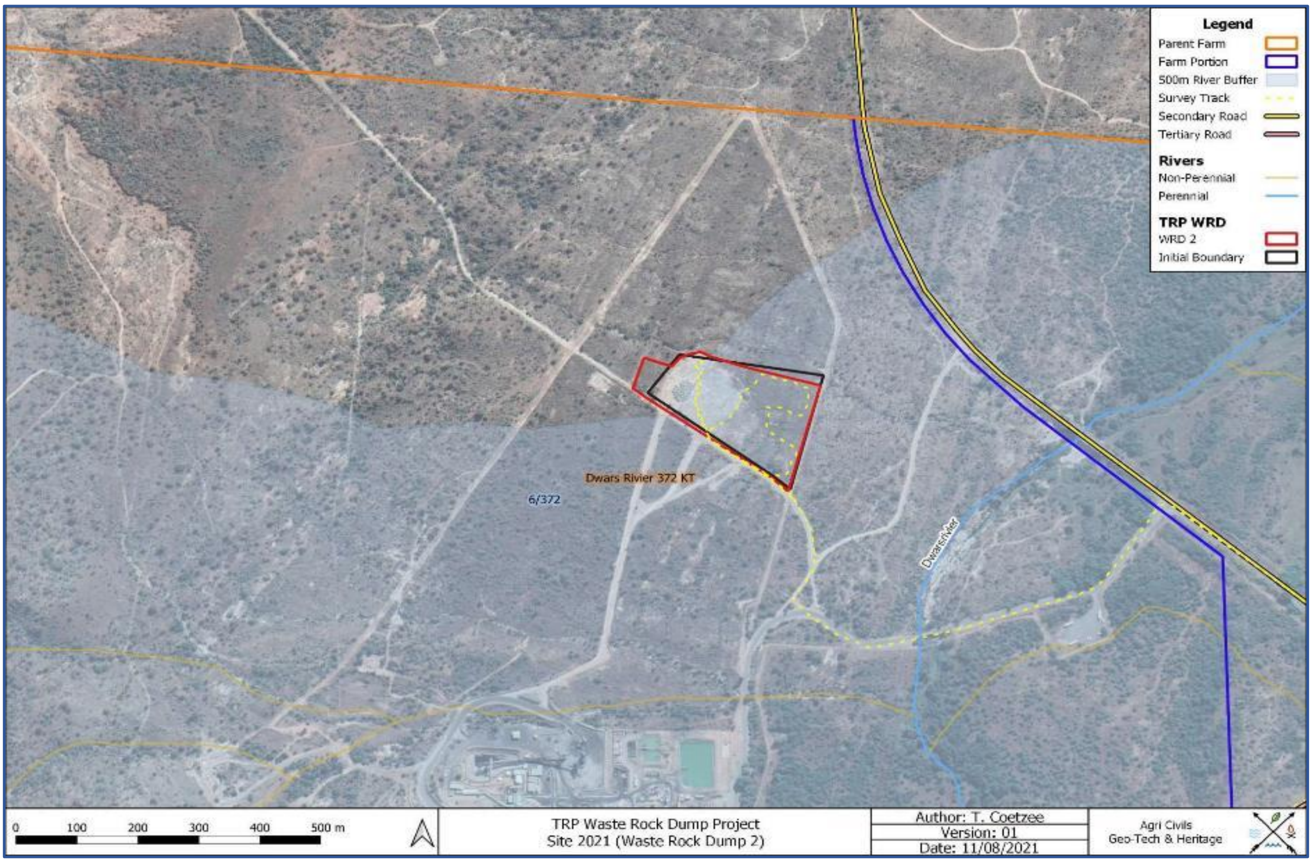


Figure 76: Waste Rock Dump 2 - Study Area

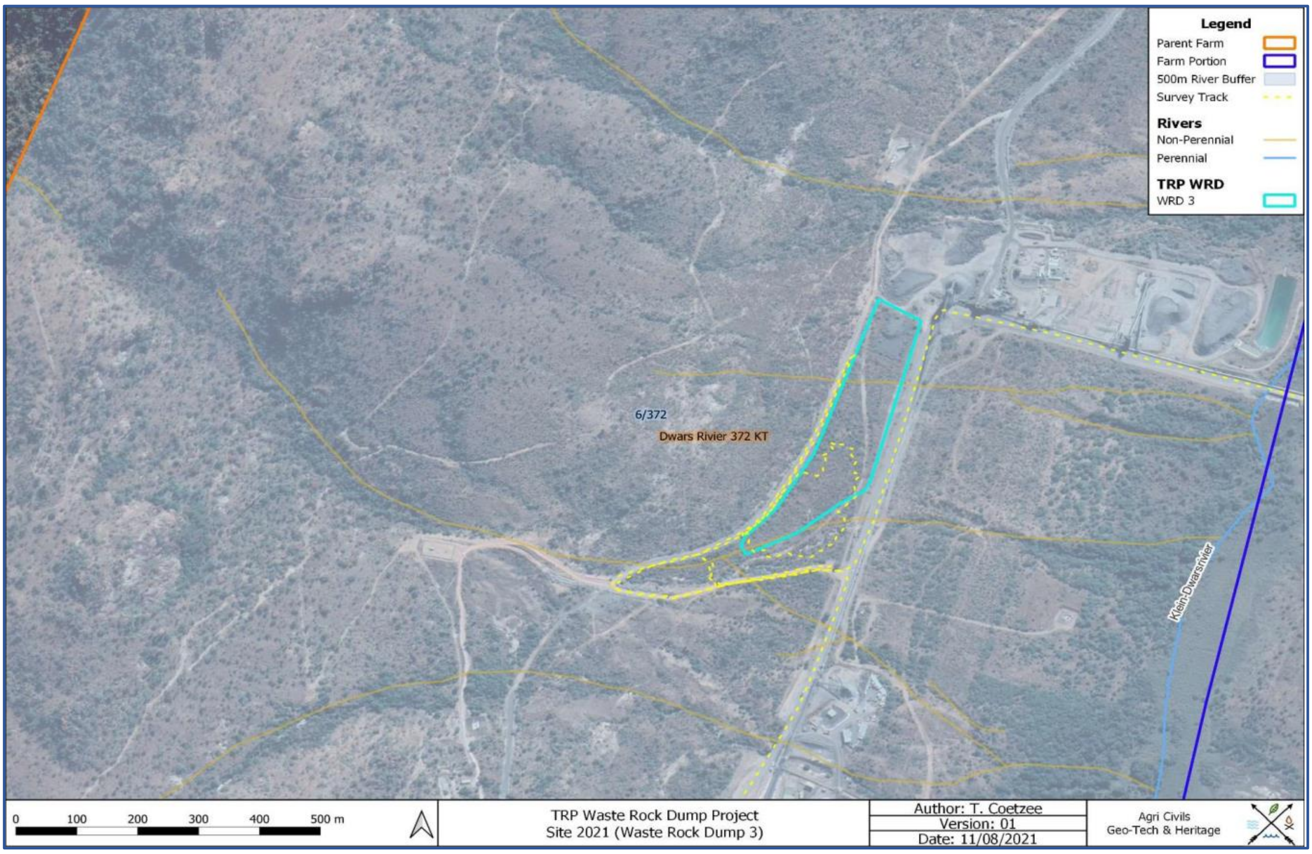


Figure 77: Waste Rock Dump 3 - Study Area

10.17.2. Results of Heritage Assessment

10.17.3. Stone Age Remains

No Stone Age remains were observed within the demarcated study areas. Stone Age artefacts are often associated with rocky outcrops or water sources.

10.17.4. Iron Age Farmer Remains

No Iron Age remains were observed within the WRD 1 and 2 areas. Although no definite Iron Age remains were observed within the demarcated WRD 3 area due to dense vegetation, Figure 77indicates a potential stone feature. The extent, however, could not be determined.

The heritage study conducted by Van Vollenhoven (2012) recorded one potsherd and noted the likely presence of Iron Age sites at higher elevations.

Figure 78: Potential Stone feature at Waste Rock Dump 3 Study Area

10.17.5. Historical

No historical remains were observed within the demarcated study areas. The heritage study by Pistorius (2009) recorded several initiation cairns that might date to the Historic Period. These sites are generally associated with higher elevations.

10.17.6. Contemporary Remains

No contemporary remains were observed within the demarcated study areas. Pistorius (2009) noted the presence of remains dating to the recent past and that no mitigation measures were required for these remains.

10.17.7. Graves

No grave or burial site was observed within the demarcated study areas.

10.17.8. Evaluation

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

10.17.9. Field Ratings

All sites should include a field rating in order to comply with section 38 of the National Heritage Resources Act (Act No. 25 of 1999). The field rating and classification in this report are prescribed by SAHRA.

Table 63: Field Ratings

Rating	Field Rating / Grade	Significance	Recommendation
National	Grade 1		National Site
Provincial	Grade 2		Provincial Site
Local	Grade 3 A	High	Mitigation no advised
Local	Grade 3 B	High	Part of site should be retained
General protection A	4 A	High / Medium	Mitigate site
General Protection B	4 B	Medium	Record site
General protection C	4 C	Low	No recording necessary

* No sites of heritage significance were observed

10.17.10. Statement of Significance

The study area comprised the areas demarcated for the development of the three additional Waste Rock Dumps.

10.17.11. Waste Rock Dump 1

The area associated with Waste Rock Dump 1 has partially been disturbed by an existing WRD. The whole area, however, used to be a cultivated land. Therefore, the WRD 1 area is considered to be of low significance.

10.17.12. Waste Rock Dump 2

The Waste Rock Dump 2 area is associated with past mining activity and no sites of heritage importance were noted. The area is therefore not considered to be significant from a heritage perspective.

10.17.13. Waste Rock Dump 3

The majority of Waste Rock Dump 3 appears not to have been disturbed by past mining activity or cultivation and a potential stone feature was observed during the survey. Also, a building was observed on historical aerial images and topographical maps near the northern border of the study area. This area, however, has been disturbed by contemporary mining activity. Dense vegetation and the unavailability of a site boundary prevented the location of heritage sites. Because the demarcated area is largely undisturbed and because the area falls within the 500 m river buffer, WRD 3 is considered to be sensitive from a heritage perspective.

10.17.14. Discussion

The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the areas demarcated for development:

10.17.15. Waste Rock Dump 1

Because past agricultural and contemporary mining activities disrupted the area associated with WRD 1, the area is not considered to be sensitive from a heritage perspective. However, because the area to the south of the gravel road could not be inspected, all activities must be suspended and a qualified archaeologist must be contacted should potential heritage sites/material be encountered.

10.17.16. Waste Rock Dump 2

The area associated with WRD 2 has been disturbed by past mining activities and no sites of heritage importance were observed. No further action is required.

10.17.17. Waste Rock Dump 3

The demarcated area falls within the 500 m river buffer and has to a large extent not been not been impacted by development. Therefore, the WRD 3 area is considered to be sensitive from a heritage perspective.

Because the boundary of the WRD 3 area was not available at the time of surveying and due to dense vegetation hampering free movement and visibility, it is recommended that the grass be slashed/burned in a manner that will not disturb potential surface features. Upon completion, the area should be inspected by a qualified archaeologist to determine the presence of heritage resources.

10.17.18. General Recommendations

- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during the course of the project, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

- Should the need arise to expand the proposed project beyond the surveyed area outlined in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment on the sections beyond the demarcated areas that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

– From a heritage point of view, the development of the three demarcated Waste Rock Dumps may proceed, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.

10.18. PALEONTOLOGICAL ASSESSMENT

A request for exemption from undertaking a Palaeontology Impact Assessment for the Two Rivers Platinum – Waste Rock Dump Project was submitted by Professor Marion Bamford, Palaeobotanist to the South African Heritage Resources Agency on 22nd April 2021. A copy of the letter for exemption is attached to this report as Appendix 16.

10.18.1. Motivation for Application for Exemption

The area demarcated for the Two Rivers Platinum – Waste Rock Dump Project is located on intrusive igneous rocks of the Rustenburg Layered Suite (Bushveld Complex) with some overlying Quaternary sands and alluvium Figure 79). In particular, the mine area is on the Dwarsriver Subsuite (Critical Zone) with anorthosite, norite gabbro and chromitite, as well as the overlying Dsjate Subsuite (Main Zone) with gabbro, norite and subordinate anorthosite (Cawthorn et al., 2006). Such rocks do not contain any fossils so there is no chance of the palaeontological heritage being impacted any way.

The Quaternary sands and alluvium are young transported sediments that do no preserve any fossils either. If any fossil fragments had been transported with the sands and alluvium they would be broken and out of context (Partridge et. al, 2006), so would be of no scientific value.

This is confirmed by the grey and blue colouration in the South African Heritage Resources Information System (SAHRIS) palaeosensitivity map (Figure 80). Based on the aforementioned, exemption was requested from any further palaeontological assessments as, from a palaeontological perspective, the project may proceed.

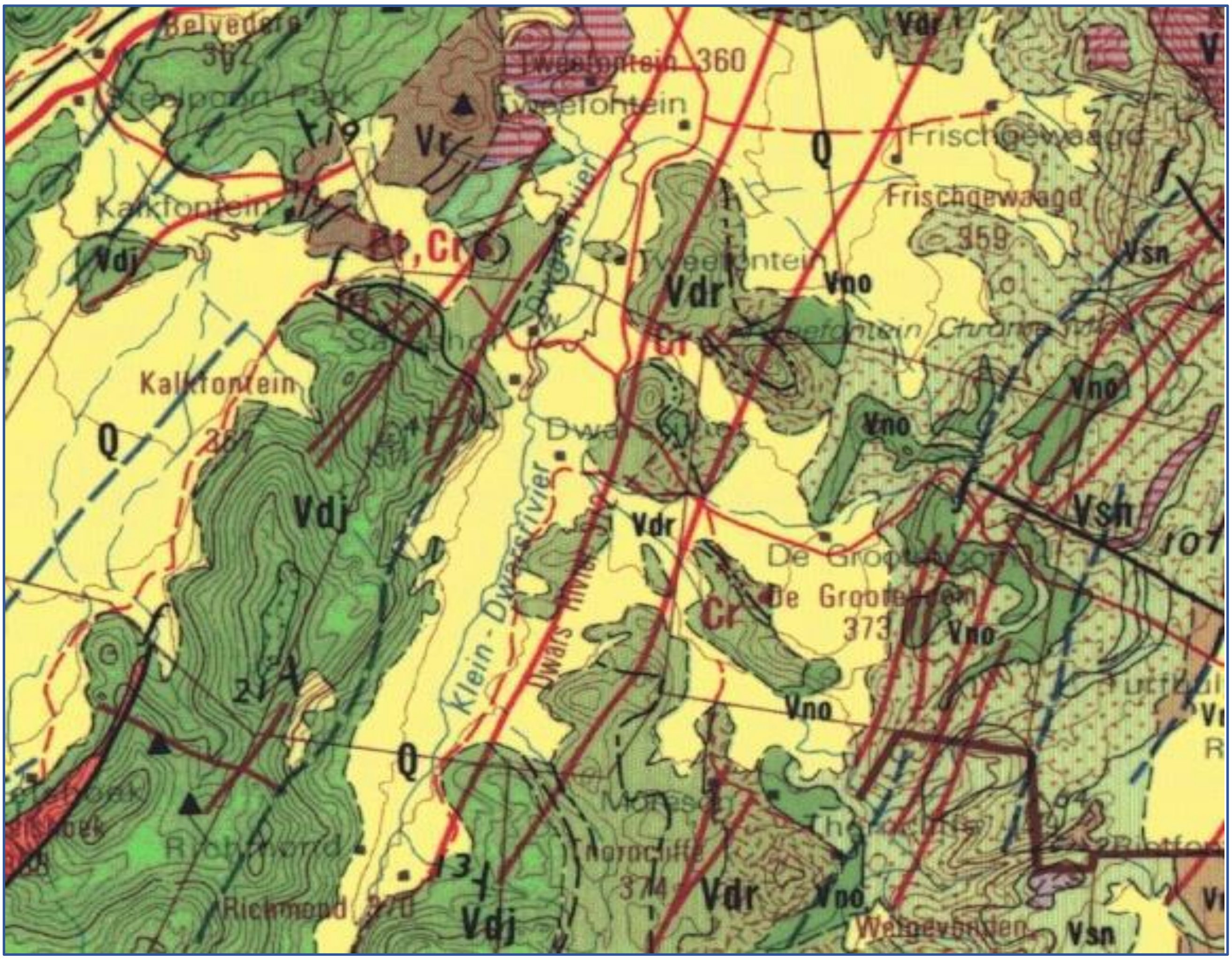


Figure 79: Geological map of the area around Dwarsriver Farm and TRP

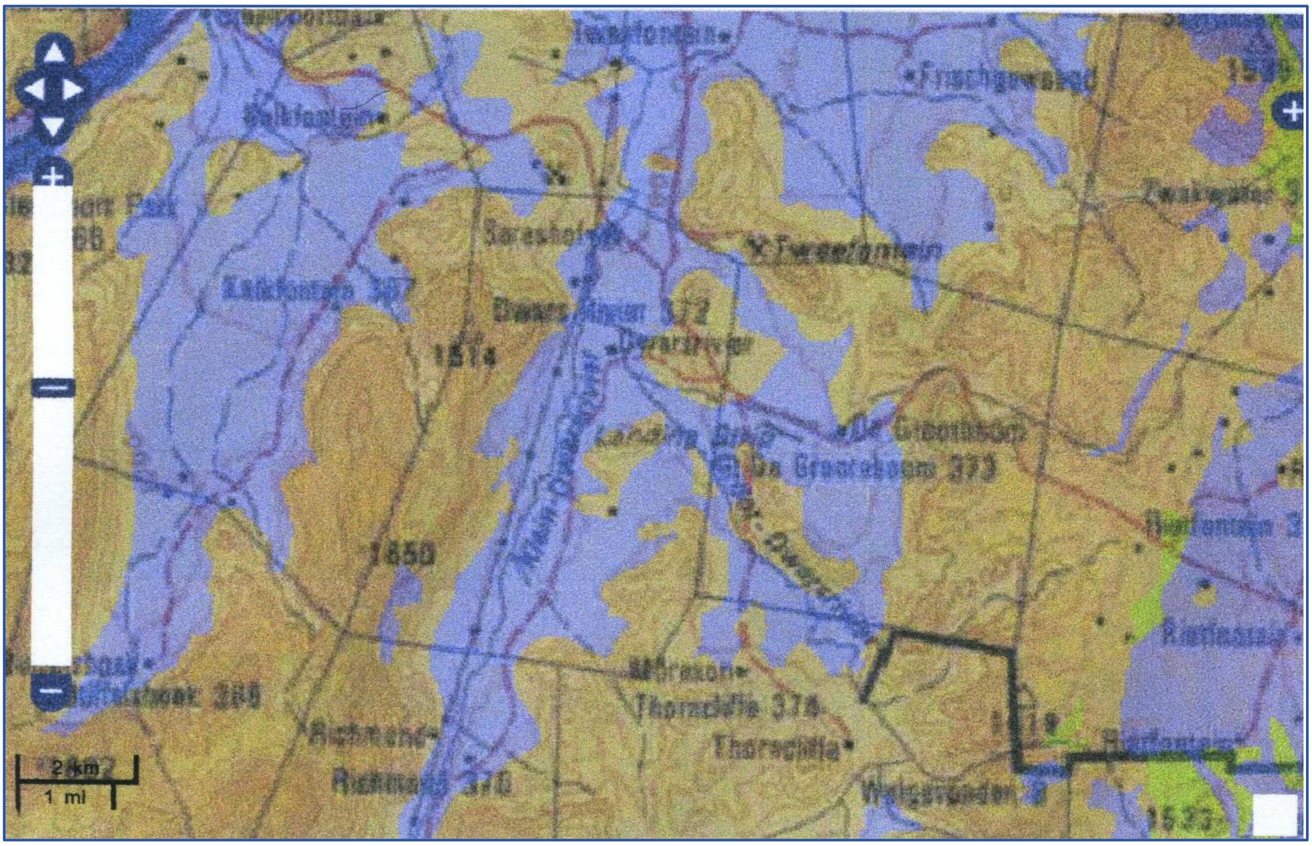


Figure 80: SAHRIS palaeosensitivity map – TRP Waste Rock Dumps on Farm Dwars River 372 KT

8.1. SOCIAL ECONOMIC ENVIRONMENT

A Social Impact Assessment was not undertaken, as it was not required for this application. *The information in the following section was extracted from the Environmental Management Programme Report (EMPR) document (GCS, 2013), the Social Impact Assessment (SIA) report compiled by GCS, 2012, the EIA/EMPR (Malan Scholes, 2018), and the Integrated Development Plan Budget for the Fetakgomo Tubatse Local Municipality 2020.*

8.1.1. Regional Context

The Two Rivers Platinum mine is falls within the municipal boundaries of the Fetakgomo-Greater Tubatse Municipality which is in the Greater Sekhukhune District Municipality, located within the Limpopo Province.The Fetakgomo Tubatse Local Municipality was established and officially proclaimed in terms of Section 12 Notice Limpopo Provincial Gazette no. 2735, titled: "Notice in terms of s12 of the Local Government: Municipal Structures Act, 1998 (Act 117 of 1998): Disestablishment of Existing Municipalities and Establishment of New Municipalities", dated 22nd July 2016 issued by the Member of the Executive Council (MEC) for local government in Limpopo Province. The municipality was formed as an amalgamation between the former Fetakgomo Local Municipality and the former Greater Tubatse Municipality. Both the former FTM and former GTM were classified as categories B municipalities due to their spatial and economic characteristics.

The Fetakgomo Tubatse Local Municipality (FTLM) is located north of N4 highway, Middleburg, Belfast and Mbombela; and east of the N1 highway; Groblersdal and Polokwane. The municipal area of jurisdiction covers approximately 4550 square kilometres, and is located within the Sekhukhune District Municipality (SDM) of the Limpopo Province.

Comprising approximately 342 villages and 39 wards, the municipality is the third largest municipality in the Limpopo Province in terms of wards after Polokwane and Thulamela with 45 and 41 wards, respectively.

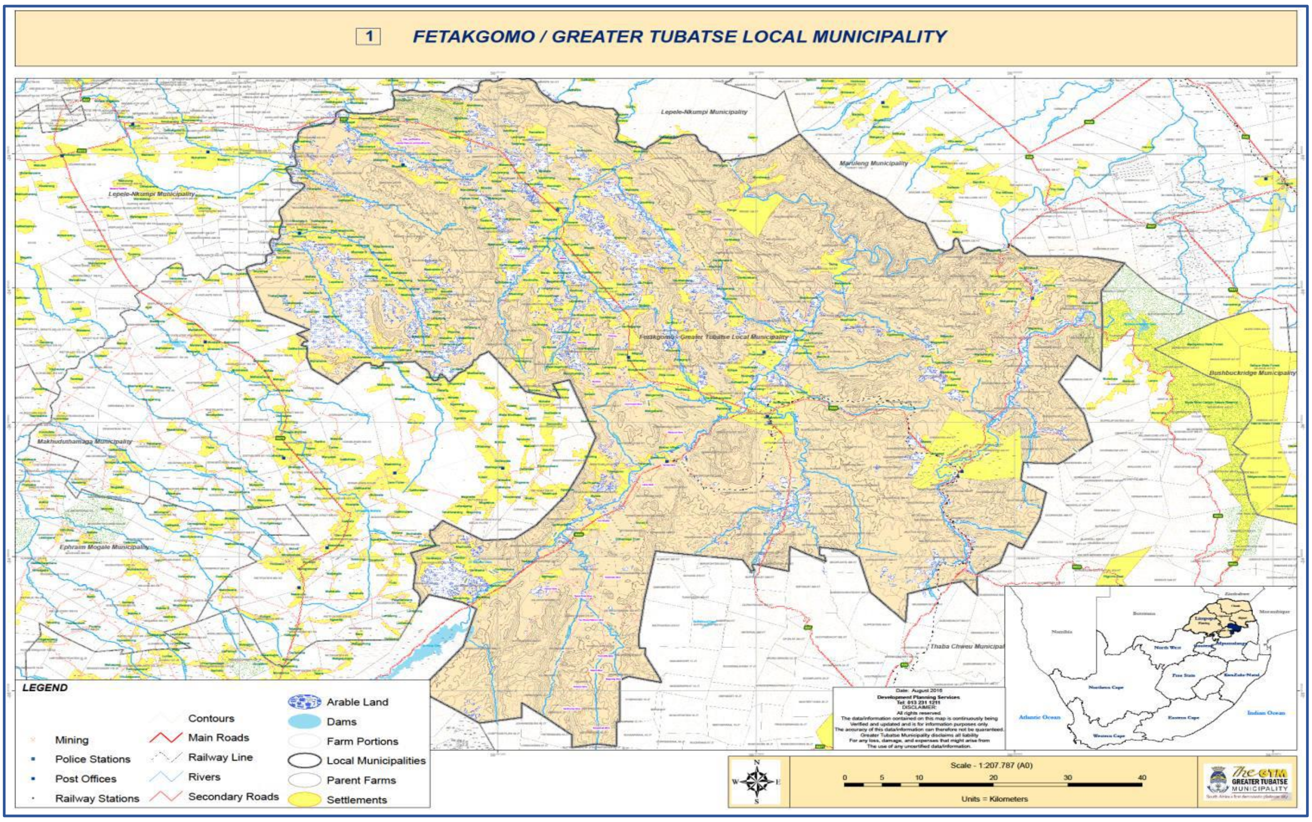


Figure 81: Fetakgomo Tubatse Local Municipality

8.1.2. Demographics

10.18.2. Population Profile

According to the 2011 Stats SA census information; the total population of the FTLM is approximately 429 471 with 106 050 households. In 2016 a community survey was undertaken for FTLM, making it the most highly populated municipality within the Sekhukhune district. The 2016 Community Survey, as compared to the 2011 results, records a population increase of 489 902 (12%) for the Fetakgomo Tubatse Local Municipality, with a household increase of 125 454.

10.18.3. Age and Gender

According to the 2011 Census demographic research, the median age for the municipality population is around 15-19 years for both genders with 60 670 people in this group (Table 64). The total population is dominated by young people 24 years and younger. The age categories below the age of 25 comprise approximately 54% of the population.

Table 64: Total Population by Age and Gender Distribution in FTLM

	Female	Male	Grand Total
0 – 4 years	27240	26816	54056
5 – 9 years	24739	24714	49452
10 – 14 years	21192	22774	43966
15 – 19 years	28667	32003	60670
20 – 24 years	27152	303329	57481
25 – 29 years	28938	30051	58989
30 – 34 years	23907	22098	46006
35 – 39 years	13768	11514	25282
40 – 44 years	10409	10130	20539
45 – 49 years	9176	7050	16226
50 – 54 years	8840	6165	15004
55 - 59 years	6247	4890	11137
60 – 64 years	5539	4507	10046
65 – 69 years	4682	2015	6697
70 – 74 years	4823	1460	6282
75 – 79 years	2650	845	3495
80 – 84 years	1732	401	2134
85+ years	2023	417	2440
Grand Total	**251 723**	**238 179**	**489 902**

10.18.4. Geography and Gender

Table 65below presents the sex ratio of the Sekhukhune District Municipality as per the 2016 community survey. As can be observed from the table, the male-female distribution is then dominated by females in FGTLM.

Table 65: Geography and Gender Statistics (Sources: STATS SA 2011 and 2016)

	2011 Stats SA			2016 Community Survey		
Municipalities	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Sekhukhune District	579 191	497 648	1 076 840	621 299	548 463	1 169 762
Ephraim Mogale	65 442	58 207	123 648	67 260	59 908	127 168
Elias Motsoaledi	133 860	115 503	249 363	143 123	125 133	268 256
Makhunduthamaga	153 075	121 282	274 358	158 993	124 963	283 956
Fetakgomo	**51 536**	**42 258**	**93 795**	**52 936**	**43 732**	**96 668**
Tubatse	**175 278**	**160 398**	**335 676**	**198 987**	**194 726**	**393 713**

The municipality has shown a growth rate of 8% in 2016, making it the biggest municipality in the District. The growth may be attributable to the mining activities taking place in the area.

10.18.5. Population Group

The distribution of the population within the FTLM is presented in Table 60 below. From the stats presented it is noted that the largest population group of FTLM is Black African, followed by White, Coloured and then Indian/Asian.

Table 66: Population Group Stats (STATS SA 2011)

Municipality	Black African		Coloured		Indian/Asian		White	
	Female	Male	Female	Male	Female	Male	Female	Male
Fetakgomo	51 302	41 910	14	17	14	47	184	199

Tubatse	172 654	157 156	284	358	230	307	2029	2380

10.18.6. Language

The languages that are spoken within the FTLM include Sepedi (94%) and isiZulu (1.2%), with other languages making up the remaining 4.8% (StatsSA, 2011). Table 61 below provides more detail on the languages spoken by the people of FTLM.

Table 61:

Table 67: Languages Spoken in FTLM

Afrikaans	English	IsiXhosa	IsiZulu	Sepedi	Sesoto	SiSwati	Xitsonga	Tshivenda	Others
0.5%	0.5%	0.3%	1.2%	94%	0.1%	0.4%	0.6%	0.1	0.4

10.18.7. Education

The quality of education for the African population has long been poor and insufficient in terms of standard requirements. The Limpopo province's education achievements lag behind those of other provinces. For example, the literacy rate of the Limpopo province was 73.6% in 1991, while average literacy in South Africa was 82.2%.

There are 225 primary and 133 secondary schools and 8 private schools with 128740 learners and 4711 educators in Fetakgomo Tubatse Local Municipality. The Department of Education Limpopo has developed two state-of-the-art schools namely Nthame Primary School at Riba – Cross and Batubatse Primary School in Praktiseer. Generally in rural or semi-rural areas such as this, the predominance of primary schools is not unusual as many pupils leave school at the earliest possible time to find employment to assist.

According to Stats SA, 2011, 22.6% of people above the age of 20 have completed matric (grade 12), while 6.6% have higher education (**Figure 82**).

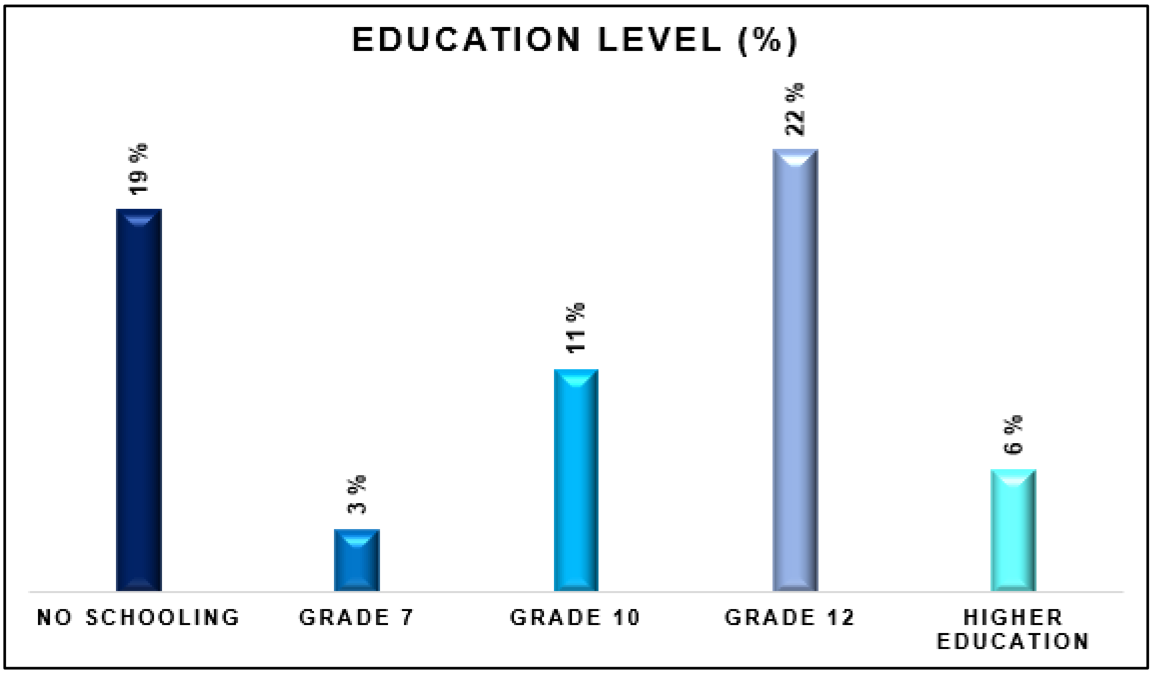


Figure 82: Education Level in GTLM (Stats SA, 2011)

10.18.8. Income

As depicted in Figure 83below, 9.24% of the working population in the FGTLM earn no income, and approximately 7.5% earning below or slightly above the poverty line.

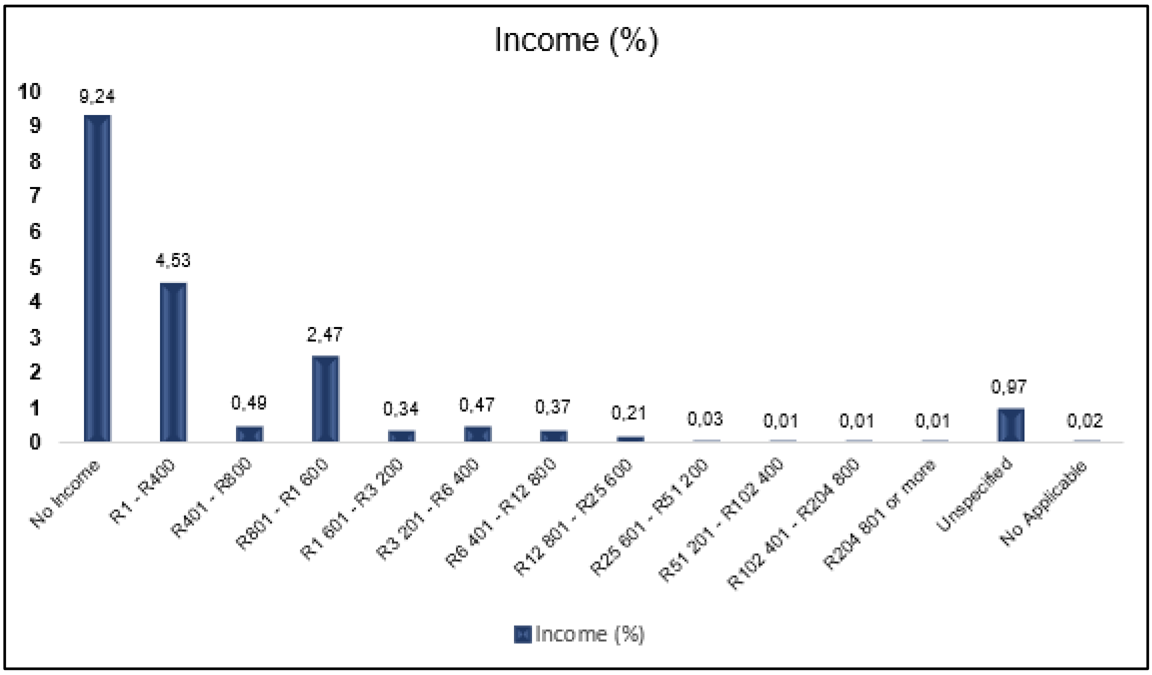


Figure 83: Household Income Levels (Stats SA, 2011)

10.18.9. Employment sector

According to Stats SA Quarterly Labour Force Survey, Quarter 4, 2018 (FGTLM 2019/2020 IDP), the provincial statistics show that the number of employed persons increased in five of the nine provinces between Q3, 2018 and Q4, 2018. An increased number of the employed persons was recorded in Limpopo at 59 000. The three largest industries that contributed to the increase in employment was Utilities (39.1%), Trade (19%) and Mining (14.7%). The three sectors that contracted were Construction (-5.1%), Community & Social Services (-2.8%) and Private Households (-2.4%).

10.18.10. Employment Status

According to the IDP, the Fetakgomo Tubatse Local Municipality is economically the most marginal region of the Limpopo province. The area is solely dependent on government assistance and migrant labour income for survival. FTLM's rate of unemployment rate is projected to rise from 41% in 2015 to 52% in 2025. In 2009, GTLM had the highest rate of unemployment at 28 022 and in 2015 it still had the highest with 22 264 people unemployed (Local Economic Development Strategy , 2015). Figure 84 below illustrates the employment status of the people of FTLM for the 15 – 64 age group.

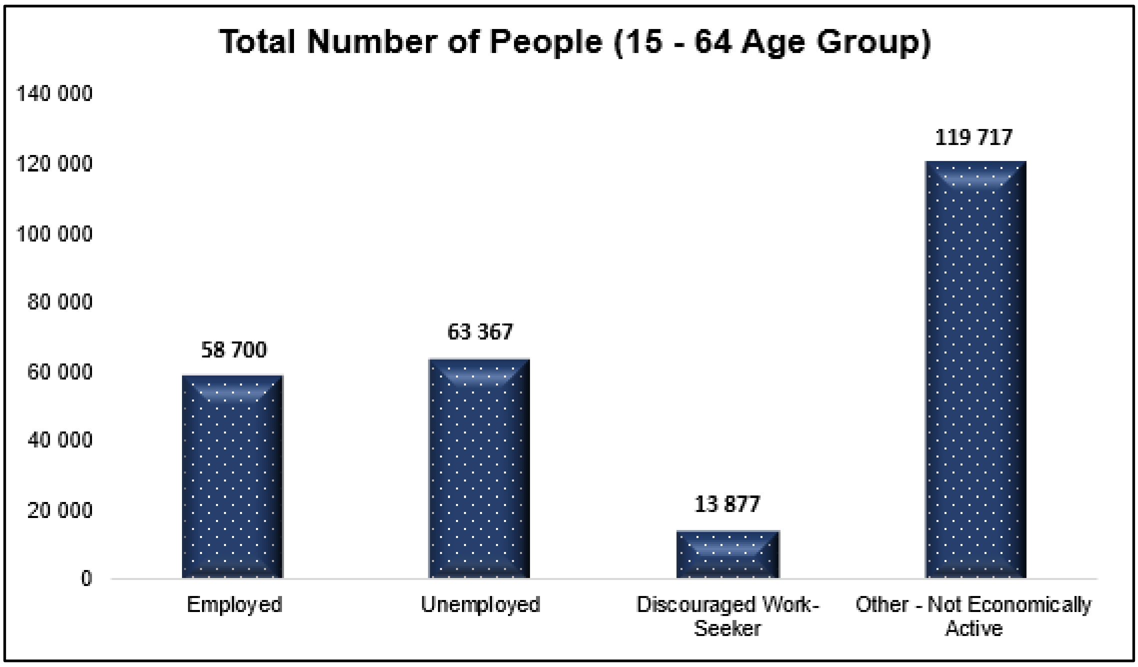


Figure 84: Economic Status (15 – 64 Age Group)

10.18.11. Social Indicator - Poverty and Inequality

Table 68: Poverty Levels (Sources: STATS SA 2011 and 2016)

	2011 Stats SA		2016 Community Survey	
Municipalities	**Poverty Headcount %**	**Intensity Poverty**	**Poverty Headcount %**	**Intensity Poverty**
Sekhukhune District	11.3	41.6	13.6	42.4
Ephraim Mogale	10.3	41.0	13.1	41.5
Elias Motsoaledi	8.5	41.3	10.9	42.3
Makhunduthamaga	12.2	41.4	15.3	42.5
Fetakgomo Tubatse	**11.6**	**41.8**	**14.5**	**42.2**

Table 62 above illustrates the comparison of the Census 2011 poverty levels, as measured by poverty headcount being 11.6 % for the FTLM, with intensity poverty being 41.8%. The Community Survey 2016 poverty headcount for FTLM is at 14.5 % and intensity poverty is at 42.2%.

10.18.12. Services and Infrastructure

10.18.13. Water

An analysis of all 39 wards concludes that the main challenge is the significant water deficit (shortage) within the Municipality. This is caused and aggravated by insufficient sources of water. There is material intolerable interruption of water supply in the overall municipal space, and households are unable to access water within the RDP standard (200 meters from the residence). There is a singing yard connection backlog of 127396. With only an approximate 51007 of households having yard connections, 3243 are owned boreholes and 413 are communal boreholes.

Table 63 below depicts Fetakgomo Tubatse Municipality as a water stressed municipality. The main causes of water shortage or deficit is the insufficient sources of water. According to the 2016 Community Survey, 58 255 have access to piped water while 67 208 have no access to piped water.

Table 69: Access to Piped Water

	Census 2011		2016 Community Survey	
Municipalities	**Access to Piped Water**	**No Access to Piped Water**	**Access to Piped Water Headcount**	**No Access to Piped**
Sekhukhune District	198 272	65 530	147 957	149 570
Ephraim Mogale	27 102	5 181	19 566	14 369
Elias Motsoaledi	40 195	20 056	31 678	34 681
Makhunduthamaga	47 801	17 146	31 458	33 312
Fetakgomo Tubatse	**83 173**	**22 877**	**58 255**	**67 208**

One of the main challenges to access water is the water illegal connections, limited communal facilities, aging infrastructure, drought, lack of financial resources, topography of the area, informal and scattered settlements. Approximately 352 (90%) villages have no access to water and depend on privately owned water sources and boreholes.

10.18.14. Electricity

Eskom is the only provider of electricity in the region and have installed basic infrastructure to provide electricity to communities. However, the majority of the rural population has no electricity. Lack of access to electricity to some villages poses a problem to the municipality as it impacts negatively on local economic development and community projects.

Table 70: Access to Electricity

	2016 Community Survey	
Municipalities	**Connected to Electricity**	**No Connected to Electricity**
Sekhukhune District	265 470	25 057
Ephraim Mogale	33 027	909
Elias Motsoaledi	62 463	3 895
Makhunduthamaga	62 209	2 560
Fetakgomo Tubatse	**107 770**	**17 692**

10.18.15. Sanitation

Generally, sanitation facilities in some villages are in a poor state. As such, the Sekhukhune District Municipality is currently constructing Ventilated Improved Toilets (VIP) in most villages of the municipality. The table below demonstrates the various sanitation facilities available. A total of 66% of households are without adequate sanitation.

Table 71: Sanitation Facilities

	Percentage
Flush toilet connected to a public sewerage system	4.70
Flush toilet connected to a septic tank or conservancy tank	1.52
Chemical toilet	4.79
Pit latrine / toilet with ventilation pipe	29.07

Pit latrine / toilet without ventilation pipe	51.48
Ecological toilet (e.g. enviroloo etc.)	0.35
Bucket toilet (collected by the municipality)	0.06
Bucket toilet (emptied by the household)	0.81
Other	2.49
None	4.73

10.18.16. Health Services and HIV/AIDS

HIV and AIDS is increasingly becoming a major public health problem, accounting for the highest number of deaths in the country. Statistics already indicates that one out of five people are HIV positive. Apart from addressing preventative and curative approaches it is important to address social conditions aggravating the vulnerability of communities to HIV and AIDS, such as poverty especially among rural women. Linkages between community care, support services and health facilities need to be developed to ensure a holistic approach to the handling of the epidemic.

There are collaborative efforts from the NGO community that assists the municipality in curbing further spread of the pandemic in this local sphere. Their scope includes heightening awareness through campaigns, HIV counselling and testing (HCT), ARV provisions and referrals. The Tubatse Home Community based care umbrella coordinates efforts of all home community-based care groups operational in the Municipality. The Municipality has a functional Local AIDS Council that drives the implementation of Local HIV/AIDS and TB response strategy in the local sphere. It has also moved into the establishment of Ward-Based AIDS councils in all municipal wards.

10.18.17. Local Economic Development

The Fetakgomo-Tubatse Local Municipality hosts the majority portion of the eastern limb of the Platinum Group Metals and the chrome ore. The municipality together with other government sector are busy with projects in expanding the roads, ensuring that there is water to run the mines, souring electrical energy to supply the mine and community etc. To this effect, FTLM hosts a town, Burgersfort, a provincial growth point and Steelpoort, a district growth point. The growth of these towns should stimulate investments that can accrue due to mine developments.

The challenge faced by the FTLM is that mining houses and mining operators source their input supplies and skills from outer areas in Gauteng Province and also imports materials that would otherwise be manufactured in the area. To this effect, the municipality needs to conduct a study on the potential of localized mineral beneficiation in order to attract investments which would maximize the usage and occupancy of the Special Economic Zone resulting in job opportunities. The spin-offs of the increased beneficiations are expected to diversify the economic sector in further manufacturing & property development, and logistics and warehousing.

The SWOT Analysis presented in Figure 85below highlights inherent strengths, weaknesses, opportunities and threats that need to be capitalised on or addressed, as applicable to ensure local economic development within FTLM.

Strengths	Weaknesses
– Qualified and experience staff – Passion for SMME development – Skill diversity and mix within senior management team – Functional governance framework and system – Vibrant SMME and cooperative business development model – Well-developed financial and accounting system and framework – Community-driven business support programmes – Solid financings partnerships with Government – Comprehensive economic development plan – Strong partnerships with private sector e.g. mining	– Emerging monitoring and evaluation framework – Embryonic coordination an interdivisional synergy – Budding research, lobbying and advocacy frameworks – Weak staff cohesion and coalition building mechanisms – Embryonic internal communication management systems – Absence of a coherent job evaluation and grading policy – A weak funding base; over-reliance on Government injection – Absence of vibrant staff development
Opportunities	**Threats**
– Government's support to economic development initiatives – Partnerships with private sector in SMME development remains untapped – SMME friendly policies and support mechanisms – Economy showing signs of recovery	– HIV and AIDS – Donor fatigue – Global recession has put significant strain on the fiscus – Grant policy stifling entrepreneurship spirit and creates a dependency syndrome

Figure 85: SWOT Analysis

10.19. DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE

10.19.1. ENVIRONMENTAL FEATURES

The study area is approximately 8.5 ha in extent. The study site falls within the Olifants Water Management Area and is situated within Quaternary Catchment B41G. Situated in the Klein-Dwars River / Dwars River valley, between mountainous areas, the TRP – Waste Rock Dump Project areas are on average 930 mamsl, gently sloping toward the river. Various non-perennial tributaries of the Klein-Dwars and Dwars Rivers are located in the area, none of which are within 100m of the TRP – WRD Project footprint.

The site consists mainly of mining related activities and infrastructure, with large sections of natural vegetation scattered throughout the area. The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located. According to the National Wetland Map (NWM) (2018) database, the study area does not overlap with any wetlands, however, the NFEPA database indicates a Channelled Valley-bottom wetland within 500m of Waste Rock Dump 1 and 3.

From the description of the baseline environment above, it is clear that some significant sensitive environmental features occur on the study area.

The entire study area is classed as a Critical Biodiversity Area 1 (CBA1).

In terms of flora, of the 278 species previously recorded for the area, six (6) are Species of Conservation Concern (SCC) in terms of their Red List status. Two additional flora species were listed for the project area in the Environmental Screening Tool Report. From the POSA data obtained, *Gladiolus reginae* (Red List Status: CR) and *Polygala sekhukhuniensis* (Red List Status: VU) have a moderate likelihood of occurrence on the project footprint. Of the 46 plant species recorded in the studied area during the site survey, four (4) have medicinal uses and one (1) species, *Sclerocarya birrea* (Marula), is protected in terms of the NFA. None of the floral species recorded during the site survey are listed in the ToPS list, or the LEMA.

With regards to fauna, five (5) mammalian species, four (4) avifaunal, one (1) reptilian species have a red listed status identified on the SANBI database for the region, pentad or QDS relevant to the mining project. Forty-six (46) species have been sighted during the field assessment, with no national SCC species confirmed within the footprints. Mammals protected or regulated under LEMA have been found to occur, and these species should not be interfered with, nor relocated. Generally, the area was found to be visibly impacted (VU2 & VU3), with predominant mining activities prevalent in the surrounding area. Natural footprint areas (VU1) were also mostly fenced off from the current mining activities and these fences will have to be lifted and moved outwards for WRD1 and 3 depending on the size designed and could therefore impact on sensitive habitat. In terms of the faunal investigation, Vegetation Unit 1 (VU) is the only area thought to represent sensitive habitat that could support other regional SCC.

The area associated with WRD1 is found to be impacted and cleared by previous stockpiling activities in this region and almost no natural habitat is remaining is this section. No animal species or habitat remains in this specific area. The area associated with WRD2 is where a current WRD is established, and this dump is to be redesigned and extended towards the south of the dump. Natural habitat has been severely impacted within this footprint; however, a pristine natural area is found adjacent to the site. WRD3 is found in largely natural terrain and is characterised by sections of pristine natural environment and the sensitive mountain side found to the west of the fence. Drainage features are also found in this area and, although impacted by the roads found here, it remains mostly intact.

The De Hoop Dam Protected Environment is a Protected Area towards the west (6 km). The National Protected Areas Expansion Strategy (NPAES) focus areas (Mpumalanga Mesic Grasslands) is located towards the east (8 km) and south (4 km) of the Two River Platinum Mine. No Important Bird or Biodiversity Areas (IBAs) or other features are located within 10km of the Waste Rock Dump Project sites.

No Stone Age, Iron Age, historical and contemporary remains, or graves were observed within the demarcated study areas.

10.19.2. EXISTING INFRASTRUCTURE ON THE STUDY AREA AND IN CLOSE PROXIMITY

The mine infrastructure presently consists of, *inter alia*, the following structures and infrastructure – approved in the 2013 (GCS) EMP/EIA. The mine is a fully operational mine with two declines, and associated building and processing infrastructure consisting of the following:

- Storm water dams, Drying Beds, Settling Dams and a treatment facility
- Dirty Water Handling Infrastructure – RWD, Cut off trenches
- Overland ore conveyances
- Waste material stockpiles
- High mast lighting. 10-15 high mast lights at each new shaft, in high traffic and security critical areas
- Ore silo to provide surge capacity for the overland conveyor system
- Office blocks
- Change houses – change facilities, ablution and storage lockers for 350 – 400 people at each shaft
- Lamp and crush facility at each shaft
- Roads network
- Haul Roads
- Bus stop and parking for personnel and visitors
- Security and access control
- Cable storage and salvage yard
- Sewage (treatment plants included as vendor supplied units, sized according to personnel complement)
- Firefighting and prevention (fire hydrants and hose reels, electric and diesel pumps to operate the deluge systems in the main substations of both shafts)
- Storm Water Management (cut off drains and berms at the Main and North shafts)
- General stores at each shaft for rock drills, rotary equipment, batteries and gas cylinders
- Explosive stores (a local explosives magazine to cater for daily usage, filled daily from the primary storage)

- Bulk fuel and lubricant storage (to receive store and dispense a week's consumption of each product)
- Miscellaneous facilities: portal rainwater sump and drain, dirty water sump and drain, covered walkways, brake test ramp, refuse disposal facilities, electrified fencing around the perimeter of the infrastructure
- Processing plants (UG 2 and Merensky)
- ROM Circuits, Silo's and Stockpiles
- Primary processing plant
- Secondary processing plant
- Underground infrastructure (refuge bays, workshops, offices and diesel and lubricant storage);
- Existing Tailings Storage and Waste Rock Facilities, and
- New Tailings Storage Facility and associated pipelines.

10.19.3. ROADS

The R577 provincial road is approximately 1km north of Two Rivers Platinum Mine, with the R555 provincial road approximately 5km to the west of the site. Access to the site is obtained from the R577 onto a tared road, which leads to the processing plant and mining area. Additionally, haul roads have been constructed within the mining area. RAILWAY.

No railway lines occur in close proximity to the study area.

10.19.4. POWERLINES

A number of Eskom servitudes are located on the mining area. Eskom's local Uchoba sub-station supplies TRP with electrical power, which steps supply voltage down from 132kV to 33kV before it is reticulated to the mine. The mine is supplied by Eskom from the two 30MVA, 33/11kV transformers. The existing main power supply continues to be adequate for the mine.

10.19.5. WATER

TRP sources its water supply from the Klein and Groot Dwars Rivers. The majority of the water supply allocation i.e., 1 500 000m^3 per annum, may be sourced from the Inyoni dam located within the Klein Dwars river catchment area on the 372KT Dwarsrivier farm in Portions 1 and 2. TRP is also allocated a total of 547 000m^3 per annum of water which can be sourced from underground sources. No additional water supply is required for the addition of the three (3) waste rock dumps being applied for.

10.19.6. SEWAGE

Two existing sewage treatment plants are currently in operation and will be used as-built without any additions or extensions.

11 DESCRIPTION OF CURRENT LAND USES

Two Rivers Platinum is an operational mine. The TRP – Waste Rock Dump Project sites are located with an approved mining right area and consists predominantly of mining and mining-related activities and infrastructure, with sections of natural vegetation scattered throughout the area. The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located.

11.1. SENSITIVE LANDSCAPES

The occurrence of possible sensitive landscapes at the project site is outlined in the Table 72below.

Table 72: Sensitive Landscapes within the Project Site

Types of Sensitive Landscapes	Occurrence at the Proposed Mining Site
Nature conservation or ecologically sensitive areas - indigenous plant communities (particularly rare communities and forests), wetlands, rivers, riverbanks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species.	The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located, with various non-perennial tributaries of these rivers located in the area, none of which are within 100m of the TRP – WRD Project footprint. According to the National Wetland Map (NWM) (2018) database, the study area does not overlap with any wetlands, however, the NFEPA database indicates a Channelled Valley-bottom wetland within 500m of Waste Rock Dump 1 and 3. The entire study area is classed as a Critical Biodiversity Area 1 (CBA1). In terms of flora, six (6) are SCC in terms of their Red List status. Two additional flora species were listed for the project area in the Environmental Screening Tool Report. From the POSA data obtained, *Gladiolus reginae* (Red List Status: CR) and *Polygala sekhukhuniensis* (Red List Status: VU) have a moderate likelihood of occurrence on the project footprint. During the site survey, four (4) plant species with medicinal uses and one (1) species, *Sclerocarya birrea* (Marula), is protected in terms of the NFA were recorded. With regards to fauna, five (5) mammalian species, four (4) avifaunal, one (1) reptilian species have a red listed status identified on the SANBI database for the region, pentad or QDS relevant to the mining project. Mammals protected or regulated under LEMA have been found to occur. In terms of the faunal investigation, Vegetation Unit 1 (VU) is the only area thought to represent sensitive habitat that could support other regional SCC.
Sensitive physical environments - such as unstable soils and geo-technically unstable areas.	N/A
Important natural resources - river systems, groundwater systems, high potential agricultural land.	The Klein-Dwars, Groot-Dwars and Dwars Rivers intersect with the farm portion where the study sites are located, with various non-perennial tributaries of these rivers located in the area, none of which are within 100m of the TRP – WRD Project footprint. According to the National Wetland Map (NWM) (2018) database, the study area does not overlap with any wetlands, however, the NFEPA database indicates a Channelled Valley-bottom wetland within 500m of Waste Rock Dump 1 and 3.
Sites of special scientific interest	None Known
Sites of social significance - including sites of archaeological, historic, cultural, spiritual or religious importance and burial sites.	None known
Sites of outstanding natural beauty, panoramic views and scenic drives	The site fall falls within the Sekhukhune Centre of Endemism. The endemic plants of this area are primarily edaphic specialists that are derived from a unique ecology. Endemics are both herbaceous and

Types of Sensitive Landscapes	Occurrence at the Proposed Mining Site
	woody with endemism high in the Anacardiaceae, Euphorbiaceae, Liliaceae and Lamiaceae (Van Wyk & Smith, 2001). Due the current mining on site as well as other mining related activities within the area, the outstanding natural beauty and panoramic views have been altered to an extent within the area.
Green belts or public open space in municipal areas	Not applicable.

11.2. LIMITATIONS AND ASSUMPTIONS

Assumptions and limitations applicable to specific to the assessment process and mitigation measures mentioned in specific specialist studies include the following:

11.3. HYDROGEOLOGICAL ASSESSMENT

- The modelling was done within the limitations of the scope of work of this study and the amount of data available.
- Although all efforts have been made to base the model on sound assumptions and has been calibrated to observed data, the results obtained from this exercise should be considered in accordance with the assumptions made. Especially the assumption that a fractured aquifer will behave as a homogeneous porous medium can lead to error. However, on a large enough scale (bigger than the REV, Representative Elemental Volume) this assumption should hold reasonably well.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.4. WASTE ROCK MATERIAL CLASSIFICATION

- No updated waste rock material classification analysis was done.
- The classification and characterisation undertaken in March 2020 was utilised.
- No limitations and/or assumptions were reported by the specialist.

11.5. SURFACE WATER

- Use was made of aerial photographs, digital satellite imagery as well as provincial and national databases to identify areas of interest before the field survey.
- Although all possible measures were undertaken to ensure all drainage lines were identified and assessed, some smaller ephemeral drainage lines may have been overlooked.
- The obtained buffer zones as calculated using the WRC Report No. TT 610/14 Tool was done on the practitioners own discretion and based on desktop and field assessments.
- Aquatic and riparian ecosystems are dynamic and complex. Some aspects of the ecology of these systems, some of which may be important may have been overlooked. The findings of this study were largely based on a single site visit. A more reliable assessment would have required that seasonal assessments take place.
- The site survey for the surface water and aquatic ecology assessment was undertaken at the end of

the wet season (April 2021). Site conditions were found to be suitable for assessment.

- The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and Red Kite Environmental Solutions and its staff reserve the right to modify aspects of the report including the recommendations when new information may become available from on-going research or further work in this field or pertaining to this investigation.
- Although Red Kite Environmental Solutions exercises due care and diligence in rendering services and preparing documents, Red Kite Environmental Solutions accepts no liability and the client, by receiving this document, indemnifies Red Kite Environmental Solutions and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expensed arising from or in connection with services rendered, directly or indirectly by Red Kite Environmental Solutions and by the use of the information contained in this document.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.6. AQUATIC ECOLOGY

- No other alternatives are applicable for the Two Rivers Platinum Project activities at the time of the compilation of this report. It is known that the layout has changed several times during the project based on finalisation of details and sensitive features identified, which included changes to one of the WRD positions.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.
- All opinions and comments are based on available resources and data at the time and findings during the site assessment may either verify or dispute the findings within this report.
- A field assessment has been conducted based on selected representative biomonitoring points for future sampling.
- No formal floodline, hydrological modelling or water balancing formed part of the scope of work for this report, however, these are the subjects of separate stand-alone reports and has been incorporated where appropriate. For detail regarding the aforementioned aspects, please refer to the separate report to be submitted.
- No wetland assessment or delineation forms part of this report or scope of work, but a wetland specialist had been appointed.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.7. WETLANDS

- The fieldwork component of the assessment comprised of one assessment only, during the dry season in April. No temporal trends for the respective seasons have been assessed.

- The determination of the watercourse boundaries and the assessment thereof, is confined to the study area (100 m buffer of WRD) of the identified wetland feature. The wetland features located within 500 m of the site, were delineated in fulfilment of Regulation GN509 of the NWA using various desktop methods including use of topographic maps, historical and current digital satellite imagery and aerial photographs. The general surroundings were, however, considered in the desktop assessment of the study area.

- The delineations as presented in this report are thus regarded as a best estimate of the temporary boundaries based on the site conditions present at the time of assessment.
- The assessment was conducted on the portion of the study site as originally defined by the client, any changes in the project boundary subsequent to this may negatively impact the robustness of this report.
- Deriving a 100% factual report based on field collecting and observations can only be done over several years and seasons to account for fluctuating environmental conditions and migrations. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage.
- Due to the scale of the remote imagery used (Google Earth Imagery), as well as the accuracy of the handheld GPS unit used to delineate wetlands in the field, the delineated boundaries cannot be guaranteed beyond an accuracy of about 15 m on the ground. Should greater accuracy of the boundary mapping be required, the boundaries will need to be pegged in the field and mapped using conventional survey techniques.
- Description of the depth of the regional water table and geohydrological and hydropedological processes falls outside the scope of the current assessment.
- Buffer zone calculations does not consider climate change or future changes to wetlands and watercourses resulting from increasing catchment transformation.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.8. TERRESTRIAL ECOLOGY (FLORA AND FAUNA)

- The layout presented within this document is thought to be the final at the time of the compilation of this report.
- It is assumed that species flowering only during specific times of the year could be confused with a very similar species of the same genus. Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- In order to obtain a comprehensive understanding of the dynamics of the vegetation of the study area, surveys should ideally have been replicated over several seasons and over a number of years. This vegetation survey was conducted in one season. Fieldwork was undertaken in April 2021, which is within the flowering period in a summer rainfall region. The timing of the site visit was thus optimal, and the seasonal constraints on the comprehensiveness of the botanical findings are considered to be low. All observed plants were in identifiable condition. The data gathered during the site visit is considered sufficient for the purposes of this report and the Scope of Work for this study.

- Data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- Riparian areas refer to watercourses, rivers or streams and does not specifically cater for wetland zones. For aspects related to wetlands, the Wetland Delineation Report will need to be referred to.

- No scientific calculated data was collected or analysed for the calculation of ecological veld condition. Any comments or observations made in this regard are based on observations, the expert knowledge and relevant professional experience of the specialist investigator.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.9. SOIL, LAND AND LAND CAPABILITY

- No updated Land use or soil study was done or required for this application.
- The soil and land use assessment was done for the 2013 EIA/EMPR as submitted for the existing mine and its expansion of the UG2 and Merensky reefs (Approved 2015).

11.10. AIR QUALITY

- No updated Air quality assessment was done or required for this application.
- The sensitive receptors closest to the TRP mine are two informal settlements, referred to as Village 1 and Village 2 in the air quality report and the residential areas of Ga-Mampuru, Kokwaneng, Madimola and Didingwe River Lodge.
- It can be assumed the surrounding chrome and platinum mining activities is the largest source contributor in the area. The rock dumps, gravel roads, crushing of ore, possible open pit operations and TSFs associated with these mines produce dust which contributes to the overall atmospheric dust load in the area. These are however all existing structures and activities.
- The Two Rivers Platinum mine is an existing mine with existing air quality monitoring and this will aid in the detection of decreased air quality during all phases of the development.

11.11. NOISE

- No updated Noise study was conducted or required for this application.
- The Noise assessment was done for the 2013 EIA/EMPR as submitted for the existing mine and its expansion of the UG2 and Merensky reefs (Approved 2015).
- Environments which are recognized as being noise sensitive include residential areas, offices, educational facilities and health and church buildings.
- None of these sensitive environments exist in close proximity to the TRP mining area. However, since the Two Rivers Platinum mine is an underground mining operation and extension of the existing underground sections, the baseline information is relevant and no direct surface impacts is expected for the project as part of this application.

11.12. VISUAL

- Visual perception is by nature a subjective experience, as it is influenced largely by personal opinions and world views. For instance, what one viewer may experience as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education, and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. To limit such subjectivity, combinations of quantitative and qualitative assessment methods were used. A high degree of reliance was placed on GIS-based analysis viewshed and visibility analysis, and on making transparent assumptions and value judgements where such assumptions or judgements are necessary.
- The viewshed generated with Geographic Information Systems (GIS) and Google Earth Pro are not 100% accurate due to unknown developments and modification of the natural environment and presents a limitation. Site visits are therefore used to verify the physical land conditions, such as natural vegetation, topography and or recent building or construction developments.
- Due to the terrain of the study area, the core study area can be defined as an area with a radius of not more than 5km from the activities and a total study area with a radius of 10 km from the activities. This is because the visual impact beyond 6 km would be so reduced that it can be considered negligible even if there is direct line of sight.
- Only viewpoints within 5 km from the activities were assessed for potential impacts.
- It is assumed that there are no alternative locations for the proposed activities and the visual assessment, therefore, assessed only the proposed site.
- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.
- Closure Phase impacts were not considered as part of the assessment as closure activities will be of short duration, and mainly rehabilitation monitoring practices will take place in the long term.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

11.13. ARCHAEOLOGY

Waste Rock Dump 1

The initial WRD 1 boundary received differs from the most recent boundary. The most significant differences, however, are the exclusion of an already disturbed section at the northern boundary, and the inclusion of a small section in the south-eastern corner. The northern half of WRD 1 has been disturbed by an existing WRD, road and a fence, while the southern half is associated with tree cover. During the site visit, however, the author was informed that the proposed WRD would not expand to the area south of the fence, which contradicts the proposed boundary. Only the area to the north of the fence was therefore inspected. It should be noted that the WRD 1 area has been disturbed by previous cultivation as indicated on historical aerial images and topographical maps.

Waste Rock Dump 2

Although the boundary initially provided for the survey differs from the updated boundary, the difference is relatively small. Also, the area associated with the updated boundary, except for a small section along the western boundary, has been disturbed by past mining activity. No other access constraints were experienced.

Waste Rock Dump 3

Only a rough indication of the WRD 3 area was available at the time of surveying, while the exact boundary was received with the rest of the updated boundaries. This resulted in a section of the demarcated area not being inspected. Also, extremely dense vegetation that hampered free movement and visibility was encountered on the inspected section and appears to be representative of the majority of the demarcated area.

11.14. PALAEONTOLOGY

- Not applicable. A request for exemption from undertaking a Palaeontology Impact Assessment for the Two Rivers Platinum – Waste Rock Dump Project was submitted by Professor Marion Bamford, Palaeobotanist to the South African Heritage Resources Agency on 22nd April 2021.

11.15. SOCIAL – ECONOMIC

- Baseline socio-economic data for this EIA/EMP report was obtained from various sources, which include Census 2011, Community Survey (“CS”) of 2016, the Fetakgomo Tubatse Local Municipality Integrated Development Plan (IDP) 2019/2020, and municipal planning documents, where more recent data could be obtained. Some of the statistics in the various sources contradict each other and, wherever relevant, was highlighted in the report. Data should therefore be used with cautiousness.

11.16. CLOSURE REPORT

Two River Platinum is an existing mine with an existing Closure report and Financial provision. The closure liability for the additiona activities where establish in the addendum report to the existing closure liability and closure plan.

- No additional risk where identified for the actitities as the mine has an existing approved WRD and PCD’s.
- The liability assocaited with the closure of the activities have been calculated based on the unit rates already utilised by the mine.

12 FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RAN THE IMPACTS AND RISK THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

12.1. IMPACTS IDENTIFIED FOR THE PROJECT

The following cultural, environmental and socio-economic impacts associated with the Two Rivers Platinum – Waste Rock Dump Project have been assessed in this document. The impacts relate to the the three additional waste rock dumps applied for on the the farm Dwarsrivier 372 KT. Associated activities during the construction, operation, decommissioning and post-closer phases will be relevant.

Potential impacts that may be caused by the proposed development will be identified using input from the following:

- Views of I&APs
- Existing information
- Specialist investigations
- Site visit with the project team, and
- Legislation.

The following potential major direct, indirect and cumulative impacts were identified:

- Land degradation
- Potential to alter the topography
- Loss of soil characteristics - erosion and compaction
- Potential for alien invasive establishment
- Reduced flow to downstream water catchment
- Potential pollution to water resources (surface and groundwater)
- Increased dust and emissions
- Increased noise levels
- Health and safety impacts
- Potential injury and loss of health and life of humans, and
- Altered Socio-Economic Environment (Positive or negative).

12.2. MOTIVATION WHERE NO ALTERNATIVES WERE CONSIDERED

Alternative layouts and locations were assessed and proposed in order to ensure sensitive impacts were mitigated (Section 7).

12.3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

An Issues and Response Report has been compiled with all the comments received during the application as part of the Public Participation Process for the project (Comments received to date have been included in Appendix 5-vii). This document records the issues of concern, questions and suggestions contributed by stakeholders during the course of the Environmental Authorisation Process. This report also includes the responses provided by relevant parties. The comments will be updated for the Final EIAR/EMPR to be submitted to the DMRE.

12.4. SPECIALIST INVESTIGATIONS

Several specialist investigations formed part of the in the EIA Phase of the project. A description of the aspects assessed by the specialists if provided in Table 73 below:

Table 73: Summary of Specialist Investigations

Aspect	Specialist Study	Specialist	Terms of Reference
Surface Water and Aquatic Ecology	Surface Water Assessment and Aquatic Ecology	Red Kite Environmental Solutions (Pty) Ltd	The Scope of Work for the surface water and aquatic ecology baseline and impact assessment study was to: • Conduct a desktop assessment on available information for the project area, including satellite images, databases, and specialist studies performed for the area • Establish the water quality baseline by assessing water quality in affected watercourses around the project area and comparing it to relevant water quality objectives • Determination of acceptable water qualities for the affected watercourses and compare to existing water quality data • Establish the aquatic ecosystem health baseline through SASS5 biomonitoring; • Field visit to survey the affected watercourses • Developing a sensitivity map based on field visits and supported by appropriate regional information to inform the impact assessment • Determination of watercourses buffers as per the Buffer Zone Guidelines for Wetlands, Rivers, and Estuaries • Undertake an impact assessment on the surface water quality and aquatic ecology for the construction and operation phases of the proposed project • Recommendation of site-specific mitigation measures, and • Compilation of a specialist assessment report detailing the methodology and findings of the assessment.
Wetlands	Wetlands Impact Assessment	Elemental Sustainability (Pty) Ltd	The terms of reference for the wetlands impact assessment were as follows: • Desktop description of the baseline receiving environment (general surrounding as well as site specific environment); • Site visit to verify desktop information; • Conduct wetland and riparian delineation of all wetland and riparian zones within the project site, as well as within a 500 m buffer zone of the proposed activity in accordance with DWAF guidelines and recommend suitable buffer zones (DWAF, 2008); • Undertake functional and integrity assessment of wetlands areas within the area assessed as specified in General Notice 267 of 24 March 2017; • Conduct an Impact Assessment as specified by the Environmental Impact Assessment Regulations of 2014 to determine the mining impact on the wetland/s; • Discuss appropriate mitigation and management procedures relevant to the conserving wetland areas on the site; and • Provide management recommendations to mitigate negative and enhance positive impacts.
Terrestrial Ecology	Flora and Fauna Impact Assessment	Enviridi Environmental Consultants (Pty) Ltd	The aim of this study includes the following objectives: • General description of the biodiversity components in the study area; • Description and mapping of the broad vegetation units (if more than one) identified in the study area;

			• Identify, evaluate and discuss any sensitive areas and species that should be avoided during the proposed activities; • Utilise the South African Biodiversity Institute (SANBI) Database to obtain specialized information and previous surveys within the area to supplement the field survey and support findings; • To determine and assess associated impacts and risks; • Relevant mitigation measures and a management plan will be proposed to reduce severity of impacts to the flora and fauna in the region; and • To provide recommendations that will support the proposed management actions.
Visual	Visual Impact Assessment	Elemental Sustainability (Pty) Ltd	The scope of work included the following: • A description of the existing visual characteristics of the proposed site and its surroundings; • Determining areas from which the proposed activities will be visible; • The development of viewshed models of the proposed activities; • Provision and recommendation of possible mitigation measures; and • A Visual Impact Assessment (VIA) to assess the significance of the visual impacts determined to be caused by the proposed mining activities
Archaeology	Heritage Impact Assessment	*Agri Civils Geo-Tech and Heritage*	The aim of the study was to determine the scope of archaeological resources that could be impacted by the development of the three additional Waste Rock Dumps.
Engineering	Engineering, and Geotechnical Assessment	GFK Consulting Engineers and Project Managers	The scope of work included the design parameters for three proposed Waste Rock Dumps, and associated Pollution Control Dams on the farm Dwars Rivier KT 372, and to undertake a site-specific geotechnical investigation.

12.5. THE POSITIVE AND NEGATIVE IMPACTS THAT THE ACTIVITY (IN TERMS OF THE INITIAL SITE LAYOUT) AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

General impacts are provided below as per specialist investigations (Appendices 6 – 16). The specialist investigations which included modelling, such as surface water, terrestrial ecology, wetlands and visual, included the modelling results below as per the relevant heading.

12.5.1. Impact on Geology

Apart from specific rock types or outcrops which are of scientific interest or cultural significance, the direct impact of the additional waste rock dumps on geology is seldom highly significant unless the long-term effects on groundwater or topography have important ramifications. In terms of the TRP – Waste Rock Dump Project areas, no specific geological feature of scientific interest or cultural significance will be impacted upon.

12.5.2. Impact on Topography

The topography of the TRP – Waste Rock Dumps Project areas will be altered by the addition of three new waste rock dumps. However, as Two Rivers Platinum is an existing, currently operational mine with associated mining activities, the impact on the topography will be absorbed by the current activities within mining right area.

12.5.3. Impact on Hydrogeology

Notwithstanding the waste rock material classified as a Class C, with no significant exceedance on TLCs, the waste rock material is a type 3 low-risk, non-hazardous waste that is not expected to influence groundwater quality.

12.5.4. Impact on Surface Water

The removal of vegetation for site clearance and the development and establishment of infrastructure will expose soils which may lead to erosion. Eroded material may cause sedimentation in downstream rivers and streams.

The movement of heavy machinery and vehicles during the construction phase may cause compaction of soils resulting in reduced infiltration of surface water and reduced baseflow. The utilisation, maintenance and refuelling of vehicles and machinery may result in hydrocarbon spills that may contaminate surface water resources.

A further impact as a result of this interaction is the alteration in current surface water drainage patterns. Increased runoff velocity as a result of the compaction of soil may further result in erosion and sedimentation of the downstream water resources.

Activities within sensitive buffer areas may impact on riparian habitats and ecological functioning of the riparian system. Changes in flow, flow patterns, water quality and riparian vegetation will impact the aquatic ecology of the surrounding and downstream surface water resources.

12.5.5. Impact on Aquatic Ecology

Construction impacts resulting in impacts to biodiversity and ecological function – including riparian zone activities or activities within buffer zones or regulated zones.

Establishment of the new waste rock dumps can result in a loss of biodiversity and ecological function, and interference with ecological corridor functioning.

Alteration of drainage patterns potentially leading to decrease and changes in water quantity and availability in the ecological reserve.

Deterioration of water quality in the Dwars and Klein-Dwars River due to improper waste management and movement of humans and vehicles resulting in contaminated soil and storm water runoff affecting aquatic communities found within water systems which may lead to death, and shifts in community structures occurring.

Sedimentation of water resources due to erosion and impacts in areas with steep topography. Nutrient enrichment which may lead to decline of Dissolved Oxygen (DO), thereby impacting the aquatic invertebrate communities found within the areas if flow is present.

Deterioration in surface water quality and changes in Present Ecological Status (PES). If river is negatively affected and may lead to a deterioration of the PES.
Water quantity impacts reducing water available to sustain aquatic diversity. Impacts to streamflow regulation.

12.5.6. Impact on Wetlands

Three (3) study sites were identified in a 100m area surrounding the Waste Rock Dumps, with a watercourse identified within each, therefore three watercourses were assessed as part of the study. The watercourses were classed as Non-Perennial Episodic Streams.

The overall PES Category for each watercourse was calculated. The loss of ecological integrity within the watercourses may be attributed to fragmentation occurring as a result of roads and other activities traversing the systems.

The summary of impacts assessed as related to the TRP – Waste Rock Dump Project includes the following:

- Alteration of the water flow regime of the watercourses
- Loss and disturbance of wetland habitat and fringe vegetation
- Alteration of the amount of sediment entering the water resource and associated change in turbidity
- Alteration of water quality due to pollution, and
- Introduction and spread of alien vegetation.

Implementation of mitigation measures and an effective management plan is imperative to mitigate potential impacts associated with the additional waste rock dumps.

12.5.7. Impact on Terrestrial Ecology (Flora and Fauna)

The site has sections which is modified, and habitat has been transformed to an extent based on mining activities in the area, however, the onset of additional activities might result in impacts to the natural environment due to increased movement, traffic and large machinery to the area. Most of the impacts on plant species will occur during the construction phase when removal of plant communities will take place on site.

Endemic, protected and/or SCC species could possibly occur within the area of construction and could be destroyed without proper knowledge and/or mitigation measures. Two SCC are considered to have a moderate likelihood occurrence on the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint.

Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2.

Sensitive (VU1 & VU2) habitats were identified to occur and development and related activities could impact on sensitive habitats, situated adjacent or in close proximity to the development footprint. Specifically, sections of WRD1 and WRD 3 has sections where sensitive natural habitat and vegetation will be removed (VU1).

Fragmentation of habitat areas due to possible fencing or the placement of boundary structures could lead to increased edge effects. Habitat that is not to be cleared, needs to be protected.

Impacts may lead to the further increase of invasive species from the surrounding areas and may change the vegetation structure and composition of this unit. It may also result in the spread of the invaders already found on-site to other surrounding areas.

Anthropogenic influence stemming from employees, visitors and contractors that infiltrate the natural veld areas will damage and impact on species communities within certain areas.

Rehabilitation could be ineffective if measures are not appropriately complied to. Without the necessary mitigation measures, rehabilitation will be unsuccessful, and the environment will not be self-sustaining.

Without mitigation the alien invasive species will increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.

12.5.8. Impact on Soil, Land and Land Capability

Impact: Soil erosion

All areas where vegetation is removed from the soil surface in preparation for the construction of the additional waste rock dumps will be at risk of erosion. Both wind and water erosion are a risk and once the soil surface is exposed, the intensity of single rainstorm may result in soil particles being transported away. Exposed soil surfaces will remain at risk of soil erosion during the operational and decommissioning phases.

Impact: Soil compaction

All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil compaction. Similarly, dump trucks that will travel to the waste rock dumps to stockpile the waste rock material, will increase the existing compaction. During the decommissioning phase, the movement of vehicles and equipment will again result in soil compaction.

Impact: Soil pollution

All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil pollution. , dump trucks that will travel to the waste rock dumps to stockpile the waste rock material, may increase the existing.

Impact: Land Capability

Two Rivers Platinum is an existing operational mine. The TRP – Waste Rock Dump Project areas are located within TRPs existing approved mining right area, with no impact on crop production and / or livestock grazing.

12.5.9. Impact on Air Quality

Nuisance dust will result from the construction of the additional waste rock dumps, and furthermore from the haulage of waste rock material to be stockpiled on the waste rock dumps during the continued operation of the current mine. Fugitive emissions are also possible from .

Nuisance dust can reduce visibility, soil or damage buildings and other materials, and increase costs due to the need for washing, cleaning and repainting. Plants can be affected by dust fallout through reduced light transmission which affects photosynthesis and can result in decreased growth. Fallout dust can also collect in watercourse causing sedimentation and a reduction in the water quality and can also affect aquatic life through the smothering of riverine habitat and fish gill clogging.

Airborne particles and diesel fumes will be emitted along the haul roads between the mine and the waste rock dumps.

12.5.10. Impact on Noise

Construction and operation of the additional waste rock dumps may result in increased noise with regards to the ambient environment noise levels, with the associated potential to displace faunal species.

12.5.11. Impact on Visual Aesthetic

The potential visual impact on the viewpoints during the construction phase is expected to have a Moderate impact before mitigation and Low after mitigation. The impact on the surrounding land users will be Moderate due to the short time the proposed construction activities will be undertaken. The construction activities will not be highly visible due to the topography, vegetation and the short time of exposure, and thus the impact on the users will be Low after mitigation measures have been implemented.

The potential visual impact on the viewpoints during the operational phase is expected to have a Moderate impact before mitigation and Low after mitigation. The structures will possibly be visible from most Viewpoints within a 2 km radius, depending on topography and vegetation occurrence

12.5.12. Impact on Archaeology

Potential damage to subsurface culturally significant material may occur during the construction phase of the TRP – Waste Rock Dump Project.

12.5.13. Impact on Palaeontology

The current operational mine, associated mining activities and the TRP – Waste Rock Dump Project area is on intrusive igneous rocks of the Rustenburg Layered Suite (Bushveld Complex) with some overlying Quaternary sands and alluvium. The mine area is on the Dwarsriver Subsuite (Critical Zone) with anorthosite, norite gabbro and chromitite, as well as the overlying Dsjate Subsuite (Main Zone) with gabbro, norite and subordinate anorthosite (Cawthorn et al., 2006). Such rocks do not contain any fossils so there is no chance of the palaeontological heritage being impacted in any way.

12.5.14. Impact on Social Economic Development

The discussion below considers and focuses on possible impacts associated with the TRP – Waste Rock Dump Project.

Issue: Positive and negative socio-economic impacts

TRP – Waste Rock Dump Project has the potential to have positive and/or negative impacts on the following:

- Continued employment for local communities
- The local and national economy
- Social structures within communities
- Quality of life and health related issues, and
- Livelihoods of businesses

Socio-economic impacts would occur during all project phases. The most pertinent socio-economic impact of the TRP – Waste Rock Dump Project is continued employment. The purpose of the additional three new waste rock dumps is to ensure the continuity of the current established mining processing operations to accommodate the projected tonnage, based on the current Life of Mine (LoM) plan, thereby positively impacting on continued livelihood of community members working at the mine.

12.5.15. Cumulative Impacts

A cumulative impact may result from an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may either be countervailing (net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (net adverse cumulative impact is greater than the sum of the individual impacts).

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

The anticipated impacts resulting from the TRP – Waste Rock Dump Project could potentially result in the following cumulative effects:

- Cumulative impacts on the aquatic ecology will likely be low based on the scale of the project and direct impacts associated with the activities. However, impacts that could reach the catchment and result in cumulative impacts is the possible impacts to the river, which will in turn impact downstream water users, the catchment, ecological reserve and many more.

- Incremental losses and fragmentation of habitat are two of the more serious cumulative impacts in terms of fauna and flora. Given the nature of the surrounding landscape, the characteristics and sensitivity of the affected area, the nature of the proposed development, and the potential for cumulative impacts are expected to be low. This is mainly due to the fact that the general area is already impacted and utilised as mining and large-scale mining developments occur within the vicinity.

- Additional risk of soil erosion, soil compaction, as well as soil, air and water pollution.

- From an visual aesthetic perspective, the project would be adding three Waste Rock Dumps to an already large mine in the region. This will not change the sense of the place and the scenic view that the area currently enjoys. Rehabilitation is anticipated to occur, depending on the success rate of the rehabilitation and post mining landcover, no cumulative impacts are expected.

- Regarding the hydrological environment, cumulative impacts in association with adjacent mines in the region will be mitigated by the implementation of appropriate management measures. With the implementation of the proposed mitigation measures by the relevant specialists, it is not anticipated that the cumulative impact on the watercourses will exceed Medium significance

12.6. METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

The Environmental Impact Assessment (EIA) 2014 Regulations [as amended] promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact
- Extent of the impact
- Duration of the impact
- Probability of the impact occurring
- Degree to which impact can be reversed
- Degree to which impact may cause irreplaceable loss of resources
- Degree to which the impact can be mitigated, and
- Cumulative impacts.

The impact assessment methodology used to determine the significance of impacts prior and after mitigation is presented below.

Extent of the impact

The EXTENT of an impact is the physical extent/area of impact or influence.

Score	Extent	Description
1	Footprint	The impacted area extends only as far as the actual footprint of the activity.
2	Site	The impact will affect the entire or substantial portion of the site/property.

3	Local	The impact could affect the area including neighbouring properties and transport routes.
4	Region	Impact could be widespread with regional implication.
5	National	Impact could have a widespread national level implication.

Duration of the impact

The DURATION of an impact is the expected period of time the impact will have an effect.

Score	Duration	Description
1	Short term	The impact is quickly reversible within a period of less than 2 years, or limited to the construction phase, or immediate upon the commencement of floods.
2	Short to medium term	The impact will have a short term lifespan (2–5 years).
3	Medium term	The impact will have a medium term lifespan (6 – 10 years)
4	Long term	The impact will have a medium term lifespan (10 – 25 years)
5	Permanent	The impact will be permanent beyond the lifespan of the development

Intensity of the impact

The INTENSITY of an impact is the expected amplitude of the impact.

Score	Intensity	Description
1	Minor	The activity will only have a minor impact on the affected environment in such a way that the natural processes or functions are not affected.
2	Low	The activity will have a low impact on the affected environment.
3	Medium	The activity will have a medium impact on the affected environment, but function and process continue, albeit in a modified way.
4	High	The activity will have a high impact on the affected environment which may be disturbed to the extent where it temporarily or permanently ceases.
5	Very High	The activity will have a very high impact on the affected environment which may be disturbed to the extent where it temporarily or permanently ceases.

Reversibility of the impact

The REVERSIBILITY of an impact is the severity of the impact on the ecosystem structure

Score	Reversibility	Description
1	Completely reversible	The impact is reversible without any mitigation measures and management measures
2	Nearly completely reversible	The impact is reversible without any significant mitigation and management measures. Some time and resources required.
3	Partly reversible	The impact is only reversible with the implantation of mitigation and management measures. Substantial time and resources required.
4	Nearly irreversible	The impact is can only marginally be reversed with the implantation of significant mitigation and management measures. Significant time and resources required to ensure impact is on a controllable level.
5	Irreversible	The impact is irreversible.

Probability of the impact

The PROBABILITY of an impact is the severity of the impact on the ecosystem structure

Score	Probability	Description
1	Improbable	The possibility of the impact occurring is highly improbable (less than 5% of impact occurring).
2	Low	The possibility of the impact occurring is very low, due either to the circumstances, design or experience (5% to 30% of impact occurring).
3	Medium	There is a possibility that the impact will occur to the extent that provision must be made therefore (30% to 60% of impact occurring).
4	High	There is a high possibility that the impact will occur to the extent that provision must be made therefore (60% to 90% of impact occurring).
5	Definite	The impact will definitely take place regardless of any prevention plans, and there can only be relied on migratory actions or contingency plans to contain the effect (90% to 100% of impact occurring).

Calculation of Impacts – Significance Rating of Impact

Significance is determined through a synthesis of the various impact characteristics and represents the combined effect of the Irreplaceability (Magnitude, Extent, Duration, and Intensity) multiplied by the Probability of the impact. The significance of an impact is rated according the scores a presented below:

Equation 1:

Significance = Irreplaceability (Reversibility + Intensity + Duration + Extent) X Probability

Significance Rating

Score	Significance	Colour Code
1 to 20	Very low	
21 to 40	Low	
41 to 60	Medium	
61 to 80	High	
81 to 100	Very high	

Mitigation Efficiency

Degree to which the impact can be mitigated: *The effect of mitigation measures on the impact and its degree of effectiveness:*

Equation 2:

Significance Rating = Significance x Mitigation Efficiency

High	0,2
Medium to High	0,4
Medium	0,6
Low to Medium	0,8

Low	1,0

Confidence rating: *Level of certainty of the impact occurring*.

- **Certain**
- **Sure**
- **Unsure**

Cumulative impacts: *The effect the combination of past, present and "reasonably foreseeable" future actions have on aspects.*

- Very Low cumulative impact
- Low cumulative impact
- Medium cumulative impact
- High cumulative impact

13 IMPACTS AND RISKS IDENTIFIED INLCUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILTY OF THE IMPACTS

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated)

13.1. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Table 74: Impact Assessment Table (Complete with Ratings used to obtain Significance)

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction Phase																			
Geology and Topography																			
Construction of Waste Rock Dumps	Alteration of present topography through addition of three new waste rock dumps.	Construction	Site	2	Long term	4	Medium	4	Partly reversible	3	13	Medium	3	Low	39	Medium	0,6	Low	23,4
Hydrogeology																			
Construction of Waste Rock Dumps	This phase is not anticipated to have influence/impact on the hydrogeology.	Construction	Site	2	Short term	2	low	2	Partly Reversible	3	9	Medium	3	Low	27	Medium to High	0,4	Very low	10.8
Hydrology (Surface Water)																			
Construction of Waste Rock Dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Construction	Local	3	Long term	4	Medium	3	Nearly Irreversible	4	14	Medium	3	Medium	42	Low to Medium	0,8	Low	33,6
Construction of Waste Rock Dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Construction	Site	2	Long term	4	Medium	3	Nearly Irreversible	4	14	High	4	Medium	56	Low to Medium	0,8	Medium	44.8
Construction of Waste Rock Dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Construction	local	3	Permanent	5	Medium	3	Partly Reversible	3	14	Medium	3	Medium	42	Medium	0,6	Low	25,2

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Aquatic Ecology																			
Construction of Waste Rock Dumps	Construction impacts resulting in impacts to biodiversity and ecological function	Construction	Site	2	Medium term	3	Minor	1	Nearly completely reversible	2	8	Low	2	Very low	16	Medium to High	0,4	Very low	6,4
Construction of Waste Rock Dumps	Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Construction	Local	3	Medium term	3	Minor	1	Nearly completely reversible	2	9	Improbable	1	Very low	9	Medium to High	0,4	Very low	3,6
Construction of Waste Rock Dumps	Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Construction	Site	2	Long term	4	Minor	1	Nearly completely reversible	2	9	Improbable	1	Very low	9	High	0,2	Very low	1,8
Construction of Waste Rock Dumps	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities	Construction	Site	2	Long term	4	Minor	1	Nearly completely reversible	2	9	Low	2	Very low	18	High	0,2	Very low	3,6
Construction of Waste Rock Dumps	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities	Construction	Site	2	Long term	4	Minor	1	Nearly completely reversible	2	9	Improbable	1	Very low	9	High	0,2	Very low	1,8
Construction of Waste Rock Dumps	Deterioration of surface water quality may lead to a deterioration of the	Construction	Site	2	Long term	4	Minor	1	Nearly completely reversible	2	9	Low	2	Very low	18	Medium to High	0,4	Very low	7,2

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	Present Ecological Status (PES).																		
Construction of Waste Rock Dumps	Surface water quantity reducing the capacity available to sustain aquatic diversity	Construction	Local	3	Long term	4	Minor	1	Nearly completely reversible	2	10	Improbable	1	Very low	10	Medium to High	0,4	Very low	4
Wetlands																			
Construction of Waste Rock Dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during construction activities.	Construction	Local	3	Long term	4	High	4	Partly Reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Construction activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Construction	Local	3	Long term	4	High	4	Partly Reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Soil and vegetation disturbance during construction activities may potentially result in opportunistic invasions of alien vegetation impacting hydrology by reducing the quantity of water entering a watercourse,	Construction	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	outcompete natural vegetation, and decreasing the natural biodiversity.																		
Construction of Waste Rock Dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Construction	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Construction	Local	3	Long term	4	High	4	Partly reversible	2	13	High	4	Medium	52	High	0,2	Very low	10,4
Terrestrial Ecology (Flora and Fauna)																			
Construction of Waste Rock Dumps	Construction of the additional waste rock dumps might result in impacts to the natural environment due to increased movement, traffic and large machinery use in the area, and specifically on the flora when removal of plant communities will take	Construction	Site	2	Permanent	5	High	4	Nearly irreversible	4	15	Definite	5	High	75	Low to Medium	0,8	Medium	60

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	place on site.																		
Construction of Waste Rock Dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	Construction	Site	2	Permanent	5	High	4	Nearly irreversible	4	15	Definite	5	High	75	Low to medium	0,8	Medium	60
Construction of Waste Rock Dumps	Fragmentation of habitat areas due to possible fencing or the placement of boundary structures, leading to increased edge effects.	Construction	Regional	4	Permanent	5	Medium	3	Partly reversible	3	15	Definite	5	High	75	Medium	0,6	Medium	45

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction of Waste Rock Dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Construction	Site	2	Permanent	5	Medium	3	Partly reversible	3	13	Definite	5	High	65	Medium	0,6	Low	39
Construction of Waste Rock Dumps	Anthropogenic influence stemming from employees, visitors and contractors that infiltrate the natural veld areas will damage and impact on species communities within certain areas	Construction	Regional	4	Permanent	5	Medium	3	Partly reversible	3	15	Likely	3	Medium	45	Medium	0,6	Low	27
Soil, Land and Land Capability																			
Construction of Waste Rock Dumps	Potential soil erosion from areas where vegetation is removed from the soil surface in preparation for the construction of the additional waste rock dump risk of erosion.	Construction	Site	2	Short term	1	Low	2	Nearly completely reversible	2	7	Medium	3	Low	21	High	0,2	Very low	4,2
Construction of Waste Rock Dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump	Construction	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0,2	Very low	6

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	facilities, will be at risk of soil compaction.																		
Construction of Waste Rock Dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil pollution.	Construction	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0,2	Very low	6
Construction of Waste Rock Dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles	Construction	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0.2	Very low	6
Air Quality																			
Construction of Waste Rock Dumps	Nuisance dust will result from the construction of the additional waste rock dumps increasing risk to health	Construction	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	Medium	0,6	Very low	18
Construction of Waste Rock Dumps	Fallout dust from construction activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Construction	Site	2	Long term	4	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium	0,6	Very low	21,6

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction of Waste Rock Dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Construction	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	Medium	0,6	Low	23,4
Construction of Waste Rock Dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution.	Construction	Site	2	Long term	4	Medium	3	Nearly completely reversible	2	11	Medium	3	Low	33	Medium	0,6	Very low	19,8
Noise																			
Construction of Waste Rock Dumps	Construction of the additional waste rock dumps may result in an increase of the ambient environment noise levels, with the associated potential to displace faunal species.	Construction	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	Medium to high	0,4	Very low	15,6
Visual																			
Construction of Waste Rock Dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps construction activities.	Construction	Regional	4	Short term	1	Medium	3	Completely reversible	1	9	Medium	3	Low	27	High	0,2	Very low	5,4

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Archaeology and Palaeontology																			
Construction of Waste Rock Dump 1	Impacts on sites of archaeological and cultural interest is expected during construction of the waste rock dumps	Construction	Footprint	1	Permanent	5	Low	2	Nearly reversible	2	10	Low	2	Low	20	Medium to high	0,4	Very low	8
Construction of Waste Rock Dump 2	Impacts on sites of archaeological and cultural interest is expected during construction of the waste rock dumps	Construction	Footprint	1	Short term	1	Minor	1	Reversible	1	4	Improbable	1	Very low	4	High	0,2	Very low	0,8
Construction of Waste Rock Dump 3	Impacts on sites of archaeological and cultural interest is expected during construction of the waste rock dumps	Construction	Footprint	1	Permanent	5	High	4	Irreversible	4	14	High	4	Medium	56	Medium to high	0,4	Low	24,4
Socio - Economic																			
Construction of Waste Rock Dumps	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on surface water, dust pollution, noise pollution etc.	Construction	Local	3	Long terms	4	Medium	3	Partly reversible	2	12	Medium	3	Low	36	High	0,2	Very low	7,2
Construction of Waste Rock Dumps	Positive impact: – Continued employment for local communities – Continued	Construction	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45	N/A	1	Medium	42

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	contribution to growth of the local and national economy – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues, and – Continued livelihoods of businesses																		
No – go option	Operations will cease with concomitant impact on employment, local business, livelihoods and socio-economic development.	Not applicable	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45			Medium	45
No – go option	**Positive:** No additional negative impacts on I&APs or surrounding land users	Not applicable	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45			Medium	45
Natural Environment																			
No – go option	**Positive:** No additional negative impacts on the environment.	Not applicable	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45			Medium	45
Operational Phase																			
Geology and Topography																			
Operation of the Waste Rock Dumps	Alteration of the current topography through the addition of the additional waste rock	Operation	Site	2	Long term	4	High	4	Partly reversible	3	13	Medium	3	Low	39	Medium	0,6	Low	23,4

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	dumps.																		
Hydrogeology																			
Operation of the Waste Rock Dumps	This phase is not anticipated to have influence/impact on the hydrogeology.	Operational	Local Site	3 2	Long term	4	Medium	3	Partly reversible	3	13 12	Medium	3	Low	36	Medium	0,6	Low	21.6
Hydrology (Surface Water)																			
Operation of the Waste Rock Dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality.	Operational	Local	3	Long term	4	Medium	3	Nearly irreversible	4	14	Medium	3	Medium	42	Low to medium	0,8	Low	33,6
Operation of the Waste Rock Dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Operational	Site	2	Permanent	5	Medium	3	Nearly Irreversible	4	14	Definite	5	High	70	Low to medium	0,8	Medium	60
Operation of the Waste Rock Dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Operational	local	3	Permanent	5	Medium	3	Partly reversible	3	14	Medium	3	Medium	42	Medium	0,6	Low	25,2
Aquatic Ecology																			
Operation of the Waste Rock Dumps	Operational activities resulting in impacts to biodiversity and ecological function	Operational	Site	2	Medium Term	3	Minor	1	Partly reversible	3	9	Low	2	Very low	18	Medium to high	0,4	Very low	7,2
Operation of the Waste Rock Dumps	Loss of biodiversity and ecological function. Impacts to ecological corridor	Operational	Local	3	Medium Term	3	Minor	1	Partly reversible	3	10	Improbable	1	Very low	10	Medium to high	0,4	Very low	4

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	functioning due to prolonged activity in proximity to watercourses																		
Operation of the Waste Rock Dumps	Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Operational	Site	2	Long Term	4	Minor	1	Partly reversible	3	8	Low	1	Very low	8	High	0,2	Very low	1,6
Operation of the Waste Rock Dumps	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities	Operational	Site	2	Long Term	4	Minor	1	Partly reversible	3	10	Improbable	2	Very low	20	High	0,2	Very low	4
Operation of the Waste Rock Dumps	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities	Operational	Site	2	Long Term	4	Minor	1	Partly reversible	3	10	Low	1	Very low	10	High	0,2	Very low	2
Operation of the Waste Rock Dumps	Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Operational	Site	2	Long Term	4	Minor	1	Partly reversible	3	10	Improbable	2	Very low	20	Medium to high	0,4	Very low	8
Operation of the Waste Rock Dumps	Surface water quantity reducing the capacity available to sustain aquatic diversity	Operational	Local	3	Long Term	4	Minor	1	Partly reversible	3	10	Low	1	Very low	10	Medium to high	0,4	Very low	4
Wetlands																			

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during operational activities.	Operational	Local	3	Long term	4	High	4	Partly Reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2
Operation of the Waste Rock Dumps	Operational activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Operational	Local	3	Long term	4	Medium	3	Partly Reversible	3	13	High	4	Medium	42	High	0,2	Very low	8,
Operation of the Waste Rock Dumps	Operational activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Operational	Local	3	Long term	4	Medium	3	Partly reversible	3	13	High	4	Medium	42	High	0,2	Very low	8,4
Operation of the Waste Rock Dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as	Operational	Site	2	Long term	4	High	4	Partly reversible	3	13	High	4	Medium	42	High	0,2	Very low	8,4

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	changes in management, fire regime and habitat fragmentation.																		
Operation of the Waste Rock Dumps	Operational activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Operational	Local	3	Long term	4	Medium	3	Partly reversible	3	13	High	4	Medium	42	High	0,2	Very low	8,4
Terrestrial Ecology (Flora and Fauna)																			
Operation of the Waste Rock Dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2)	Operational	Site	2	Permanent	5	High	4	Nearly irreversible	4	15	Definite	5	High	75	Low to medium	0,8	Medium	60

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).																		
Operation of the Waste Rock Dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Operational	Regional	4	Permanent	5	Medium	3	Partly reversible	3	15	medium	3	Medium	45	Medium	0,6	Low	27
Soil, Land and Land Capability																			
Operation of the Waste Rock Dumps	Similarly, dump trucks that will travel to the waste rock dumps to stockpile the waste rock material, will increase the existing compaction.	Operational	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0,2	Very low	6
Operation of the Waste Rock Dumps	Dump trucks traveling to the waste rock dumps to stockpile the waste rock material, may increase existing soil pollution.	Operational	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0,2	Very low	6

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles.	Operational	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	30	High	0,2	Very low	6
Air Quality																			
Operation of the Waste Rock Dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution, increasing risk to health.	Operational	Site	2	Long term	4	Medium	3	Nearly completely reversible	2	11	Medium	3	Low	33	Medium	0,2	Very low	6,6
Operation of the Waste Rock Dumps	Fallout dust from waste rock stockpiling activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Operational	Site	2	Long term	4	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium	0,2	Very low	7,2
Operation of the Waste Rock Dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Operational	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	Medium	0,2	Very low	7,8
Noise																			

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Stockpiling of waste rock during the operational phase may result in increased ambient environment noise levels, with the associated potential to displace faunal species.	Operational	Site	2	Long term	4	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium to high	0,2	Very low	7,2
Visual																			
Operation of the Waste Rock Dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps	Operational	Regional	4	Long term	4	Medium	3	Completely reversible	1	12	High	4	Medium	48	High	0,2	Very low	9,6
Archaeology and Palaeontology																			
Operation of the Waste Rock Dumps	No impacts on sites of archaeological, palaeontological and cultural interest is expected during the operational phase.	Operational	Site	2	Long term	4	Minor	1	Completely reversible	1	8	Low	2	Very Low	16	High	0,2	Very Low	3.2
Socio – Economic																			
Operation of the Waste Rock Dumps	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	Operational	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	High	0,2	Very low	7,8

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Positive impact: – Continued employment for local communities – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues, and	Operational	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45	NA	1	Medium	45
Operation of the Waste Rock Dumps	Continued sourcing of supplies from local businesses, thereby continuing to contribute to the local economy.	Operational	Regional	4	Long term	4	Hight	4	Partly reversible	3	15	Medium	3	Medium	45	NA	1	Medium	45
Decommissioning and Closure																			
Geology and Topography																			
Closure – stockpiling of waste rock ceased	Visual aspect of stockpile to remain after rehabilitation	Closure	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	Medium	0,6	Low	23.4
Hydrogeology																			
Closure – stockpiling of waste rock ceased	Closure – stockpiling of waste rock ceased rehabilitation	Closure	Local	3	Long term	4	Low	2	Partly reversible	3	12	Medium	3	Low	36	High	0,2	Very low	7.2
Hydrology (Surface Water)																			
Closure and rehabilitation of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the	Closure	Local	3	Long term	4	Medium	3	Nearly irreversible	4	14	Medium	3	Medium	42	Medium	0,6	Low	33,6

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	deterioration of water quality																		
Closure and rehabilitation of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Closure	Local	3	Permanent	5	Medium	3	Nearly irreversible	4	15	Definite	5	High	75	Low to medium	0,8	Medium	60
Closure and rehabilitation of waste rock dumps	Surface water quantity - Reinstatement of surface drainage patterns (Positive Impact)	Closure	Local	3	Medium term	3	Medium	3	Nearly completely reversible	2	11	Medium	3	Low	33	Medium	0,6	Very low	19,8
Wetlands																			
Closure and rehabilitation of waste rock dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during rehabilitation activities.	Closure	Local	3	Short term	1	High	4	Partly reversible	3	11	High	4	Medium	44	High	0,2	Very low	8,8
Closure and rehabilitation of waste rock dumps	Rehabilitation activities could result in sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Closure	Local	3	Short term	1	High	4	Partly reversible	3	11	High	4	Medium	44	High	0,2	Very low	8,8
Closure and rehabilitation of waste rock dumps	Rehabilitation activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a	Closure	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.																		
Closure and rehabilitation of waste rock dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Closure	Site	2	Long term	4	High	4	Partly reversible	3	13	High	4	Medium	42	High	0,2	Very low	8,4
Closure and rehabilitation of waste rock dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Closure	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2
Terrestrial Ecology (Flora and Fauna)																			
Closure and rehabilitation of waste rock dumps	Without the necessary mitigation measures, rehabilitation will be unsuccessful, and the environment will not be self-sustaining; the alien invasive species will increase and result in a degraded veld condition making the property less viable for	Closure	Regional	4	Long term	4	Medium	3	Partly reversible	3	14	Medium	3	Medium	42	Medium	0,6	Low	25,2

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
	post-closure land use activities such as wilderness, grazing and agriculture.																		
Soil, Land and Land Capability																			
Closure and rehabilitation of waste rock dumps	During the decommissioning phase, the movement of vehicles and equipment will again result in soil compaction.	Closure	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	33	High	0,2	Very low	6,6
Closure and rehabilitation of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Closure	Site	2	Long term	4	Low	2	Nearly completely reversible	2	10	Medium	3	Low	33	High	0,2	Very low	6,6
Air Quality																			
Closure and rehabilitation of waste rock dumps	Windborne dust (waste rock) from the waste rock dumps altering air quality through dust pollution, increasing risk to health.	Closure	Site	2	Long term	4	Medium	2	Nearly completely reversible	2	10	Medium	3	Low	33	High	0,2	Very low	6,6
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock closure activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Closure	Site	2	Long term	4	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium to high	0,4	Very low	14,4

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock dump closure activities can collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Closure	Local	3	Long term	4	Medium	3	Partly reversible	3	13	Medium	3	Low	39	Medium to high	0,4	Very low	15,6
Noise																			
Closure and rehabilitation of waste rock dumps	Removal of waste rock during the closure phase may result in an increase in the ambient environment noise levels, with the associated potential to displace faunal species.	Closure	Site	2	Long term	4	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium to high	0,4	Very low	14,4
Visual																			
Closure and rehabilitation of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps closure activities.	Closure	Regional	4	Short term	1	Medium	3	Completely reversible	1	9	Medium	3	Very low	12	High	0,2	Very low	2,4
Archaeology and Palaeontology																			
Closure and rehabilitation of waste rock dumps	No impact is expected during this phase	Closure	Not Applicable																

Activity	Potential Impact	Phases	Extent		Duration		Intensity		Reversibility		Irreplaceability	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Socio – Economic																			
Closure and rehabilitation of waste rock dumps	Loss of employment	Closure	Regional	4	Long term	4	High	4	Partly reversible	3	15	Medium	3	Medium	45	Medium to low	0,6	Low	27

The supporting impact assessment conducted by the EAP must be attached as an appendix.
(Considerations used to inform the impact assessment was included in the section above. Please refer to the discussion in Section 12.5).

Table 75: Cumulative Impact Assessment

Potential Impact	Extent		Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability		Significance without mitigation		Mitigation Efficiently		Significance with mitigation		Management and Mitigation Measures
Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Local	3	Long term	4	Medium	3	Nearly irreversible	4	14	Medium	3	Medium	42	Low to medium	0,8	Low	33,6	Storm water management structures to ensure clean water is diverted away from dirty water areas Implement effective clean and dirty water separation systems. No contaminated (“dirty”) water should be allowed to enter the natural environment, clean water systems or water resources.

																	Clean dirty water collection trenches regularly to reduce build-up of sediment and to ensure they are able to accommodate and convey the 1:50 year peak flows. Monitor waste rock dump to prevent erosion of the slopes resulting in silt transported into the trenches. Water quality in the PCDs should be monitored
Surface water quantity - changes in the runoff flow velocity, volume increasing erosion and sedimentation, and reduced Catchment Yield	Local	3	Permanent	5	Medium	3	Nearly irreversible	4	15	Definite	5	Medium	45	Low to medium	0,8	Low	36	Implement and monitor erosion prevention measures and structures for the waste rock dump to prevent silt transported into the trenches.
Surface water quantity - Reinstatement of surface drainage patterns (Positive Impact)	Local	3	Medium term	3	Medium	3	Nearly completely reversible	2	11	Medium	3	Low	33	Medium	0,6	Very low	19,8	Do not remove stormwater management structures during the decommissioning and post closure phase until rehabilitation is completed to ensure that sediment generated during this phase is captured. The Waste Rock Dumps should be shaped to allow for a free-draining topography, topsoiled and vegetated. Rehabilitation processes to restore the topography to a pre-activity state and re-vegetation of disturbed areas will assist in returning natural surface water drainage patterns.

Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Local	3	Medium term	3	Minor	1	Partly reversible	3	10	Improbable	1	Very low	10	Medium to high	0,4	Very low	4	Development should not hamper corridor movement associated with water resources. Sound waste management; no waste disposal in or around the waste rock dump area, to prevent attracting rodents or other types of fauna.
Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Site	2	Long term	4	Minor	1	Partly reversible	3	10	Improbable	1	Very low	10	High	0,2	Very low	2	Adherence to the Storm Water Management Plan as compiled by an accredited engineer.
Nutrient enrichment due to sedimentation, resulting in the decline of Dissolved Oxygen (DO), and impacting aquatic invertebrate communities	Site	2	Long term	4	Minor	1	Partly reversible	3	10	Improbable	1	Very low	10	High	0,2	Very low	2	Protection of soil resource, beds and banks through measures and structure to prevent erosion and sedimentation.
Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Site	2	Long term	4	Minor	1	Partly reversible	2	9	Low	2	Very low	18	Medium to high	0,4	Very low	7,2	No dirty water discharge. Spill management to prevent contamination of soils. Prevent any unnecessary impacts within the riparian and 20m delineated buffer zone of the watercourse. Rehabilitation of the affected areas immediately to prevent sedimentation and protect against erosion.
Surface water quantity reducing the capacity available to sustain aquatic diversity	Local	3	Long term	4	Minor	1	Partly reversible	3	11	Improbable	1	Very low	11	Medium to high	0,4	Very low	4,4	Water conservation and demand management. Implement divergences / impedances, as applicable (crossings specifically) as per designs and formal management plans.

Alteration of the watercourse flow regime with potential compaction of soil, vegetation removal, redirection of water, sedimentation and permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in fire regime and habitat fragmentation.	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2	Restrict construction to the dryer winter months. Installation of a temporary fence or area of demarcation around no-go areas outside the proposed works area prior construction to prevent access to adjacent portions of the watercourse. Implement and monitor effective stormwater management. Monitor for changes to the aquatic baseline of the downstream watercourses. Restrict activities to outside of the zoned 20m buffer area placed around the watercourses. Demarcate and clearly mark watercourse areas and buffer zones as ‘no-go’ areas to limit disturbance. Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. Implement and monitor erosion management and sediment controls. Re-slope and top-soil areas where necessary, and reseed with indigenous grasses to stabilise the loose material.

Soil disturbance which could result in loss of topsoil, sedimentation of the watercourse and increase in the turbidity (increasing/decreasing the amount of the water).	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2	Sediment traps and energy dissipation structure that prevents sedimentation and erosion, respectively. Restrict construction around the watercourses to dry winter months. Removal of vegetation and soil only immediately ahead of construction / earthworks in respective areas. Maintain adjoining natural vegetation intact and buffer zones. Install erosion and sediment measures and controls.
Opportunistic invasion of alien vegetation impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Local	3	Long term	4	High	4	Partly reversible	3	14	High	4	Medium	56	High	0,2	Very low	11,2	Relocate conservation-worthy species under the supervision of a vegetation or horticultural specialist. Develop and implement an alien invasive vegetation management plan. Eradicate alien invasive species and control spread. Prevent vehicle movement in designated sensitive areas. Rehabilitate or revegetate disturbed areas.

13.2. THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

Management Objectives and Mitigation types for each aspect is provided here. Mitigation measures are prescribed within the Environmental Management Programme (EMPR).

Table 76: Summary of the key environmental impacts and Management Objectives and Mitigation Type

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Hydrology					
Construction of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Prevent hydrological impacts and prevent contamination of water resources.	– Application of Section 21 water uses in terms of the National Water Act, 36 of 1998 (Water Use Licence) – Development of the storm water management structures to ensure that sediment generated during the construction phase is conveyed to the silt trap, and clean water is diverted away from dirty water areas. – Ensure that storm water management structures are in good working condition through regular inspection, especially after large storm events. – If excessive erosion is observed, soil management and erosion protection structures and measures should be implemented. – Soils compacted by heavy machinery in areas that are not utilised post construction can be ripped to allow infiltration. – Roads should be maintained regularly to ensure that surface water drains freely off the road preventing erosion. – Limit refuelling and maintenance of machinery and vehicles to specified locations and ensure the appropriate spill prevention and incident management measures are in place. – Avoid encroaching on natural areas directly adjacent to proposed activities. – Proliferation of alien and invasive species is expected within any disturbed areas. AIP species should be eradicated and controlled to prevent their spread within or beyond the footprint. An AIP Control Plan should be compiled and implemented for the proposed project. – Where feasible, rehabilitate disturbed areas as soon as possible after construction.	Low	33,6
Construction of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.		Medium	60
Construction of waste rock dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Prevent hydrological impacts and prevent contamination of water resources.		Low	25,2

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Operation of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality.	Prevent hydrological impacts and prevent contamination of water resources.	– Ensure that effective separation of clean and dirty water systems is implemented, as designed by an engineer. No contaminated ("dirty") water should be allowed to enter the natural environment, clean water systems or water resources. – The dirty water collection trenches should be cleaned regularly to reduce the build-up of sediment and to ensure they are able to accommodate and convey the 1:50 year peak flows. – Stockpiling should be monitored so that the side slopes do not encourage erosion of the slopes resulting in silt transported into the trenches from the stockpiles. – Stockpiling areas need to be licenced and constructed as per the requirements of the Competent Authority. – Water quality in the PCDs should be monitored. This ensures that pollution sources are monitored during the operational phase and in the unlikely event of any spillages the downstream impacts can be estimated. – Seepage or discharge of waste water from the waste water containment facilities should be prevented to reduce pollution of surface water resources as well as to improve water conservation. Dirty water containment facilities and residue stockpiles should be appropriately lined as per the recommendations of the Geohydrological and/or Waste Classification Study. – Corridor movement associated with water resources should not be hampered by the development. No sections of the rivers and streams should be cordoned off, i.e. hydrological connectivity should be maintained. – Ongoing implementation of the recommended monitoring plan to ensure that impacts to the surface water environment are detected timeously. – Implement erosion prevention measures and structures. – Avoid contamination of soils and implement appropriate remedial measures if incidents of spillage occur. – Concurrent rehabilitation to be implemented, specifically revegetation of disturbed areas.	Low	33.6
Operation of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.		Medium	60
Operation of waste rock dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Prevent hydrological impacts and prevent contamination of water resources.		Low	25,2
Closure and rehabilitation of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Prevent hydrological impacts and prevent contamination of water resources.	– Leaving the storm water management structures in place during the decommissioning and post closure phase until the rehabilitation process is completed. This will ensure that sediment generated during this phase is captured. – Storm water management structures should be inspected after large storm events to ensure that there are no blockages or damage. Should blockages or damage occur, immediate action should be undertaken to remove debris or to repair damaged areas. – Soils compacted by heavy machinery can be ripped to allow infiltration. – The Waste Rock Dumps should be shaped to allow for a free-draining topography, topsoiled and vegetated. – Rehabilitation processes such as restoring the topography to a pre-activity state, and re-vegetation of disturbed areas will assist in returning natural surface water drainage patterns. – Establish free-draining final landform.	Low	33,6
Closure and rehabilitation of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.		Medium	60
Closure and rehabilitation of waste rock dumps	Surface water quantity - Reinstatement of surface drainage patterns (Positive Impact)	Prevent hydrological impacts and prevent contamination of water resources.		Very low	19,8
Aquatic Ecology					

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Construction and Operation of waste rock dumps	Construction impacts resulting in impacts to biodiversity and ecological function	Prevent contamination of water resources and associated aquatic ecological impacts	– Corridor movement associated with water resources should not be hampered by the development. No sections of the river should be cordoned off and avoidance of these sensitive areas is recommended. – No waste will be disposed of in or around the project area, which can attract rodents or other types of fauna; waste will be managed correctly.	Very low	6,4
Construction and Operation of waste rock dumps	Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Prevent contamination of water resources and associated aquatic ecological impacts		Very low	3,6
Construction and Operation of waste rock dumps	Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Prevent contamination of water resources and associated aquatic ecological impacts	– Define the runoff/flood characteristics of the study site and floodline analysis accordingly. – Adherence to the Engineered Storm Water Management Plan as compiled by an accredited engineer is crucial.	Very low	1,8
Construction and Operation of waste rock dumps	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities	Prevent contamination of water resources and associated aquatic ecological impacts	– Erosion protection and appropriate energy dissipation structures should be implemented where crossings are proposed, thereby stabilising and protecting areas/banks. – Decreased Dissolved Oxygen will also result if nutrients increase and impacts reach water resources, leading to possible eutrophication and algae and a decline in PES, which will decrease the aquatic ecology integrity and thereby further affecting the streams. – Monitor Water Quality and Aquatic Health (Biomonitoring) regularly - every month and Aquatic Health bi-annually (wet and dry season).	Very low	3,6
Construction and Operation of waste rock dumps	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities	Prevent contamination of water resources and associated aquatic ecological impacts	– Protect soil resource, beds and banks therefore preventing erosion and increased sedimentation in the resource. This will prevent increased sedimentation and smothering of aquatic ecosystems.	Very low	1,8
Construction and Operation of waste rock dumps	Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Prevent contamination of water resources and associated aquatic ecological impacts	– There will be no discharges of dirty water from the construction site and mobile chemical toilets to be provided for workers during construction. – Avoid contamination of soils and implement appropriate remedial measures if incidents of spillage occur. – Protect and prevent unnecessary impacts within the riparian and 32m zone (or otherwise delineated buffer as per surface water assessment) of the watercourse. – Rehabilitate affected areas immediately to prevent sedimentation and protect against erosion.	Very low	7,2
Construction and Operation of waste rock dumps	Surface water quantity reducing the capacity available to sustain aquatic diversity	Prevent contamination of water resources and associated aquatic ecological impacts	– Optimise water use by means of reuse and recycling. – Implement divergences or impedances if these are applicable (crossings specifically) as per designs and formal management plans.	Very low	4

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Wetlands					
Construction of Waste Rock Dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during construction activities.	Protection of wetlands and ensuring their continued ecological function.	– Construction affecting watercourses should be restricted to the dryer winter months. – A temporary fence or demarcation must be erected around no-go areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. – Effective stormwater management should be a priority during all phases of the project. This should be monitored as part of the EMPr. – Monitor for changes to the aquatic baseline of the downstream watercourses. – A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. – All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed. – As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.	Very low	11,2
Construction of Waste Rock Dumps	Construction activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	– It is possible that water will be contaminated within earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion. Effective sediment traps should be installed. – Construction in and around watercourses must be restricted to the dryer winter months where possible. – Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). – Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. – Buffer zones should be maintained, in order to minimise sedimentation of the downstream areas. – Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities.	Very low	11,2

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Construction of Waste Rock Dumps	Soil and vegetation disturbance during construction activities may potentially result in opportunistic invasions of alien vegetation impacting hydrology by reducing the quantity of water entering a watercourse, outcompete natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	– Relocate conservation-worthy species under the supervision of a vegetation or horticultural specialist. – Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread beyond. – An alien invasive vegetation management plan should be developed and implemented. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Footprint areas should be kept as small as possible when removing alien plant species. – No vehicles should be allowed to drive through designated sensitive areas during the eradication of alien and weed species. – Rehabilitate or revegetate disturbed areas.	Very low	11,2
Construction of Waste Rock Dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	– A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.	Very low	11,2
Construction of Waste Rock Dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	– Implementation of appropriate stormwater management around the waste rock dumps to prevent contaminated runoff into the watercourses. – The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. – A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer. – All vehicles must be regularly inspected for leaks. – Re-fueling must take place on a sealed surface area to prevent hydrocarbon pollution. – All spills should be cleaned up immediately and disposed of. – Littering must be prevented by effective site management and the provision of bins.	Very low	10,4

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– Effective stormwater management should be implemented to avoid runoff to the wetland. – Maintenance of buffer zones to trap sediments with associated toxins. – Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. – Treatment of pollution identified should be prioritised accordingly.		
Operation of the waste rock dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during operational activities.	Protection of wetlands and ensuring their continued ecological function.	– Construction affecting watercourses should be restricted to the dryer winter months. – A temporary fence or demarcation must be erected around no-go areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. – Effective stormwater management should be a priority during all phases of the project. This should be monitored as part of the EMPr. – Monitor for changes to the aquatic baseline of the downstream watercourses. – A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. – All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed. – As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.	Very low	11,2
Operation of the waste rock dumps	Operational activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	– It is possible that water will be contaminated within earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion. Effective sediment traps should be installed. – Construction in and around watercourses must be restricted to the dryer winter months where possible. – Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). – Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. – Buffer zones should be maintained, in order to minimise sedimentation of the downstream areas.	Very low	8,4

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities.		
Operation of the waste rock dumps	Operational activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	– Relocate conservation-worthy species under the supervision of a vegetation or horticultural specialist. – Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread beyond. – An alien invasive vegetation management plan should be developed and implemented. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Footprint areas should be kept as small as possible when removing alien plant species. – No vehicles should be allowed to drive through designated sensitive areas during the eradication of alien and weed species. – Rehabilitate or revegetate disturbed areas.	Very low	8,4
Operation of the waste rock dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	– A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.	Very low	8.4
Operation of the waste rock dumps	Operational activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	– Implementation of appropriate stormwater management around the waste rock dumps to prevent contaminated runoff into the watercourses. – The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. – A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer. – All vehicles must be regularly inspected for leaks.	Very low	8,4

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– Re-fueling must take place on a sealed surface area to prevent hydrocarbon pollution. – All spills should be cleaned up immediately and disposed of. – Littering must be prevented by effective site management and the provision of bins. – Effective stormwater management should be implemented to avoid runoff to the wetland. – Maintenance of buffer zones to trap sediments with associated toxins. – Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. – Treatment of pollution identified should be prioritised accordingly.		
Closure and rehabilitation of waste rock dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during rehabilitation activities.	Protection of wetlands and ensuring their continued ecological function.	– Construction affecting watercourses should be restricted to the dryer winter months. – A temporary fence or demarcation must be erected around no-go areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. – Effective stormwater management should be a priority during all phases of the project. This should be monitored as part of the EMPr. – Monitor for changes to the aquatic baseline of the downstream watercourses. – A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. – All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed. – As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.	Very low	8,8
Closure and rehabilitation of waste rock dumps	Rehabilitation activities could result in sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	– It is possible that water will be contaminated within earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the velocity of the water thus reducing the risk of erosion. Effective sediment traps should be installed. – Construction in and around watercourses must be restricted to the dryer winter months where possible. – Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005).	Very low	8.8

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. – Buffer zones should be maintained, in order to minimise sedimentation of the downstream areas. – Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities.		
Closure and rehabilitation of waste rock dumps	Rehabilitation activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	– Relocate conservation-worthy species under the supervision of a vegetation or horticultural specialist. – Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread beyond. – An alien invasive vegetation management plan should be developed and implemented. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Footprint areas should be kept as small as possible when removing alien plant species. – No vehicles should be allowed to drive through designated sensitive areas during the eradication of alien and weed species. – Rehabilitate or revegetate disturbed areas.	Very low	11,2
Closure and rehabilitation of waste rock dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	– A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas. – Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. – Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.	Very low	8,4
Closure and rehabilitation of waste rock dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	– Implementation of appropriate stormwater management around the waste rock dumps to prevent contaminated runoff into the watercourses. – The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc.	Very low	11,2

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– A 20 m buffer area has been placed around the watercourses; all activities should take place outside of the buffer areas. – Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer. – All vehicles must be regularly inspected for leaks. – Re-fueling must take place on a sealed surface area to prevent hydrocarbon pollution. – All spills should be cleaned up immediately and disposed of. – Littering must be prevented by effective site management and the provision of bins. – Effective stormwater management should be implemented to avoid runoff to the wetland. – Maintenance of buffer zones to trap sediments with associated toxins. – Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. – Treatment of pollution identified should be prioritised accordingly.		
Terrestrial Ecology (Flora and Fauna)					
Construction of waste rock dumps	Construction of the additional waste rock dumps might result in impacts to the natural environment due to increased movement, traffic and large machinery use in the area, and specifically on the flora when removal of plant communities will take place on site.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. – Adhere to all management and mitigation measures as prescribed within other specialist reports and Environmental Management Programme (EMPr). – To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. – Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater systems and drains to prevent contaminated water entering the natural environment.	High	65
Construction of waste rock dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. – A survey for SCC species on the project footprint area should be undertaken by a suitably qualified specialist prior to the start of construction. – If any SCC are encountered within the subject property in the future, the following should be ensured: ○ If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. ○ All rescue and relocation plans should be overseen by a suitably qualified specialist.	High	70

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
	the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).		○ Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. – Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary		
Construction of waste rock dumps	Fragmentation of habitat areas due to possible fencing or the placement of boundary structures, leading to increased edge effects.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. – Adhere to all management and mitigation measures as prescribed within other specialist reports and Environmental Management Programme (EMPr). – Keep the footprints as small as possible and clear only the designated approved areas. – During the construction phase control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. It is also important that no additional fragmentation occurs and that all roads are clearly demarcated and kept to. No vehicles or personnel should be permitted outside of these demarcated roads	Medium	45
Construction of waste rock dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– Implement an Alien and Invasive Management Programme, which will aim to remove and manage the plants recorded during the field survey, since most of these species are already listed on the Alien and Invasive Species list as published in 2020. – Ensure awareness amongst all staff, contractors and visitors to site to not needlessly damage flora. – To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees.	Low	39
Construction of waste rock dumps	Anthropogenic influence stemming from employees, visitors and contractors that infiltrate the natural veld areas will damage and impact on species communities within certain areas	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. – Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater management systems.	Low	27

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Operation of waste rock dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. – A survey for SCC species on the project footprint area should be undertaken by a suitably qualified specialist prior to the start of construction. – If any SCC are encountered within the subject property in the future, the following should be ensured: o If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. o All rescue and relocation plans should be overseen by a suitably qualified specialist. o Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. – Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary	High	70
Operation of waste rock dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– Implement an Alien and Invasive Management Programme, which will aim to remove and manage the plants recorded during the field survey, since most of these species are already listed on the Alien and Invasive Species list as published in 2020. – Ensure awareness amongst all staff, contractors and visitors to site to not needlessly damage flora. – To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees.	Low	27
Construction and rehabilitation of waste rock dumps	Without the necessary mitigation measures, rehabilitation will be unsuccessful, and the environment will not be self-sustaining; the alien invasive species will increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	– A management plan for control of invasive/exotic plant species needs to be implemented for all footprint and surrounding areas. This will be ongoing until the end of the mining closure phase. – Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase. – Rehabilitation plan should be implemented. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied. – Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. A report should be written and stored and should be available at all times.	Low	25,2

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Soil, Land and Land Capability					
Construction of waste rock dumps	Potential soil erosion from areas where vegetation is removed from the soil surface in preparation for the construction of the additional waste rock dump risk of erosion.	Prevention of soil erosion	– Minimise vegetation removal to just the areas to be prepared for construction. – Avoid disturbance on natural areas directly adjacent to proposed activities.	Very low	4,2
Construction of waste rock dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil compaction.	Early detection of potential impacts on soil and remediation thereof.	– Visual inspection/confirmation that no surface impacts are occurring. Management and rehabilitation (if required) – Material must be delivered to a laydown area	Very low	46
Construction of waste rock dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil pollution.	To prevent contamination of soils.	– Remedy through visual monitoring, rehabilitation, proper removal and disposal if soils have become contaminated – Material must be delivered to a laydown area	Very low	6
Construction of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles	To prevent contamination of soils.	– Remedy through visual monitoring rehabilitation, proper removal and disposal if soils have become contaminated – Material must be delivered to a laydown area	Very low	6
Operation of waste rock dumps	Dumps trucks travelling to the waste rock dumps to stockpile the waste rock material, will increase the existing compaction.	Early detection of potential impacts on soil and remediation thereof.	– Visual inspection/confirmation that no surface impacts are occurring. Management and rehabilitation (if required)	Very low	6
Operation of waste rock dumps	Dump trucks traveling to the waste rock dumps to stockpile the waste rock material, may increase existing soil pollution.	To prevent contamination of soils.	– Remedy through visual monitoring, rehabilitation, proper removal and disposal if soils have become contaminated	Very low	6
Operation of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles.	To prevent contamination of soils.	– Remedy through visual monitoring rehabilitation, proper removal and disposal if soils have become contaminated – Vehicle maintenance	Very low	6

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Closure and rehabilitation of waste rock dumps	During the decommissioning phase, the movement of vehicles and equipment will again result in soil compaction.	Early detection of potential impacts on soil and remediation thereof.	– Visual inspection/confirmation that no surface impacts are occurring. Management and rehabilitation (if required)	Very low	6,6
Closure and rehabilitation of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	To prevent contamination of soils.	– Remedy through visual monitoring rehabilitation, proper removal and disposal if soils have become contaminated – Vehicle maintenance	Very low	6,6
Air Quality					
Construction of waste rock dumps	Nuisance dust will result from the construction of the additional waste rock dumps increasing risk to health	Prevent of occupational health risk and public exposure resulting from nuisance dust	– Regular dust suppression – Personal protective equipment to be provided and worn correctly at all times, as per the health and safety risk assessment – Fallout dust monitoring – Adhere to Dust regulations already implemented on TRP	Very low	18
Construction of waste rock dumps	Fallout dust from construction activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	– Regular dust suppression – Vegetation monitoring	Very low	21,6
Construction of waste rock dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	– Regular dust suppression – Biomonitoring	Low	23,4
Construction of waste rock dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution.	Prevent of occupational health risk and public exposure resulting from nuisance dust	– Regular dust suppression – Personal protective equipment to be provided and worn correctly at all times, as per the health and safety risk assessment – Fallout dust monitoring – Adhere to Dust regulations already implemented on TRP	Very low	19,8
Operation of waste rock dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution, increasing risk to health.	Prevent of occupational health risk and public exposure resulting from nuisance dust	– Regular dust suppression – Personal protective equipment to be provided and worn correctly at all times, as per the health and safety risk assessment – Fallout dust monitoring – Adhere to Dust regulations already implemented on TRP	Very low	6,6

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Operation of waste rock dumps	Fallout dust from waste rock stockpiling activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	– Regular dust suppression – Vegetation monitoring	Very low	7,2
Operation of waste rock dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	– Regular dust suppression – Biomonitoring	Very low	7,8
Closure and rehabilitation of waste rock dumps	Windborne dust (waste rock) from the waste rock dumps altering air quality through dust pollution, increasing risk to health.	Prevent of occupational health risk and public exposure resulting from nuisance dust	– Regular dust suppression – Personal protective equipment to be provided and worn correctly at all times, as per the health and safety risk assessment – Fallout dust monitoring – Adhere to Dust regulations already implemented on TRP	Very low	6,6
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock closure activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	– Regular dust suppression – Vegetation monitoring	Very low	14,4
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock dump closure activities can collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	– Regular dust suppression – Biomonitoring	Very low	15,6
Noise					
Construction of waste rock dumps	Construction of the additional waste rock dumps may result in an increase of the ambient environment noise levels, with the associated potential to displace faunal species.	Mitigate impact on fauna	– A survey for SCC species on the project footprint area should be undertaken by a suitably qualified specialist prior to the start of construction. – If any SCC are encountered within the subject property in the future, the following should be ensured: ○ If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property.	Very low	15,6

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			○ All rescue and relocation plans should be overseen by a suitably qualified specialist. ○ Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed.		
Operation of waste rock dumps	Stockpiling of waste rock during the operational phase may result in increased ambient environment noise levels, with the associated potential to displace faunal species.	Mitigate impact on fauna	– Visual monitoring – If any SCC are encountered within the subject property in the future, the following should be ensured: ○ If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. ○ All rescue and relocation plans should be overseen by a suitably qualified specialist. ○ Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed.	Very low	7,2
Closure and rehabilitation of waste rock dumps	Removal of waste rock during the closure phase may result in an increase in the ambient environment noise levels, with the associated potential to displace faunal species.	Mitigate impact on fauna	– Visual monitoring – If any SCC are encountered within the subject property in the future, the following should be ensured: ○ If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. ○ All rescue and relocation plans should be overseen by a suitably qualified specialist. ○ Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed.	Very low	14,4
Visual					
Construction of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps construction activities.	Mitigation of visual impacts	– Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone. – Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing. – Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. – Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.. – Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution.	Very low	5,4

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
			– Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light downwards to avoid illumination to the sky. Use motion light sensors to avoid lighting unused places.		
Operation of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps	Mitigation of visual impacts	– Plan the site layout in accordance with the topography to limit visual impact on surrounding communities and land users. – Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way.. – Maintain stockpiles to the recommended minimum height. – Rehabilitation of disturbed areas and re-establishment of vegetation.	Very low	9,6
Closure and rehabilitation of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps closure activities.	Mitigation of visual impacts	– Planting / avoid removal of indigenous trees to create a visual barrier for the surrounding areas. – Backfill and reshape with a surveyor. Reshape to create a gentle slope of free-draining topography. – Dust suppression measures must be implemented on roads and in stockpile areas to prevent excessive dust. – Institute a rehabilitation monitoring program with a rehabilitation specialist.	Very low	2,4
Heritage and Palaeontological					
Construction of waste rock dumps	Impacts on sites of archaeological and cultural interest is not expected during construction of the waste rock dumps	Mitigation of impact on heritage and/or culturally significant materials	– Monitor subsurface material for culturally significant material. – If culturally significant material is exposed during the development phase, suspend all activities pending further archaeological investigations by a qualified archaeologist. – In the event of skeletal remains being exposed during the course of the project, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).	Very low	9,6
Socio- Economic					
Construction and operation of waste rock dumps	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on surface water, dust pollution, noise pollution etc.	Mitigation of impacts on farmers, labourers and surrounding landowners	– Dust suppression – Fallout dust monitoring – Biomonitoring and ecotoxicology assessments – Vegetation monitoring – Surface water monitoring – Noise monitoring	Very low	7,2

Activity	Potential Impact	Management of Objective	Mitigation Type	Significance with mitigation / Residual	
Construction and operation of waste rock dumps	Positive impact: – Continued employment for local communities – Continued contribution to growth of the local and national economy – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues, and – Continued livelihoods of businesses	Continued contribution to employment, and socio-economic development	– Continued operations for scheduled Life of Mine – Implementation of Social and Labour Plan	Medium	42
Operation of waste rock dumps	Continued sourcing of supplies from local businesses, thereby continuing to contribute to the local economy.	Continued contribution to, and growth of, local economy	– Continued operations for scheduled Life of Mine – Implementation of Social and Labour Plan	Medium	45
Closure and rehabilitation of waste rock dumps	Loss of employment	Mitigation of loss of employment	– Continued operations for scheduled Life of Mine – Implementation of Social and Labour Plan	Low	27
No – go option	Operations will cease with concomitant impact on employment, local business, livelihoods and socio-economic development.	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable	Medium	45
No – go option	**Positive:** No additional negative impacts on I&APs or surrounding land users	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable	Medium	45
Natural Environment					
No – Go Option	Positive: No additional negative impacts on the environment	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable	Medium	45

13.3. SUMMARY OF SPECIALIST REPORTS

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

Table 77: Specialist Recommendations Summarised

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
Engineering Design Report	GFK Consulting Engineers were contracted as part of the Environmental Impact Assessment (EIA) to undertake the geotechnical assessment and complete the engineering designs for the Two Rivers Platinum – Waste Rock Dump Project. A site-specific geotechnical investigation was conducted on 24 June 2021. A waste assessment (Appendix 8a – Two River Platinum Waste Classification by IMPC 10 June 2020) was conducted which indicates that waste rock dumps pose a Low Risk. Class D barriers are proposed for the waste rock dump pads (Appendix 6) consisting of the following: • Strip vegetation and topsoil for stockpiling and use where grass needs to be planted/established. • Rip approximate 150 mm deep, water if required to Optimum Moisture Content (OMC), and compact with heavy vibrating roller to minimum 95% of Mod AASHTO. Stormwater emanating from the waste rock dumps will be collected via grass lined channels and berms for containment in Pollution Control Dams (PCDs). A Class C double barrier system is recommended for the Pollution Control Dams (PCDs) consisting of the following (also refer to the relevant drawing attached): • Underdrainage system with a leakage monitoring, consisting of 110mm diameter perforated drain pipes placed in a herringbone pipe system where applicable, discharging to a collector drain. • A 300mm thick clay layer consisting of two 150mm layers compacted to minimum 95% Proctor density at OMC. Results of a geotechnical investigation to determine permeability of in-situ material were not available at report writing. In the event that available material is found to be not impermeable enough, it is proposed the increase the HDPE membrane to minimum 2 mm thick. • HDPE geomembrane liner, minimum 1.5 mm thick or 2 mm as described above, textured one side on 1:3 embankment slopes. • As the LOM is approximately 22 years, a 150mm thick ash-cement protection layer on at least the side walls to serve as an UV protection layer and extend the life of the geomembrane is recommended. • Ballast bags filled with minimum 30kg sand, evenly spaced on a 4m x 4m grid on the PCD basin or the same 150 mm thick ash-cement protection as for the sides. It is the reasoned opinion of the EAP that the Waste Rock Dump Project proceeds, in strict adherence to the design parameters of the waste rock dumps and pollution control dams.	X	Baseline Endvironment (Section 10)
Hydrogeology	The Hydrogeological Model Assessment undertaken for the Two Rivers Platinum in March 2021 is referenced. Groundwater levels were measured during the hydro census survey conducted in July 2020. Six (6) privately used boreholes, thirty-six (36) monitoring boreholes owned and operated by TRP, and fourteen (14) monitoring boreholes from adjacent mines were surveyed during the field hydro census in July 2020. One fountain (H35- F0487) was identified on a private land user's property, 4.5 km west of the mine. Two monitoring boreholes, TRPGWM06s and TRPGWM06d, monitoring the weathered and fractured aquifer, respectively were recorded as artesian.	X	Baseline Endvironment (Section 10.5), Impacts described as per specialist report in Section 14.5.3, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	Static water levels within the fractured aquifer range between 0 and 79.10 meters below surface (mbs) with an average of 17.01 mbs, while water levels within the shallow weathered aquifer range between 0 and 12.01 mbs with an average of 5.61 mbs. The substantial difference in water levels noted between the shallow and deeper aquifers may be an indication of hydraulically disconnected aquifers. However, due to the highly heterogenous and fractured nature of hard rock aquifers, some connectivity may be present at places. All privately owned boreholes are located to the west of the mining area and most of these boreholes recorded relatively deep-water levels of between ~30 to ~50 mbs. – Nitrate as N concentrations are elevated in TRPGWM01D, TRPGWM02D, TRPGWM04S and – TRPGWM10D. This might be due to the presence of explosive residue in the return water dams where theses boreholes are located. – Sulphate exceeded the aesthetic limits but not the chronic health limits in TRPGWM06D, TRPGWM06S, TRPGWM14D, TRPGWM16S, TRPGWM15D, TRPGWM15S – Conductivity exceeded the limits in TRPGWM04S – TDS Exceeded the limits in TRPGWM04D, and TRPGWM04S – The limits for chloride were exceeded in TRPGWM04S – The limits for sodium were exceeded in TRPGWM14S Monitoring data and historic information that was made available indicate an already impacted groundwater system. The activities are surrounded by historical and current mining operations that reflects a heavily altered and complex regional groundwater system influenced by multiple sources. The current regional groundwater conditions are therefore mostly a result of cumulative impacts from historical and current mining activities.		
Waste Rock Material Classification	The Waste Classification and Characterisation (June 2020) specialist report is referenced, supplemented by the existing Hydrogeological Model Assessment conducted (March 2021). According to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), GG36784, GNR635 National Norms & Standards for the Assessment of Waste for Landfill Disposal (2013) (7)(2) waste with any element or chemical substance concentration above the LCT0 but below or equal to the LCT1 limits and all TC concentrations below or equal to the TCT1 limits (LCT0<LC≤LCT1 and TC≤TCT1) are Type 3 Wastes. Type 3 waste may only be disposed of at a Class C landfill, designed in accordance with section 3(1) and (2) of these Norms & Standards. The geological formations were considered in conjunction with the analysis. Waste rock classification to date indicates that the waste rock marginally classifies as a Type 3 waste based on total concentrations as well as the leachable concentrations. However, it is evident that the waste rock will not produce a significant leached contaminant stream, nor pose any risks to the receiving environment. It is our professional opinion that the environmental setting does not suggest that this material presents any significant environmental risks, and therefore does not need an underliner. It must be noted that the presence of a potential elements of concern does not necessarily indicate a potential impact on the receiving environment. However, it does indicate where to focus needs when assessing the potential for metal mobility. Although based on the total concentrations, the waste rock would classify as a Type 3 waste material, the concentrations are not considered to be significantly enriched relative to crustal abundances and a risk-based approach in assessing the potential impacts arising from the waste rock dumps to the groundwater resource should be adopted.		Baseline Endvironment (Section 10.6)

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	According to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), GG36784, GNR634 National Norms & Standards for the Assessment of Waste for Landfill Disposal (2013) (Chapter 4(9)), motivation can be submitted to demonstrate that the waste management activity, including associated storage and handling, can be implemented and conducted consistently and repeatedly in a controlled manner without unacceptable impact on, or risk to, the environment or health. As the waste rock is excavated earth material which were not exposed to the chemical beneficiation process, this material does not contain hazardous chemicals and no synthetic liner is required. It is the reasoned opionion of the EAP that the proposed Waste Rock Dump project proceeds.		
Hydrology (Surface Water)	The Surface Water and Aquatic Ecology Assessment (July 2021) is referenced. During the field survey two (one upstream and one downstream) water samples were taken and analysed by a SANAS accredited laboratory. Only aluminium levels were found to exceed the AEV[2]. Elevated concentrations of bio-available aluminium in water are toxic to a wide variety of organisms. There is, however, uncertainty as to the form(s) of bio-available aluminium as well as to the mechanism(s) of toxicity. The toxic effects are dependent on the species and life stage of the organism, the concentration of calcium in the water, and pH. The pH may not only affect the chemistry of aluminium but may also determine how the organism responds to dissolved aluminium. In acidic waters, aluminium is generally more toxic over the pH range of 4.4 - 5.4, with maximum toxicity occurring about pH 5.0 - 5.2. The mine should follow a zero-discharge policy and water management infrastructure must be designed in accordance with the requirements as contained in GN 704 Regulations. In doing so clean water separation will be ensured, allowing direct runoff towards natural watercourses. Surfaces within the dirty areas will be kept to a minimum to reduce the volume of dirty runoff generated by mining activities. This affected water will be collected in an appropriately lined PCD from where the dirty water will be recycled for further use. The following surface water management objectives will be applicable for the Two Rivers Platinum: Waste Rock Dumps Project activities: – Identify any potential risks from the project on surface water resources; – Protect and conserve the aquatic and surface water environment from any impacts; – Prevent the aquatic and surface water environment from degrading due to the project activities; – Strive for a zero effluent discharge operation; – Preserve the water resources in line with the management objectives of the CMA/DWS for the water management unit; – Water use authorisation to be obtained from the relevant regulatory body; – Ensure compliance with GN 704. Storm water management will be based on the objective of separating clean water from dirty water and therefore encompass the key principle of pollution prevention. The following objectives will apply: – Keep clean water clean; – Collect and contain dirty water;	X	Baseline Endvironment (Section 10.7), Impacts described as per specialist report in Section 14.5.4,and Impact Assessment and Management Tables

[2] The Acute Effect Value (AEV) is defined as that concentration or level of a constituent above which there is expected to be a significant probability of acute toxic effects to up to 5 % of the species in the aquatic community. If such acute effects persist for even a short while, or occur at too high a frequency, they can quickly cause the death and disappearance of sensitive species or communities from aquatic ecosystems. This can have considerable negative consequences for the health of aquatic ecosystems, even over a short period. (DWAF, 1996)

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	– Ensure sustainable storm water management over the project life cycle; and – Compliance with Regulations as contained in GN 704. A formal Storm Water Management Plan will be compiled and implemented upon approval from the Department of Water and Sanitation. General management measures recommended include: – Qualitative assessment of the water resources on the mining property to effectively conduct Integrated Water Resource Management; – Optimise water use by means of waste minimisation, reuse and recycling; – Effective and efficient use of the existing available water resources in all water use sectors within the mine (Water Conservation and Demand Management); – Minimisation and, where possible, prevention of water pollution stemming from project activities by compliance with and adherence to management commitments as specified in the EMPr; and – Appropriate storm water management over the entire footprint of the project area to ensure reduction in silt load and erosion. As this project is part of a current mining operation, surface water and biomonitoring are undertaken as per the requirements of the existing EMP and WUL. It is suggested that monthly surface water monitoring continue in the Klein-Dwars River and the Dwars River, at the monitoring points described in the table below. Biomonitoring should be undertaken biannually, once in the wet season and once in the dry season, at an upstream and downstream point in the Klein-Dwars River and the Dwars River, as described in the Aquatic Ecology Study in Appendix B. Proposed monitoring should be undertaken during the construction and operational phases of the project. Once the mine, and this project moves towards decommissioning and closure, the monitoring programme will have to be updated to cover the monitoring needs related to the specific closure objectives. A 20 m operational buffer is recommended for the proposed surface infrastructure in terms of surface water resources. It is the opinion of the specialist that the development may continue without severe ecological impacts in terms of the watercourses identified in the framework of the study. Management of impacts should be initiated from the onset of the project. All management features as set out in this report, the WUL, the EMPr, and the wetland assessment should also be adhered to.		
Aquatic Ecology	The Aquatic Ecology Impact Assessment (July 2021) is referenced. The current classes as per the findings of the Aquatic Ecology Assessment are as follows: – Both upstream and downstream points sampled compare well to the ASPT and SASS5 Scores applicable for the Ecoregion, the upstream point scoring a Class D, and the downstream scoring a Class C. The downstream point was visibly less impacted and based on observations this could be as a result of the wetland type habitats found between the sampling points, filtering the water and taking up chemical constitutes. – If future monitoring is conducted, it is recommended that all sites be revisited and monitored regularly to obtain seasonal data. – The reference scores for the reach is a Class D, and therefore the classes achieved through the SASS monitoring conducted compare well and should be maintained or ideally be managed in accordance with Class C/D in accordance with the RQOs for the catchment and applicable river.	X	Baseline Endvironment (Section 10.8), Impacts described as per specialist report in Section 14.5.5, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	Cumulative impacts will likely be low based on the scale of the project and direct impacts associated with the activities, which includes minimal surface infrastructure predominantly mining of underground. However, impacts that could reach the catchment and result in cumulative impacts is the possible impacts to the river, which will in turn impact downstream water users, the catchment, ecological reserve and many more. No change should occur in the PES of this watercourse and prevented with proper stormwater management, including decant monitoring and remediation if it is confirmed. It is the reasoned opinion of the specialist that the project may continue without significnat ecological impacts and degradation, specifically based on considerations that the project will also include adequete stormwater management features, which that could be easily managed to prevent any unwanted impacts. The infratructure proposed could create crossings along dry watercourses which needs to be rehabilitated in terms of the WUL, but the direct impacts are of short term and if rehabilitated correctly, not significant.		
Wetlands Assessment	The Watercourse Delineation and Impact Assessment (July 2021) is referenced. Three study sites were identified in a 100 m area surrounding the Waste Rock Dumps. Study site 1 is the area surrounding WRD1, study site 2 surrounds WRD2 and study site 3 surrounds WRD3. The proposed DWS regulated area of 100m for rivers and 500 m for wetlands was consulted to show all relevant watercourses on the study site and beyond, to natural breaks in the system. All watercourses within 100 m of the Waste Rock Dumps were delineated and assessed. **Study Area 1 (WRD1):** An existing Waste Rock Dump is in operation at this site, and it is proposed to be extended towards the south. This proposed area for WRD1 is within 100 m of a drainage area and within 500 m from a wetland. The site is drained by the Klein-Dwars River. The proposed WRD is not expected to have a change on the PES of the wetland within 500m and therefore, the wetland was not assessed in detail and only delineated. **Study Area 2 (WRD2):** No natural habitat remains in this area and has been cleared for previous stockpiling. One drainage area was noted within 100m of the proposed dump. Within 500m another drainage area was noted. The site is drained by the Dwars River, and the proposed WRD is not expected to impact on the PES of the Riparian Area. **Study Area 3 (WRD3):** The area surrounding the proposed site for WRD3 is largely natural, with several drainage areas within 500m. One of which is within 100m of the proposed WRD3 site. Several roads traverse the drainage areas. **Watercourse Classification** The watercourse assessment focused on the three proposed study sites, with an extended footprint of 100m. Several Non-Perennial Episodic Streams (Drainage Areas) were delineated and assessed within the 100m study area of each proposed Waste Rock Dump sites. The watercourses were classified in terms of a functional unit recognised in the classification system proposed in SANBI (2009). The overall PES Category for each watercourse was calculated. The loss of ecological integrity within the watercourses may be attributed to fragmentation occurring as a result of roads and other activities traversing the systems. **Vegetation** The riparian areas of the perennial Klein Dwars and Dwars Rivers were surveyed. The dominant riparian indicator species identified included: *Phragmites mauritianus* (Steekriet), *Schoenoplectus brachyceras*, *Digitaria eriantha* (Common finger grass), *Setaria sphacelata* (Golden bristle grass), and *Phragmites australis* (Common reed).	X	Baseline Endvironment (Section 10.9), Impacts described as per specialist report in Section 14.5.6, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	Apart from slightly denser plant growth in the immediate vicinity of the non-perennial Episodic Streams of the Klein Dwars and Dwars Rivers, no riparian zone could be identified, in relation to the surrounding vegetation. Various potential negative impacts are associated with the activities and it is imperative that an effective management plan is implemented to ensure that all mitigation measures discussed in the report are adhered to. The specialist recommends the proposed Waste Rock Dump Project only if all the conditions, mitigation measures and environmental impact regulations are implemented.		
Terrestrial Ecology (Flora and Fauna)	The Terrestial Biodiversity and Ecological Impact Assessment (July 2021) is referenced. General regional and site characteristics in terms of ecology could be summarized as follows: – The project area lies within the Savanna Biome. – The project area is located within the Sekhukhune Mountain Bushveld (LC), the Sekhukhuneland Centre of Endemism (SCOE) and within a nationally threatened ecosystem, namely, the Sekhukhune Mountainlands (MP 9). – All areas fall within Critical Biodiversity Areas 1 (CBA1) areas within the Limpopo Conservation Plan. Flora findings: – Of the 278 species previously recorded for the area, six (6) are Species of Conservation Concern (SCC) in terms of their Red List status. Two additional flora species were listed for the project area in the Environmental Screening Tool Report. – From the POSA data obtained, *Gladiolus reginae* (Red List Status: CR) and *Polygala sekhukhuniensis* (Red List Status: VU) have a moderate likelihood of occurrence on the project footprint. – A total of 46 plant species were recorded in the studied area during the site survey. Of this number four have medicinal uses and two (2) are exotic. One (1) species, *Sclerocarya birrea* (Marula), is protected in terms of the NFA. None of the floral species recorded during the site survey are listed in the ToPS list, or the LEMA. Fauna findings: – Five (5) mammalian species, four (4) avifaunal, one (1) reptilian species have a red listed status identified on the SANBI database for the region, pentad or QDS relevant to the mining project. – Forty-six (46) species have been sighted during the field assessment and no national SCC species confirmed within the footprints. Mammals protected or regulated under LEMA have been found to occur, and these species should not be interfered with, nor relocated. Generally, the area was found to be visibly impacted (VU2 & VU3), with predominant mining activities prevalent in the surrounding area. Natural footprint areas (VU1) were also mostly fenced off from the current mining activities and these fences will have to be lifted and moved outwards for WRD1 and 3 depending on the size designed and could therefore impact on sensitive habitat. In terms of the faunal investigation, Vegetation Unit 1 (VU) is the only area thought to represent sensitive habitat that could support other regional SCC. VU1 and VU2 are classified as having a high sensitivity due to these Vegetation Units consisting of low to moderately disturbed vegetation which is representative of the Sekhukhune Mountain Bushveld. VU1 and VU2 have habitat present suitable for SCC and is considered to be of conservation importance, as denoted by their designation as CBA1 areas. However, no substantial impacts to SCC are expected beyond the boundary of the preferred sites. The De Hoop Dam Protected Environment is a Protected Area towards the west (6 km). The NPAES focus areas	X	Baseline Endvironment (Section 10.10. Flora, 10.11. Fauna and 10.12. Sensitivity Analysis), Impacts described as per specialist report in Section 14.5.7, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	(Mpumalanga Mesic Grasslands) is located towards the east (8 km) and south (4 km) of the Two River Platinum Mine. No IBA or other features are located within 10 km of the proposed sites. It's the reasoned opinion of the specialist that the development may continue if all mitigation measures are implemented.		
Soil, Land and Land Capability	Specialist studies were undertaken in 2001 – 2002, and again for the first expansion project in 2013 and the EIA/EMP (GCS Water and Environmental Engineering (Pty) Ltd, 2013) and EIA/EMP (Malan Scholes Consulting, 2018) is referenced. In the initial infield studies in 2001-2002 a total of thirteen (13) soil forms were identified in the study area (existing mine infrastructure) including: Hutton (Hu), Avalon (Av), Westleigh (We), Valsrivier (Va), Swartland (Sw), Sterkspruit (Ss), Sepane (Se), Bonheim (Bo), Glenrosa (Gs), Mayo (My), Mispah (Ms), Oakleaf (Oa) and Willowbrook (Wo). In the study carried out in August 2002 on the Northern Decline Area, a total of four (4) soil forms were identified in the study area including: Hutton (Hu), Valsrivier (Va), Glenrosa (Gs) and Mispah (Ms). The soil forms Oakleaf, Valsrivier and Mispah dominate the existing mine infrastructure areas. A specialist study was undertaken by TerraAfrica in 2013. For the investigation, three different main soil groups were identified i.e. soil of the Mispah, Oudtshoorn and Rensburg soil forms. The site is dominated by very shallow rocky soils of the Mispah form (47.5% or 75.5 ha of the total study area) as well as soil with a dorbank horizon of the Oudtshoorn form (76.7 ha or 48.3%). The other soil form identified is that of the Rensburg form that consist of a vertical A-horizon overlying a G-horizon. Soil was chemically analysed at a soil laboratory and was found to range from slightly acidic to mildly alkaline. High levels of calcium and magnesium were tested. Two main land capability classes namely grazing and wilderness capability were identified for the footprint site and pipeline route. Grazing land capability included all the soil forms except soils from the Mispah soil form. The area has very low potential for irrigated and rainfed crop production due to the soil properties. The area has an average grazing capacity of 6-8 ha per large animal unit and the entire study area can carry approximately 20 head of cattle without resulting in veld degradation. It is the reasoned opionion of the EAP that the proposed Waste Rock Dump project proceeds.	X	Baseline Endvironment (Section 10.13), Impacts described as per specialist report in Section 14.5.8, and Impact Assessment and Management Tables
Air Quality	The Air Quality Assessment undertaken by Airshed Planning Professionals (December 2012), for description of the baseline conditions (GCS Water and Environmental Consultants (Pty) Ltd, 2013) and the and the EIA/EMP (Malan Scholes Consulting, 2018) was referenced for this assessment. The sensitive receptors closest to the TRP mine (approximately 3km to the west of the Tailing Storage Facility) are two informal settlements, referred to as Village 1 and Village 2 in the air quality report and the residential areas of Ga-Mampuru, Kokwaneng, Madimola and Didingwe River Lodge. Local source contributors to ambient PM_{10} (airborne particulates) concentrations in the vicinity of the TRP mine include: – Domestic fuel burning and vehicle activity in residential areas/sensitive receptors close to the mine; – Surrounding chrome and platinum mining activities; – Cattle ranching in the Steelpoort Valley; – Agricultural activities and limited cultivation in fertile areas adjacent to the Steelpoort River.	X	Baseline Endvironment (Section 10.14), Impacts described as per specialist report in Section 14.5.9, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	The surrounding chrome and platinum mining activities can be assumed to be significant source contributors in the area. The rock dumps, gravel roads, crushing of ore, possible open pit operations and tailings storage facilities associated with these mines produce dust which contributes to the overall atmospheric dust load in the area. Standard measures to mitigate dust fallout includes implementing a speed limit of 30km/h which will serve a triple purpose: Reduce dust fallout, reduce exhaust emissions and ensure the safety of workers. Another mitigation measure is the implementation of dust suppression by means of spraying water on surrounding roads. The Dust Management Programme including dust monitoring currently in place at TRP must continue. It is the reasoned opionion of the EAP that the proposed Waste Rock Dump project proceeds.		
Noise	*The Specialist Noise Assessment undertaken in 2013, for the EIA/EMPr, as submitted for the existing mine and its expansion of the UG2 and Merensky reefs (EIA/EMP (GCS Water and Environmental Engineering (Pty) Ltd, 2013, approved in 2015) and for the EIA/EMP (Malan Scholes Consulting, 2018) was referenced for this assessment.* The most sensitive receptors identified for the Two Rivers Platinum Mine include the mine workers, mining communities, surrounding communities including land users, permanent farm homesteads and settlements. The region is predominantly occupied by mining, tourism and agricultural land uses. The main noise generation activities associated with the Two Rivers Platinum – Waste Rock Dump Project include the transportation of materials, and the offloading of materials. Noise generation can therefore be expected due to activities and actions as indicated above. Environments which are recognised as being noise sensitive include residential areas, offices, educational facilities and health and church buildings. None of these sensitive environments exist in close proximity to the Two Rivers Platinum – Waste Rock Dump. The existing noise levels in the vicinity of the Two Rivers Platinum – Waste Rock Dump Project site include traffic on the R555 road as well as current mining and associated operational activities. It is important to implement a noise monitoring programme to monitor noise levels and implement mitigation measures should the set limits be exceeded. It is the reasoned opionion of the EAP that the proposed Waste Rock Dump project proceeds.	**X**	Baseline Endvironment (Section 10.15), Impacts described as per specialist report in Section 14.5.10, and Impact Assessment and Management Tables
Visual Impact Assessment	*Reference is made to the Visual Assessment undertaken for this assessment.* The following is recommended for the construction phase to minimise the visual impact: – Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone. – Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing. – Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. – Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. Screen the whole construction site via fence cover.	**X**	Baseline Endvironment (Section 10.16), Impacts described as per specialist report in Section 14.5.11, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	– Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution. – Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places. During the **Operational Phase**, the following should be implemented to minimise the visual impact: – Planning the site layout in accordance with the topography to limit visual impact on surrounding communities and land users. – Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. – Maintain stockpiles to the recommended minimum height. – Rehabilitation of disturbed areas and re-establishment of vegetation. In addition, the following measures are recommended: – Planting / avoid removal of indigenous trees to create a visual barrier for the surrounding areas. – Backfill and reshape with a surveyor. Reshape to create a gentle slope of free-draining topography. – Dust suppression measures must be implemented on roads and in stockpile areas to prevent excessive dust. – Institute a rehabilitation monitoring program with a rehabilitation specialist. The most significant mitigation measures are the rehabilitation of the area after mining has been concluded. With correct rehabilitation, the impact will be minimised and there should be little visual impact after the landform has been restored. Based on the findings made, the impact can be mitigated to an acceptable level and the specialist supports the application on the basis that all mitigation measures provided in this report as well as general good practice, are strictly adhered to.		
Archaeology Impact Assessment	Agri Civils Geotech and Heritage were appointed to undertake a Archaeological Impact Assessment for the Two Rivers Platinum – Waste Rock Dump Project. The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the areas demarcated for development: **Waste Rock Dump 1** – Because past agricultural and contemporary mining activities disrupted the area associated with WRD 1, the area is not considered to be sensitive from a heritage perspective. However, because the area to the south of the gravel road could not be inspected, all activities must be suspended and a qualified archaeologist must be contacted should potential heritage sites/material be encountered. **Waste Rock Dump 2** – The area associated with WRD 2 has been disturbed by past mining activities and no sites of heritage importance were observed. No further action is required. **Waste Rock Dump 3** – The demarcated area falls within the 500 m river buffer and has to a large extent not been not been impact by development. Therefore, the WRD 3 area is considered to be sensitive from a heritage perspective. Because the boundary of the WRD 3 area was not available at the time of surveying and due to dense vegetation hampering free movement and visibility, it is recommended that the grass be slashed/burned in a manner that will not disturb potential surface features. Upon completion, the area should be inspected by a qualified archaeologist to determine the presence of heritage resources. **General Recommendations**	X	Baseline Endvironment (Section 10.17), Impacts described as per specialist report in Section 14.5.12, and Impact Assessment and Management Tables

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	– Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during the course of the project; all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)). – Should the need arise to expand the proposed project beyond the surveyed area outlined in this study, a qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment on the sections beyond the demarcated areas that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites. From a heritage point of view, it is the opinion of the specialist that the development of the three demarcated Waste Rock Dumps may proceed, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.		
Paleontological Assessment	For the purpose of the Two Rivers Platinum – Waste Rock Project, a request for exemption from undertaking a Palaeontology Impact Assessment for the Two Rivers Platinum – Waste Rock Dump Project was submitted by Professor Marion Bamford, Palaeobotanist to the South African Heritage Resources Agency on 22nd April 2021 (Appendix 16). The request notes that the area demarcated for the Two Rivers Platinum – Waste Rock Dump Project is located on intrusive igneous rocks of the Rustenburg Layered Suite (Bushveld Complex) with some overlying Quaternary sands and alluvium. In particular, the mine area is on the Dwarsriver Subsuite (Critical Zone) with anorthosite, norite gabbro and chromitite, as well as the overlying Dsjate Subsuite (Main Zone) with gabbro, norite and subordinate anorthosite (Cawthorn et al., 2006). Such rocks do not contain any fossils so there is no chance of the palaeontological heritage being impacted any way.	X	Baseline Endvironment (Section 10.18), Impacts described as per specialist report in Section 14.5.13, and Impact Assessment and Management Tables
Socio-Economic Assessment	A Social Impact Assessment was not undertaken, as it was not required for this application. The information in the following section was extracted from the Environmental Management Programme Report (EMPR) document (GCS, 2013), the Social Impact Assessment (SIA) report compiled by GCS, 2012, the EIA/EMPR (Malan Scholes, 2018), and the Integrated Development Plan Budget for the Fetakgomo Tubatse Local Municipality 2020. Based on the positive socio-economic impact of the current mining operations at TRP, and the criticality of the additional three waste rock dumps to continue with mining operations, it is the reasoned opinion of the EAP that proposed Waste Rock Dump project proceeds.	X	Baseline Endvironment (Section 10.19), Impacts described as per specialist report in Section 14.5.14, and Impact Assessment and Management Tables
Closure and Financial Provisioning	The Closure liability associated with the proposed development must be included into the existing closure liability of the mine after approval of the activities. The risks associated with the activities are already included in the existing closure liability report as the mine as existing approved WRD's and PCD's. Continue quarterly surface and groundwater quality monitoring during the operational Life of Mine (LoM) to determine trends over time and to monitor changes in water quality over time to determine if the mine is impacting on water quality and/or quantity within the vicinity of the mine Skill development training for employees and engagement with employees to ensure that when closure is reached and downscaling, and retrenchment of staff occurs that all are aware of the process and that people have the required skills in order to find alternative employment	X	Closure Objectives and Financial Provisioning within the EMP is aligned with the findings of this report.

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The EIA Report	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	Stakeholder engagements should be conducted with relevant stakeholders, local municipalities and/or third parties regarding the ownership of the infrastructure after mine closure Interact and communicate with local stakeholders and local farmers, to ensure their concerns are taken into consideration during the closure planning process Vegetation monitoring and maintenance of the rehabilitated areas should take place on an annual basis for at least five years post-closure The monitoring of rehabilitated areas should be undertaken to ensure the successful establishment of seeded plant species		

13.4. SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The findings of the specialist studies undertaken for this EIA/EMP process provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed Waste Rock Dump Project. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that should prevent the proposed project from proceeding.

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from this EIA/EMP will form part of the contract with the contractors appointed to construct and maintain the mine and associated infrastructure. The EIA/EMP would be used to ensure compliance with environmental specifications and management measures. The implementation of this EIA/EMP for key cycle phases (i.e. operation and closure/decommissioning) of the project is considered to be fundamental in achieving the appropriate environmental management standards as detailed for this project.

For a detailed impact assessment layout specifying all the ratings used to obtain Significance of impacts with and without mitigation, refer to Table 68 above.

For a summary giving only the Significance obtained, refer below. Impacts have been discussed in detail within Section 12.5.

Table 78: Summary of Key findings in terms of Impact Significance

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction Phase								
Construction of Waste Rock Dumps	Geology and Topography	Alteration of present topography through addition of three new waste rock dumps.	Low	39	Medium	0,6	Low	23,4
Construction of Waste Rock Dumps	Hydrology (Surface Water)	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Medium	42	Low to Medium	0,8	Low	33,6
Construction of Waste Rock Dumps	Hydrology (Surface Water)	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	High	75	Low to Medium	0,8	Medium	60
Construction of Waste Rock Dumps	Hydrology (Surface Water)	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Medium	42	Medium	0,6	Low	25,2
Construction of Waste Rock Dumps	Aquatic Ecology	Construction impacts resulting in impacts to biodiversity and ecological function	Very low	16	Medium to High	0,4	Very low	6,4
Construction of Waste Rock Dumps	Aquatic Ecology	Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Very low	9	Medium to High	0,4	Very low	3,6
Construction of Waste Rock Dumps	Aquatic Ecology	Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Very low	9	High	0,2	Very low	1,8
Construction of Waste Rock Dumps	Aquatic Ecology	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities	Very low	18	High	0,2	Very low	3,6
Construction of Waste Rock Dumps	Aquatic Ecology	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities	Very low	9	High	0,2	Very low	1,8
Construction of Waste Rock Dumps	Aquatic Ecology	Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Very low	18	Medium to High	0,4	Very low	7,2
Construction of Waste Rock Dumps	Aquatic Ecology	Surface water quantity reducing the capacity available to sustain aquatic diversity	Very low	10	Medium to High	0,4	Very low	4
Construction of Waste Rock Dumps	Wetlands	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during construction activities.	Medium	56	High	0,2	Very low	11,2

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction of Waste Rock Dumps	Wetlands	Construction activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Wetlands	Soil and vegetation disturbance during construction activities may potentially result in opportunistic invasions of alien vegetation impacting hydrology by reducing the quantity of water entering a watercourse, outcompete natural vegetation, and decreasing the natural biodiversity.	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Wetlands	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Medium	56	High	0,2	Very low	11,2
Construction of Waste Rock Dumps	Wetlands	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Medium	52	High	0,2	Very low	10,4
Construction of Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Construction of the additional waste rock dumps might result in impacts to the natural environment due to increased movement, traffic and large machinery use in the area, and specifically on the flora when removal of plant communities will take place on site.	High	75	Low to Medium	0,8	Medium	60
Construction of Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	High	75	Low to medium	0,8	Medium	60
Construction of Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Fragmentation of habitat areas due to possible fencing or the placement of boundary structures, leading to increased edge effects.	High	75	Medium	0,6	Medium	45

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction of Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	High	65	Medium	0,6	Low	39
Construction of Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Anthropogenic influence stemming from employees, visitors and contractors that infiltrate the natural veld areas will damage and impact on species communities within certain areas	Medium	45	Medium	0,6	Low	27
Construction of Waste Rock Dumps	Soil, Land and Land Capability	Potential soil erosion from areas where vegetation is removed from the soil surface in preparation for the construction of the additional waste rock dump risk of erosion.	Low	21	High	0,2	Very low	4,2
Construction of Waste Rock Dumps	Soil, Land and Land Capability	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil compaction.	Low	30	High	0,2	Very low	6
Construction of Waste Rock Dumps	Soil, Land and Land Capability	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil pollution.	Low	30	High	0,2	Very low	6
Construction of Waste Rock Dumps	Soil, Land and Land Capability	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles	Low	30	High	0.2	Very low	6
Construction of Waste Rock Dumps	Air Quality	Nuisance dust will result from the construction of the additional waste rock dumps increasing risk to health	Low	30	Medium	0,6	Very low	18
Construction of Waste Rock Dumps	Air Quality	Fallout dust from construction activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Low	36	Medium	0,6	Very low	21,6
Construction of Waste Rock Dumps	Air Quality	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Low	39	Medium	0,6	Low	23,4
Construction of Waste Rock Dumps	Air Quality	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution.	Low	33	Medium	0,6	Very low	19,8
Construction of Waste Rock Dumps	Noise	Construction of the additional waste rock dumps may result in an increase of the ambient environment noise levels, with the associated potential to displace faunal species.	Low	39	Medium to high	0,4	Very low	15,6

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Construction of Waste Rock Dumps	Visual	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps construction activities.	Low	27	High	0,2	Very low	5,4
Construction of Waste Rock Dumps	Archaeology and Palaeontology	No impacts on sites of archaeological and cultural interest is expected during construction of the waste rock dumps	Low	21	High	0,2	Very low	4,2
Construction of Waste Rock Dumps	Socio - Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on surface water, dust pollution, noise pollution etc.	Low	36	High	0,2	Very low	7,2
Construction of Waste Rock Dumps	Socio - Economic	**Positive impact** – Continued employment for local communities – Continued contribution to growth of the local and national economy – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues, and – Continued livelihoods of businesses	Medium	45	N/A	1	Medium	42
No – go option	Socio - Economic	Operations will cease with concomitant impact on employment, local business, livelihoods and socio-economic development.	Medium	45			Medium	45
No – go option	Socio - Economic	**Positive:** No additional negative impacts on I&APs or surrounding land users	Medium	45			Medium	45
No – go option	Natural Environment	**Positive:** No additional negative impacts on the environment.	Medium	45			Medium	45
Operation of the Waste Rock Dumps	Geology and Topography	Alteration of the current topography through the addition of the additional waste rock dumps.	Low	39	Medium	0,6	Low	23,4
Operation of the Waste Rock Dumps	Hydrogeology	Groundwater quality – based on the waste classification and the possibility of pollution leaching from the waste rock into the groundwater resources resulting in the deterioration of water quality.	Medium	45	Medium	0,6	Low	27
Operation of the Waste Rock Dumps	Hydrology (Surface Water)	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality.	Medium	42	Low to medium	0,8	Low	33,6
Operation of the Waste Rock Dumps	Hydrology (Surface Water)	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	High	75	Low to medium	0,8	Medium	60
Operation of the Waste Rock Dumps	Hydrology (Surface Water)	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Medium	42	Medium	0,6	Low	25,2

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Aquatic Ecology	Operational activities resulting in impacts to biodiversity and ecological function	Very low	18	Medium to high	0,4	Very low	7,2
Operation of the Waste Rock Dumps	Aquatic Ecology	Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Very low	10	Medium to high	0,4	Very low	4
Operation of the Waste Rock Dumps	Aquatic Ecology	Alteration of drainage patterns leading to decrease and changes in water quantity and availability.	Very low	8	High	0,2	Very low	1,6
Operation of the Waste Rock Dumps	Aquatic Ecology	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities.	Very low	20	High	0,2	Very low	4
Operation of the Waste Rock Dumps	Aquatic Ecology	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities.	Very low	10	High	0,2	Very low	2
Operation of the Waste Rock Dumps	Aquatic Ecology	Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Very low	20	Medium to high	0,4	Very low	8
Operation of the Waste Rock Dumps	Aquatic Ecology	Surface water quantity reducing the capacity available to sustain aquatic diversity	Very low	10	Medium to high	0,4	Very low	4
Operation of the Waste Rock Dumps	Wetlands	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during operational activities.	Medium	56	High	0,2	Very low	11,2
Operation of the Waste Rock Dumps	Wetlands	Operational activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Medium	42	High	0,2	Very low	8,
Operation of the Waste Rock Dumps	Wetlands	Operational activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Medium	42	High	0,2	Very low	8,4
Operation of the Waste Rock Dumps	Wetlands	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Medium	42	High	0,2	Very low	8,4

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Wetlands	Operational activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Medium	42	High	0,2	Very low	8,4
Operation of the Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	High	75	High	0,8	Medium	60
Operation of the Waste Rock Dumps	Terrestrial Ecology (Flora and Fauna)	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Medium	45	Medium	0,6	Low	27
Operation of the Waste Rock Dumps	Soil, Land and Land Capability	Similarly, dump trucks that will travel to the waste rock dumps to stockpile the waste rock material, will increase the existing compaction.	Low	30	High	0,2	Very low	6
Operation of the Waste Rock Dumps	Soil, Land and Land Capability	Dump trucks traveling to the waste rock dumps to stockpile the waste rock material, may increase existing soil pollution.	Low	30	High	0,2	Very low	6
Operation of the Waste Rock Dumps	Soil, Land and Land Capability	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles.	Low	30	High	0,2	Very low	6
Operation of the Waste Rock Dumps	Air Quality	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution, increasing risk to health.	Low	33	Medium	0,2	Very low	6,6
Operation of the Waste Rock Dumps	Air Quality	Fallout dust from waste rock stockpiling activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Low	36	Medium	0,2	Very low	7,2
Operation of the Waste Rock Dumps	Air Quality	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Low	39	Medium	0,2	Very low	7,8

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Operation of the Waste Rock Dumps	Noise	Stockpiling of waste rock during the operational phase may result in increased ambient environment noise levels, with the associated potential to displace faunal species.	Low	36	Medium to high	0,2	Very low	7,2
Operation of the Waste Rock Dumps	Visual	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps	Medium	48	High	0,2	Very low	9,6
Operation of the Waste Rock Dumps	Socio – Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	Low	39	High	0,2	Very low	7,8
Operation of the Waste Rock Dumps	Socio – Economic	**Positive impact** – Continued employment for local communities – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues	Medium	45	NA	1	Medium	45
Operation of the Waste Rock Dumps	Socio – Economic	Continued sourcing of supplies from local businesses, thereby continuing to contribute to the local economy.	Medium	45	NA	1	Medium	45
Closure – stockpiling of waste rock ceased	Hydrogeology	This phase is not anticipated to have influence/impact on the hydrogeology.						
Closure and rehabilitation of waste rock dumps	Hydrology (Surface Water)	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Medium	42	Medium	0,6	Low	33,6
Closure and rehabilitation of waste rock dumps	Hydrology (Surface Water)	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	High	75	Low to medium	0,8	Medium	60
Closure and rehabilitation of waste rock dumps	Hydrology (Surface Water)	**Positive Impact** Surface water quantity - Reinstatement of surface drainage patterns	Low	33	Medium	0,6	Very low	19,8
Closure and rehabilitation of waste rock dumps	Wetlands	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during rehabilitation activities.	Medium	44	High	0,2	Very low	8,8
Closure and rehabilitation of waste rock dumps	Wetlands	Rehabilitation activities could result in sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Medium	44	High	0,2	Very low	8,8
Closure and rehabilitation of waste rock dumps	Wetlands	Rehabilitation activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Medium	56	High	0,2	Very low	11,2

Activity	Aspect Affected	Potential Impact	Significance without mitigation		Mitigation Efficiently		Significance with mitigation	
Closure and rehabilitation of waste rock dumps	Wetlands	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Medium	42	High	0,2	Very low	8,4
Closure and rehabilitation of waste rock dumps	Wetlands	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Medium	56	High	0,2	Very low	11,2
Closure and rehabilitation of waste rock dumps	Terrestrial Ecology (Flora and Fauna)	Without the necessary mitigation measures, rehabilitation will be unsuccessful, and the environment will not be self-sustaining; the alien invasive species will increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Medium	42	Medium	0,6	Low	25,2
Closure and rehabilitation of waste rock dumps	Soil, Land and Land Capability	During the decommissioning phase, the movement of vehicles and equipment will again result in soil compaction.	Low	33	High	0,2	Very low	6,6
Closure and rehabilitation of waste rock dumps	Soil, Land and Land Capability	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Low	33	High	0,2	Very low	6,6
Closure and rehabilitation of waste rock dumps	Air Quality	Windborne dust (waste rock) from the waste rock dumps altering air quality through dust pollution, increasing risk to health.	Low	33	High	0,2	Very low	6,6
Closure and rehabilitation of waste rock dumps	Air Quality	Fallout dust from waste rock closure activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Low	36	Medium to high	0,4	Very low	14,4
Closure and rehabilitation of waste rock dumps	Air Quality	Fallout dust from waste rock dump closure activities can collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Low	39	Medium to high	0,4	Very low	15,6
Closure and rehabilitation of waste rock dumps	Noise	Removal of waste rock during the closure phase may result in an increase in the ambient environment noise levels, with the associated potential to displace faunal species.	Low	36	Medium to high	0,4	Very low	14,4
Closure and rehabilitation of waste rock dumps	Visual	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps closure activities.	Very low	12	High	0,2	Very low	2,4

13.5. FINAL SITE MAP

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attached as Appendix.

Please refer to Appendix 3

13.6. IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorization.

Specialist management measures are provided in Table 76 and contained in the respective studies. Specialist recommendations which could be included as conditions have been discussed in Table 77.

Table 79: Impact management objectives and the impact management outcomes for inclusion in the EMPr

Activity	Potential Impact	Management of Objective	Management Outcome
Hydrology			
Construction of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Prevent hydrological impacts and prevent contamination of water resources.	Prevent hydrological impacts through implementation of preventive mitigation measures (e.g. stormwater management structures, erosion structures and measures, soil management, road maintenance, and alien invasive management plan).
Construction of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.	
Construction of waste rock dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Prevent hydrological impacts and prevent contamination of water resources.	
Operation of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality.	Prevent hydrological impacts and prevent contamination of water resources.	Prevent hydrological impacts through implementation of preventive mitigation measures (e.g. effective, monitoring of waste rock dumps for erosion potential, monitoring or water quality in the pollution control dams, effective clean and dirty water systems, and erosion structures and measures).
Operation of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.	
Operation of waste rock dumps	Surface water quantity - Reduction of Catchment Yield as dirty water runoff within the mine will be contained in the PCD.	Prevent hydrological impacts and prevent contamination of water resources.	
Closure and rehabilitation of waste rock dumps	Surface water quality - Sedimentation and pollution of surface water resources resulting in the deterioration of water quality	Prevent hydrological impacts and prevent contamination of water resources.	Prevent hydrological impacts through implementation of preventive mitigation measures (e.g. monitoring of stormwater management structures effective, rehabilitation processes to restore topography to pre-activity state, and establishing a free-draining final landform).
Closure and rehabilitation of waste rock dumps	Surface water quantity - changes in the runoff flow velocity and volume increasing erosion and sedimentation	Prevent hydrological impacts and prevent contamination of water resources.	
Closure and rehabilitation of waste rock dumps	Surface water quantity - Reinstatement of surface drainage patterns (Positive Impact)	Prevent hydrological impacts and prevent contamination of water resources.	
Aquatic Ecology			
Construction and Operation of waste rock dumps	Construction impacts resulting in impacts to biodiversity and ecological function	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. maintenance of corridor movement associated with water resources, and waste management).
Construction and Operation of waste rock dumps	Loss of biodiversity and ecological function. Impacts to ecological corridor functioning due to prolonged activity in proximity to watercourses	Prevent contamination of water resources and associated aquatic ecological impacts	

Activity	Potential Impact	Management of Objective	Management Outcome
Construction and Operation of waste rock dumps	Alteration of drainage patterns leading to decrease and changes in water quantity and availability	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. defining rrunoff/flood characteristics of the site and floodline analysis accordingly, and Storm Water Management Plan).
Construction and Operation of waste rock dumps	Deterioration of water quality in the surrounding and downstream water resources due to polluted water runoff, affecting aquatic communities	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. erosion protection and appropriate energy dissipation structures, Water Quality and Aquatic Health (Biomonitoring) and Aquatic Health monitoring.
Construction and Operation of waste rock dumps	Nutrient enrichment due to sedimentation, leading to decline of Dissolved Oxygen (DO), thereby impacting aquatic invertebrate communities	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. erosion structures and monitoring).
Construction and Operation of waste rock dumps	Deterioration of surface water quality may lead to a deterioration of the Present Ecological Status (PES).	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. effective clean and dirty water separation systems, spillage management, 32m buffer, and rehabilitation).
Construction and Operation of waste rock dumps	Surface water quantity reducing the capacity available to sustain aquatic diversity	Prevent contamination of water resources and associated aquatic ecological impacts	Prevent impacts on aquatic ecology through implementation of preventive mitigation measures (e.g. water conservation and water demand management, divergences and impedances).
Wetlands			
Construction of Waste Rock Dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during construction activities.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management plan, 32m buffer area around watercourses, and erosion management).
Construction of Waste Rock Dumps	Construction activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. sediment traps, maintenance of buffer zones, restriction of vegetation removal as required, and erosion management).
Construction of Waste Rock Dumps	Soil and vegetation disturbance during construction activities may potentially result in opportunistic invasions of alien vegetation impacting hydrology by reducing the quantity of water entering a watercourse, outcompete natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. relocation of conservation-worthy species, and alien invasive vegetation management plan).

Activity	Potential Impact	Management of Objective	Management Outcome
Construction of Waste Rock Dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. maintenance of 32m buffer area, alien invasive vegetation management, and erosion monitoring and management).
Construction of Waste Rock Dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management, maintenance of 32m buffer area, vehicle/equipment maintenance, spill management, and waste management).
Operation of the waste rock dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during operational activities.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management plan, 32m buffer area around watercourses, and erosion management).
Operation of the waste rock dumps	Operational activities will result in earthworks and soil disturbance which could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. sediment traps, maintenance of buffer zones, restriction of vegetation removal as required, and erosion management).
Operation of the waste rock dumps	Operational activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. relocation of conservation-worthy species, and alien invasive vegetation management plan).
Operation of the waste rock dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. maintenance of 32m buffer area, alien invasive vegetation management, and erosion monitoring and management).
Operation of the waste rock dumps	Operational activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management, maintenance of 32m buffer area, vehicle/equipment maintenance, spill management, and waste management).
Closure and rehabilitation of waste rock dumps	Alteration of the water flow regime of the watercourses with potential compaction of soil, the removal of vegetation, and surface water redirection during rehabilitation activities.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management plan, 32m buffer area around watercourses, and erosion management).
Closure and rehabilitation of waste rock dumps	Rehabilitation activities could result in sedimentation of the watercourse and increase the turbidity (increasing or decreasing the amount) of the water.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. sediment traps, maintenance of buffer zones, restriction of vegetation removal as required, and erosion management).

Activity	Potential Impact	Management of Objective	Management Outcome
Closure and rehabilitation of waste rock dumps	Rehabilitation activities may potentially result in opportunistic invasions of alien vegetation, thereby impacting hydrology by reducing the quantity of water entering a watercourse, outcompeting natural vegetation, and decreasing the natural biodiversity.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. relocation of conservation-worthy species, and alien invasive vegetation management plan).
Closure and rehabilitation of waste rock dumps	Permanent loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. maintenance of 32m buffer area, alien invasive vegetation management, and erosion monitoring and management).
Closure and rehabilitation of waste rock dumps	Construction activities may result in the discharge of runoff from the waste rock dumps and leakage of fuel/oil from vehicles resulting in the loss of sensitive biota in the rivers and a reduction in watercourse function.	Protection of wetlands and ensuring their continued ecological function.	Prevent impacts on wetlands through implementation of preventive mitigation measures (e.g. stormwater management, maintenance of 32m buffer area, vehicle/equipment maintenance, spill management, and waste management).
Terrestrial Ecology (Flora and Fauna)			
Construction of waste rock dumps	Construction of the additional waste rock dumps might result in impacts to the natural environment due to increased movement, traffic and large machinery use in the area, and specifically on the flora when removal of plant communities will take place on site.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. limiting footprint of project, and stormwater management).
Construction of waste rock dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. survey for SCC species prior to construction, and Rescue and Relocation Procedure).
Construction of waste rock dumps	Fragmentation of habitat areas due to possible fencing or the placement of boundary structures, leading to increased edge effects.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. limiting footprint of project and restriction of vehicle/equipment movement).
Construction of waste rock dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. Alien and Invasive Management Programme, continued training and awareness and monitoring).

Activity	Potential Impact	Management of Objective	Management Outcome
Construction of waste rock dumps	Anthropogenic influence stemming from employees, visitors and contractors that infiltrate the natural veld areas will damage and impact on species communities within certain areas	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. limiting footprint of project and stormwater management systems).
Operation of waste rock dumps	Endemic, protected and/or SCC species within the area of activity could potentially be destroyed. Two SCC are considered to have a moderate likelihood occurrence within the project footprint. One tree species protected in terms of the NFA was confirmed to occur on the project footprint. Development and related activities will impact on sensitive habitats, such as the CA1 areas of VU1 and VU2. Sensitive (VU1 & VU2) habitats situated adjacent or in close proximity to the development footprint could be impacted on, specifically sections of WRD1 and WRD 3 which will require sensitive natural habitat and vegetation to be removed (VU1).	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. survey for SCC species prior to construction, and Rescue and Relocation Procedure).
Operation of waste rock dumps	Increase of invasive species from the surrounding areas, leading to further change to the vegetation structure and composition. Potential for the spread of existing invaders already on-site, to other surrounding areas.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. Alien and Invasive Management Programme, continued training and awareness and monitoring).
Construction and rehabilitation of waste rock dumps	Without the necessary mitigation measures, rehabilitation will be unsuccessful, and the environment will not be self-sustaining; the alien invasive species will increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Protection of flora and fauna and mitigation of impacts on terrestrial ecology	Prevent impacts on flora and fauna through implementation of preventive mitigation measures (e.g. Alien and Invasive Management Programme, monitoring of floral communities and rehabilitation plan).
Soil, Land and Land Capability			
Construction of waste rock dumps	Potential soil erosion from areas where vegetation is removed from the soil surface in preparation for the construction of the additional waste rock dump risk of erosion.	Prevention of soil erosion	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. restriction of project footprint and limiting vegetation removal).
Construction of waste rock dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil compaction.	Early detection of potential impacts on soil and remediation thereof.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual inspection and rehabilitation, if required).
Construction of waste rock dumps	All areas where vehicles and equipment will traverse during the construction phase to deliver materials, prepare the terrain and construct the waste rock dump facilities, will be at risk of soil pollution.	To prevent contamination of soils.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual monitoring, rehabilitation, and waste management)

Activity	Potential Impact	Management of Objective	Management Outcome
Construction of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles	To prevent contamination of soils.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual monitoring, rehabilitation, and waste management)
Operation of waste rock dumps	Dumps trucks travelling to the waste rock dumps to stockpile the waste rock material, will increase the existing compaction.	Early detection of potential impacts on soil and remediation thereof.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual inspection and rehabilitation, if required).
Operation of waste rock dumps	Dump trucks traveling to the waste rock dumps to stockpile the waste rock material, may increase existing soil pollution.	To prevent contamination of soils.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual monitoring, rehabilitation, and waste management)
Operation of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles.	To prevent contamination of soils.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual monitoring, rehabilitation, and waste management)
Closure and rehabilitation of waste rock dumps	During the decommissioning phase, the movement of vehicles and equipment will again result in soil compaction.	Early detection of potential impacts on soil and remediation thereof.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual inspection and rehabilitation, if required).
Closure and rehabilitation of waste rock dumps	Contamination of soils through accidental release / spillage of hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	To prevent contamination of soils.	Prevent impacts soil and land capability through implementation of preventive mitigation measures (e.g. visual monitoring, rehabilitation, and waste management)
Air Quality			
Construction of waste rock dumps	Nuisance dust will result from the construction of the additional waste rock dumps increasing risk to health	Prevent of occupational health risk and public exposure resulting from nuisance dust	Prevent impacts air quality and concomitant health risk through implementation of preventive mitigation measures (e.g. dust suppression, PPE, and fallout dust monitoring)
Construction of waste rock dumps	Fallout dust from construction activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	Prevent impacts air quality and concomitant impact on vegetation through implementation of preventive mitigation measures (e.g. dust suppression and vegetation monitoring)
Construction of waste rock dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	Prevent impacts air quality and concomitant impact on aquatic ecology through implementation of preventive mitigation measures (e.g. regular dust suppression and biomonitoring)
Construction of waste rock dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution.	Prevent of occupational health risk and public exposure resulting from nuisance dust	Prevent impacts air quality and concomitant health risk through implementation of preventive mitigation measures (e.g. dust suppression, PPE, and fallout dust monitoring)
Operation of waste rock dumps	Increased windborne dust (waste rock) and vehicle fumes, altering air quality through dust pollution, increasing risk to health.	Prevent of occupational health risk and public exposure resulting from nuisance dust	Prevent impacts air quality and concomitant health risk through implementation of preventive mitigation measures (e.g. dust suppression, PPE, and fallout dust monitoring)

Activity	Potential Impact	Management of Objective	Management Outcome
Operation of waste rock dumps	Fallout dust from waste rock stockpiling activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	Prevent impacts air quality and concomitant impact on vegetation through implementation of preventive mitigation measures (e.g. dust suppression and vegetation monitoring)
Operation of waste rock dumps	Fallout dust can also collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	Prevent impacts air quality and concomitant impact on aquatic ecology through implementation of preventive mitigation measures (e.g. regular dust suppression and biomonitoring)
Closure and rehabilitation of waste rock dumps	Windborne dust (waste rock) from the waste rock dumps altering air quality through dust pollution, increasing risk to health.	Prevent of occupational health risk and public exposure resulting from nuisance dust	Prevent impacts air quality and concomitant health risk through implementation of preventive mitigation measures (e.g. dust suppression, PPE, and fallout dust monitoring)
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock closure activities may impact light transmission, with the potential to decrease plant growth by impacting on the process of photosynthesis.	Prevent impact on flora from fallout dust	Prevent impacts air quality and concomitant impact on vegetation through implementation of preventive mitigation measures (e.g. dust suppression and vegetation monitoring)
Closure and rehabilitation of waste rock dumps	Fallout dust from waste rock dump closure activities can collect in watercourses, resulting in sedimentation and reduced water quality, potentially affecting aquatic life by the smothering of riverine habitat and fish gill clogging.	Prevent impact on aquatic ecology from fallout dust.	Prevent impacts air quality and concomitant impact on aquatic ecology through implementation of preventive mitigation measures (e.g. regular dust suppression and biomonitoring)
Noise			
Construction of waste rock dumps	Construction of the additional waste rock dumps may result in an increase of the ambient environment noise levels, with the associated potential to displace faunal species.	Mitigate impact on fauna	Prevent noise impacts on fauna through implementation of preventive mitigation measures (e.g. SCC species survey, and Rescue and Relocation Plan).
Operation of waste rock dumps	Stockpiling of waste rock during the operational phase may result in increased ambient environment noise levels, with the associated potential to displace faunal species.		
Closure and rehabilitation of waste rock dumps	Removal of waste rock during the closure phase may result in an increase in the ambient environment noise levels, with the associated potential to displace faunal species.		
Visual			
Construction of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps construction activities.	Mitigation of visual impacts	Prevent visual impact through implementation of preventive mitigation measures (e.g. restricting vegetation removal to project footprint, dust suppression, and restriction of construction activities to daylight hours).
Operation of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps	Mitigation of visual impacts	Prevent visual impact through implementation of preventive mitigation measures (e.g. waste rock dump height compliance, and rehabilitation).

Activity	Potential Impact	Management of Objective	Management Outcome
Closure and rehabilitation of waste rock dumps	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the waste rock dumps closure activities.	Mitigation of visual impacts	Prevent visual impact through implementation of preventive mitigation measures (e.g. restricting vegetation removal to project footprint, dust suppression, rehabilitation and free-draining end landform).
Heritage and Palaeontological			
Construction of waste rock dumps	Impacts on sites of archaeological and cultural interest is not expected during construction of the waste rock dumps	Mitigation of impact on heritage and/or culturally significant materials	Prevent impact on heritage and culturally significant material through implementation of preventive actions and mitigation measures (e.g. subsurface monitoring material for culturally significant material).
Socio- Economic			
Construction and operation of waste rock dumps	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on surface water, dust pollution, noise pollution etc.	Mitigation of impacts on farmers, labourers and surrounding landowners	Prevent negative impact on neighbouring farms and surrounding landowners through implementation of preventive mitigation measures (e.g. dust suppression, and environmental monitoring e.g. fallout dust monitoring, biomonitoring and ecotoxicology assessments, vegetation monitoring, surface water monitoring and noise monitoring).
Construction and operation of waste rock dumps	**Positive impact** – Continued employment for local communities – Continued contribution to growth of the local and national economy – Continued maintenance and growth of the current community social structures – Continued and improved quality of life and health related issues, and – Continued livelihoods of businesses	Continued contribution to employment, and socio-economic development	Prevent negative socio-economic impact through mitigation measures (e.g. continuing operations for scheduled Life of Mine, and implementation of Social and Labour Plan).
Operation of waste rock dumps	Continued sourcing of supplies from local businesses, thereby continuing to contribute to the local economy.	Continued contribution to, and growth of, local economy	Prevent negative socio-economic impact through mitigation measures (e.g. continuing operations for scheduled Life of Mine, and implementation of Social and Labour Plan).
Closure and rehabilitation of waste rock dumps	Loss of employment	Mitigation of loss of employment	Prevent negative socio-economic impact through mitigation measures (e.g. continuing operations for scheduled Life of Mine, and implementation of Social and Labour Plan).
No – go option	Operations will cease with concomitant impact on employment, local business, livelihoods and socio-economic development.	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable
No – go Option	**Positive Impact** No additional negative impacts on I&APs or surrounding land users	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable
Natural Environment			
No – Go Option	Positive: No additional negative impacts on the environment	No additional management objective if the Waste Rock Dump Project does not proceed	– Not Applicable

13.7. FINAL ALTERNATIVES

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

Alternatives have been described within Section 7. The positioning of the waste rock dumps was informed by reviewing operational requirements, potential options available, and associated sensitivities. Alternatives were assessed and changes were made. The current layout proposed is assessed as the most preferred option.

14 ASPECTS FOR INLCUSION AS CONDITIONS OF AUTHORISATION

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The following aspects are highlighted and should be included as conditions of the authorisation

- A water use licence in terms of Section 21 of the National Water Act (Act 36 of 1998) must be applied for prior to commencement of construction commences
- If any heritage and culturally significant material is identified during the pre-construction and construction phase, all work on the project site must stop and the SAHRA must be notified. All construction activities must be stopped, a 30m no-go barrier constructed and an Archaeologist consulted in to determine proper mitigation measures.
- All monitoring programmes as recommended by the specialists (surface water monitoring, biomonitoring, noise monitoring, fallout dust monitoring, vegetation assessments, etc) must be undertaken as discussed in Section 30 of the EIAR and EMPR.

15 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

(Which relate to the assessment and mitigation measures proposed?)

Please refer to Section 11.2 giving a description of all the “Limitations and Assumptions” of the study. No other uncertainties are known at this stage relating to the assessment or the mitigation measures.

16 REASONED OPINION AS TO WHETHER THE ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

16.1. REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

Please refer to Section 13.4 for the impact statements. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that post the provided mitigation, should prevent the proposed project from proceeding.

16.2. CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

Please refer to Section 14 above, which states the conditions which could possibly be included, as discussed in Table 77– Specialist Recommendation Summary.

16.3. REHABILITATION REQUIREMENTS: CLOSURE OBJECTIVES

Adhere to the Closure and Rehabilitation Plan (Appendix 17). Specific rehabilitation and closure actions forming the basis of the rehabilitation and closure operations have been considered. The actions are aligned with the mitigations defined in the comparative risk assessment (as per Closure Report – refer to Appendix 17). These actions are planned to comply with the requirements of the vision and objectives. The closure actions form the basis for the closure liability assessment.

17 FINANCIAL PROVISION

This section provides details on the closure cost. The outlined assumptions and limitations also underpin the basis of this closure cost determination. It is important to note that the estimation is based on existing information. The closure cost calculation has been performed in accordance with NEMA GNR 1147 financial provision.

Two Rivers Platinum is an existing mine with existing financial provision. The annual review and update of the financial provisioning for the June 2020 – July 2021 period was undertaken by Knight Piésold (Pty) Ltd. This update is required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, and associated Financial Provisioning Regulations, 2015 (GN R1147 published in GG 39425 on 20 November 2015) (See Appendix 17).

An addendum report (See Appendix 17) was completed for the proposed development of the waste rock dumps. The risk associated with the development and closure of the WRD's and PCD's are included in the Knight Piésold report as the mine has existing WRD's and PCD's. All the mitigation, management and rehabilitation measures as provided in the Knight Piésold report should be implemented. The Closure Liability associated with the proposed development should be included into the mine financial provisioning report when the activities are approved.

EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED

For the development, the final rehabilitation cost was calculated, and no concurrent rehabilitation cost is included based on the mine schedule and how the waste rock dumps will be developed. Any concurrent annual environmental costs will be included into the operating budget of the mine. The closure costs of the aspects linked with the project have been determined using current contractor rates as provided in the Knight Piésold report.

Costing calculations refer to the specific rehabilitation actions, areas and type of disturbance that requires rehabilitation. The bill of quantities (BoQ) for each of the closure items have been developed based on information contained in the Design Report. The method employed is deemed acceptable for the level of accuracy required in terms of the regulations.

ASSUMPTIONS

The following qualifications and assumption were made for the closure assessment:

- The rates contained in the Knight Piésold report is correct and relevant
- The rehabilitation measures, mitigation and management measures as included in the Knight Piésold report are sufficient to ensure that the rehabilitation objectives are met.
- All the limitations and assumptions identified in the Knight Piésold report are relevant to the mining area.

CLOSURE COST

The quantum for closure-related financial provision for the proposed Waste Rock Dump project was undertaken by Elemental Sustainability (Pty) Ltd. The summary of the closure cost calculated for the mine is presented in Table 80 below.

The estimated financial provision required for the rehabilitation and closure of the Waste Rock Dump Project is **R 1 311 855.12** (Final Closure) excl. VAT. A summary of the financial provision estimates associated with the Waste Rock Dump Project is included in Table 80 below.

Table 80: Financial Liability

Closure Component		Applicable	Unscheduled Closure			
			Quantity	Unit	Unit Rate	Total Cost
1.	Stockpiles Waste Rock Dumps					
1.1	Waste Rock Dump 1	Yes	1,1	ha	R141 573,04	R155 730,34
1.2	Waste Rock Dump 2	Yes	1,95	ha	R141 573,04	R276 067,43
1.3	Waste Rock Dump 3	Yes	1,4	ha	R141 573,04	R198 202,26
Sub-total for Infrastructure Areas						R630 000,03
2.	Water Management Areas					
2.1	PCD - WRD 2 - remove liner	Yes	2 000,0	m2	R17,71	R35 420,00
2.1.1	PCD - WRD 2 - rehabilitation	Yes	0,2	ha	R141 573,04	R28 314,61
2.2	PCD - WRD 3 - remove liner	Yes	2 000,0	m2	R17,71	R35 420,00
2.2.1	PCD - WRD 2 - rehabilitation	Yes	0,2	ha	R141 573,04	R28 314,61
Sub-total for Water Management Areas						R99 154,61
3.	General Surface rehabilitation and placement of Topsoil					
3.1	Grassing	Yes	5	ha	R34 299,43	R166 352,24
Sub-total for General Surface rehabilitation and placement of Topsoil						R166 352,24
					Subtotal 1:	R895 506,87
4.	P&G's, Contingencies and Additional Allowances					
4.1	Preliminaries and general	Yes	7,5	/sum	R67 163,02	R67 163,02
4.2	Contingencies	Yes	10	/sum	R89 550,69	R89 550,69
					Subtotal 2:	R156 713,70
5.	Residual and Latent Liability Cost					
5.1	2 to 3 year maintenance and aftercare	Yes	5	ha	R17 308,97	R259 634,55
					Subtotal 3:	R259 634,55
Grand Total Excl. Vat. (or Subtotal 1+2+3)						R1 311 855,12

18 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

No deviations from the approved Scoping Report have been made.

18.1. DEVIATIONS FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

No deviations have been made.

18.2. MOTIVATION FOR THE DEVIATION

Not Applicable.

19 COMPLIANCE WITH THE PROVISION

Compliance with the provisions of SECTIONS 24(4)(a) AND (b) READ WITH SECTION 24 (3) (a) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND THE EIA REPORT MUST INCLUDE THE

19.1. Impact on the Socio-Economic Conditions of Any Directly Affected Person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial *diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix*.

No updated Socio-Economic Impact Assessment report was done, or required, for the compilation of this report. Socio-Economic aspects have been adequetly assessed and addressed within this document and the Environmental Management Programme as mitigation measures. Census 2011, Community Survey (“CS”) of 2016, and the updated Fetakgomo Tubatse Local Municipality Integrated Development Plan (IDP) 2019/2020, was used to inform the Baseline socio-economic data and impact assessment prediction for this EIA/EMP. Integrated Development Plan was used to inform the Baseline assessment as well as the impact prediction. TRP is currently implementing the approved 2018 Social and Labour Plan (Appendix 19).

It is important to keep in mind that the TRP is an existing mine and no sudden large-scale influx of workers or activities are associated or predicted for the activity applied for.

19.2. Crime, Health and HIV

Influx of foreigners and job seekers and increase in disposable income for local people may create negative social impacts such as crime, alcoholism and prostitution in and around the project area. This will usually result in moderate to high negative impacts to the surrounding communities.

The TRP mine is an existing mine which requires approval for the addition of three new waste rock dumps to ensure continuity of current mining operations for the scheduled Life of Mine, as discussed in this EIAR / EMPR report. Therefore, a large influx of new workers and foreigners is not expected as the mine is already established. Job-seekers in the area may start to show new interest in the mine as it becomes apparent that operations are extending and new work opportunities may become available. A low negative impact is expected, with several positive impacts as well.

19.3. Land Use and Land Capability

In terms of land use, the additional waste rock dump activities will not significantly add to the existing negative impacts of air pollution due to dust, visual and noise impacts, restricted access, loss of grazing and cultivation land, and loss of land for cultural or traditional practices due to mining.

The impact will be low given that the project will be located within the current mining right area of an established and operational mine.

The positive impact of additional waste rock dumps is that it will ensuring continuation of current mining operations, with the concomitant impact of continued local business support, and continued capacity for employment, etc. The economic and the Social and Labour Plan (SLP) benefits will therefore be of high positive significance. Authorisation of the additional waste rock dumps will ensure continuity of mining operations over the Life of Mine.

The visual impact assessment conducted concluded a low impact, with the implementation of mitigation measures, cognisant that the sense-of-place is currently disturbed given that TRP is an existing operational mine, and the additional waste rock dumps will be located within an approved mining right area.

19.4. Noise

The impact of noise from the additional waste rock dumps will be of low negative significance taking cognisance of the current mining operations underway.

Recommendations have been made for mitigation measures to ensure that impacts will be low, managed and monitored (Table 77 - Specialist Recommendations Summarised).

19.5. Air Pollution

The impact is considered of low negative significance. Adherence to the mitigation measures proposed will mitigate further impact on air quality. Fallout dust monitoring is in place and must continue to ensure preventive management of dust pollution.

19.6. Visual Aspects

The visual impact assessment conducted concluded a low impact, with the implementation of mitigation measures, cognisant that the sense-of-place is currently disturbed given that TRP is an existing operational mine, and the additional waste rock dumps will be located within an approved mining right area.

19.7. Economic Opportunities, Infrastructure Development and Employment

Authorisation of the additional three waste rock dumps will ensure continuity of current mining operations at TRP, and hence have a positive impact to the local and regional economy, continued employment during the Life of Mine, continued implementation of the 2018 approved SLP and associated socio-economic benefits of the aforementioned impacts.

No increase in negative social impacts such as crime, alcoholism and prostitution is anticipated in and around TRP mine. The significance of this is also thought to be of low consequence, because the area has already been subjected to mining industries over a long period of time and no sudden “boom of activities” is expected

19.8. Impact on the National Estate Referred to in Section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

No significant impacts are expected (Refer to Appendix 15 – Heritage Impact Assessment and the recommendations made (Table 77)). A letter of exemption from undertaking a Palaeontological Assessment, as submitted to SAHRA, is included as part of this application (Appendix 16).

19.9. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4) AND (B) OF THE ACT

Please refer to Section 7 where alternatives have been discussed in detail.

20 UNDERTAKING

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report.

The signed undertaking is included in Section 31 of Part B and is valid for both the Environmental Impact Assessment (Part A) and the Environmental Management Programme (Part B) of this report.