

PROPOSED EXTENSION OF THE RAILWAY INFRASTRUCTURE AT THE WESSELS MINE, NORTHERN CAPE - BASIC ASSESSMENT REPORT

Prepared for: Hotazel Manganese Mines (Pty) Ltd

Authority References:

DMRE Ref: NC-00212-MR/102



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(Project Manager)



Rob Hounsome
(Reviewer)

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EXECUTIVE SUMMARY

PROJECT BACKGROUND

Hotazel Manganese Mines (Pty) Ltd (HMM), a subsidiary of South32 Limited (South32), owns and operates the underground Wessels Manganese Mine (Wessels Mine) located approximately 15 km north of the town of Hotazel, in the John Taolo Gaetsewe District Municipality (JTGDM) and the Joe Morolong Local Municipality (JMLM), Northern Cape province.

HMM holds and operates in accordance with the following authorisations (attached as Appendix A):

- A Converted Old Mining Right (MR) issued in terms of the Mineral and Petroleum Resources Development Act, 28 of 2002 (MPRDA) (Department of Mineral Resources and Energy (DMRE) [previously the Department of Minerals and Energy (DME) Ref: 03/2006(MR)] issued on 16 January 2006; and
- An approved amended Environmental Management Programme (EMPR) issued in terms of the MPRDA [DMRE (previously the Department of Mineral Resources (DMR) Ref: NC30/5/1/2/3/2/1(253) MR] dated 16 March 2018.

The Wessels Mine is located on the farms Dibiaghomo 226, Wessels 227 and Dikgatlong 268 and comprises vertical and incline shafts for access to underground areas, waste rock dump (WRD) and stockpile areas, along with support services and infrastructure. As part of its on-going mine planning, HMM has identified the need to upgrade the existing railway infrastructure at the Wessels Mine. In this regard, HMM is proposing to design a new rail balloon and upgrade the existing railway infrastructure (the proposed project).

SUMMARY OF AUTHORISATION REQUIREMENTS

Prior to the commencement of the proposed project, the following is required:

- An amended EMPR in terms of Section 102 the MPRDA from the DMRE; and
- An Environmental Authorisation (EA) in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) promulgated under the National Environmental Management Act, 107 of 1998 (NEMA) from the DMRE.

SLR Consulting (South Africa) (Pty) Ltd (SLR), an independent firm of Environmental Assessment Practitioners (EAPs), has been appointed by HMM to manage the amended EMPR and EA processes.

OPPORTUNITY FOR COMMENT

This Basic Assessment Report (BAR) has been distributed for a 30-day comment period from 10 September to 11 October 2021 in order to provide Interested and Affected Parties (I&APs) with an opportunity to comment on any aspect of the Basic Assessment (BA) process and the proposed project. Copies of the full report have been made available on the SLR website (www.slrconsulting.com) and the SLR data-free website (<https://slrpublicdocs.datafree.co/public-documents>). Any comments should be forwarded to SLR at the

address, telephone or email address shown below¹. For comments to be included in the revised BAR, comments should reach SLR **by no later than 11 October 2021**.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Mrs Rizqah Baker
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Email: rbaker@slrconsulting.com
 *(if using post, please call SLR to notify us of your submission)

SUMMARY OF IDENTIFIED IMPACTS AND SIGNIFICANCE

The potential impacts associated with the project activities and infrastructure can be categorised into those that have very low, low, medium, high, very high or insignificant significance in the unmitigated scenario. A summary of the identified impacts is provided in the table below.

Aspect	Potential Impact	Cumulative impact significance of the impact	
		Unmitigated	Mitigated
Geology	Loss and sterilisation of mineral resources	INSIGNIFICANT	
Topography	Altering topography	INSIGNIFICANT	
	Hazardous excavations and infrastructure resulting in safety risks to third parties and animals	Medium	INSIGNIFICANT
Soil and land capability	Soil erosion	High	MEDIUM
	Disturbance of original soil profiles	Medium	VERY LOW
	Chemical pollution of soils	Medium	VERY LOW
Biodiversity	Physical destruction and disturbance of floral species	Medium	LOW
	Physical destruction and disturbance of faunal species	Medium	LOW
Surface water resources	Alteration of natural drainage patterns	INSIGNIFICANT	
	Contamination of surface water resources	INSIGNIFICANT	
Groundwater	Contamination of groundwater resources	INSIGNIFICANT	
Air quality	Air pollution	INSIGNIFICANT	
Noise	Increase in disturbing noise levels	INSIGNIFICANT	
Visual	Negative visual views	INSIGNIFICANT	
Traffic	Road disturbance and traffic safety	INSIGNIFICANT	
Cultural/heritage and palaeontological resources	Loss of cultural/heritage and palaeontological resources	INSIGNIFICANT	
Socio-economic	Inward migration and economic impact	INSIGNIFICANT	
	Change in land use	INSIGNIFICANT	

¹ By providing your personal information to be registered as an I&AP for this project, you consent to SLR keeping and using your personal information as part of a contact database for this and other EIA projects and processes; contacting you about these projects; disclosing it to other authorised parties for lawful purposes, including transferring to other countries; processing it for lawful purposes (fulfilling contractual, legal and public policy obligations, and protecting legitimate interests SLR and other authorized parties). SLR will only collect the necessary personal information. SLR (and any authorised parties) will only use it for lawful purposes, and use reasonable, appropriate security safeguards to protect it, reasonably prevent any damage to, or loss, unauthorised access, or disclosure thereof. **Your rights:** You may request SLR to provide you with names of the authorized parties, and details of your personal information held in the I&AP database. You may object to the processing thereof, or request to correct, delete or destroy it, at any time by contacting SLR by email or in writing. However, you understand that SLR (and any authorised parties) may not be able to delete or destroy it for legal or public policy reasons. SLR will provide you with the reasons. You may lodge a complaint with the information regulator at: <https://justice.gov.za/inforeg/>. Link to SLR's privacy policy: <https://cdn.slrconsulting.com/uploads/2020-08/slr-privacy-notice.pdf>

ENVIRONMENTAL STATEMENT

The assessment of the proposed project presents the potential for negative impacts to occur (in an unmitigated scenario) on the biophysical environments both on the project footprint and in the surrounding area. With the implementation of management actions, these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMPR is effectively implemented, there is no reason from a biophysical, cultural/heritage or socio-economic standpoint why the proposed project should not proceed.

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
AEL	Atmospheric Emissions Licence
AQSR	Air Quality Sensitive Receptors
Assmang	Assmang (Pty) Ltd
BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
BIF	Banded Ironstone Formation
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and Environment
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DMRE	Department of Mineral Resources and Energy
DRDLR	Department of Rural Development and Land Reform
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ESDD	Environmental and Social Due Diligence
ESIA	Environmental and Social Impact Assessment
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme
GHT	GHT Consulting
GIS	Geographic Information System
GN	Government Notice
GNR	Government Notice Regulation
H&S	Health and Safety
ha	Hectares
HC	Hydrocarbon
HIA	Heritage Impact Assessment
HMM	Hotazel Manganese Mines (Pty) Ltd
I&APs	Interested and Affected Parties

Acronym / Abbreviation	Definition
IAIAsa	International Association for Impact Assessment South Africa
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
JMLM	Joe Morolong Local Municipality
JTGDM	John Taolo Gaetsewe District Municipality
KMF	Kalahari Manganese Field
KP	Knight Piésold (Pty) Ltd
LB	Lower Body
m	Meter
mm	Millimetre
mamsl	Metres Above Mean Sea Level
MAP	Mean Annual Precipitation
MAR	Mean Annual Run-Off
mbgl	Metres Below Ground Level
MMT	Mamatwan Manganese Mine
MPRDA	Mineral and Petroleum Resources Development Act, 28 of 2002
MR	Mining Right
NBA	National Biodiversity Assessment
NCNCA	Northern Cape Nature Conservation Act, 9 of 2009
NDCR	National Dust Control Regulations
NDP	National Development Plan
NEM: AQA	National Environmental Management: Air Quality Act, 39 of 2004
NEM: BA	National Environmental Management: Biodiversity Act, 10 of 2004
NEM: WA	National Environmental Management: Waste Act, 59 of 2008
NEMA	National Environmental Management Act, 107 of 1998
NFA	National Forest Act, 84 of 1998
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 25 of 1999
NPAES	National Protected Areas Expansion Strategy
NTS	Non-Technical Summary
P&G's	Preliminary and Generals
PAH	Polycyclic Aromatic Hydrocarbon
PPP	Public Participation Process
RDL	Red-Data List

Acronym / Abbreviation	Definition
SACAD	South African Conservation Areas Database
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANS	South African National Standards
SAPAD	South African Protected Area Database
SAWB	South African Weather Bureau
SAWS	South African Weather Service
SCC	Species of Conservation Concern
SLP	Social and Labour Plan
SLR	SLR Consulting (South Africa) (Pty) Ltd
South32	South32 Limited
SSVR	Site Sensitivity Verification Report
StatsSA	Statistics South Africa
STS	Scientific Terrestrial Services cc
SWSA	Strategic Water Source Area
TFR	Transnet Freight Rail
TSF	Tailings Storage Facility
UMK	United Manganese of Kalahari
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
Wessels Mines	Wessels Manganese Mine
WMA	Water Management Area
WRD	Waste Rock Dump
WUL	Water Use Licence

Proposed Extension of the Railway Infrastructure at the Wessels Mine, Northern Cape - Basic Assessment Report

INTRODUCTION

This chapter provides a brief description of the proposed project background, described the purpose of the report, summarises the legislative authorisation requirements and outlines the opportunity for stakeholders to comment.

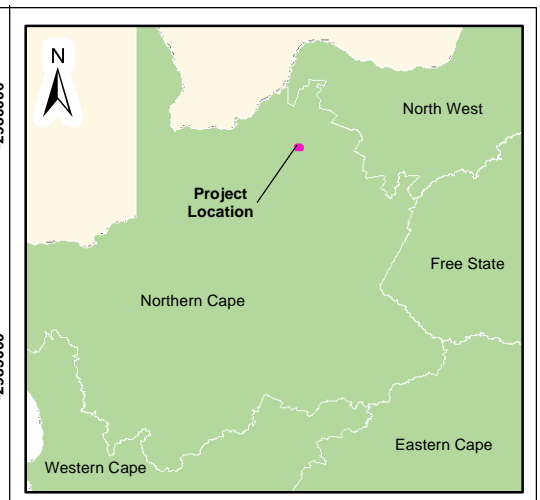
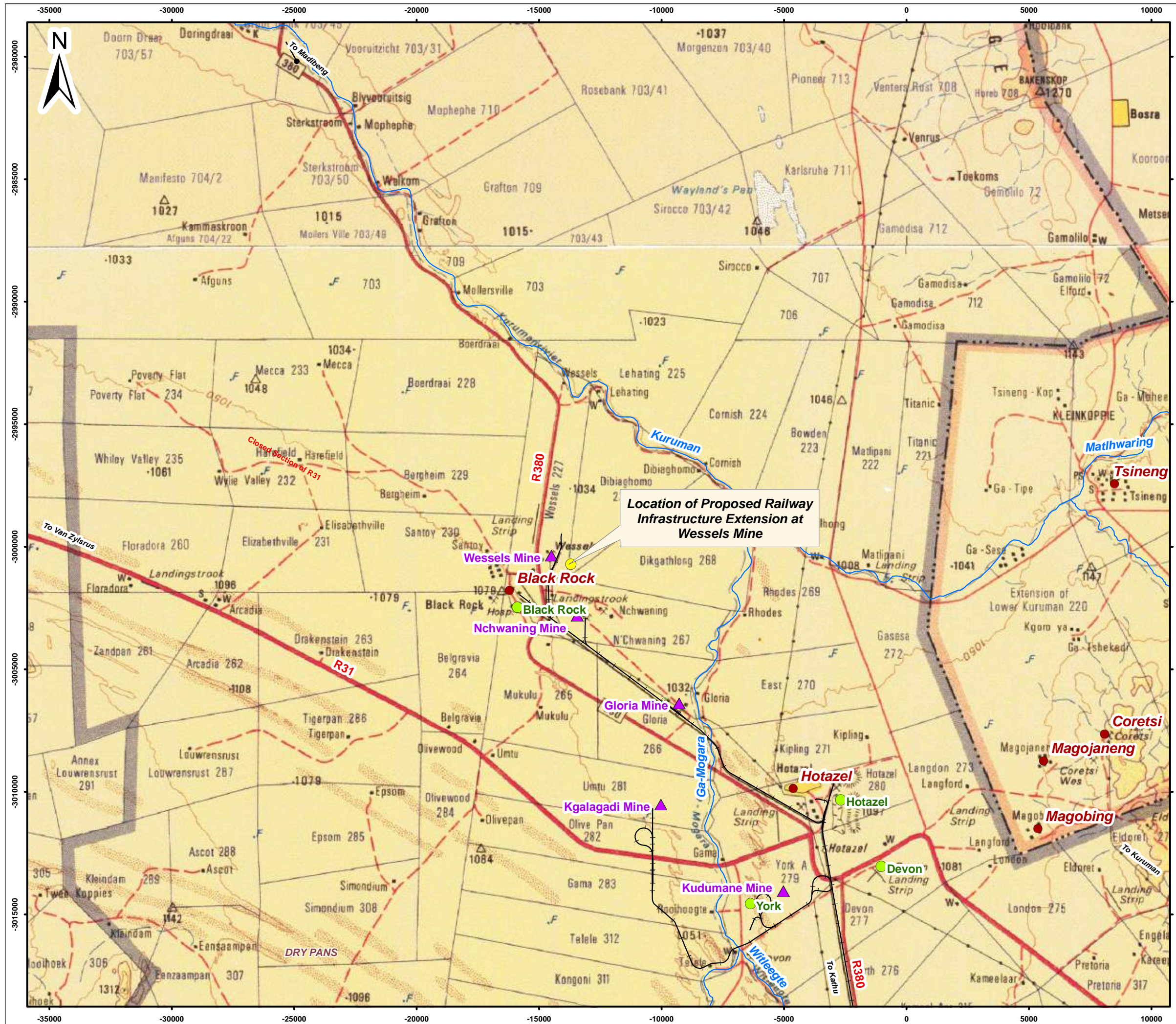
PROJECT BACKGROUND

Hotazel Manganese Mines (Pty) Ltd (HMM), a subsidiary of South32 Limited (South32), owns and operates the underground Wessels Manganese Mine (Wessels Mine) located approximately 15 km north of the town of Hotazel, in the John Taolo Gaetsewe District Municipality (JTGDM) and the Joe Morolong Local Municipality (JMLM), Northern Cape province. Regional and local setting maps are provided in Figure 1-1 and Figure 1-2, respectively.

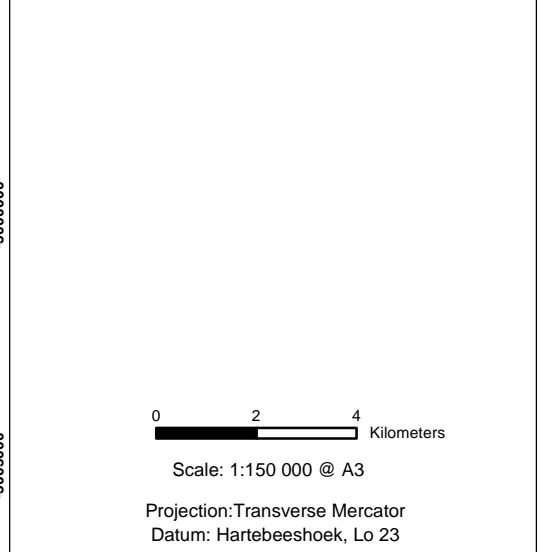
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The Wessels Mine is located on the farms Dibiaghomo 226, Wessels 227 and Dikgatlong 268 and comprises vertical and incline shafts for access to underground areas, waste rock dump (WRD) and stockpile areas, along with support services and infrastructure. As part of its on-going mine planning, HMM has identified the need to upgrade the existing railway infrastructure at the Wessels Mine. In this regard, HMM is proposing to design a new rail balloon and upgrade the existing railway infrastructure (proposed project).



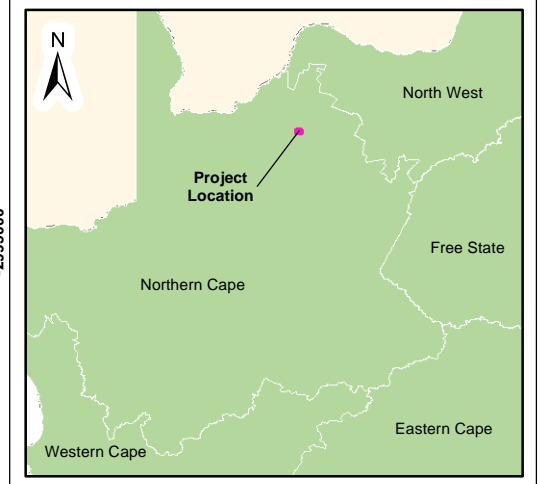
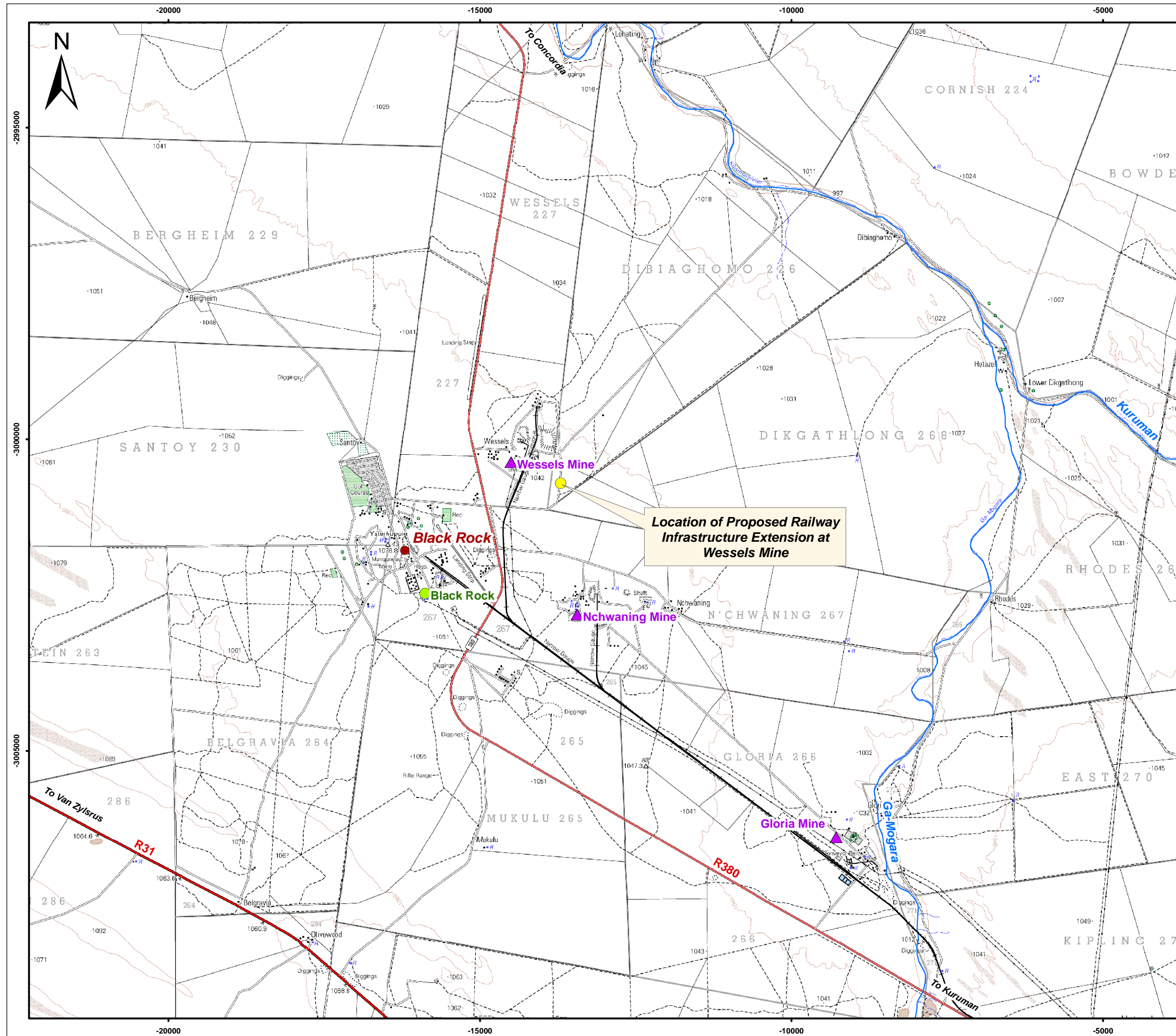
- Legend**
- Towns
 - Main Roads
 - +— Railway
 - Rivers
 - ▲ Operating Manganese Mines
 - Closed / Dormant Mines
 - Location of Proposed Railway Extension



South32 Limited

Figure 1-1
 Regional Setting

SLR
 SLR Consulting (Africa) (Pty) Ltd
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- Legend**
- Towns
 - Main Roads
 - +— Railway
 - Rivers
 - ▲ Operating Manganese Mines
 - Closed / Dormant Mines
 - Location of Proposed Railway Extension

0 1 2 Kilometers
 Scale: 1:63 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

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Figure 1-2
Local Setting

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SUMMARY OF AUTHORISATION REQUIREMENTS

Prior to the commencement of the proposed project, the following is required:

- An amended EMPR in terms of Section 102 the MPRDA from the DMRE; and
- An Environmental Authorisation (EA) in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) promulgated under the National Environmental Management Act, 107 of 1998 (NEMA) from the DMRE.

SLR Consulting (South Africa) (Pty) Ltd (SLR), an independent firm of Environmental Assessment Practitioners (EAPs), has been appointed by HMM to manage the amended EMPR and EA processes.

PURPOSE OF THIS REPORT

This Basic Assessment Report (BAR) is compiled in accordance with Appendix 1 of the EIA Regulations, 2014 (as amended) and is distributed for review and comment as part of a Basic Assessment (BA) process undertaken for the proposed project.

This BAR provides a description of the proposed project and the affected environment, summarises the BA process undertaken to date, identifies and assesses the key impacts resulting from the proposed project and presents management and mitigation measures that are recommended to enhance benefits and limit negative impacts. The specialist findings and other relevant information are integrated into this BAR, which includes an EMPR.

The purpose of the report is to present the aforementioned information in a clear and accessible format that is suitable for easy understanding by Interested and Affected Parties (I&APs) and provides an opportunity for I&APs to comment on all aspects of the proposed project, as well as findings of the impact assessment.

Furthermore, the proposed project requires an amendment to the existing EMPR in terms of the MPRDA: *“A reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right, production right, prospecting work programme, exploration work programme, production work programme, mining work programme environmental management programme or an environmental authorisation issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied (including by extension of the area covered by it or by the additional of minerals or a shares or seams, mineralised bodies or strata, which are not at the time the subject thereof) without the written consent of the Minister.”*

In this regard, this BAR aims to address the requirements of both the MPRDA Section 102, as well as NEMA requirements to facilitate informed decision making by the competent authority. Due to the localised nature of the activity, a stand-alone EMPR has been compiled for ease of management of this activity. The stand-alone EMPR will be appended to the broader mining EMPR.

TERMS OF REFERENCE

The terms of reference for these amended EMPR and EA processes are to:

- Apply for an EA for the Listed Activities triggered by the proposed project in terms of the EIA Regulations promulgated under NEMA;
- Submit a Section 102 application to amend the consolidated EMPR in terms of the MPRDA;
- Ensure that a BA process for the proposed project is undertaken in an open, participatory manner that ensures all potential issues of concern and their associated impacts are identified;
- Undertake a formal public participation process (PPP), which includes the distribution of information to I&APs and provide an opportunity for I&APs to raise any issues/concerns arising from the proposed project, as well as an opportunity to comment on all documentation arising from the BA process; and
- Integrate all information into a BAR to allow for an informed decision to be taken on the proposed project by the relevant authorities.

OBJECTIVES OF THE BASIC ASSESSMENT PROCESS

In accordance with Appendix 1 of the EIA Regulations, 2014 (as amended), the objectives of the BA process are to:

- Identify the relevant policies and legislation relevant to the activity and determine how the activity complies and responds to the policy and legislative context;
- Present the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity, technology and sites related to the proposed project;
- Undertake an impact assessment, inclusive of cumulative impacts, to determine the biophysical and socio-economic sensitivity of the project sites and assess the nature, significance, consequence, extent, duration and probability of the impacts occurring;
- Assess the degree to which impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

OPPORTUNITY FOR COMMENT

This BAR has been distributed for a 30-day comment period from 10 September to 11 October 2021 in order to provide I&APs with an opportunity to comment on any aspect of the BA process and the proposed project. Copies of the full report have been made available on the SLR website (www.slrconsulting.com) and the SLR data-free website (<https://slrpublicdocs.datafree.co/public-documents>). Any comments should be forwarded to SLR at the address, telephone or email address shown below². For comments to be included in the revised BAR, comments should reach SLR **by no later than 11 October 2021**.

² By providing your personal information to be registered as an I&AP for this project, you consent to SLR keeping and using your personal information as part of a contact database for this and other EIA projects and processes; contacting you about these projects; disclosing it to other authorised parties for lawful purposes, including transferring to other countries; processing it for lawful purposes (fulfilling contractual, legal and public policy obligations, and protecting legitimate interests SLR and other authorized parties). SLR will only collect the necessary personal information. SLR (and any authorised parties) will only use it for lawful purposes, and use reasonable, appropriate security safeguards to protect

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Attention: Mrs Rizqah Baker

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Tel: 011 467 0945

Email: rbaker@slrconsulting.com

*(if using post, please call SLR to notify us of your submission)

After the conclusion of the comment period, all comments received will be collated into a Comments and Responses Report. The comments will be duly considered in compiling the revised BAR, which will be submitted to the DMRE for consideration and decision-making.

it, reasonably prevent any damage to, or loss, unauthorised access, or disclosure thereof. **Your rights:** You may request SLR to provide you with names of the authorized parties, and details of your personal information held in the I&AP database. You may object to the processing thereof, or request to correct, delete or destroy it, at any time by contacting SLR by email or in writing. However, you understand that SLR (and any authorised parties) may not be able to delete or destroy it for legal or public policy reasons. SLR will provide you with the reasons. You may lodge a complaint with the information regulator at: <https://justice.gov.za/inforeg/>. Link to SLR's privacy policy: <https://cdn.slrconsulting.com/uploads/2020-08/slr-privacy-notice.pdf>

PART A – SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

This chapter provides the details, qualifications and experience of the EAPs undertaking the BA process for the proposed project.

1.1 DETAILS OF THE PROJECT TEAM

SLR, an independent firm of EAPs, has been appointed by HMM to manage the amended EMPR and EA processes. The details of the project team that were involved in the preparation of this BAR are provided in Table 1-1.

SLR has no vested interest in the proposed project other than fair payment for consulting services rendered as part of the amended EMPR and EA processes and has declared its independence, as required by the EIA Regulations, 2014 (as amended), in chapter 17.

Table 1-1: Details of the EAP

General		
Organisation	SLR Consulting (South Africa) (Pty) Ltd	
Postal Address	PO Box 1596, Cramerview, 2060	
Tel	011 467 0945	
Fax	011 467 0978	
Name	Task and role	Email
Rob Hounsome	Project Reviewer - Document and process review, quality control	rhounsome@slrconsulting.com
Sharon Meyer	Project Lead – EAP	smeyer@slrconsulting.com
Rizqah Baker	Project Manager – Management of BA process, report compilation	rbaker@slrconsulting.com
Milisa Rala	Project Assistant – Project Assistant	mrala@slrconsulting.com

1.2 EXPERTISE OF THE EAP

Rob Hounsome has undertaken more than 200 Environmental and Social Impact Assessments (ESIAs) and Environmental and Social Due Diligence (ESDD) services in nearly 40 countries over the past 27 years in accordance with requirements of national governments, industry associations, and various funding agencies including all the major International Finance Institutes, Equator Principle Banks, and/or legal firms, including both Due Diligence Assessments for project financing and advisory on Lender expectations (and associated project financing negotiations). Rob is a member of the International Association for Impact Assessment South Africa (IAIAsa) and a registered Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

Sharon Meyer has over 20 years of experience as an environmental scientist and project manager. She has managed complex projects within the mining and power generation sectors, with a focus on industrial waste management. She has managed multi-national and multi-disciplinary teams on authorisation processes and social due diligence mining projects in Africa. Sharon has worked on a variety of mining projects including diamond, coal, gold, vanadium, and tailings reclamation projects. Sharon is registered as an EAP with the Environmental Assessment Practitioner's Association of South Africa (EAPASA), is registered with SACNASP and is a member of IAIAAsa.

Rizqah Baker is a consultant with four years' experience working in the environmental field and has worked both in the public and private sectors. She worked for the City of Cape Town; her roles included environmental auditing and providing comment on various BARs, Method Statements, EMPRs and development proposals. In the private sector she worked for an environmental rehabilitation firm, with a main role being report compilation and writing and has spent considerable time in the field, having undertaken alien vegetation control and search and rescue operations. As a consultant, she has worked in the various fields including infrastructure, oil & gas, mining, and the built environment. She's also worked as an Environmental Control Officer (ECO) in various fields and thus brings with her a strong understanding of, and implementation of EMPRs.

Milisa Rala has a MSc in Resource Conservation Biology and a BSc in Environmental Sciences. Her MSc research focused on using Geographic Information Systems (GIS) to find the relationship between land cover change and the socio-economics status of all ten of the former South African Homelands (Bantustans).

Curriculum vitae and professional registrations of the project team are provided in Appendix B.

2. LOCATION OF ACTIVITY

This chapter provides details of the location of the proposed project.

2.1 LOCATION OF OVERALL ACTIVITY

Details of the properties on which the proposed project is located is provided in Table 2-1.

Table 2-1: Property Description

Description	Detail
Farm name and portion	<ul style="list-style-type: none"> • Portion 2 of the farm Dibiaghomo 226 • Remaining Extent of the farm Wessels 227 • Portion 9 of the farm N’Chwaning 267 • Remaining Extent of the farm Mukulu 265 • Portion 1 of the farm Gloria 266
Application area (hectares (ha))	The proposed project covers an area of approximately 10 ha
Magisterial District	John Taolo Gaetsewe Magisterial District
Distance and direction from nearest town	15 km north of the town of Hotazel
21-digit surveyor general code	<ul style="list-style-type: none"> • Portion 2 of the farm Dibiaghomo 226 - C04100000000022600002 • Remaining Extent of the farm Wessels 227 - C04100000000022700000 • Portion 9 of the farm N’Chwaning 267 - C04100000000026700009 • Remaining Extent of the farm Mukulu 265 - C04100000000026500000 • Portion 1 of the farm Gloria 266 - C04100000000026600001

2.2 LOCALITY MAP

Regional and local setting maps are provided in Figure 1-1 and Figure 1-2, respectively.

3. DESCRIPTION OF THE SCOPE OF THE ACTIVITY

This chapter provides an overview of the existing operations, identifies the Listed Activities triggered by the proposed project and provides a description of the proposed project activities.

3.1 OVERVIEW OF EXISTING OPERATIONS

The Wessels Mine is located approximately 15 km north of the town of Hotazel. The mine comprises vertical and incline shafts for access to underground areas, WRD and stockpile areas, along with support services and infrastructure. Wessels Mine officially commenced with operations in 1973 and has been in operation ever since. Further detail is provided in the following sections.

3.1.1 Mining Method

Wessels Mine is a trackless bord and pillar underground mine operating at a depth of approximately 350 m below surface. Currently two areas of mineralisation are being mined. One vertical and two decline shafts access the mineralisation. Hydraulic twin boom drilling machines undertake drilling. Blasting takes place at the end of shift, using a mixture of emulsion and sensitizer, with electronic detonators to obtain a face advance of approximately 2.65 m for each blast.

The cleaning crew uses rubber wheeled loaders to load 25-ton haulers with ore. The haulers transport the ore to tipping points where the ore passes through a primary crusher, and after some conveyor transportation, is stored in silos underground until it is hoisted to surface by means of a continuous cable belt conveyor. Once on the surface, the ore passes through a screening and washing plant. The washing plant produces material from 150 micron and below. The material is then stockpiled for loading on to the railway line. Orders are generally received for specific ore, which is then selectively loaded on to trucks. The market tends to be both inland and for export.

3.1.2 Existing Railway Line

From the Wessels Mine through to Hotazel, the railway line is privately owned as a joint venture. At the Wessels Mine, the railway consists of a single track and does not allow for optimal and cost-effective loading of manganese ore from the mine in its current configuration.

3.2 PROPOSED LISTED AND SPECIFIED ACTIVITIES

The EIA Regulations, 2014 (as amended) promulgated under NEMA and published in Government Notice (GN) No. R982 (as amended by GN No. 326 of 7 April 2017) controls certain Listed Activities. These activities are listed in GN No. R983 (Listing Notice 1; as amended by GN No. 327 of 7 April 2017), R 984 (Listing Notice 2; as amended by GN No. 325 of 7 April 2017) and R985 (Listing Notice 3; as amended by GN No. 324 of 7 April 2017) and are prohibited until EA has been obtained from the competent authority. Such EA, which may be granted subject to conditions, will only be considered once there has been compliance with GN No. R982 (as amended).

GN No. R 983 (as amended) sets out the procedures and documentation that need to be complied with when applying for EA. A BA process must be applied to an application if the authorisation applied for is in

respect of an activity or activities listed in Listing Notices 1 and/or 3 and an EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

The proposed project triggers Listing Activity 64 contained in Listing Notice 1 (see Table 3-1), thus a BA process must be undertaken in order for the DMRE to consider the application in terms of NEMA and make a decision as to whether to grant EA or not.

Table 3-1: Listing Activities Applicable to the Proposed Project

Description of the proposed project	Extent of the activity	Listed Notice, Listing Activity and Relevance
Proposed extension of the railway infrastructure at the Wessels Mine	Approximately 10 ha	<p>Listing Notice 1, GN No. R983, Listing Activity 27: <i>The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for -</i></p> <ul style="list-style-type: none"> <i>(i) the undertaking of a linear activity; or</i> <i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i> <p>Relevance: The proposed extension of the railway infrastructure at the Wessels Mine will require the clearance of approximately 10 ha of indigenous vegetation. However, given that the proposed project is characterised as a linear activity, SLR is of the opinion that this Listing Activity is <u>not triggered</u> by the proposed project.</p>
		<p>Listing Notice 1, GN No. R983, Listing Activity 64: The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding -</p> <ul style="list-style-type: none"> <i>(i) railway lines, shunting yards and railway stations in industrial complexes or zones;</i> <i>(ii) underground railway lines in mines; or</i> <i>(iii) additional railway lines within the railway line reserve.</i> <p>Relevance: The proposed project entails the extension of the railway infrastructure at the Wessels Mine which will increase the development footprint.</p>

3.3 DESCRIPTION OF THE PROPOSED PROJECT

South32 has a Manganese Export Corridor Allocation on the Transnet Freight Rail (TFR) manganese line between Hotazel, in the Northern Cape, and Coega, in the Eastern Cape. The allocation is underutilised due to train loading inefficiencies of the current railway configuration at the Wessels Mine. Additionally, TFR has initiated a manganese expansion programme which will increase manganese export capacity by

upgrading the rail network. TFR plans to increase capacity of the manganese rail line beyond the current four million tonnes per annum to 16 million tonnes per annum.

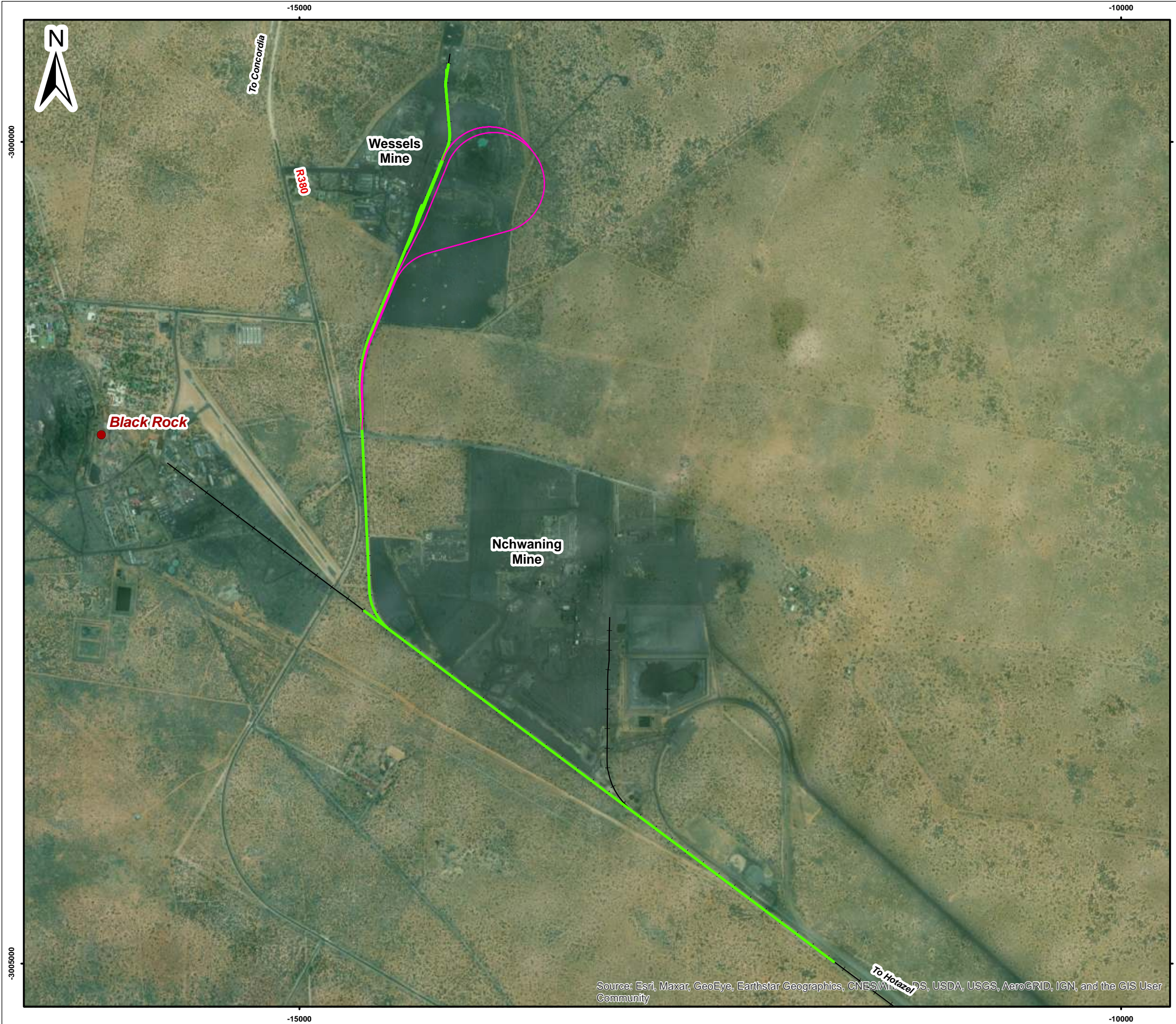
To take-up the TFR's extended capacity, the loading rates at the Wessels Mine need to be improved. In this regard, HMM is proposing to extend the existing railway infrastructure at the Wessels Mine by upgrading the existing railway line. A site layout map is provided in Figure 3-1. The scope of work for the proposed project includes the following:

- The extension of the existing railway into a new railway balloon measuring at approximately 2 500 m long and 25 m wide;
- The extension of the railway onto a section of the existing tailings dam resulting in the removal of approximately 15 000 – 25 000 m³ of material from the tailings area, which would be deposited on another existing tailings dam; and
- The upgrade of the existing railway line from the Wessels Mine to the tie-in point near Assmang (Pty) Ltd's (Assmang) railway line.

It must be noted that that the upgrade of the railway line does not trigger any Listed Activities in terms of the EIA Regulations, 2014 (as amended) and does not require authorisation. As such, the description of this portion of the proposed project is included for completeness only. Furthermore, it is important to note that decommissioning and closure-related activities for the proposed project will form part of the existing approved activities for the Wessels Mine.

An overview of the activities and infrastructure associated with the proposed project are provided in Table 3-2.

The duration of the construction phase of the proposed project is anticipated to be approximately 15 months. A staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities). Procurement opportunities would be sourced locally, as far as possible. Due to the nature of the proposed project, no job or procurement opportunities will be created post-construction.



- Legend**
- Towns
 - +— Existing Railway
 - Proposed Railway Extension Layout
 - Upgrade to Existing Line

0 250 500 Meters
 Scale: 1:22 500 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

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Figure 3-1
Site Layout

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus, DigitalGlobe, GeoEye, IGN, Aerogrid, IGN, and the GIS User Community

Table 3-2: Overview of the Activities Associated with the Proposed Project

Main Activity	Sub-Activity	Applicable Phase
Site preparation	Establishment of contractor's site camp and laydown area	<ul style="list-style-type: none"> • Construction
Earthworks	Vegetation clearing	<ul style="list-style-type: none"> • Construction
	Topsoil removal	<ul style="list-style-type: none"> • Construction
	Site excavation for foundations and base compaction	<ul style="list-style-type: none"> • Construction
Civil works	Mixing of concrete and concrete work (including storage and handling of fuel, lubricants, sand, rock, cement and chemical additives)	<ul style="list-style-type: none"> • Construction
	Dust suppression	<ul style="list-style-type: none"> • Construction
	Piling	<ul style="list-style-type: none"> • Construction
	Structural steelwork (including grinding and welding)	<ul style="list-style-type: none"> • Construction
	Slope stabilisation and compaction	<ul style="list-style-type: none"> • Construction
	Stormwater drainage management	<ul style="list-style-type: none"> • Construction
Transport system	The use of parking, loading and off-loading areas for truck, plant and other equipment	<ul style="list-style-type: none"> • Construction • Decommissioning
	Transportation of staff to and from site	<ul style="list-style-type: none"> • Construction • Decommissioning
	Use of railway line	<ul style="list-style-type: none"> • Operation
General site management	Security and access control	<ul style="list-style-type: none"> • Construction • Operation
	Alien vegetation management	<ul style="list-style-type: none"> • Construction • Operation
	General monitoring, inspection and maintenance	<ul style="list-style-type: none"> • Operation
	Dust suppression	<ul style="list-style-type: none"> • Construction • Operation
Demolition	Removal of contractor's site camp and laydown area	<ul style="list-style-type: none"> • Construction
	Removal of infrastructure	<ul style="list-style-type: none"> • Decommissioning
Rehabilitation	Replenishment of soil resources	<ul style="list-style-type: none"> • Decommissioning
	Revegetation of disturbed areas	<ul style="list-style-type: none"> • Decommissioning
	Slope stabilisation and erosion control	<ul style="list-style-type: none"> • Decommissioning
	Alien vegetation management	<ul style="list-style-type: none"> • Decommissioning
Maintenance and aftercare	Initiation of aftercare and maintenance programme	<ul style="list-style-type: none"> • Closure
	Maintenance of post-closure landforms, facilities and rehabilitated areas	<ul style="list-style-type: none"> • Closure

4. POLICY AND LEGISLATIVE CONTEXT

In accordance with the EIA Regulations, 2014 (as amended) and the DMRE BAR template, this chapter outlines the key legislative requirements applicable to the proposed project and outlines the guidelines, policies and plans that have been considered during the EMPR amendment and EA processes.

4.1 CONSIDERATION OF LEGISLATION

4.1.1 Mineral and Petroleum Resources Development Act, 28 of 2008

The MPRDA governs the acquisition, use and disposal of mineral and petroleum resources. The objectives of the Act, amongst others, are to promote economic growth and mineral and petroleum resources development in South Africa, particularly the development of downstream industries through the provision of feedstock and development of mining and petroleum inputs industries. Additionally, the aim is also to promote employment and advance the social and economic welfare of all South Africans.

Chapter 4 of the Mineral and Environmental Regulation provides a framework for the application of mining, prospecting and closure rights. The DMRE must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) of NEMA provides the minimum requirements for procedures for the investigation, assessment, management, and communication of the potential impacts.

In addition, Section 102 of the MPRDA governs the amendment of rights, permits, programmes and plans.

The proposed project entails the extension of railway infrastructure at the Wessels Mine. The proposed project will be undertaken within the boundary of the HMM's MR, but outside the boundary of the Wessels Mine. The proposed project does not include the addition of any minerals not currently included in the MR given that the proposed project relates to the extension of the railway infrastructure only, therefore, a separate EA under the MPRDA is not deemed applicable. However, an application, in terms of Section 102 of the MPRDA, to amend the approved amended EMPR must be submitted to the DMRE to take cognisance of the proposed project, the associated environmental impacts and the subsequent monitoring or mitigation measures.

4.1.2 National Environmental Management Act, 107 of 1998

The NEMA establishes principles and provides a regulatory framework for decision-making on matters affecting the environment. Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. NEMA also provides for the participation of I&APs and stipulates that decisions must take into account the interests, needs and values of all I&APs.

Chapter 5 of NEMA outlines the general objectives and implementation of IEM, which provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of EA. In order to give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

This EA process must be undertaken in consideration of the afore-mentioned principles. In line with sustainability principles, potential impacts arising from the proposed project must be identified and mitigation actions must be provided.

4.1.3 Environmental Impact Assessment Regulations, 2014 (as amended)

The EIA Regulations, 2014 (as amended, promulgated under NEMA provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1, Listing Notice 2 and Listing Notice 3. The undertaking of activities specified in the Listing Notices is prohibited until EA has been obtained from the competent authority. Such EA, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, 2014 (as amended).

The EIA Regulations, 2014 (as amended) set out the procedures and documentation that need to be complied with when applying for EA. A BA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

Furthermore, Appendix 1, Appendix 4 and Appendix 6 of the EIA Regulations, 2014 (as amended) set out the outcomes and requirements of reporting when compiling a BAR, EMPR and specialist reports, respectively. Compliance with these appendices is required upon submission of a BAR, EMPR and specialist reports (supporting documentation for a BAR) for application for EA in terms of the EIA Regulations, 2014 (as amended).

The proposed project triggers a Listed Activity in terms of Listing Notice 1 (Activity 64) (refer to Table 3-1), therefore application for EA and a BA process, requiring the compilation of a BAR and EMPR (with specialist reports as supporting documentation), must be submitted to the DMRE.

4.1.4 National Environmental Management: Air Quality Act, 39 of 2004

This National Environmental Management: Air Quality Act, 39 of 2004 (NEM: AQA) regulates all aspects of air quality, including prevention of pollution and environmental degradation; providing for national norms and standards regulating air quality monitoring, management and control; and licencing of activities that result in atmospheric emissions and have or may have a significant detrimental effect on the environment. The NEM: AQA has established a National Framework for Air Quality Management with various standards being implemented. Activities that require an Atmospheric Emissions Licence (AEL) are listed in GN No. 893 (22 November 2013), published in terms of Section 21(1) ((b) of the NEM: AQA. In terms of Section 22 of NEM: AQA no person may conduct a listed activity without an AEL.

The proposed project does not trigger any activities that require application for an AEL in terms of NEM: AQA. However, the proposed project would result in the clearance of vegetation and removal of topsoil during the construction phase. In this regard, the potential impacts on air quality in terms of NEM: AQA must be assessed and monitoring and mitigation measures must be recommended.

4.1.5 National Environmental Management: Waste Act, 59 of 2008

The National Environmental Management: Waste Act, 59 of 2008 (NEM: WA) regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEM: WA creates a system for listing and licensing waste management activities. Listed waste management activities above certain thresholds are subject to a process of impact assessment and licensing. Activities listed in Category A require a BA, while activities listed in Category B require a Scoping and EIA process. Furthermore, in terms of Section 43A(1) contained in Chapter 5 of NEM: WA, residue stockpiles and residue deposits must be managed in the prescribed manner on any site demarcated for that purpose.

The proposed project does not trigger any activities that require application for a Waste Management Licence in terms of NEM: WA. However, minimal volumes of construction waste may be generated during the construction phase of the proposed project. The proposed project would also entail the extension of the railway onto a section of the existing tailings dam resulting in the removal of approximately 15 000 – 25 000 m³ of material from the tailings area, which would be deposited on another existing tailings dam. Given the afore-mentioned, monitoring and management measures of waste in terms of NEM: WA must be recommended, and it must be ensured that the removal and placement of materials from one tailings area to the other is done in compliance with the Act.

4.1.6 National Environmental Management: Biodiversity Act, 10 of 2004

The National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEM: BA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA and provides for the following:

- The protection of species and ecosystems that warrant national protection;
- The sustainable use of indigenous biological resources;
- The fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and
- The establishment and functions of a South African National Biodiversity Institute (SANBI) and for matters connected therewith.

The proposed project entails the clearance of approximately 10 ha of indigenous vegetation in order to make provision for the extension of the railway infrastructure at the Wessels Mine. In this regard, the potential impact on biodiversity must be considered as part of the EA process. Moreover, cognisance of protected species in terms of NEM: BA must be made, in the event that these species are identified within the project footprint.

4.1.7 National Forest Act, 84 of 1998

The National Forest Act, 84 of 1998 (NFA) provides for the promotion of the sustainable management of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes, as

well as the provision of measures for the protection of forests and trees. The DFFE (previously the Department of Water Affairs and Forestry) followed an objective, scientific and participatory process to determine the tree species requiring protection by the Act. Protective actions take place within the framework of the Act, as well as national policy and guidelines and are protected for a variety of reasons. Moreover, some species require strict protection, while others require control over harvesting and utilisation.

The proposed project entails the clearance of approximately 10 ha of indigenous vegetation in order to make provision for the extension of the railway infrastructure at the Wessels Mine. In this regard, cognisance of protected species in terms of the NFA must be made, in the event that these species are identified within the project footprint.

4.1.8 Northern Cape Nature Conservation Act, 9 of 2009

The Northern Cape Nature Conservation Act, 9 of 2009 (NCNCA) provides for the sustainable utilisation of wild animals, aquatic biota and plants. The Act provides for the issuing of permits and other authorisations for restricted activities involving protected fauna or flora. Similarly, to the NFA, some species require strict protection, while other require control over harvesting and utilisation.

The proposed project entails the clearance of approximately 10 ha of indigenous vegetation in order to make provision for the extension of the railway infrastructure at the Wessels Mine. In this regard, cognisance of protected fauna and flora in terms of the NCNCA must be made, in the event that these species are identified within the project footprint.

4.1.9 National Heritage Resources Act, 25 of 1999

The National Heritage Resources Act, 25 of 1999 (NHRA) provides for the identification, assessment and management of the heritage resources of South Africa. The Act lists development activities that would require authorisation by the responsible heritage resources authority. The Act requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and consider in its decision-making any comments and recommendations made by the relevant heritage resources authority.

In terms of Section 38(1)(c)(i) of the NHRA, any development or activity exceeding 5 000 m² in extent would require that notification of the proposed development be made to the responsible heritage authority. Furthermore, details pertaining to the location, nature and extent of the proposed development are also required to be submitted to the responsible heritage authority.

The proposed project entails the extension of railway infrastructure, measuring at approximately 10 ha i.e., exceeding 5 000 m² in extent. In this regard, the provisions of NHRA must be followed and notification and other relevant information must be submitted to the South African Heritage Resources Agency (SAHRA).

4.2 CONSIDERATION OF GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

The guidelines, policies, plans and frameworks that have been considered during the EMPR amendment and EA processes are provided in Table 4-1.

Table 4-1: Guidelines, Policies, Plans and Frameworks Applicable to the Proposed Project

Document	Governing Body	Relevance	
Covid-19 Directions	Department of Social Development	These Directions informed the form and levels of public participation possible within the restrictions related to the National State of Disaster.	
Public Participation Guideline in terms of NEMA (2017)	Department of Forestry, Fisheries and Environment (DFFE)	The purpose of these guidelines is to ensure that an adequate PPP was undertaken during the EMPR amendment and EA process.	
Guideline for consultation with communities and I&APs (2014)	DMRE		
IEM Guideline Series Guideline 7: Public participation in the EIA process (2012)	DFFE		
Guideline on need and desirability in terms of the EIA Regulations (2017)	DFFE		
Guideline on need and desirability in terms of the EIA Regulations (2014)	DFFE	These documents informed the consideration of the need and desirability aspects of the proposed project.	
National Development Plan (NDP), 2030	National Planning Commission		
New Growth Path, 2011	Department of Economic Development		
Integrated Development Plan (IDP) JTGDM, 2019-20	JTGDM		
“NC 451” Final IDP 2021/2022 Financial Year	JMLM		
Cumulative Effects Assessment, IEM, Information Series 7 (2004)	DFFE		This guideline will be consulted to inform the consideration of potential cumulative effects of the proposed project.
Criteria for determining Alternatives in EIA, IEM, Information Series 11 (2004)	DFFE		This guideline was consulted to inform the consideration of alternatives.
Environmental Management Plans (EMP), IEM, Information Series 12 (2004)	DFFE	This guideline will be consulted to ensure that the EMPR has been adequately compiled.	

Document	Governing Body	Relevance
Environmental Impact Reporting, IEM, Information Series 15 (2004)	DFFE	This guideline was consulted to inform the approach to impact reporting.
Specialist Studies, IEM, Information Series 4 (2002)	DFFE	This guideline was consulted to ensure adequate development of terms of reference for specialist studies.
Impact significance, IEM, Information Series 5 (2002)	DFFE	This guideline was consulted to inform the assessment of significance of impacts of the proposed project.

4.3 LEGISLATIVE BAR CONTENT REQUIREMENTS

This BAR has been prepared in accordance with the DMRE BAR template format and Appendix 1 and Appendix 4 of EIA Regulations, 2014 (as amended), the contents of which are outlined in Table 4-2 and Table 4-3.

Table 4-2: Requirements of a BAR in terms of Part A of the DMRE template and Appendix 1 of the EIA Regulations

BAR requirements as per the DMRE template	BAR requirements as per the EIA Regulations, 2014 (as amended)	Reference in the report
Part A of the DMRE template	Appendix 1 of the EIA Regulations, 2014 (as amended)	
Details of the EAP.	Details of the EAP who prepared the report.	Chapter 1
Expertise of the EAP.	Details of the expertise of the EAP, including curriculum vitae.	Chapter 1 and Appendix A
Location of overall activity.	The location of the activity, including - the 21-digit Surveyor General code of each cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties.	Chapter 2
Locality plan.	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 1-1, Figure 1-2 and Figure 3-1
Description of the scope of the proposed overall activity.	A description of the scope of the proposed activity, including all listed and specified activities triggered. A description of the activities to be undertaken, including associated structure and infrastructure.	Chapter 3
Policy and legislative context.	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	Chapter 0

BAR requirements as per the DMRE template	BAR requirements as per the EIA Regulations, 2014 (as amended)	Reference in the report
Need and desirability of the proposed activity.	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Chapter 5
Motivation for the overall preferred site, activities and technology alternative.	A motivation of the preferred development footprint within the approved site including.	Chapter 6
A full description of the process followed to reach the proposed development footprint within the site.	A full description of the process followed to reach the proposed development footprint within the approved site.	Chapter 7
Details of the development footprint alternatives considered.	Details of all the alternatives considered.	Chapter 6
Details of the PPP followed.	Details of the PPP undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Chapter 7
Summary of issues raised by I&APs.	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Chapter 7
Environmental attributes associated with the alternatives.	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Chapter 7
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts including the degree of the impacts.	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated.	Appendix C
Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 7.6.
The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected.	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Appendix C
The possible management actions that could be applied and the level of risk.	The possible management actions that could be applied and level of residual risk.	Chapter 26

BAR requirements as per the DMRE template	BAR requirements as per the EIA Regulations, 2014 (as amended)	Reference in the report
Motivation where no alternative sites were considered.	The outcome of the site selection matrix. If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	Chapter 6
Statement motivating the alternative development location within the overall site.	A concluding statement indicating the preferred alternatives, including preferred location within the approved site.	Chapter 7
Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout) through the life of the activity.	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and 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 management actions.	Chapter 8
Assessment of each identified potentially significant impact and risk.	An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated.	Chapter 9
Summary of specialist reports.	Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Chapter 10
Environmental impact statement.	An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Chapter 11
Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR.	Chapter 12
Aspects for inclusion as conditions of authorisation.	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Chapter 13

BAR requirements as per the DMRE template	BAR requirements as per the EIA Regulations, 2014 (as amended)	Reference in the report
Description of any assumptions, uncertainties and gaps in knowledge.	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and management actions proposed.	Chapter 14
Reasoned opinion as to whether the proposed activity should or should not be authorised.	Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Chapter 15
Period for which environmental authorisation is required.	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Chapter 16
Undertaking.	An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	Chapter 17
Financial provision.	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Chapter 27
Specific information required by the competent authority.	Any specific information required by the competent authority.	Chapter 30
Other matter required in terms of section 24(4)(a) and (b) of the Act.	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

Table 4-3: Requirements of a BAR in terms of Part A of the DMRE template and Appendix 4 of the EIA Regulations

BAR requirements as per the DMRE template	EMPR requirements per the EIA Regulations, 2014 (as amended)	Reference in the report
Part B of the DMRE template	Appendix 4 of the EIA Regulations, 2014 (as amended)	
Details of EAP.	Details of the EAP who prepared the EMPR and the expertise of that EAP to prepare the EMPR, including curriculum vitae.	Chapter 1
Description of the aspects of the activity.	A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description.	Chapter 3
Composite map.	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.	Figure 1-1, Figure 1-2 and Figure 3-1
Description of impact management objectives	A description of the impact management objectives, including management statements, identifying the impacts and risks	Appendix C

BAR requirements as per the DMRE template	EMPR requirements per the EIA Regulations, 2014 (as amended)	Reference in the report
including management statements.	that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities.	
Impacts to be mitigated in their respective phases.	-	Appendix C
Impact management outcomes.	A description and identification of impact management outcomes required for the aspects contemplated in paragraph.	Chapter 25
Impact management actions.	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Chapter 26
Financial provision.	-	Chapter 27
Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.	The method of monitoring the implementation of the impact management actions.	Chapter 28
-	The frequency of monitoring the implementation of the impact management actions.	Chapter 28
-	An indication of the persons who will be responsible for the implementation of the impact management actions.	
-	The time periods within which the impact management actions must be implemented.	
-	The mechanism for monitoring compliance with the impact management actions.	
-	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	
Environmental Awareness Plan.	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 29
Specific information required by the competent authority.	Any specific information that may be required by the competent authority.	Chapter 30

BAR requirements as per the DMRE template	EMPR requirements per the EIA Regulations, 2014 (as amended)	Reference in the report
Undertaking.	-	Chapter 31

5. NEED AND DESIRABILITY OF THE PROPOSED PROJECT

This chapter aims to provide an overview of the need and desirability of the proposed project with the strategic context of national development policy planning, broader societal needs and regional and local planning, as well as the NEMA principles of sustainable development.

5.1 BACKGROUND

The DFFE's (previously the Department of Environmental Affairs (DEA)) guideline on need and desirability (2017) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. Thus, the over-arching framework for considering the need and desirability of development in general is taken at the policy level through the identification and promotion of activities/industries/developments required by civil society as a whole. The DFFE guideline further notes that at a project level (as part of an impact assessment process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks and strategies.

In light of the above, and in alignment with the above-mentioned guideline (DFFE, 2017), this section aims to provide an overview of the need and desirability for the proposed project by highlighting how it is aligned with the strategic context of national, regional and local development policy and planning, as well as with the goals of sustainable development as outlined in NEMA.

5.2 RATIONALE FOR THE PROPOSED PROJECT

South32 has a Manganese Export Corridor Allocation on the TFR manganese line between Hotazel, in the Northern Cape, and Coega, in the Eastern Cape. The allocation is underutilised due to train loading inefficiencies of the current railway configuration at the Wessels Mine. Additionally, TFR has initiated a manganese expansion programme which will increase manganese export capacity by upgrading the rail network. TFR plans to increase capacity of the manganese rail line beyond the current four million tonnes per annum to 16 million tonnes per annum.

In order to meet the TFR's extended capacity requirements, the loading rates at the Wessels Mine need to be improved. The project is thus motivated by the inefficiency of the current railway configuration that does not allow for optimal and cost-effective loading of the manganese ore and product from the mine for transport to the market. The proposed project would allow for more ore to be loaded onto the railway carts in a shorter space of time, hereby increasing outputs and productivity. It would also decrease the need for road transport, which is considered more expensive and inefficient in relation to rail transport.

5.3 ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

The proposed project footprint is located within the Savanna Biome, the Eastern Kalahari Bushveld Bioregion and the Kathu Bushveld vegetation type. Three habitat units were identified on site, the majority of the project footprint which is located within the Transformed Area habitat unit. These units are described as follows:

- **Transformed Area Habitat Unit:** This habitat unit includes existing gravel roads and the active mining area and comprises of little to no remaining vegetation. This habitat unit is no longer representative of the associated vegetation type (Kathu Bushveld) and is considered to be of low sensitivity. Existing impacts include historic transformation due to mining, edge effects of mining activities and active mining leading to dust and noise pollution, impacting on the biodiversity of the adjacent areas;
- ***Senegalia melifera* Thicket Habitat Unit:** This habitat unit, although encroached, is considered representative of the reference vegetation type. The herbaceous layer has recovered from extended dry periods and grazing activities, providing suitable groundcover. The vegetation structure comprises encroached stands of *Senegalia melifera* with relatively homogenous grass swards scattered throughout. No alien species were identified in this habitat unit. This habitat unit is not considered a unique landscape, as it is well-represented at a regional level; and
- **Open Mixed *Senegalia melifera* – *Vachellia erioloba* – *Vachellia haematoxylon* Woodland Habitat Unit:** This habitat unit comprises a well-established and dense herbaceous layer. The habitat unit is considered representative of the reference vegetation type and the woody component is open and not encroached. No alien species were identified in this habitat unit. This habitat unit is not considered a unique landscape, as it is well-represented at a regional level.

The proposed project has the potential to directly disturb fauna and flora, with specific reference to vegetation clearing within the development footprint. Furthermore, soil is considered to be a valuable resource that supports a variety of ecological functions, and the proposed project has the potential to damage soil resources through physical disturbance, which has a direct impact on the potential loss of the natural capability of the land. As part of the EA process, independent biodiversity and agricultural specialists were appointed to determine the sensitivity of the project footprint. Measures that were considered to avoid the destruction and disturbance of biodiversity resources include limiting the extent of the development footprint. Where sensitivities could not be avoided, management actions focussed on ensuring ecological sustainability through appropriate rehabilitation measures. These management measures have been included in the EMPR, where appropriate.

5.4 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

5.4.1 National Policy and Planning Framework

5.4.1.1 National Development Plan, 2030

The NDP, 2030 provides the context for all growth in South Africa, with the overarching aim of eradicating poverty and inequality between people in South Africa through the promotion of development. The NDP, 2030 provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality based on the six focused and interlinked priorities. One of the key priorities is “faster and more inclusive economic growth”.

In order to transform the economy and create sustainable expansion for job creation, an average economic growth exceeding 5% per annum is required. One of the approaches to achieve this includes increasing exports by focusing on areas where South Africa already has natural endowments and comparative advantage, such as mining.

Notwithstanding the above, it is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- Protect the natural environment;
- Enhance the resilience of people and the economy to climate change;
- Reduce carbon emissions in line with international commitments;
- Make significant strides toward becoming a zero-waste economy; and
- Reduce greenhouse gas emissions and improve energy efficiency.

The NDP, 2030 identifies the “minerals and metals cluster” (which encompasses all mining and quarrying activities, supplier industries to the mining sector, and downstream beneficiation of mined minerals) as a sector with substantial potential for growth stimulation and/or employment. It is pointed out that South Africa must exploit its mineral resources to create employment and generate foreign exchange and tax revenue.

The proposed project does not relate directly to the exploitation of mineral resources; however, the proposed extension of the railway infrastructure is considered an ancillary activity associated with the current mining operations at the Wessels Mine. In this regard, as part of on-going mine planning, the need to extend the railway infrastructure at the mine was identified, which will improve productivity and efficiency at the mine.

5.4.1.2 New Growth Path, 2011

The New Growth Path, 2011 reflects the commitment of Government to prioritise employment creation in all economic policies and sets out the key drivers and sectors for employment which will be the focus of Government. The sectors identified for prioritisation include infrastructure, agriculture, mining, manufacturing, tourism and the green economy.

In this regard, a staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities) of the proposed project. Procurement opportunities would be sourced locally, as far as possible.

5.4.2 Regional and Local Policy and Planning Framework

5.4.2.1 Integrated Development Plan John Taolo Gaetsewe District Municipality 2019/20

The BPDM IDP, 2019-2020 is the principle strategic instrument guiding all planning, management, investment and development within the district in order to provide best solutions towards sustainable development. The vision statement of the BPDM IDP, 2019-2020 reflects its commitment to the ideal of an integrated, development-focused district and is built on the following four core values:

- Development – Strive for the development of the district and its people, while also striving for own personal development;
- Commitment – Stay committed to the vision of the JTGDM and to serving the people of the district in whatever you do;
- Care – To show empathy and care towards others, while striving to promote a positive working atmosphere; and

- **Integrity** – Stay true to whatever you commit to, performing your duties to the best of your ability, while conducting yourself professionally at all times.

Consistent with the afore-mentioned core values, five key performance areas were identified when compiling the IDP, namely:

1. Basic Service Delivery and Infrastructure;
2. Local Economic Development;
3. Financial Viability and Financial Management;
4. Good Governance and Community Participation and;
5. Municipal Transformation and Institutional Development

The proposed project is considered to relate to the afore-mentioned key performance area number 2. This is because the proposed project will support economic development through the provision of job and procurement opportunities within the region during the construction phase. It will also increase productivity and efficiency at the mine, hereby contributing to the national South African economy at macro level by exporting its product that leverages foreign income into the country.

5.4.2.2 Joe Morolong Local Municipality Integrated Development Plan, 2021/2022

The JMLM IDP, 2021/2022 identifies key performance areas which form the foundation of its five-year IDP 2016 - 2021. These include:

- Basic Service Delivery and Infrastructure Development
- Good Governance and Public Participation;
- Municipal Transformation and Organisational Development;
- Local Economic Development; and
- Municipal Financial Management and Management Viability.

The IDP identifies agriculture, mining and community services, as sectors that contribute to local economic development. As mentioned previously, the proposed project will support economic development through the provision of job and procurement opportunities within the region during the construction phase. It will also increase productivity and efficiency at the mine, hereby contributing to the national South African economy at macro level by exporting its product that leverages foreign income into the country.

5.5 CONSISTENCY WITH NEMA PRINCIPLES

When considering an application for EA, the competent authority must comply with Section 24O of NEMA and must have regard for any guideline published in terms of Section 24J of the Act and any minimum requirements for the application. This includes the DFFE's Guideline on Need and Desirability (2017). Additionally, the EIA Regulations, 2014 (as amended) require EAPs who undertake environmental assessments, to have knowledge and consider relevant guidelines. A person applying for an EA must abide by the Regulations, which are binding on the applicant.

The DFFE's Guideline on Need and Desirability (2017) sets out a list of questions which should be addressed when considering need and desirability of a proposed development. These are divided into questions that

relate to the aspects of ecological sustainability and justifiable economic and social development of the proposed project. Table 5-1 sets out the list of questions as per the Guideline.

Table 5-1: Questions to be Engaged with when Considering Need and Desirability, as per the DFFE Guideline on Need and Desirability (2017)

QUESTION	LOCATION IN REPORT/RELEVANCE
1. How will this development (and its separate elements / aspects) impact on the ecological integrity of the area?	
<p>1.1 How were the ecological integrity considerations taken into account?</p> <p>1.1.1. Threatened Ecosystems,</p> <p>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,</p> <p>1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”),</p> <p>1.1.4. Conservation targets,</p> <p>1.1.5. Ecological drivers of the ecosystem,</p> <p>1.1.6. Environmental Management Framework,</p> <p>1.1.7. Spatial Development Framework, and</p> <p>1.1.8. Global and international responsibilities relating to the environment (e.g., RAMSAR sites, Climate Change, etc.)</p>	<p>A Terrestrial Biodiversity Study was commissioned as part of the EA process. The study outlined the biodiversity sensitivities of the development footprint and recommended monitoring, mitigation and enhancement measures to limit impacts and enhance benefits have been included in the EMPR.</p>
<p>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?</p>	
<p>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?</p>	<p>See response provided above. Recommended monitoring, mitigation and enhancement measures have been included in the EMPR.</p>
<p>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?</p>	<p>Minimal volumes of construction waste will be generated by the proposed project. Measures to management waste have been included in the EMPR.</p>
<p>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?</p>	<p>A Phase I Heritage Study was commissioned as part of the EA process. No cultural/heritage resources were identified within the development footprint. Recommended monitoring, mitigation and enhancement measures to limit impacts on cultural/heritage and enhance benefits have been included in the EMPR.</p>
<p>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?</p>	<p>The proposed project does not relate directly to the development or use of non-renewable/ renewable resources; however, the proposed extension of the railway infrastructure is considered an ancillary activity associated with the current mining operations at the Wessels Mine, and associated exploitation of manganese. In this regard, as part of on-going mine planning, the need for an improved railway system was identified, and will support the current mining operations.</p>
<p>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 considering carrying capacity 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?</p> <p>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)</p> <p>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?)</p> <p>1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?</p>	
<p>1.8 How were a risk-averse and cautious approach applied in terms of ecological impacts?</p> <p>1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>1.8.2. What is the level of risk associated with the limits of current knowledge?</p> <p>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?</p>	<p>Assumptions, uncertainties and limitations associated with the compilation of this BAR are included in chapter 14. Compliance with the various legislative requirements is presented in this BAR.</p>
<p>1.9. How will the ecological impacts resulting from this development impact on people’s environmental right in terms following:</p> <p>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?</p> <p>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?</p>	<p>The impact assessment is undertaken in accordance with SLR’s methodology. The potential impacts and the significance thereof are presented in Appendix C.</p>
<p>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 socioeconomic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?</p>	

QUESTION	LOCATION IN REPORT/RELEVANCE
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?	
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 considerations?	The locality of the proposed project was determined due to the need to be in close proximity to the existing railway infrastructure. In this regard, location alternatives were not applicable to the proposed project. Design alternatives related to alternative routes, one of which included a larger railway balloon.
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?	The impact assessment is undertaken in accordance with SLR’s methodology. The potential impacts and the significance thereof are presented in Appendix C.
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 or 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”).	The need and desirability of the proposed project has been presented in terms of the consideration of the national, regional and local context.
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?	The impact assessment is undertaken in accordance with SLR’s methodology. The potential impacts and the significance thereof are presented in Appendix C.
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The proposed project aims to increase productivity and outputs associated with the mining operations at Wessels Mine. Due to the nature of the proposed project, it is not anticipated to have an impact on intergenerational impact distribution.
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?	
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 underutilised 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. Consider 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 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?	A staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities) of the proposed project. Procurement opportunities would be sourced locally, as far as possible. However, due to the limited nature and extent of the proposed project, the development is not anticipated to contribute to the other factors mentioned.
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?	Assumptions, uncertainties and limitations associated with the compilation of this BAR is included in chapter 14. Compliance with the various legislative requirements is presented in this BAR.
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?	The impact assessment is undertaken in accordance with SLR’s methodology. The potential impacts and the significance thereof are presented in Appendix C.

QUESTION	LOCATION IN REPORT/RELEVANCE
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.)?	
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	An alternatives analysis was undertaken as part of the proposed project.
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?	An EMPR has been compiled for the proposed project which will be implemented during the development's life cycle.
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?	Due to the nature of the proposed project, this is not applicable.
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?	An EMPR has been compiled for the proposed project which will be implemented during the development's life cycle.
<p>2.13. What measures were taken to:</p> <p>2.13.1. Ensure the participation of all interested and affected parties,</p> <p>2.13.2. Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</p> <p>2.13.3. Ensure participation by vulnerable and disadvantaged persons,</p> <p>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,</p> <p>2.13.5. Ensure openness and transparency, and access to information in terms of the process,</p> <p>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</p> <p>2.13.7. Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?</p>	The PPP for the proposed project was undertaken in terms of the EIA Regulations, 2014 (as amended) promulgated under NEMA. The PPP undertaken to date, as well as the proposed process for the remainder of the application process, is provided in section 7.2
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 consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	A staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities) of the proposed project. Procurement opportunities would be sourced locally, as far as possible.
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?	Project activities would comply with HMM's occupational health and safety policies and/or standards, as well as national legislation.
<p>2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:</p> <p>2.16.1. The number of temporary versus permanent jobs that will be created,</p> <p>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),</p> <p>2.16.3. The distance from where labourers will have to travel,</p> <p>2.16.4. The location of jobs opportunities versus the location of impacts (i.e., equitable distribution of costs and benefits), and</p> <p>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.).</p>	A staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities) of the proposed project. Procurement opportunities would be sourced locally, as far as possible. Due to the nature of the proposed project, no job or procurement opportunities will be created post-construction.
<p>2.17. What measures were taken to ensure:</p> <p>2.17.1. That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</p> <p>2.17.2. That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</p>	The need and desirability of the proposed project has been presented in terms of the consideration of the national, regional and local context.
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?	Measures to mitigate environmental impacts associated with the proposed project have been included in the EMPR.
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	
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?	HMM will be responsible for the implementation of the measures included in the EMPR. The financial provision has been determined to cater for the costs associated with the rehabilitation of the environmental post-closure.
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?	The locality of the proposed project was determined due to the need to be in close proximity to the existing railway infrastructure. In this regard, location alternatives were not applicable to the proposed project. Design alternatives related to alternative routes, one of which included a larger railway balloon.
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?	The impact assessment is undertaken in accordance with SLR's methodology.

6. MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVES

This section provides a motivation for the preferred site and technology alternatives relative to the proposed project.

6.1 LOCATION ALTERNATIVES

The proposed project entails the extension of the existing railway infrastructure and, therefore, it is most effective if it is adjacent to the existing railway line. It follows that no site alternatives were considered due to this fixed position.

6.2 TECHNOLOGY ALTERNATIVES

Due to the nature and limited extent of the proposed project, no technology alternatives were considered.

6.3 DESIGN ALTERNATIVES

The proposed project entails the extension of the existing railway infrastructure and the construction of a railway balloon or turning loop. One design alternative, in addition to the preferred alternative, was considered for the proposed project. The alternative railway loop was proposed to be larger than the preferred alternative (see Figure 6-1). This alternative was not considered further for assessment, due to the larger development footprint. It would require a larger area of land to be cleared, which was not considered favourable.



- Legend**
- Towns
 - +— Existing Railway
 - Upgrade to Existing Line
 - Proposed Railway Extension Layout - Preferred Alternative
 - Proposed Railway Extension Layout - Alternative 1

0 250 500 Meters
 Scale: 1:20 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

South32 Limited

Figure 6-1
Alternatives

SLR
 SLR Consulting (Africa) (Pty) Ltd
 P O Box 1596, Cramerview, 2060, South Africa
 Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

7. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

This chapter describes the alternatives considered for the proposed project and summarises the process followed to reach the preferred alternative.

7.1 DETAILS OF THE DEVELOPMENT FOOTPRINT CONSIDERED

7.1.1 Site Alternatives

As mentioned in section 6.1, the proposed project entails the extension of the existing railway infrastructure and therefore it is most effective if it is adjacent to the existing railway line. It follows that no site alternatives were considered due to this fixed position.

7.1.2 Technology Alternatives

As mentioned in section 6.2, due to the nature and limited extent of the proposed project, no technology alternatives were considered.

7.1.3 Activity Alternatives

The proposed extension of the railway infrastructure is considered an ancillary activity associated with the current mining operations at the Wessels Mine. In this regard, the need for a railway balloon was identified, as part of on-going mine planning, to increase productivity, which will decrease the time needed to load ore onto the railway carts. It follows that no other activity alternatives were considered.

7.1.4 Design Alternatives

As mentioned above, one design alternative, in addition to the preferred alternative, was considered for the proposed project. The alternative railway loop was proposed to be larger than the preferred alternative (refer to Figure 6-1). This alternative was not considered further for assessment, due to the larger development footprint. It would require a larger area of land to be cleared, which was not considered favourable.

7.1.5 No-Go Alternative

The No-Go alternative is the non-occurrence of the proposed project. The negative implications of not going ahead with the proposed project are as follows:

- Loss of opportunity to increase efficiency and productivity at the Wessels Mine, as well as associated cost savings, safety improvements and reduced carbon footprint associated with rail transport in comparison to road transport; and
- Lost job and procurement opportunities associated with the construction phase.

The positive implications of the no-go option are that there would be no effects on the biophysical environment within the development footprint.

7.2 DETAILS OF THE PPP FOLLOWED

The PPP was undertaken in accordance with the requirements of chapter 6 of the EIA Regulations, 2014 (as amended) promulgated under NEMA. In addition to this, consideration was also given to various public participation guidelines governed by the DFFE (refer to Table 4-1).

7.2.1 PPP Undertaken to Date

The PPP undertaken to date is provided in Table 7-1. Proof of the undertaking of the PPP associated with the pre-application phase has been included in Appendix D. Proof of the undertaking of the PPP associated with the application phase will be provided in the revised BAR.

Table 7-1: PPP Undertaken to Date

Step	Detail
Pre-Application Phase	
Stakeholder identification	<p>A project I&AP database was developed for the proposed project and comprises key I&APs (surrounding landowners, land users and community forums; neighbouring mines and industries, Non-Government Organisations and Associations, Parastatals and regulatory and commenting authorities (local and regional). The commenting authorities who have been identified include:</p> <ul style="list-style-type: none"> • DMRE; • DFFE; • Department of Water and Sanitation (DWS); • Northern Cape Department of Environment and Nature Conservation (DENC); • Northern Cape DRDLR (inclusive of Land Claims Commissioner); • Transnet SOC Limited; • SAHRA; • Northern Cape Department of Roads and Public Works; • JMLM; and • JTGDM.
Consultation with Land Claims Commissioner	<p>The DRDLR (Land Claims Commissioner) in the Northern Cape was contacted to confirm if there were any land claims on the properties on which the project infrastructure will be placed. The Land Claims Commissioner confirmed that no land claims have been lodged on the properties.</p>
Meetings with authorities	<p>Meetings with the DMRE and commenting authorities were undertaken on 14 July 2021 and 7 July 2021, respectively. The meetings were undertaken virtually, via Microsoft Teams, and were facilitated by SLR. The main aims of the meetings were to present the proposed project, to propose stakeholder engagement strategies and to provide a platform for any initial concerns or queries to be raised.</p>
Meetings with key stakeholders	<p>A meeting with key I&APs (landowners of properties on which infrastructure would be placed and adjacent landowners) was undertaken on 21 July 2021. The meeting was undertaken virtually, via Microsoft Teams, and was facilitated by SLR. The main aims of the meeting were to present the proposed project, to propose stakeholder engagement strategies and to provide a platform for any initial concerns or queries to be raised.</p>

Step	Detail
Background Information Document (BID)	<p>A BID (English, Setswana and Afrikaans) was compiled by SLR was made available for a public and authority review period from 1 July – 2 August 2021 on SLR’s websites (including a data-free option). The BID provided:</p> <ul style="list-style-type: none"> • Information about the proposed project; • Information about the baseline environment of the proposed project footprint; • Information regarding possible biophysical/cultural/socio-economic impacts associated with the proposed project activities; • Details pertaining to stakeholder engagement; • Information on how I&APs and commenting authorities can have input into the environmental assessment process. <p>A registration and response form was attached to the BID, which provided I&APs with an opportunity to register as an I&AP and submit comments on the proposed project.</p> <p>A notification letter (English, Setswana and Afrikaans) indicating the availability of the BID and providing the links to the SLR websites in order to access the BID, was provided to I&APs registered on the project database, via email on 1 July 2021.</p> <p>A notification (English) indicating the availability of the BID and providing a link to the SLR data-free website in order to access the BID, was provided to I&APs registered on the project database, via SMS on 1 July 2021.</p>
Site notices	<p>Six laminated A2-sized site notices (English and Setswana and English and Afrikaans) were placed at key conspicuous positions in and around Hotazel, as well as along the property boundary on 2 July 2021.</p> <p>The site notices provided information about the proposed project, details pertaining to stakeholder engagement, information on how I&APs can have input into the environmental assessment process, and information pertaining to the availability and access of the BID for review and comment.</p>
Newspaper advertisements	<p>Advertisements (English) were placed in two local newspapers. These include the <i>Kathu Gazette</i> (3 July 2021) and <i>Noordkaap Bulletin</i> (2 July 2021). The advertisements provided information about the proposed project, details pertaining to stakeholder engagement, information on how I&APs can have input into the environmental assessment process, and information pertaining to the availability and access of the BID for review and comment.</p>
Application Phase	
BAR and Non-Technical Summary (NTS)	<p>This BAR (English) and NTS (English, Setswana and Afrikaans) have been made available for a 30-day public review and comment period from 10 September – 11 October 2021 in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the environmental assessment process. Full copies of the BAR and the NTS have been placed on the SLR website (www.slrconsulting.com) and the SLR data-free website (https://slrpublicdocs.datafree.co/public-documents).</p> <p>A notification letter (English, Setswana and Afrikaans) indicating the availability of the BAR and NTS and providing the links to the SLR websites in order to access the documents, was provided to I&APs registered on the project database, via email on 9 September 2021.</p>

Step	Detail
	<p>A notification (English) indicating the availability of the documents and providing a link to the SLR data-free website in order to access the documents, was provided to I&APs registered on the project database, via SMS on 9 September 2021.</p>
<p>Revised BAR and NTS</p>	<p>This revised BAR (English) and NTS (English, Setswana and Afrikaans) will be compiled and updated with comments received from the I&APs. The revised BAR and NTS will be submitted to the DMRE for consideration and decision-making. Full copies of the revised BAR and the NTS will be placed on the SLR website (www.slrconsulting.com) and the SLR data-free website (https://slrpublicdocs.datafree.co/public-documents).</p> <p>A notification letter (English, Setswana and Afrikaans) indicating the submission of the revised BAR and NTS to the DMRE, as well as the links to the SLR websites in order to access the documents, will be provided to I&APs registered on the project database, via email.</p> <p>A notification (English) indicating the submission of the revised BAR and NTS to the DMRE, as well as the links to the SLR websites in order to access the documents, will be provided to I&APs registered on the project database, via SMS.</p>
<p>DMRE decision</p>	<p>All I&APs registered on the project database will be notified once the decision to grant or refuse EA is received. The notification letter (English, Setswana and Afrikaans) will include information on how to access the decision, as well as information pertaining to the appeal process. The notification letter will be provided to I&APs registered on the project database via email.</p> <p>A notification (English) of the afore-mentioned will also be provided by SMS.</p>

7.3 SUMMARY OF ISSUES RAISED BY I&APS

A full record of the issues and concerns raised to date have been included in Table 7-2.

Table 7-2: Full Record of Issues Raised by I&APs to date

I&AP	Date comment received	Issue raised	Response provided	Report reference where the issue and responses were incorporated
Authorities				
Natasha Higgitt (SAHRA)	7 July 2021 (at commenting authorities pre-application meeting)	It is noted that SLR will be undertaking cultural/heritage and palaeontological assessments as part of the BA process. SLR can take into consideration that an area that is highly disturbed would have limited potential for the impact on heritage resources. As part of the BA process, SLR can consider the compilation of exemption letters for cultural/ heritage and paleontological components instead.	The potential for exemption letters for the cultural/heritage and palaeontological components have been discussed with the heritage specialist, as well as through the consideration of the findings of the DFFE Screening Tool Report. Based on the outcome of the Screening Tool Report, and the level of environmental sensitivity identified, it was determined that a full HIA and a desktop paleontological study be undertaken as part of the proposed project.	Section 7.4.2, chapter 10 and Appendices C and F
Jacoline Mans (DFFE)	7 July 2021 (at commenting authorities pre-application meeting)	It is noted that a terrestrial study will be undertaken as part of the BA process. The study will cover the occurrence of protected trees on site. I am satisfied with this, given that it was noted that protected trees have been identified in the area.	A biodiversity study has been undertaken as part of the BA process for the proposed project. The presence of protected species within the project footprint has been identified and have been noted in the BAR. Recommendations to mitigate the impacts on vegetation and protected species are also included.	Section 7.4.1.5, chapter 10 and Appendices C and F
Hambulani Mashau (DMRE)	14 July 2021 (at DMRE pre-application meeting)	How long is the loop/balloon that is being extended?	The balloon loop measures at 2 500 m long with a 25 m wide corridor.	Chapter 3
		Please extend the PPP to the relevant heritage authority to verify whether or not heritage resources have been located on site.	SLR has engaged with SAHRA as part of a commenting authority pre-application meeting held on 7 July 2021. SLR has also commissioned a HIA and paleontological desktop study to verify the presence of heritage and paleontological resources on site.	Section 7.4.2, chapter 10 and Appendices C and F
Johannes Nematatani (DMRE)	14 July 2021 (at DMRE pre-application meeting)	Does SLR intend to follow a BA process?	A BA process will be followed as the proposed project triggers Listed Activities in contained in Listing Notice 1.	Table 3-1
		Please note that a copy (hard or soft copy) of the BAR must be provided to the commenting authorities, not only a notification letter. Please engage with each authority as to what their specific requirements are in order to conduct a proper PPP.	SLR has engaged with commenting authorities as part of a commenting authority pre-application meeting held on 7 July 2021. SLR will also engage with all commenting authorities with regard to the format they prefer for the review of project documentation.	Appendix D
		Please load the application on the South African Heritage Resources Information System (SAHRIS).	SLR has engaged with SAHRA as part of a commenting authority pre-application meeting held on 7 July 2021. The project documentation will be uploaded onto SAHRIS as part of the BA process and will ensure that final comment is received from SAHRA.	Appendix D
Landowners, Land Users and Adjacent Landowners and Land Users				
Michelle Reynecke	6 July 2021 (email)	As representative of the landowner of Nchwaning Farm 267, and holder of the property lease for Dikgatlong 268 we would like to register as an I&AP for the proposed railways infrastructure extension at Wessel Mine, South32.	Michelle Reynecke was included on the I&AP database for the proposed project.	Appendix D
		I have read through the background information. May I please request a more detail map for the proposed extension.	A detailed map, as requested, was provided to Michelle Reynecke via email by Rizqah Baker on 12 July 2021.	N/A
		From the background information I do understand that South32 are the mining right holder (mineral rights) of the four properties, but they are not the surface use right holder and/or landowners of Nchwaning 267, Dikgatlong 268 and Dibiagomo 226. Please confirm that the information is on SLR's side the same.	HMM is the landowner of portions 1 and 2 of the farm Dibiaghomo 226 and portion 1 of the farm Dikgathlong 268. This information is verified by the Windeed database. There are other surface rights owners of portions of the afore-mentioned farms.	
		Furthermore, may I please ask that you forward me the draft BAR and EIA.	A notification letter (English, Afrikaans and Setswana) has been provided to all I&APs registered on the project database notifying them of the availability of this BAR for review and comment. The notification letter provided links to the SLR websites (including a data-free option) that I&APs can use to access the full BAR and NTS.	Section 7.2
	21 July 2021 (at key I&AP focussed meeting)	Will the work not pass the servitude into N'Chwaning south? In other words, will you be working (doing upgrades) in the line running by the square piece by N'Chwaning Mine?	The proposed upgrades to the existing railway line will not be undertaken outside of the existing servitude.	Chapter 3

I&AP	Date comment received	Issue raised	Response provided	Report reference where the issue and responses were incorporated
		Are there going to be changes where the existing railway is coming into the South32 laydown area?	The proposed project entails upgrading the existing railway line within the existing servitude up until where the railway ties into the existing Assmang loop.	Chapter 3
		Where the loop turns onto the farm Dibiaghomo, will negotiations with the surface right owner be undertaken? It is understood that South32 does not own this land.	Both the surface rights and mining rights of portion 2 of the farm Dibiaghomo 226 are owned by HMM. This information is verified by the Windeed database. Negotiations with other surface right owners, where HMM is not the owner, will be undertaken. This process; however, will be undertaken as part of a separate process to the BA process.	Section 7.4.3.2
		A major concern is that of dust created by the laydown station and the impact it has on the adjacent land. Dust affects the grazing capabilities of the adjacent land.	HMM will comply with the provisions of the EMPR which will include dust suppression measures during the construction phase.	Chapter 12 and Appendix C
		With regards to the loop, will South32 be doing a laydown station similar to what UMK and Assmang have?	The railway balloon will be tied to the existing laydown station. In future another laydown station will be constructed but it does not form part of the current BA process.	Chapter 3
Melissa Pillay	2 August 2021 (email)	Good day. Please register myself and Gomolemo (cc'd in this email) as I&APs for the project mentioned below. Also, provide me with an update on the application. Thank you	Melissa Pillay and Gomolemo Fritz were added to the I&AP database for the proposed project. An update on the BA process, was requested, was provided to Melissa Pillay via email by Rizqah Baker on 3 August 2021.	Appendix D
	4 August 2021 (email)	Good morning. Can you send me a BID?	A BID, as requested, was provided to Melissa Pillay via email by Rizqah Baker on 4 August 2021.	N/A
Joseph and Engela van der Walt	8 August 2021 (email)	Good day. Can we please be registered as an interested and affected party on the proposed extension of the Wessels Mine railroad. We gain entrance to our farm driving next to Wessels security fence and our turn off is more or less at the proposed turn of the new extension. We farm on the remaining portion of the farm Dibiaghomo. Thank you.	Joseph and Engela van der Walt were added to the I&AP database for the proposed project.	Appendix D
Other I&APs				
Modiegi Matsietsa	2 July 2021 (email)	God afternoon. I would like to know if there are any sub-contracting opportunities for local contractors.	A staff complement of approximately 250 individuals would be required for the construction phase (skilled and unskilled job opportunities). Procurement opportunities would be sourced locally, as far as possible. The appointment of contractors for the construction phase does not form part of the BA process. HMM and South32 would need to be contacted at the relevant stage of development.	Chapter 3
Moses Moalahi	8 July 2021 (email)	Thanks once again to let us know about current activities which are taking place in Wessels mine South 32. Last time I registered as an interested party for the new development which was also taking place at Mamatwan Mine South 32. At Mamatwan my interest was to have access to waste rock for aggregate and to use it for the construction of the roads, bricks and paving blocks making including other road materials like culverts & bridges/rails concrete components. Recycling of waste rock from the mine was also the initiative of South 32 Mine because last year they advertised in our local newspapers looking for local SMME'S which are interested in recycling of the waste rock from the mine. I was also interested in having access to wastewater from the mine to use it during road construction and irrigation of lucerne or gain/maize for animal feedings. In short, I hereby registered once again to have access to waste rock for aggregate and wastewater from both mines, Wessels, Mamatwan including UMK mine. Last but not list, I also interest to work with the Engineers for both mines during construction at Mamatwan and Wessels. Looking forward for your positive response		

7.4 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROPOSED PROJECT AND THE ALTERNATIVES

An understanding of the biophysical, cultural/heritage and socio-economic context and sensitivity within which the proposed project is located is important in understanding the potential impacts of the project. This section provides a description of these attributes in the receiving environment of the project footprint.

7.4.1 Baseline Biophysical Environment Affected by the Proposed Activity

7.4.1.1 Geology

Introduction

Mineral resources can be sterilised and/or lost through the placement of infrastructure and activities in close proximity to resources, by preventing access to potential mining areas. Geological processes can also influence soil forms and the potential for palaeontological resources.

A baseline situational analysis is described below in order to understand:

- The potential for sterilisation of mineral reserves; and
- The potential for geological lineaments such as faults and dykes. Faults, dykes and other lineaments can act as preferential flow paths of groundwater, which can influence both the dispersion of potential pollution plumes and the inflow of water into mine workings.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (Knight Piésold (Pty) Ltd (KP), 2018), the Geohydrology Specialist Report for the Wessels Mine (GHT Consulting (GHT), 2017) and the Scoping Report for the Changes to the Infrastructure Layout and Activities at the Mamatwan Manganese Mine (MMT) (SLR, 2021).

Description

Regional Geology: The world's largest land-based sedimentary manganese deposit is contained in the Kalahari Manganese Field (KMF), situated 47 km north-west of Kuruman in the Northern Cape. The general stratification of the KMF is illustrated in Figure 7-1. The KMF comprises five erosional, or structurally preserved, relics of the manganese bearing Hotazel Formation of the Paleoproterozoic Transvaal Supergroup. These include the Mamatwan-Wessels deposit (also known as the main Kalahari Basin), the Avontuur and Leinster deposits, and the Hotazel and Langdon Annex/Devon deposits. Wessels is located in the Hotazel Formation (Transvaal Supergroup). The Hotazel Formation typically consists of repeated thin layers of black iron oxides (magnetite or hematite) alternating with bands of iron-poor shales and cherts – known as the banded iron formations.

The Hotazel Formation is underlain by basaltic lava of the Ongeluk Formation (Transvaal Supergroup) and directly overlain by dolomite of the Mooidraai Formation (Transvaal Supergroup). The Transvaal Supergroup is overlain unconformably by the Olifantshoek Supergroup which consists of arenaceous sediments, typically interbedded shale, quartzite and lavas overlain by coarser quartzite and shale. Sulphide-bearing Olifantshoek Group sediments, comprising Mapedi Formation shales and mudstones, and the Lucknow

Formation quartzite horizons are of significance at Wessels Mine. The whole Supergroup has been deformed into a succession with an east-verging dip.

Supergroup / Group / Subgroup / Formation			Geological Description	
Kalahari Group			Kalahari sands, calcrete, clays & gravel beds	
Kalahari unconformity				
Karoo Supergroup			Dwyka tillite	
Dwyka unconformity				
Olifantshoek Supergroup	Lucknow Formation		White ortho-quartzite	
	Mapedi Formation		Green, maroon and black shales and quartzites	
Olifantshoek unconformity				
Transvaal Supergroup	Postmasburg Group	Voelwater Subgroup	Mooidraai Formation	Dolomite, Chert
			Hotazel Formation	Banded ironstone (upper)
				Upper Manganese Ore Body
				Banded Ironstone (middle)
				Middle Manganese Ore Body
				Banded Ironstone (middle)
				Lower Manganese Ore Body
			Banded Ironstone (lower)	
		Ongeluk Formation	Andesitic Lava	

Figure 7-1: General Stratigraphic Column for the KMF

The Olifantshoek Supergroup is overlain by Dwyka Formation which forms the basal part of the Karoo Supergroup, this consists of tillite (diamictite) which is covered by sands, claystone and calcrete of the Kalahari Group.

Local Geology: Wessels Mine exploits the northernmost portion of the KMF, which is an orebody preserved in a 40 km long (north – south) by 15 km wide (east - west) basin. It occupies a gently folded structure, the Dimothen syncline, which plunges at a shallow angle (3° to 8°) to the north-north-west. The Hotazel Formation (Voëlwater Subgroup, Postmasburg Group) of the Transvaal Sequence hosts the manganese mineralisation at Wessels Mine.

The volcanogenic – sedimentary manganese enriched horizons are erosional or structurally preserved relicts of the Proterozoic aged Hotazel Formation. The latter is characterised by three manganese rich horizons separated by Banded Ironstone Formations (BIF). The lowermost of the three units, the Lower Body (LB) is the only unit presently being mined. High grade (on average 48%) Wessels type manganese mineralisation occurs at Wessels Mine. The ore is typically coarse grained, shiny, massive or vuggy with the principal ore minerals being Hausmannite and Braunitz II.

The Hotazel Formation is underlain by the Ongeluk Formation lava and, unconformably overlain by interbedded red shales of the Proterozoic Mapedi Formation (Olifantshoek Group). The unconformity is known as the Olifantshoek Unconformity. The Mapedi lithologies are in turn overlain by remnants of Lucknow Formation quartzite and Karoo age Dwyka Formation tillite (preserved in the north-eastern portion of Wessels Mine) and finally a cover of Kalahari Quaternary age alluvial/fluvial sediments. The tillite also truncates unconformably into the underlying sediments.

Lineaments: Structural deformation near Wessels Mine is significantly more complex than further south within the basin. Faulting is dominated by north - south and east-north-east – west-south-west trending systems. Fault displacements vary in scale from cm to m. Sub-vertical displacements of up to 200 m have been recorded. Differential movement parallel or sub-parallel to bedding planes also occurs. These are commonly defined at Wessels Mine as shear planes. Dykes occurring at Wessels Mine are primarily orientated in a north-east – south-west direction, often following older fault surfaces. Thicknesses vary from 10's of cm to several m (up to 70 m have been recorded). Normal thicknesses are; however, in the order of 20 - 30 m. No dykes and faults have been identified beneath the project footprint.

Conclusion

Where new permanent infrastructure is placed within close proximity to mineable ore there is the possibility that sterilisation can occur. It is not envisaged that the location of the proposed railway balloon will result in any sterilisation of minerals. No dykes and faults have been identified beneath the project footprint. There are; however, dykes located further afield from the project footprint. These lineaments are not considered to be preferential flow paths for contamination and therefore do not affect the site selection or design of the proposed railway balloon.

7.4.1.2 Topography

Introduction

Changes to topography through the development of the proposed project may impact on surface water drainage, visual aspects and the safety of both people and animals. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018) and the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021).

Description

Regional Topography: The broader environment is characterised by terrain that is predominantly flat with a gentle slope towards the north-west. The elevation varies from 1 087 m to 1 107 m above mean sea level (mamsl). There are two ranges of high ground running through the region from south to north. The eastern range contains the Asbestos Mountain and Kuruman Hills. To the west are the Langeberg and Koranna mountains. The natural topography of the area surrounding the Wessels Mine has been largely influenced by mining activities associated with the Nchwaning Mine and Black Rock Mine, and mines further afield, including the MMT, United Manganese of Kalahari (UMK) and the Tshipi Borwa mines.

Local Topography: The Wessels mining area is predominantly flat with the only significant topographical features being the tailings storage facility (TSF), stockpiles and WRDs. Majority of the project footprint has been transformed by existing mining operations and activities; therefore, the topography of the site has been altered.

Conclusion

Mining activities, infrastructure and communities have the potential to alter the topography and the natural state of undisturbed areas. An alteration of the natural topography has the potential to impact both animals and people. The proposed project; however, does not pose safety risks to third parties and animals, as the topography within the project footprint has already been largely transformed and is largely located within the boundary of the Wessels Mine which is access-controlled.

7.4.1.3 Climate

Introduction

Climate can influence the potential for environmental impacts and related mine design. Specific issues are listed below:

- Rainfall could influence erosion, evaporation, vegetation growth, rehabilitation planning, dust suppression, and surface water management planning;
- Temperature could influence air dispersion through impacts on atmospheric stability and mixing layers, vegetation growth, and evaporation which could influence rehabilitation planning; and
- Wind could influence erosion, the dispersion of potential atmospheric pollutants, and rehabilitation planning.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018) and the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021).

Description

Climate: The project footprint falls within an area typical of the central Kalahari Desert and within the Northern Steppe Climatic Zone, as defined by the South African Weather Bureau (SAWB). This is a semi-arid region characterised by seasonal rainfall, hot temperatures in summer, and colder temperatures in winter.

Rainfall: Rainfall data from the Mukulu Station is provided in Table 7-3, for the period 1912 – 2017. The Mukulu Station is located approximately 6 km from the Wessels Mine and is the closest station to the project area with a reliable record. Rainfall records for this region seem to vary with 250 mm per annum being reported for Hotazel, 375 mm per annum reported for a local game ranch, whilst rainfall maps, weather service data and other sources of rainfall data all suggest rainfall for the site that varies between 250 - 380 mm per annum. The Mean Annual Precipitation (MAP), as indicated by the Mukulu Station, is 289 mm per annum.

Table 7-3: Rainfall Data from the Mukulu Station

Name of rainfall station	Rainfall station number	Distance (km)	Latitude (°)(')	Longitude (°)(')	Record (years)	MAP (mm)
Mukulu	0392640_W	5.91	27° 10'	22° 51'	106	289

The average monthly rainfall depths are indicated in Figure 7-2. Approximately 81% of the annual rainfall falls in summer, between October – March, in the form of showers with the maximum amount of precipitation falling in February. Rainfall events are generally short, with most rainfall events occurring in one day.

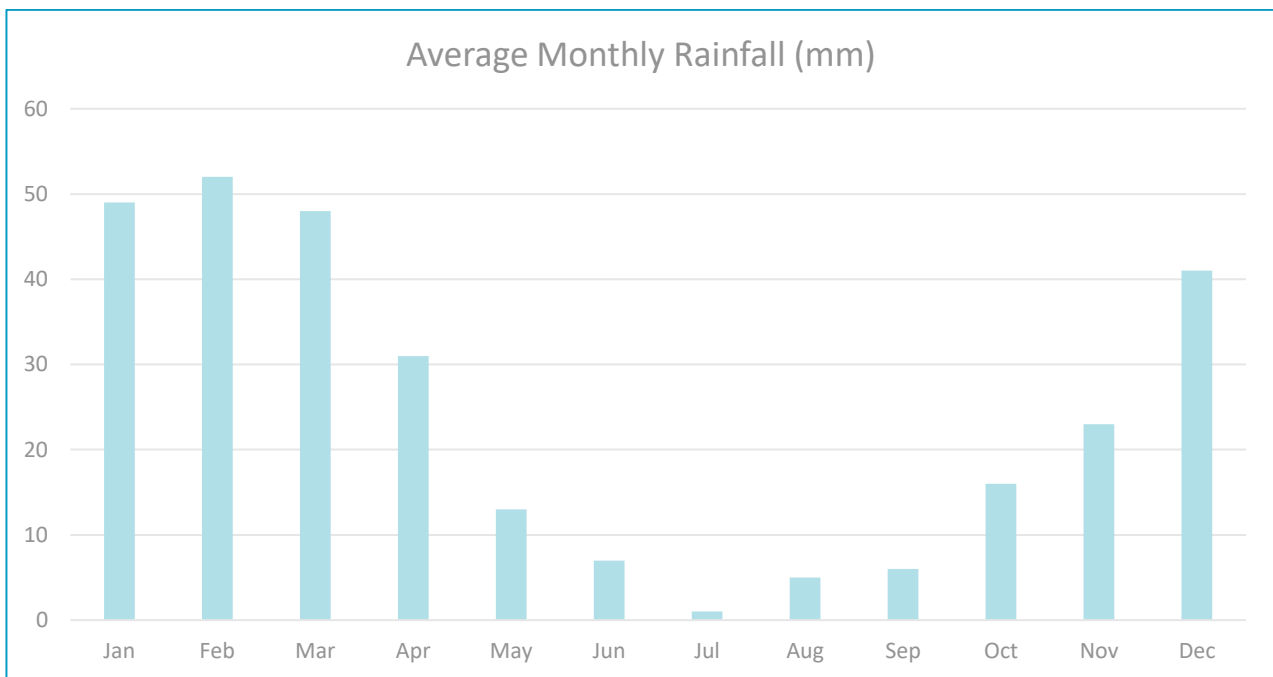


Figure 7-2: Monthly Rainfall (Mukulu Station Measured Data, 1912 - 2017)

Wind: The annual average wind roses for the Kuruman Weather Station (located approximately 60 km west of Wessels Mine) for the years 2015, 2016 and 2017 are shown in Figure 7-3, with the period average wind field (2015 - 2017) and diurnal variability in the wind field provided in Figure 7-4. The predominant wind direction is from the south-south-east and south with most of strong winds from the west. Frequent winds also occur from the north. Over the three-year period (2015 – 2017), the frequency of occurrence of south-south-easterly wind was between 12% and 17%, with winds with a westerly component occurring approximately 15% of the time. Winds occur less frequently from the easterly sector. During the day winds are more frequent from the westerly and the northerly sectors, with the strongest winds directly from the west. The wind shifts during the night-time to dominantly south-south-easterly and southerly winds. Day-time calms occurred for 9% of the time, with night-time calms for 24% of the time.

According to the Beaufort wind force scale, wind speeds between 6-8 m/s equates to a moderate breeze, with wind speeds between 14-17 m/s near gale force winds. Based on the three years of South African Weather Service (SAWS) data (2015 - 2017), wind speeds exceeding 6 m/s occurred for only 1% of the time, with a maximum wind speed of 10 m/s. The average wind speed over the three years was 2.06 m/s. Calm conditions (wind speeds < 1 m/s) occurred for 17% of the time. The United States Environmental Protection

Agency (US EPA) indicates a friction velocity of 5.4 m/s to initiate erosion from a coal storage piles (US EPA, 2006). Thus, the likelihood exists for wind erosion to occur from open and exposed surfaces, with loose fine material, when the wind speed exceeds at least 5.4 m/s. Wind speeds exceeding 5.4 m/s occurred only for 2% over the three years (2015 - 2017).

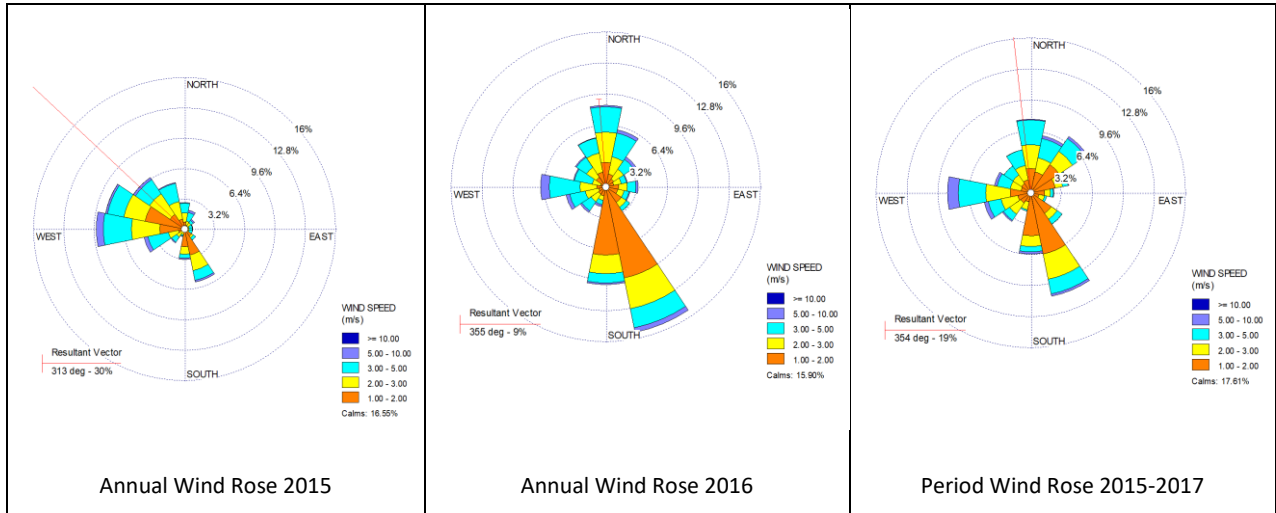


Figure 7-3: Period and Annual Wind Roses (Kuruman Weather Station Measured Data, 2015 – 2017)

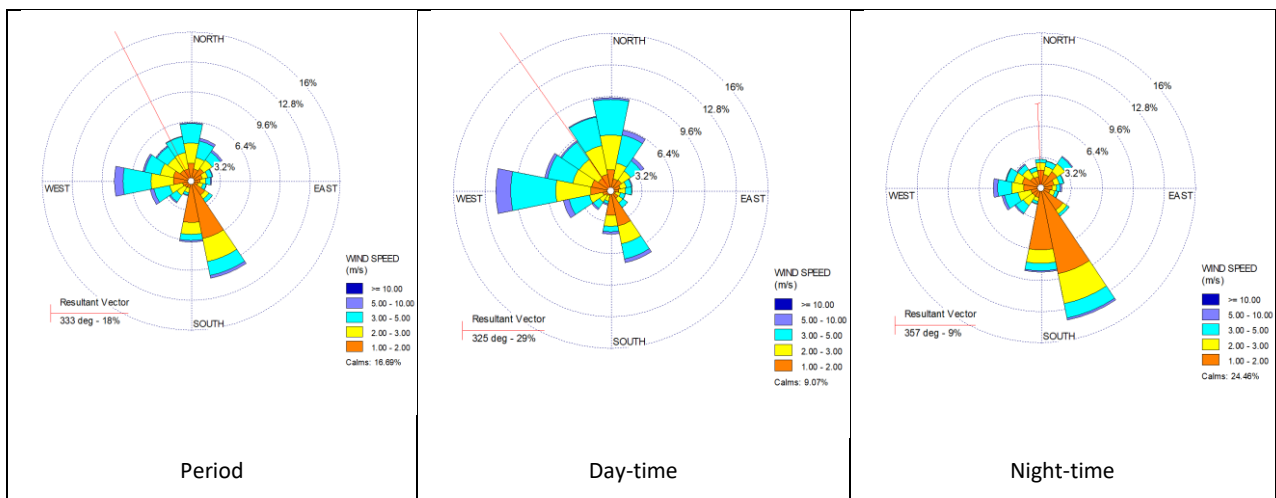


Figure 7-4: Period, Daytime and Night-time Wind Roses (Kuruman Weather Station Measured Data, 2015 – 2017)

Ambient Temperature: Average daily maximum temperatures for January (the hottest month) in the order of 30°C are expected, but temperatures as high as 45°C are not uncommon during hotter periods. Average minimum temperatures of 1°C are expected in the mid-winter months, but low humidity will preclude the possibility of frost.

Conclusion

The project area’s semi-arid region is characterised by erratic rainfall, hot temperatures in summer and cold temperatures in winter. High rainfall events can increase the erosion potential and the formation of erosion gullies. The presence of vegetation does however allow for surface infiltration thereby reducing the effects of erosion. Wind significantly affects the amount of material that is suspended from exposed surface to the atmosphere. The wind speed determines the distance of downward transport, as well as the rate of dilution

of pollutants in the atmosphere. Where wind speeds increase above 5m/s the possibility of dust dispersion increases and this will require consideration from a planning and management perspective. These climatic aspects need to be taken into consideration as part of the project's management planning.

7.4.1.4 Soils and Land Capability

Introduction

Soils are an important component of most ecosystems. Soil is the medium in which most vegetation grows and a range of vertebrates and invertebrates exist. In the context of mining operations, soil is even more significant if one considers that mining is a temporary land use, whereafter rehabilitation (using soil) is the key to re-establishing post closure land capability that will support post closure land uses.

Mining projects have the potential to damage soil resources through physical loss of soil and/or the contamination of soils, thereby impacting on the soils' ability to sustain natural vegetation and altering land capability. Contamination of soils may in turn contribute to the contamination of surface and groundwater resources. Loss of the topsoil resource reduces chances of successful rehabilitation and restoration. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the Soil and Agricultural Assessment as Part of the BA Process for the Proposed Extension of the Railway Infrastructure at the Wessels Mine, Northern Cape Province (TerraAfrica, 2021).

Description

Soil Distribution and Forms: The distribution of soils is closely linked to the topography and parent materials from which they are derived. The better drained soils are generally associated with a less basic parent material; while the more structured and more clay rich (less easily drained) soils are associated with the intrusive, basic parent material.

The project area consists of two soils forms namely, the Ermelo Form and the Witbank Form. The Ermelo Form consists of bleached to slightly chromic sandy topsoil that is underlain by yellow-brown apedal subsoil that is deeper than 1.5 m. This soil form is well-drained, structureless (apedal), supports natural vegetation and has a grazing land capability. The Witbank Form represents soils that were previously natural soils, and consists of a mixture of natural soils, anthropogenic materials and excavated areas.

Land Capability: The Ermelo Form with its deep, sandy profiles has the potential for arable land capability and could be suitable for irrigated crop production. However, due to unfavourable climatic conditions, the land capability is that of extensive grazing. Where Witbank Soil Forms are located, the land capability is that of wilderness. This is because vegetation in these areas is sparse or absent.

Conclusion

The land capability within the project footprint is that of extensive grazing and wilderness. In this regard, soil management is important if the land capability is to be appropriately reinstated as part of closure activities.

7.4.1.5 Biodiversity

Introduction

In the broadest sense, biodiversity provides value for ecosystem functionality, aesthetic, spiritual, cultural, and recreational reasons. The known value of biodiversity and ecosystems is as follows:

- Soil formation and fertility maintenance;
- Primary production through photosynthesis, as the supportive foundation for all life;
- Provision of food and fuel;
- Provision of shelter and building materials;
- Regulation of water flows and water quality;
- Regulation and purification of atmospheric gases;
- Moderation of climate and weather;
- Control of pests and diseases; and
- Maintenance of genetic resources.

The establishment of infrastructure, as well as certain supportive activities have the potential to result in the loss of vegetation, habitat and related ecosystem functionality through physical disturbance and/or contamination of soil and/or water resources. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the Biodiversity Assessment as Part of the BA Process for the Proposed Extension of the Railway Infrastructure at the Wessels Mine, Northern Cape Province (Scientific Terrestrial Services (STS), 2021).

Description

Flora: The Wessels Mine is located within the Savannah Biome. The Savannah Biome comprises various vegetation types, one of which is within the project area – the Kathu Bushveld vegetation type (see Figure 7-5). The Kathu Bushveld vegetation type is characterised by *Vachellia erioloba*, *V. karroo*, *Searsia lancea* and *Ziziphus mucronate* and is found within the North West and Northern Cape provinces of South Africa. The shrub layer is generally poorly developed, with *Grewia flava* and *Tarchonanthus camphoratus* and an open grass layer, with much bare soil in places. The Kathu Bushveld has been identified by the National Biodiversity Assessment (NBA) 2018 as poorly protected and of Least Concern.



- Legend**
- Towns
 - +— Existing Railway
 - Proposed Railway Extension Layout
 - Upgrade to Existing Line
- Vegetation Types**
- Open Mixed Senegalia mellifera – Vachellia erioloba – Vachellia haematoxylon Woodland
 - Senegalia melifera Thicket
 - Transformed

0 100 200 Meters
 Scale: 1:8 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

South32 Limited

Figure 7-5

Vegetation Types



SLR Consulting (Africa) (Pty) Ltd
 P O Box 1596, Cramerville, 2060, South Africa
 Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Following a field assessment undertaken by STS on 10 June 2021, three broad habitat units were distinguished at the project footprint (see Figure 7-6). These are as follows:

- Transformed Area Habitat Unit: This habitat unit includes existing gravel roads and the active mining area and comprises of little to no remaining vegetation. This habitat unit is no longer representative of the associated vegetation type (Kathu Bushveld) and is considered to be of low sensitivity. Existing impacts include historic transformation due to mining, edge effects of mining activities and active mining leading to dust and noise pollution, impacting on the biodiversity of the adjacent areas;
- Senegalia Melifera Thicket Habitat Unit: This habitat unit, although encroached, is considered representative of the reference vegetation type. The herbaceous layer has recovered from extended dry periods and grazing activities, providing suitable groundcover. The vegetation structure comprises encroached stands of *Senegalia melifera* with relatively homogenous grass swards scattered throughout. No alien species were identified in this habitat unit. This habitat unit is not considered a unique landscape, as it is well-represented at a regional level; and
- Open Mixed Senegalia Melifera – Vachellia erioloba – Vachellia haematoxylon Woodland Habitat Unit: This habitat unit comprises a well-established and dense herbaceous layer. The habitat unit is considered representative of the reference vegetation type and the woody component is open and not encroached. No alien species were identified in this habitat unit. This habitat unit is not considered a unique landscape, as it is well-represented at a regional level.

Dominant trees and shrubs, herbs and forbs and graminoids identified within the project footprint is provided in Table 7-4. Protected species are shade in green. A full list of floral species recorded on site is provided in the Biodiversity Study (see Appendix E).



- Legend**
- Towns
 - +— Existing Railway
 - Proposed Railway Extension Layout
 - Upgrade to Existing Line
- Habitat Units**
- Intermediate
 - Low

0 100 200 Meters
 Scale: 1:8 000 @ A3
 Projection: Transverse Mercator
 Datum: Hartbeeshoek, Lo 23

South32 Limited

Figure 7-6
Habitat Units



SLR Consulting (Africa) (Pty) Ltd
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Table 7-4: Dominant Floral Species Identified with the Project Footprint

Species Type	Species			
Tree and Shrub Species	<i>Grewia flava</i>	<i>Melolobium candicans</i>	<i>Senegalia mellifera</i>	
	<i>Vachellia erioloba</i>		<i>Vachellia haematoxylon</i>	
Herb and Forb Species	<i>Aptosimum elongatum</i>	<i>Crotalaria orientalis</i>	<i>Cucumis africanus</i>	<i>Dimorphotheca sp.</i>
Graminoid Species	<i>Eragrostis lehmanniana</i>		<i>Schmidtia kalahariensis</i>	

The following floral species of conservation concern (SCC), as per the national and provincial protected species regulations (NFA, NCNCA and the NEM: BA), were identified within the project footprint:

- *Vachellia erioloba* (protected as per the NFA);
- *Vachellia haematoxylon* (protected as per the NFA);
- *Harpagophytum procumbens* (protected as per the NCNCA and NEM: BA); and
- *Boophone disticha* (protected as per the NCNCA).

It is noted that none of the afore-mentioned species are considered threatened according to the Red-Data List (RDL) of South African plants. Notably, no alien species were identified within the project footprint; however, there do occur within the region and are known to flourish specifically in disturbed areas.

It is important to note that as part of the proposed project, consideration was given to provincial and national biodiversity sensitivity databases, such as the National Protected Areas Expansion Strategy (NPAES) 2010, the South African Conservation Areas Database (SACAD) 2020, the South African Protected Area Database (SAPAD) 2020, the Important Bird Areas (IBAs) 2015, the National Freshwater Ecosystem Priority Areas (NFEPA) Database 2011, the Northern Cape Critical Biodiversity Area (CBA) 2016 database and the Strategic Water Source Areas (SWSA) for Surface Water (2017) database. The project footprint does not fall within or within 10 km of any sensitive habitats identified in these databases (except the NPAES database – the project footprint is approximately 4 km south-east of the Eastern Kalahari Bushveld Focus Area).

Fauna: Anthropogenic activities, as well as historic grazing in the local area have resulted in a decline of habitats associated with the project footprint. In particular, overgrazing has led to a decline in more favourable and palatable herbaceous species, impacting on food availability for fauna in the surrounding area. Increased human presence in the area has further led to a decline of larger mammal species due to increased levels of persecution (snaring/hunting) and competition for space. Due to the arid nature of the environment, food and water resources are not as readily available for fauna, which has been further compounded by the degraded state of the habitats. As such, faunal species must range over larger distances to meet their individual energy requirements. Mines, roads and the current railway have impacted upon habitat connectivity to the west, whilst connectivity to the east is still largely unhindered by large scale developments.

Following a site assessment undertaken by STS on 10 June 2021, it was revealed that invertebrate abundances were low. However, this is likely attributable to the winter season. Insects play an integral role in ecosystem maintenance and are also a primary food resource for many species in arid regions, the decline of which places increased stresses on insectivorous species and has a notable knock-on impact for other

species. The decline in suitable herbaceous material and the encroachment of woody species in areas has led to a decrease in suitable habitat. Suboptimal habitat conditions as well as anthropogenic activities have led to a cascading effect on faunal species which is evident in the loss of species diversity and abundances adjacent the mine.

Species, or signs thereof, observed within the project footprint are provided in Table 7-5. A full list of faunal species recorded on site is provided in the Biodiversity Study (see Appendix E).

Table 7-5: Faunal Species, or Signs thereof Identified with the Project Footprint

Species Type	Scientific Name	Common Name
Mammals	<i>Cryptomus hottentosus</i>	Common Mole Rat
	<i>Elephantulus intufi</i>	Bushveld Sengi
	<i>Hystrix africaeaustralis</i>	Porcupine
	<i>Lepus capensis</i>	Cape Hare
	<i>Lupulella mesomelas</i>	Black-Backed Jackal
	<i>Raphicerus campestris</i>	Steenbok
Avifauna	<i>Tragelaphus strepsiceros</i>	Kudu
	<i>Calendulauda africanoides</i>	Fawn-Coloured Lark
	<i>Cercotrichas paena</i>	Kalahari-Scrub Robin
	<i>Prinia masulosa</i>	Karoo Prinia
	<i>Sigelus silens</i>	Fiscal Fly-Catcher
Arachnids	<i>Tchagra senegalus</i>	Back-Crowned Tchagra
Insects	<i>Ageledidae sp</i>	Funnel-Web Spide
	<i>Cynthia cardui</i>	Painted Lady Butterfly
	<i>Danaus chrysippus</i>	African Monarch
	<i>Pachylomerus femoralis</i>	Flattened Giant Dung Beetle
Reptiles	<i>Sternocera sp</i>	Giant Jewel Bug
	<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizard
Amphibians	<i>Agama aculeata</i>	Ground Agama
		None

No faunal SCC were identified on site. While faunal SCC may occur within the project footprint and in the region, they are unlikely to be wholly reliant on the areas affected by the proposed project.

Conclusion

Three habitat units were identified within the project footprint, namely the Senegalia Melifera Thicket, the Open Mixed Senegalia Melifera – Vachellia erioloba – Vachellia haematoxylon Woodland and Transformed Areas. Protected floral species, as per the FNA, NCNCA and the NEM: BA have been identified within the project footprint, which would need to be managed as part of the proposed project. While no alien species were identified, they do occur elsewhere in the region and are known to proliferate in disturbed areas. In

this regard, alien species would need to be managed as part of the proposed project, as well as part of rehabilitation measures post-closure.

7.4.1.6 Surface Water

Introduction

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Mine-related activities have the potential to alter the drainage of surface water through the establishment of infrastructure and/or result in the contamination of the surface water resources through seepage and/or spillage of process materials and non-mineralised (general and hazardous) and mineralised wastes. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Wessels Mine Surface Water Study (KP, 2017) and the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021).

Description

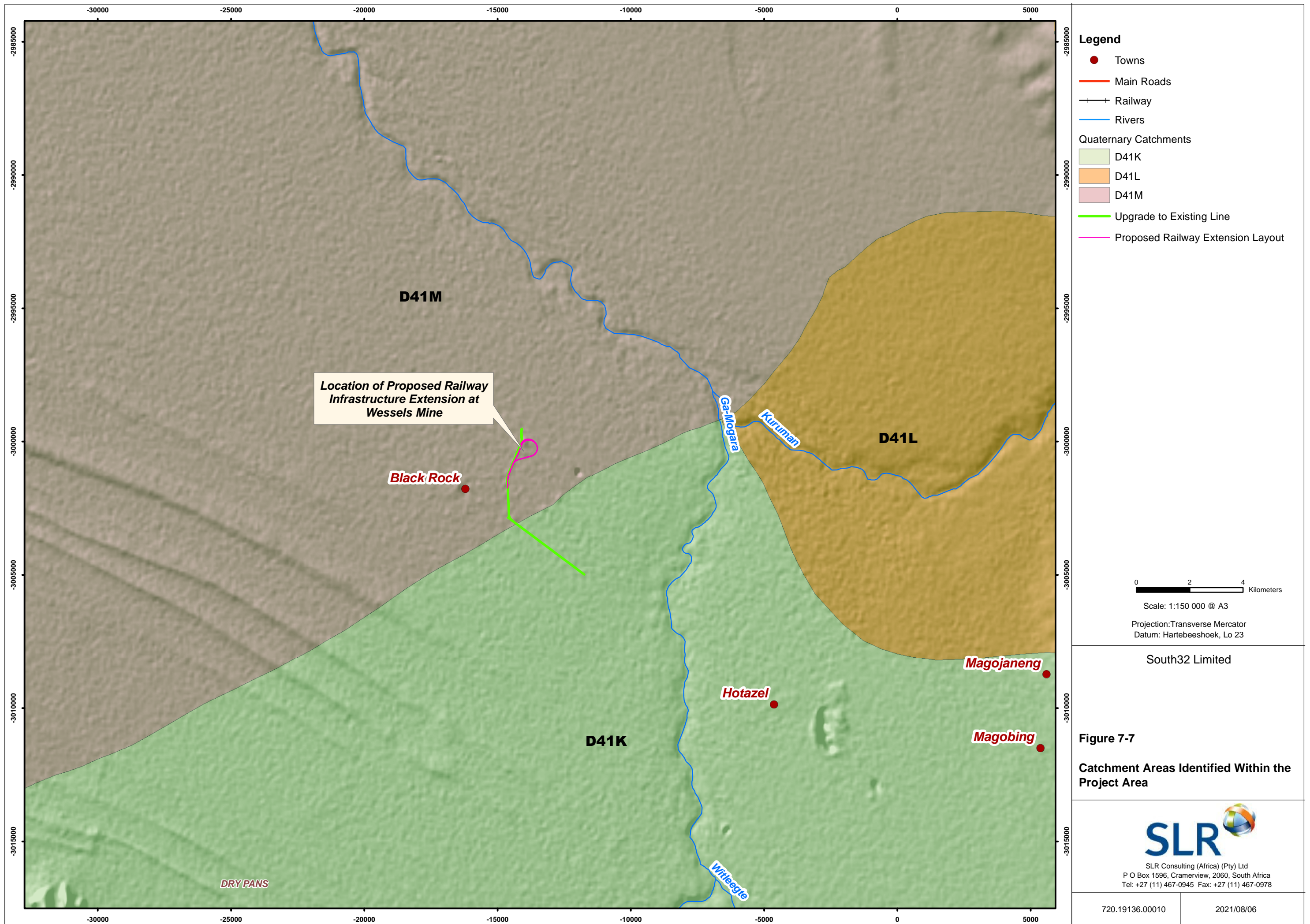
Catchments: The Wessels Mine is located within the Lower Vaal Water Management Area (WMA) (Primary Catchment D) and within the quaternary catchment D41M (see Figure 7-7). The quaternary catchment D41M has a catchment area of 2 628 km², a mean annual runoff (MAR) of 0.6 mm and a MAP of 305 mm. The Lower Vaal WMA is located downstream of the Bloemhof Dam and upstream of the Douglas Weir. Major rivers in the WMA include the Molopo, Harts, Dry harts, Kuruman and Vaal Rivers.

Surface Water Resources: The Ga-Mogara and Kuruman Rivers (non-perennial) are located approximately 13 km east and 4.7 km north-east of the Wessels Mine, respectively. No other drainage line or wetlands have been identified within or in close proximity to the Wessels Mine and project footprint.

Surface Water Use: Agricultural activities are the main activities downstream of the Wessels Mine. These activities include livestock (beef and dairy cattle, goats, non-wooled sheep, pigs and ostriches) and dryland cropping (maize, sunflower, cotton, groundnuts and vegetables). Other mining activities with reliance on water in the WMA include mining for diamonds, iron ore, manganese and other minerals, such as limestone, dolomite and amphibole asbestos.

Conclusion

Mining infrastructure has the potential to influence contributions of runoff to the catchment and related natural drainage patterns. In addition to this, mining activities and infrastructure present contamination sources that have the potential to pollute surface water resources. These impacts must be considered during the proposed project; however, given that there are no surface water resources in close proximity to the project footprint, it is not anticipated that surface water resources would be affected.



7.4.1.7 Groundwater

Introduction

Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in soil/rock pore spaces and in the fractures of lithologic formations. Activities such as the handling and storage of hazardous materials and handling and storage of mineralised and non-mineralised wastes have the potential to impact groundwater resources, both to the environment and third-party users, through potential pollution. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Wessels Mine Surface Water Study (KP, 2017) and the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021).

Description

Aquifer: Four aquifer units occur in the region, namely the Ongeluk, Hotazel, Moordraai and Kalahari Formations. Based on the Aquifer Classification Map of South Africa, the local aquifer of Wessels Mine is classified as poor, the electrical conductivity measures 70 – 150 millisiemens per metre (mS m), the vulnerability is rated as least; and the susceptibility is rated as low. A poor aquifer is described as a moderately-yielding aquifer system of variable water quality.

Groundwater Recharge: The site's semi-arid climate and a relatively thick unsaturated zone (>25 m deep on average) are not conducive to active recharge, which has been calculated to be between 1 and 4% of average annual rainfall. Groundwater is up to 25 000 years old in deeper, confined aquifers, although surficial unconfined/semi-confined aquifers have been recharged in relatively recent time. Site aquifers are recharged directly from rainfall, though stable isotope results suggest that infiltration of standing surface water contained in topographical depressions may be of importance regionally. Recharge occurs via the relatively permeable Kalahari Formation, the recharge front mobilising soil nitrates, particularly at sites that have been overgrazed or stripped of vegetation.

Groundwater Levels: Groundwater levels at Wessels Mine have been monitored through various boreholes from 2002 to the present day. Data from the most recent surveys (September 2016) indicates that the hydraulic gradient is towards the south-west. The water table appears to be locally elevated towards the duck pond and TSF at the Wessels Mine. Average groundwater elevation is approximately 998.3 mamsl; with the average groundwater table depth at approximately 40.9 metres below ground level (mbgl).

Groundwater Use: Majority of the groundwater in the broader region is used in the form of third-party boreholes. Use is primarily for livestock water, but also supplies potable water to local farms.

Conclusion

The proposed project is located on a minor aquifer with an average depth of 40.9 mbgl. Due the nature of the proposed project, it is not anticipated that groundwater would be affected.

7.4.1.8 Air Quality

Introduction

Existing sources of emissions in the region and the characterisation of existing ambient pollution concentrations are fundamental to the assessment of cumulative air impacts. A change in ambient air quality can result in a range of impacts which in turn may cause a disturbance and/or health impacts to nearby receptors. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021) and the Landscape/Visual Site Sensitivity Verification Report (SSVR) compiled for the proposed project (SLR, 2021).

Description

Regional Air Quality: The following regional sources of emissions of most significance were identified:

- Fugitive dust: Occurs as a result of vehicle entrainment of dust from local paved and unpaved roads, wind erosion from open areas and dust generated by agricultural activities. Vehicle entrainment from the various unpaved farm and public roads is anticipated to be a significant, but localised source of dust;
- Current mining operations in the area: Particulates represent the main pollutant of concern at mining operations, whether it is underground or opencast. The amount of dust emitted by these activities depends on the physical characteristics of the material, the way in which the material is handled and the weather conditions. Current mining operations in relatively close proximity to the Wessels Mine include Nchwaning Mine and Black Rock Mine, and mines further afield, including the MMT, UMK Mine and the Tshipi Borwa Mine;
- Biomass burning: Biomass burning emissions include CO, CH₄ and NO₂ gases;
- Veld burning: Represent significant sources of combustion-related emissions in many areas of the country;
- Rail-related emissions: Emissions from diesel generated locomotives include particulates, NO₂, SO₂, CO and various volatile organic compounds (VOC) including polycyclic aromatic hydrocarbons (PAH);
- Household fuel combustion: It is likely that households within the region utilise coal or wood for cooking and space heating (during winter) purposes. Emissions from domestic burning include PM₁₀, NO₂, CO₂, CO, PAHs, particulate benzo(a)pyrene and formaldehyde; and
- Vehicle tailpipe emissions: Significant primary pollutants include CO₂, CO, hydrocarbons (HCs), SO₂, O_x, and particulates. Secondary pollutants include NO₂, photochemical oxidants (ozone), sulphur acid, sulphates and nitric acid.

Local Air Quality: The key operations and activities that contribute to the air pollution within the Wessels Mine include:

- Ventilation emissions from underground mine workings (NO_x, CO_x and particulates);
- Dust generated from the tailings dams and spills along the delivery pipelines;

- Diesel generators;
- Vehicle tailpipe emissions;
- Materials handling operations (e.g., crushing, tipping of waste rock and ore, conveying of ore, stockpiles);
- Vehicle activity on paved and unpaved roads (during construction, operation and decommissioning); and
- Wind erosion from exposed working surfaces.

These emissions contribute towards both nuisance value, mainly in the immediate area of the source (large particle deposition) and potential increased health impacts (PM₁₀ in particular).

Potential Receptors: Air Quality Sensitive Receptors (AQSR) generally include places of residences and areas where members of the public may be affected by air pollution. Sensitive receptors within a 10 km radius of the proposed project area include the Kuruman River and gravel access road to the east, the R380 and R31 roads to the south and the R380 road and town of Blackrock to the west.

Dust Fallout Data: Dust monitoring at Wessels Mine is conducted on a monthly basis at three locations within the area. The monitoring of dust fallout commenced in 2010 and the most recent dataset, from September 2015 – November 2016 is presented in Figure 7-8. Data indicates that dust fallout rates in accordance with the National Dust Control Regulations (NDCR) for residential and non-residential areas have not been exceeded at the Wessels Mine.

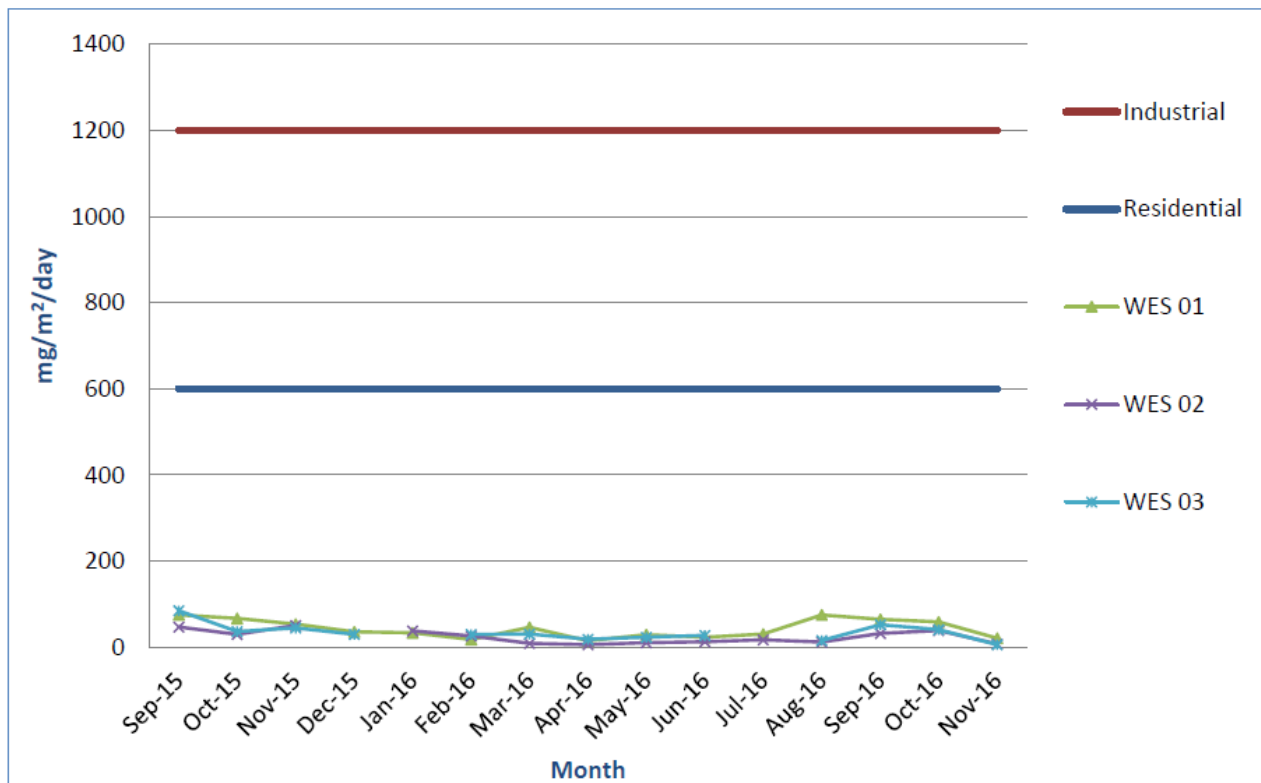


Figure 7-8: Dust Fallout Rates at Wessels Mine (Measured Data September 2015 - November 2016)

Conclusion

The project area is situated within a region hosting numerous sources of emissions. Monitoring results at Wessels Mine indicate that dust fallout from the existing mining operations do not exceed the NDCR limits. Management measures for current mining activities need to be complied with at all times to effectively manage operational contributions to ambient air concentrations and dust fallout.

Due to the nature of the proposed project, it is unlikely to result in any material changes to localised air impacts. Given the prevalence of agricultural activity within the region, it must be noted that the emissions to air generated by the proposed project will be negligible, limited primarily to the construction phase and is not expected that impacts will be felt by the agricultural community. With that being said, measures to limit and control dust during the construction phase must be considered as part of the proposed project.

7.4.1.9 Noise

Introduction

Mining activities and infrastructure have the potential to cause an increase in ambient noise levels in and around the proposed project area. This may cause a disturbance to nearby receptors. Land uses and potential receptor sites including residential areas surrounding the mine have been described in the land use section below. To understand the basis of these impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018)

Description

The local topography surrounding Wessels Mine is considerably flat, and therefore no screening against the noise generated by the mine is provided. The local vegetation does; however, provide some of attenuation through the absorption of sound by the interspersed shrubs and medium-sized trees of the Kathu Bushveld. Although the local environment is characterised as being rural, several other mining operations are present within the area, which contribute to existing ambient noise levels within the local region. An additional source contributing to the ambient noise levels is road traffic from the nearby main road to Kuruman and Kathu.

Ambient noise levels along the boundary of Wessels Mine were studied in accordance with the procedures stipulated in South African National Standards (SANS) 10103. Measurements were processed in order to remove noise contributions of noise emissions not originating from mining operations at the Wessels Mine. Noise contours obtained at Wessels Mine for daytime and night-time conditions are provided in Figure 7-9 and Figure 7-10, respectively. The data indicates that both daytime and night-time noise levels at Wessels Mine are well below the SANS 10103 70 dBA requirement, as typical for industrial areas.

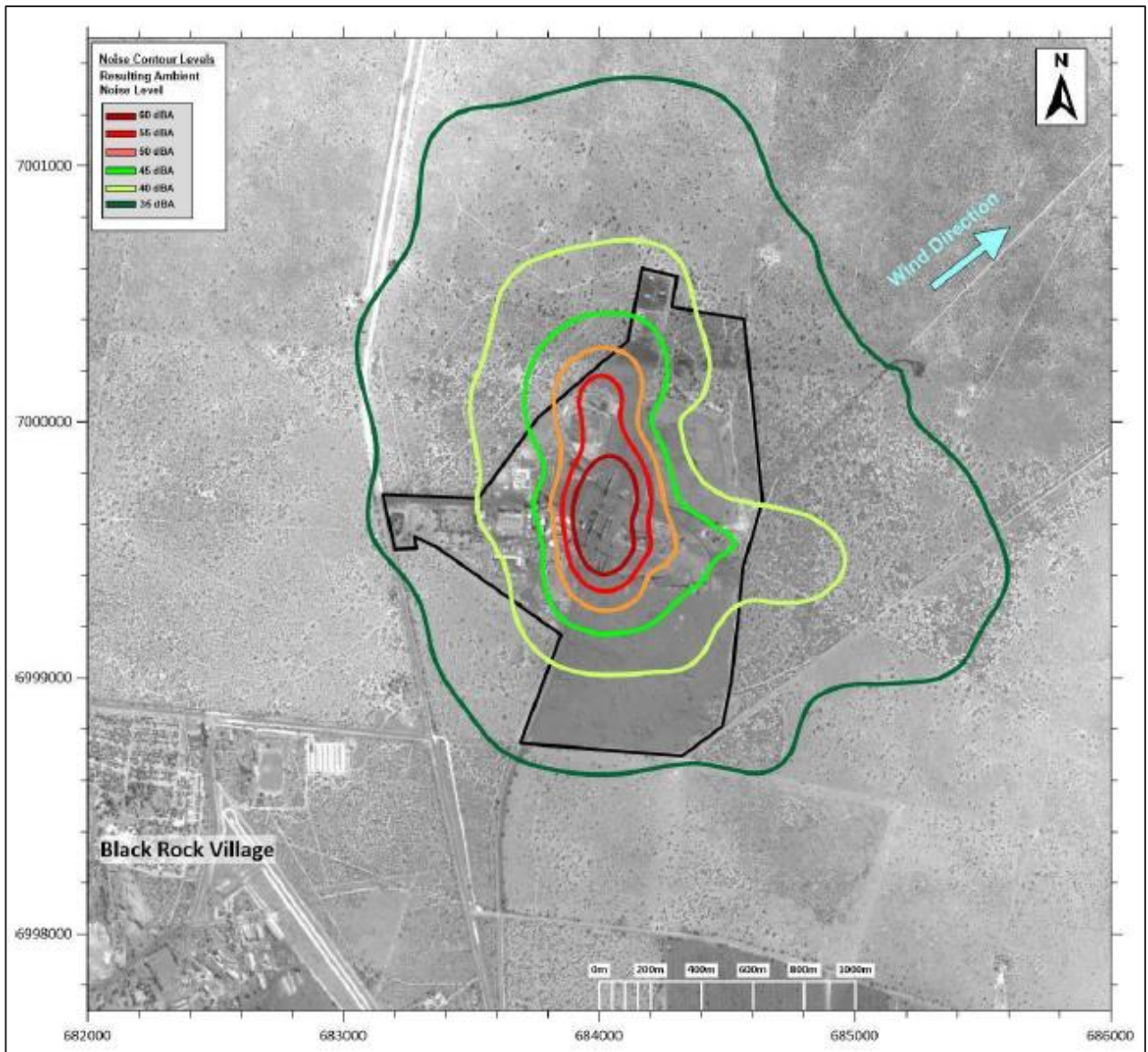


Figure 7-9: Noise Contours for Daytime Conditions

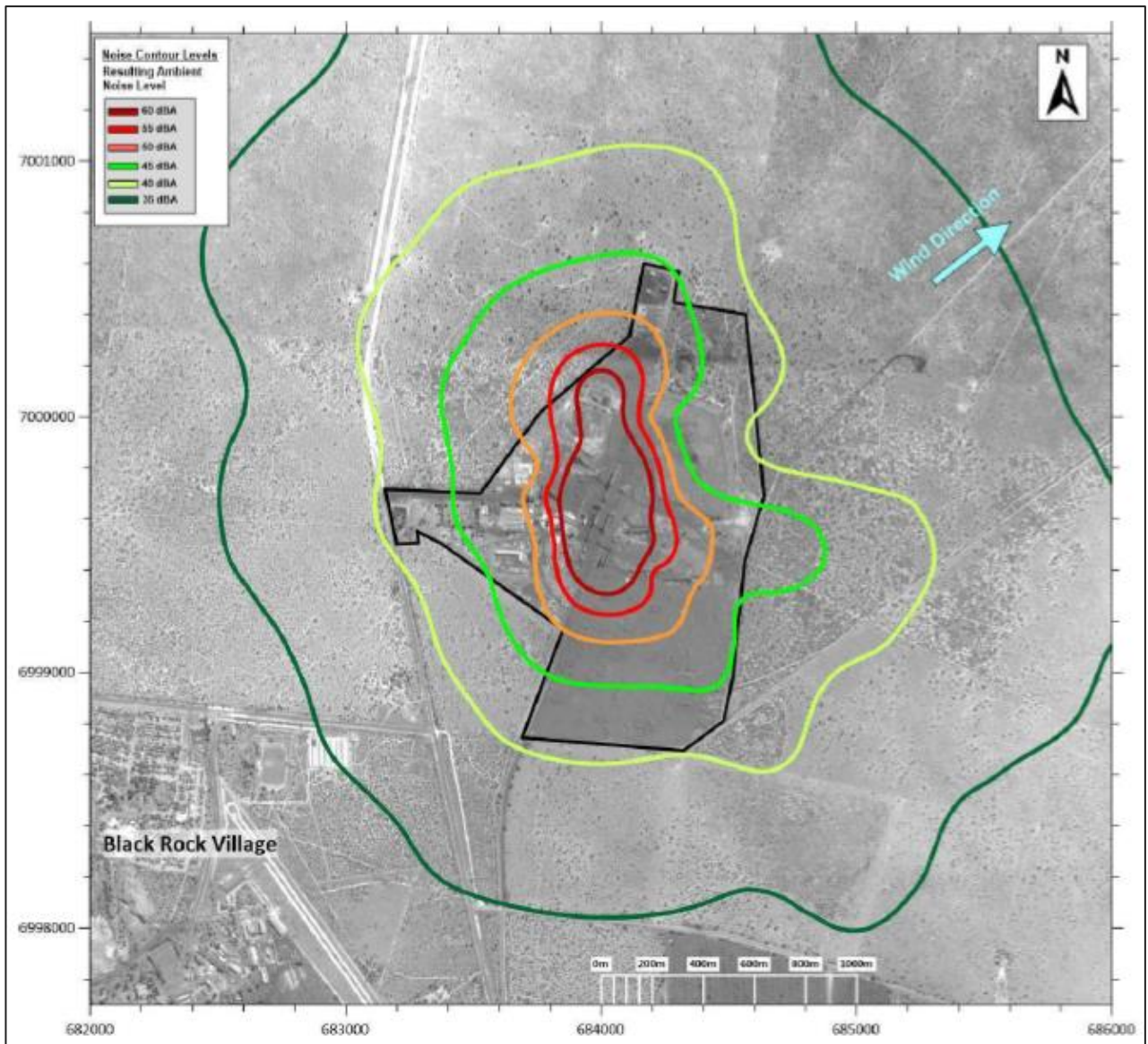


Figure 7-10: Noise Contours for Night-Time Conditions

Conclusion

Areas that are located in close proximity to mining activities have elevated ambient noise levels. Given that the project footprint is located adjacent to the Wessels Mine, the noise environment has already been altered and as such, is not expected that the proposed project will result in an increase in noise disturbance. Due to the nature of the proposed project, it is unlikely to result in any material changes to noise impacts.

7.4.1.10 Visual

Introduction and Link to Impact

Mining infrastructure has the potential to alter the landscape character at the proposed project area and surrounding area through the establishment of both temporary and permanent infrastructure. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021) and the Landscape/Visual Site Sensitivity Verification Report (SSVR) compiled for the proposed project (SLR, 2021).

Description

Landscape Character: The broader environment is characterised by terrain that is predominantly flat with a gentle slope towards the north-west. There are two ranges of high ground running through the region from south to north. The eastern range contains the Asbestos Mountain and Kuruman Hills. To the west are the Langeberg and Koranna mountains. The natural topography of the area surrounding the Wessels Mine has been largely influenced by mining activities associated with the Nchwaning Mine and Black Rock Mine, and mines further afield, including the MMT, UMK and the Tshipi Borwa mines. The project footprint is largely located within the Wessels Mine on disturbed land; however, a portion of the project footprint is located adjacent to the Wessels Mine (eastern portion). This eastern portion is located in largely undisturbed farmland, with a vegetation structure comprising encroached stands of *Senegalia melifera* with relatively homogenous grass swards scattered throughout.

Scenic Quality: The scenic quality is linked to the type of landscapes that occur within an area. Scenic quality ranges from high to low as follows:

- High – these include the mountains and koppies, water bodies such as farm and irrigation dams, and natural drainage systems;
- Moderate – these include agricultural activities and recreational areas; and
- Low – these include towns, communities, roads, railway line, industries and existing mines.

When these landscape types are considered as a whole, the scenic quality of the majority of the project footprint is considered to be low, due to existing mining infrastructure. The landscape to the east of the project footprint has not been disturbed by existing and surrounding mining activities, bar the gravel access and farm roads. The area provides limited topographical variety since the terrain is relatively flat and is not considered scarce as it is representative of the greater landscape and common in the area. The scenic quality is thus considered to be moderate to low.

Sense of Place: The sense of place results from the combined influence of landscape diversity and distinctive features. The primary informant of these qualities is the spatial form and character of the natural landscape taken together with the cultural transformations and traditions associated with the historic use and habitation of the area. The project footprint is located within a “mining belt”. Surrounding existing mining operations and the infrastructure that supports these mines dominates the area to the west, south and south-east of the area. It follows that the immediate area within and surrounding the proposed project has a relatively weak sense of place (when the viewer is within the mining belt). However, seen in context with the site surrounded by large open spaces of arid vegetation, the harsh nature of the mining activities is “softened”. When the viewer views the area from outside the “mining belt”, the larger area has a stronger sense of place.

Visual Receptors: Visual receptor locations and routes that are sensitive and/or potentially sensitive to the visual intrusion of the proposed project include the towns of Black Rock and Hotazel located 15 km north and 1.8 km south-west, respectively, the gravel access road located within the eastern-most section of the proposed project area, and the R380 located 650 m westwards. The proposed project is not considered to have a significant visual impact on these areas given the following details:

- The proposed project entails the extension of an existing railway line;
- It is located within and adjacent to the existing Wessels Mine operation, which is visually intrusive;
- The proposed project is linear in nature and will not comprise of any high structures; and
- The proposed project area is not visible from the R380 and the towns of Black Rock and Hotazel, as the Wessels Mine is obstructing it.

Conclusion

When considering landscape character, scenic quality, sense of place and visual receptors the baseline conclusion is that the project footprint is located in an area which has already been disturbed by mining and historic agricultural activities. It follows that the visual value of the project area has already been influenced.

7.4.2 Baseline Cultural/Heritage Environment Affected by the Proposed Activity

7.4.2.1 Cultural/Heritage and Palaeontology

Introduction

Cultural/heritage resources include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

Paleontological resources are fossils, the remains or traces of prehistoric life preserved in the geological (rock stratigraphic) record. They range from the well-known and well-publicized (such as dinosaur and mammoth bones) to the more obscure but nevertheless scientifically important fossils (such as palaeobotanical remains, trace fossils, and microfossils). Paleontological resources include the casts or impressions of ancient animals and plants, their trace remains (for example, burrows and trackways), microfossils (for example, fossil pollen, ostracodes, and diatoms), and unmineralised remains (for example, bones of Ice Age mammals).

Mining activities and mining-related infrastructure have the potential to impact heritage/cultural and paleontological resources through the placement of infrastructure and through the related construction and operational activities. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021) and the HIA compiled for the proposed project (CTS Heritage, 2021).

Description

Cultural/Heritage: The Wessels Mine is situated in an area that, as a whole, has had a relatively low human presence due to the dryness of the region, and as such, if there were human settlements they tended to be located on or near watercourses. In this regard, archaeological artefacts have predominantly been located along the riverbanks of both the Kuruman and Ga-Mogara Rivers. Identified cultural/heritage resources in close proximity to the project area and that are not associated with the banks of the surrounding rivers include a cemetery and limestone houses, located approximately 8 km westwards. The grave site has more than 60 graves, are unmarked and have no tombstones. The cemetery most likely represents the graves of mine workers from the 1940s and 1970s, while the limestone houses date to the 1920s and are likely the original farmsteads of the respective farms.

Following a field assessment undertaken by CTS Heritage on 2 June 2021, cultural/heritage materials of significance were not identified within or in close proximity to the project footprint.

Palaeontology: The Wessels Mine is underlain by aeolian red sand and the occasional surface calcrete with deep sandy soils of the Hutton soil forms. The Kuruman River and associated riverbanks are embedded with the Kalahari sediments that cover the Precambrian metamorphic crust and characterised as silty, sandy, rocky and poorly drained. In this regard, it is unlikely that paleontological resources would be identified.

Conclusion

The project footprint is situated within a region of that harbours few cultural/heritage resources and no cultural/heritage resources of significance have been identified within the project footprint. Furthermore, the project footprint is located within an area where there is an unlikelihood for the identification of palaeontological resources. Notwithstanding the afore-mentioned, the potential exists for resources to be buried beneath the surface of the ground and chance finds during the construction phase would need to be managed accordingly.

7.4.3 Baseline Socio-Economic Environment Affected by the Proposed Activity

7.4.3.1 Socio-Economic

Introduction

Mining operations have the potential to result in both positive and negative socio-economic impacts. The positive impacts are usually economic in nature with mines contributing directly towards employment, procurement, skills development and taxes on a national, regional and local scale. In addition, mines indirectly contribute to economic growth in the national, regional and local economies by strengthening the national economy and by increasing the number of income-earning people, this has a multiplying effect on the trade of other goods and services in other sectors.

The negative impacts associated with mining operations can be both social and economic in nature. In this regard, mines can cause:

- An influx of people seeking job opportunities which can lead to increased pressure on basic infrastructure and services (housing, health, sanitation and education), informal settlement development, increased trespassing, increased crime, introduction of diseases and disruption to the existing social structures within communities; and

-
- A change to not only pre-existing land uses, but also the associated social structure and meaning associated with these land uses and way of life. This is particularly relevant in the closure phase when the economic support provided by mines ends, the natural resources that were available to the pre-mining society are reduced, and the social structure that has been transformed to deal with the threats and opportunities associated with mining finds it difficult to readapt.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the Community Survey (Statistics South Africa (StatsSA), 2016).

Description

The socio-economic environment on a provincial, district and municipal level are summarised in Table 7-6.

Table 7-6: Socio-Economic Environment of the District and Local Municipalities

Category and Indicator	Northern Cape Province	JTGDM	JMLM
Demographics			
Municipality Size	378 276.6 km ²	27 498.9 km ²	20 215 km ²
Population Size	1 193 780	242 265	84 200
Population Density	3.2 per km ²	8.8 per km ²	4.2 per km ²
Age	<ul style="list-style-type: none"> 0 - 29 years (56%) 30-59 years (34%) 60 years and older (10%) 	<ul style="list-style-type: none"> 0 - 29 years (62%) 30-59 years (30%) 60 years and older (8%) 	<ul style="list-style-type: none"> 0 - 29 years (64%) 30-59 years (29%) 60 years and older (6%)
Gender	<ul style="list-style-type: none"> Female (50%) Male (50%) 	<ul style="list-style-type: none"> Female (51%) Male (49%) 	<ul style="list-style-type: none"> Female (55%) Male (45%)
Race	<ul style="list-style-type: none"> Black African (48%) Coloured (43%) White (8%) Indian or Asian (1%) 	<ul style="list-style-type: none"> Black African (84%) Coloured (10%) White (6%) 	<ul style="list-style-type: none"> Black African (97%) White (2%) Coloured (1%)
Language	<ul style="list-style-type: none"> Afrikaans (56%) Setswana (33%) IsiXhosa (5%) English (2%) Others (4%) 	<ul style="list-style-type: none"> Setswana (75%) Afrikaans (19%) Sesotho (1%) IsiXhosa (1%) Others (4%) 	<ul style="list-style-type: none"> Setswana (92%) Afrikaans (3%) Others (5%)
Migration	<ul style="list-style-type: none"> South African (99%) <ul style="list-style-type: none"> Northern Cape (87%) North West (3%) Western Cape (3%) Gauteng (2%) Free State (2%) Others and outside of South Africa (3%) 	<ul style="list-style-type: none"> South African (99%) <ul style="list-style-type: none"> Northern Cape (90%) North West (5%) Gauteng (1%) Free State (1%) Western Cape (1%) Others and outside of South Africa (2%) 	<ul style="list-style-type: none"> South African (100%) <ul style="list-style-type: none"> Northern Cape (93%) North West (5%) Others and outside of South Africa (2%)
Households			
Household Number	353 713	72 310	23 922
Household Type	<ul style="list-style-type: none"> Formal houses (74%) Shacks (14%) Flats in backyards (5%) Others (5%) Traditional dwellings (2%) 	<ul style="list-style-type: none"> Formal houses (71%) Shacks (10%) Flats in backyards (7%) Traditional dwellings (6%) Others (6%) 	<ul style="list-style-type: none"> Formal houses (69%) Traditional (13%) Flats in backyards (10%) Shack (6%) Others (2%)
Service Delivery			
Water	<ul style="list-style-type: none"> Piped water inside house or yard (80%) Community stand (8%) Communal tap (7%) Others (5%) 	<ul style="list-style-type: none"> Piped water inside house or yard (39%) Community stand (27%) Communal tap (24%) Others (10%) 	<ul style="list-style-type: none"> Community stand (45%) Communal tap (32%) Borehole in yard (7%) Piped water inside yard 5% Oher (11%)
Electricity	<ul style="list-style-type: none"> Pre-paid or conventional meters (90%) 	<ul style="list-style-type: none"> Pre-paid or conventional meters (90%) 	<ul style="list-style-type: none"> Pre-paid or conventional meters (89%)

Category and Indicator	Northern Cape Province	JTGDM	JMLM
	<ul style="list-style-type: none"> No access (7%) Solar or other (3%) 	<ul style="list-style-type: none"> No access (9%) Unmetered (unpaid) or other (1%) 	<ul style="list-style-type: none"> No access (10%) Other (1%)
Toilets	<ul style="list-style-type: none"> Flush toilet (71%) Pit toilet (19%) Other (6%) No access (4%) 	<ul style="list-style-type: none"> Pit toilet (58%) Flush toilet (31%) No access (7%) Other (4%) 	<ul style="list-style-type: none"> Pit toilet (81%) No access (7%) Flush toilet (5%) Other (7%)
Refuse	<ul style="list-style-type: none"> Regular service provider (65%) Own dump (22%) Other (6%) Communal dump (4%) None (3%) 	<ul style="list-style-type: none"> Own dump (64%) Regular service provider (25%) Communal dump (2%) Other (6%) None (3%) 	<ul style="list-style-type: none"> Own dump (84%) Communal dump (6%) None (4%) Other (6%)
Economics			
Employment	<ul style="list-style-type: none"> Employed (38%) Other not economically active (42%) Unemployed (15%) Discouraged work seeker (5%) 	<ul style="list-style-type: none"> Employed (32%) Other not economically active (47%) Unemployed (14%) Discouraged work seeker (7%) 	<ul style="list-style-type: none"> Employed (16%) Other not economically active (61%) Unemployed (10%) Discouraged work seeker (13%)
Sector of employment	<ul style="list-style-type: none"> Formal (72%) Informal (15%) Private household (11%) Unsure (2%) 	<ul style="list-style-type: none"> Formal (75%) Informal (11%) Private household (13%) Unsure (1%) 	<ul style="list-style-type: none"> Formal (65%) Informal (17%) Private household (16%) Unsure (2%)
Annual Income	<ul style="list-style-type: none"> Average – R30 000 <ul style="list-style-type: none"> R0 – R20 000 (41%) R20 0001 – R150 000 (44%) R150 001 – R600 000 (10%) R600 001 and above (1%) Unspecified (4%) 	<ul style="list-style-type: none"> Average – R30 000 <ul style="list-style-type: none"> R0 – R20 000 (32%) R20 0001 – R150 000 (51%) R150 001 – R600 000 (12%) R600 001 and above (1%) Unspecified (4%) 	<ul style="list-style-type: none"> Average – R14 600 <ul style="list-style-type: none"> R0 – R20 000 (62%) R20 0001 – R150 000 (37%) R150 001 – R600 000 (11%) R600 001 and above (1%)
Education			
Education Level	<ul style="list-style-type: none"> None (8%) Primary (or some) (19%) Matric (or some secondary) (65%) Tertiary (5%) Unspecified (3%) 	<ul style="list-style-type: none"> None (10%) Primary (or some) (19%) Matric (or some secondary) (62%) Tertiary (5%) Unspecified (4%) 	<ul style="list-style-type: none"> None (15%) Primary (or some) (30%) Matric (or some secondary) (48%) Tertiary (3%) Unspecified (4%)

Conclusion

The socio-economic environment descriptions for the province and district and local municipalities indicate that in the communities surrounding the Wessels Mine, there are significant social and economic challenges. The existing situation indicates that there is a measure of unemployment, informal settlement development, with limited inward migration of people with the resultant pressure on basic infrastructure and services (education, sanitation, water etc.). Whilst the proposed project may contribute (cumulatively) to the social and economic challenges described above, due to the nature, scale and limited extent of the proposed project, it is expected that the associated negative socio-economic impact will be negligible. The proposed extension of the railway infrastructure will contribute and allow for the creation of short-term employment and procurement opportunities. However, similarly to the afore-mentioned negative impacts, this positive impact will be negligible due to the limited nature, scale and extent of the proposed project.

7.4.3.2 Land Use

Introduction

Mining activities have the potential to affect land uses both within the mine area and in the surrounding areas. This can be caused by physical land transformation and through direct or secondary impacts. The key related potential environmental impacts are pollution of water, air pollution, noise pollution, visual impacts and the influx of job seekers with related social ills. To understand the basis of the potential land use impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the South32 EIA and EMPR for the Amendment of the EMPR Report (KP, 2018), the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021), site observations, Windeed searches and a review of topographical maps and satellite imagery.

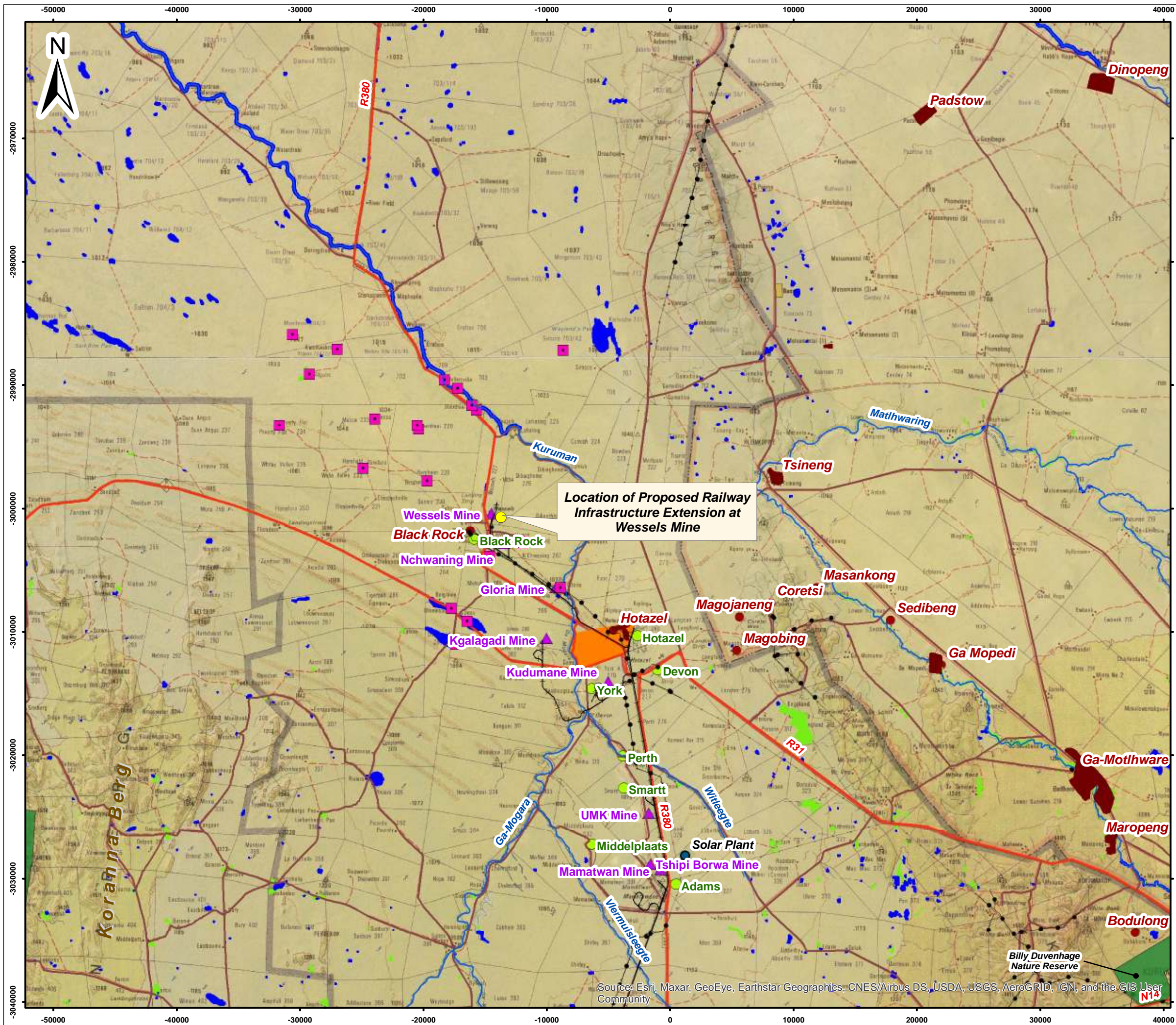
Description

Mining and Prospecting Rights: HMM holds a MR (Ref No. 03/2006(MR)) for remaining extent of the farm Wessels 227, portions 1 and 2 of the farm Dibiaghomo 226 and portion 1 of the farm Dikgathlong 268. The MR boundary is illustrated in the Regional Land Use Map provided in Figure 7-11.

Land Ownership: Land ownership details of the land on which the proposed project is located are provided in Table 7-7. Land ownership details of landowners of properties adjacent to the project area are provided in Appendix F.

Table 7-7: Land Ownership Within the Project Footprint

Property Name	Portion Number	Title Deed Reference	Registered Property Owner
Wessels 227	Remaining Extent	T2426/2010	Hotazel Manganese Mines (Pty) Ltd
Dibiaghomo 226	2	T2426/2010	
N'Chwaning 267	9	T2144/2015	
Mukulu 265	Remaining Extent	T288/1956	Assmang (Pty) Ltd
Gloria 266	1	T506/1966	



- Legend**
- Towns
 - Location of Proposed Railway Extension
 - Main Roads
 - Secondary Roads
 - Power Line
 - Rivers and Streams
 - Existing Railway
 - Receptors / Isolated Farmsteads
 - Solar Plant
 - ▲ Operating Manganese Mines
 - Closed / Dormant Mines
 - Urban Areas
 - Cultivated Land
 - Wetlands
 - Possible Hotazel Town Expansion Area
 - South African Protected Areas (2020)

0 3 6 9 Kilometers

Scale: 1 : 300 000 @ A3

Projection: Transverse Mercator
Datum: Hartbeeshoek, Lo23

South32 Limited

Figure 7-11
Regional Land Use Map



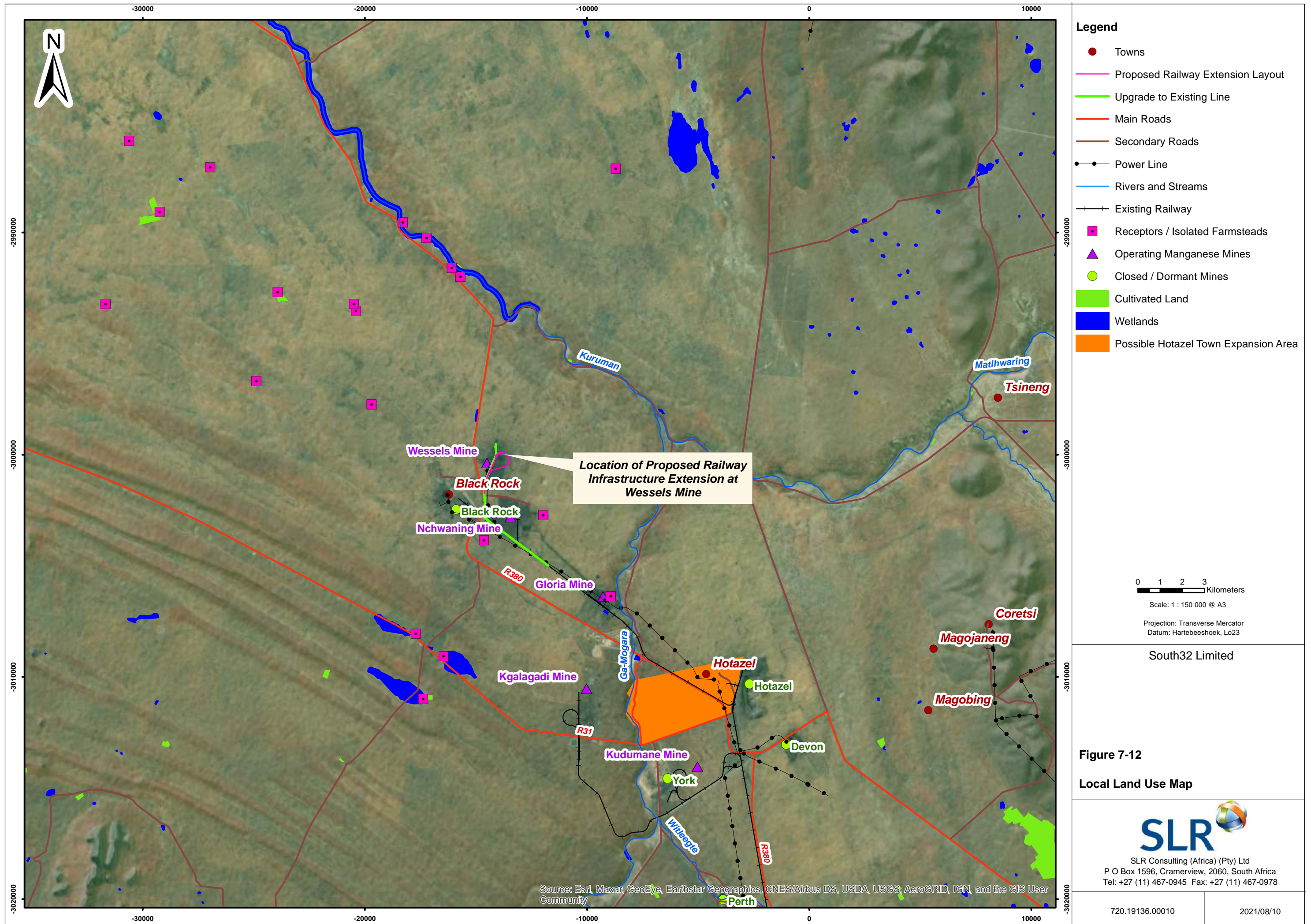
SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Land Claims: The DRDLR Land Claims Commissioner of the Northern Cape was contacted to confirm if any land claims were lodged on the proposed project area (see Appendix D). The Land Claims Commissioner confirmed that no land claims have been lodged.

Land Use: Land use within the broader region surrounding the Wessels Mine is a mixture of agriculture, residential, mining activities and renewable energy facilities. Regional and local land use maps are provided in Figure 7-11 and Figure 7-12, respectively. More detail is provided below.

- **Agriculture:** Agricultural activities currently undertaken within the areas surrounding the Wessels Mine include game farming and ad-hoc livestock grazing.
- **Residential:** Numerous towns are located in the area surrounding Wessels Mine. These are listed as follows:
 - Black Rock, approximately 2.5 km west;
 - Hotazel, approximately 15 km south;
 - Kuruman, approximately 69 km south-east; and
 - Kathu, approximately 74 km south.
- **Infrastructure and Servitudes:** Numerous Eskom-related infrastructure is located within close proximity of the Wessels Mine. These include 132 kV, 66 kV and 400 kV powerlines, as well as 132kV substations. The Sedibeng Vaal Gamagara water pipeline supplies the MMT with process and potable water is located approximately 400 m east of the boundary of the MMT and approximately 20 km south-east of the Wessels Mine. Furthermore, there exists an extensive railway network in the area that is used by the surrounding mine and that runs to Coega in the Eastern Cape.
- **Mining Operations and Other Industries:** There are a number of mines located within the broader region. Those located within a 10 km radius of the Wessels Mine are as follows:
 - N'Chwaning Mine, approximately 2.5 km south-east;
 - Black Rock Mine, approximately 2.7 km south-east,
 - Gloria Mine, approximately 8 km south-east; and
 - Kalagadi Mine, approximately 10 km south-east.
- The Adams Solar Plant owned by Enel Green power (Pty) Ltd is located approximately 22 km south-east.



Conclusion

Whilst the project footprint is located within close proximity to Black Rock and Hotazel, it is not anticipated that these towns will be affected by the proposed project. This is due largely to the nature and limited scale and extent of the proposed project, as well as the mining-related context wherein the Wessels Mine is located. Various infrastructural components (powerline, pipeline and railway line) are located in close proximity or within the project footprint. The proposed project will need to be managed in such a way so as not to interfere with the infrastructure.

7.4.3.3 Traffic

Introduction

Traffic from mining projects has the potential to affect the capacity of existing road networks, as well as result in public road safety issues. To understand the basis of these potential impacts in the context of the project activities, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from the Scoping Report for the Changes to the Infrastructure Layout and Activities at the MMT (SLR, 2021) and from site observations.

Description

Existing road intersections within the vicinity of the proposed project include the following:

- The provincial R380 which lies to the west of the Wessels Mine and traverses in a north-south direction between Hotazel and Kuruman;
- The R31 road starts from the R380 south of the Wessels Mine and goes from an east-west direction to Van Zylsrus; and
- Gravel and farms roads towards the east of the Wessels Mine used by farmers.

Conclusion

A key potential traffic-related impact is public safety. The proposed project will require the movement of heavy vehicles and an increase in the traffic in the project area during the construction phase. Due to the nature and limited scale and extent of the proposed project, and the surrounding mining-related land uses, the impacts on surrounding communities are expected to be limited. These impacts would; however, still need to be managed accordingly.

7.4.3.4 Description of Specific Environmental Features and Infrastructure on the Site

The environmental features associated with the project area are described in Section 7.4.1 above. No notable environmental features are associated with the project footprint.

7.4.3.5 Environmental and Current Land Use Map

Regional and local land use maps are provided in Figure 7-11 and Figure 7-12, respectively.

7.5 ENVIRONMENTAL IMPACTS AND RISKS OF THE ALTERNATIVES

This section requires a list of potential impacts on environmental and socio-economic aspects that have been identified in respect of each of the main project activities and processes for each of the project phases

in terms of the project alternatives. With reference to chapter 6, no project alternatives have been considered and as such this section is not applicable.

7.6 METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

The method used for the assessment of environmental issues is set out in Table 7-8. Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

The assessment methodology enables the assessment of environmental issues including cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

Table 7-8: SLR's Impact Assessment Methodology

PART A: DEFINITIONS AND CRITERIA *		
Definition of SIGNIFICANCE		Significance = consequence x probability
Definition of CONSEQUENCE		Consequence is a function of intensity, spatial extent and duration
Criteria for ranking of the INTENSITY of environmental impacts	VH	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.	
Criteria for ranking the DURATION of impacts	VL	Very short, always less than a year. Quickly reversible
	L	Short-term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years (likely to cease at the end of the operational life of activity).
	VH	Very long, permanent, +20 years (Irreversible, Beyond closure).
Criteria for ranking the EXTENT of impacts	VL	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours.
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	VH	Low	Low	Medium	Medium	High
	Long term	H	Low	Low	Low	Medium	Medium
	Medium term	M	Very Low	Low	Low	Low	Medium

	Short term	L	Very low	Very Low	Low	Low	Low
	Very short	VL	Very low	Very Low	Very Low	Low	Low
INTENSITY = L							
DURATION	Very long	VH	Medium	Medium	Medium	High	High
	Long term	H	Low	Medium	Medium	Medium	High
	Medium term	M	Low	Low	Medium	Medium	Medium
	Short term	L	Low	Low	Low	Medium	Medium
	Very short	VL	Very low	Low	Low	Low	Medium
INTENSITY = M							
DURATION	Very long	VH	Medium	High	High	High	Very High
	Long term	H	Medium	Medium	Medium	High	High
	Medium term	M	Medium	Medium	Medium	High	High
	Short term	L	Low	Medium	Medium	Medium	High
	Very short	VL	Low	Low	Low	Medium	Medium
INTENSITY = H							
DURATION	Very long	VH	High	High	High	Very High	Very High
	Long term	H	Medium	High	High	High	Very High
	Medium term	M	Medium	Medium	High	High	High
	Short term	L	Medium	Medium	Medium	High	High
	Very short	VL	Low	Medium	Medium	Medium	High
INTENSITY = VH							
DURATION	Very long	VH	High	High	Very High	Very High	Very High
	Long term	H	High	High	High	Very High	Very High
	Medium term	M	Medium	High	High	High	Very High
	Short term	L	Medium	Medium	High	High	High
	Very short	VL	Low	Medium	Medium	High	High
			VL	L	M	H	VH
			A part of the site/property	Whole site	Beyond the site, affecting neighbours	Extending far beyond site but localised	Regional/ National
EXTENT							
PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	VH	Very Low	Low	Medium	High	Very High
	Probable	H	Very Low	Low	Medium	High	Very High
	Possible/ frequent	M	Very Low	Very Low	Medium	Medium	High
	Conceivable	L	Insignificant	Very Low	Low	Medium	High
	Unlikely/ improbable	VL	Insignificant	Insignificant	Very Low	Low	Medium
			VL	L	M	H	VH
CONSEQUENCE							
PART D: INTERPRETATION OF SIGNIFICANCE							
Significance	Decision guideline						
Very High	Potential fatal flaw unless mitigated to lower significance.						
High	It must have an influence on the decision. Substantial mitigation will be required.						
Medium	It should have an influence on the decision. Mitigation will be required.						
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely required.						
Very Low	It will not have an influence on the decision. Does not require any mitigation						
Negligible	Inconsequential, not requiring any consideration.						

7.7 POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES

As noted in chapter 6, no site alternatives were considered as the project footprint was determined due to the need to be in close proximity to the existing railway infrastructure.

7.8 POSSIBLE MANAGEMENT ACTIONS THAT COULD BE APPLIED AND THE LEVEL OF RISK

A summary of the issues and concerns raised by I&APs during the BA process to date is provided in Section 7.3. A list of the potential impacts identified raised by I&APs, as well as the possible management and mitigation measures, is provided in Table 7-9. An estimation of the level of residual risk after management or mitigation is provided.

Table 7-9: Possible Management Actions and the Anticipated Level of Risk

Issue and Concern Raised	Possible Management Actions or Alternatives to Address Issue	Impact Significance of the Possible Management Action Before and After Mitigation	
		Without Mitigation	With Mitigation
A major concern is that of dust created by the laydown station and the impact it has on the adjacent land. Dust affects the grazing capabilities of the adjacent land.	HMM will comply with the provisions of the EMPR which will include dust suppression measures during the construction phase.	Insignificant	INSIGNIFICANT

7.9 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

As noted in chapter 6, no site alternatives were considered as the project footprint was determined due to the need to be in close proximity to the existing railway infrastructure.

7.10 STATEMENT MOTIVATING THE PREFERRED ALTERNATIVE

The project is motivated by the inefficiency of the current railway configuration that does not allow for optimal and cost-effective loading of the manganese ore and product from the mine for transport to the market. The proposed project would allow for more ore to be loaded onto the railway carts in a shorter space of time, hereby increasing outputs and productivity. It would also decrease the need for road transport, which is considered more expensive and inefficient in relation to rail transport.

One design alternative, in addition to the preferred alternative, was considered for the proposed project. The alternative railway loop was proposed to be larger than the preferred alternative (refer to Figure 6-1). The smaller balloon loop is preferred as it will result in the least vegetation clearance, is located closest to the current active mining operations at Wessels Mine and would thus have been more likely subjected to edge effects that would have already resulted in the displacement of faunal species.

8. FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE THROUGH THE LIFE OF THE ACTIVITY

This chapter provides a description of the process that was followed in order to identify the potential biophysical, cultural and socio-economic impacts that are assessed as part of the proposed project.

8.1 DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY IMPACTS

Biophysical, cultural/heritage and socio-economic impacts associated with the proposed project were identified through site visits undertaken by SLR, as well as specialists and the associated specialist studies.

As part of the PPP, I&APs (refer to section 7.2) are being provided with opportunities to provide input into the BA process and comment on the proposed project, including the identification of biophysical, cultural/heritage and socio-economic impacts.

8.2 DESCRIPTION OF THE PROCESS UNDERTAKEN TO ASSESS AND RANK THE IMPACTS AND RISKS

A description of SLR's assessment methodology used to assess the severity of identified impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated, is provided in section 7.6.

8.3 A DESCRIPTION OF THE ENVIRONMENTAL IMPACTS AND RISKS IDENTIFIED DURING THE ENVIRONMENTAL ASSESSMENT PROCESS

Descriptions of the biophysical, cultural/heritage and socio-economic impacts in respect of each of the main project activities and phases are provided in Table 8-1. The detailed assessment of these impacts is provided in Appendix C. Impacts that have been deemed insignificant, but only due to the implementation of mitigation, are also included. Impacts that are deemed insignificant without mitigation are included for completeness and will not be associated with any activities or project phase.

Table 8-1: List of Potential Impacts in respect of each Project Activity and Phase

Potential Impact	Activity	Phase
Loss and sterilisation of mineral resources	N/A	N/A
Altering topography	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Decommissioning • Closure
Hazardous excavations and infrastructure resulting in safety risks to third parties and animals	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks 	<ul style="list-style-type: none"> • Construction

Potential Impact	Activity	Phase
Soil erosion	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning • Closure
Disturbance of original soil profiles	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning • Closure
Chemical pollution of soil	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site management • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning • Closure
Physical destruction and disturbance of floral species	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site maintenance • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Decommissioning • Closure
Physical destruction and disturbance of faunal species	<ul style="list-style-type: none"> • Site preparation • Civil works 	<ul style="list-style-type: none"> • Construction • Decommissioning

Potential Impact	Activity	Phase
	<ul style="list-style-type: none"> • Earthworks • Transport systems • General site maintenance • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Closure
Alteration of natural drainage patterns	N/A	N/A
Contamination of surface water resources	N/A	N/A
Contamination of groundwater resources	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site maintenance • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning • Closure
Air pollution	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks • Transport systems • General site maintenance • Demolition • Rehabilitation • Maintenance and aftercare 	<ul style="list-style-type: none"> • Construction • Operation • Decommissioning • Closure
Increase in disturbing noise levels	N/A	N/A
Negative visual views	N/A	N/A
Road disturbance and traffic safety	N/A	N/A
Loss of cultural/heritage and palaeontological resources	<ul style="list-style-type: none"> • Site preparation • Civil works • Earthworks 	<ul style="list-style-type: none"> • Construction
Inward migration and economic impact	N/A	N/A
Change in land use	N/A	N/A

8.4 ASSESSMENT OF THE SIGNIFICANCE OF EACH IMPACT AND RISK AND AN INDICATION OF THE EXTENT OF WHICH THE ISSUE AND RISK CAN BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MANAGEMENT ACTION

The assessment of the significance of potential biophysical, cultural/heritage and socio-economic impacts, including the extent to which impacts can be avoided or mitigated, is included in chapter 9 and Appendix C.

9. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

This chapter provides a summary of the assessment results of the identified potentially significant biophysical, cultural/heritage and socio-economic impacts identified for the proposed project.

A summary of the assessment of the identified potentially significant biophysical, cultural/heritage and socio-economic impacts associated with the proposed project is provided in Table 9-1. A full description of the assessment is included in Appendix C.

Table 9-1: Assessment of Significant Impacts and Risks

Activity	Potential impact	Aspects affected	Phase	Significance (Unmitigated)	Management actions type	Significance (Mitigated)	Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated
N/A	Loss and sterilisation of mineral resources	Geology	N/A	INSIGNIFICANT			
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Rehabilitation Maintenance and aftercare 	Altering topography	Topography	<ul style="list-style-type: none"> Construction Decommissioning Closure 	Insignificant	<ul style="list-style-type: none"> Minimise the area of disturbance by designing and constructing the most compact infrastructure practically possible; Rehabilitate in accordance with the approved mine closure plan that ensure a suitable post-closure land use is achieved. 	INSIGNIFICANT	
<ul style="list-style-type: none"> Site preparation Civil works Earthworks 	Hazardous excavations and infrastructure resulting in safety risks to third parties and animals		<ul style="list-style-type: none"> Construction 	Medium	<ul style="list-style-type: none"> The project area will be fenced off to prevent inadvertent access by third parties and animals; Access control will be implemented to ensure access is only granted to those who have authorisation; Barriers will be erected around all hazardous excavations; Warning signage will be erected at all hazardous excavations; and Where the proposed project has caused injury to third parties or animals, appropriate compensations will be provided. 	INSIGNIFICANT	<ul style="list-style-type: none"> Highly likely to be mitigated. Highly unlikely to be reversed in the case of injury or death. Highly likely to be avoided with mitigation. Highly likely to cause irreplaceable loss in the case of injury or death.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Soil erosion	Soil and Land Capability	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	High	<ul style="list-style-type: none"> Implement the soil conservation procedure as set out in Table 26-3; Establish short term perennial vegetation that will stabilise the site but allow the indigenous vegetation to establish over the site; Use existing established roads; Ensure vegetation clearing is undertaken in phases; Limit vegetation clearance to only the areas where the infrastructure will be constructed; Avoid parking of vehicles and equipment outside of designated parking areas; Plan vegetation clearance for dry seasons (late autumn, winter and early spring); and Re-establish vegetation along the railway infrastructure to reduce the impact of run-off from the compacted surface of the railway area. 	MEDIUM	<ul style="list-style-type: none"> Highly likely to be mitigated. Unlikely to be reversed where vegetation has been removed, highly likely to be reversed beyond the project footprint. Unlikely to be avoided where vegetation has been removed, highly likely to be avoided beyond the project footprint. Highly unlikely to result in irreplaceable loss.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management 	Disturbance of original soil profiles		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Medium	<ul style="list-style-type: none"> Land clearance must only be undertaken immediately prior to construction activities within the development footprint; and Level any remaining topsoil that was removed from the railway area and that remained on the surface instead of allowing small stockpiled of soil to remain on the surface. 	VERY LOW	<ul style="list-style-type: none"> Highly likely to be mitigated. Unlikely to be reversed where vegetation has been removed, highly likely to be reversed beyond the project footprint. Unlikely to be avoided where vegetation has been removed,

Activity	Potential impact	Aspects affected	Phase	Significance (Unmitigated)	Management actions type	Significance (Mitigated)	Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated
<ul style="list-style-type: none"> Demolition Rehabilitation Maintenance and aftercare 							<ul style="list-style-type: none"> highly likely to be avoided beyond the project footprint. Highly unlikely to result in irreplaceable loss.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Chemical pollution of soil		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Medium	<ul style="list-style-type: none"> Conduct potentially polluting activities (i.e., loading, hauling, tipping, transportation, handling and storage) in a manner that pollutants are contained at source and do not pollute soils. In this regard: <ul style="list-style-type: none"> Service all vehicles and mobile equipment regularly in workshops, service bays and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps; Design and operate all new and used chemical, fuel and oil storage and handling facilities in a manner that all spillages are contained in impermeable areas and cannot be released into the environment; Report ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) to the environmental manager immediately and clean up and/or remediate immediately; Implement and maintain a dirty water management system; Implement the waste management practices, as set out in Table 26-2; Educate and train all employees (temporary and permanent) and contractors in pollution prevention; and Implement formalised action plans to enable fast and efficient reaction to contain and remediate pollution incidents. Take into account the requirements for long term soil pollution prevention, land function and confirmatory monitoring in the design of any permanent and potentially polluting structures; and Implement the emergency response procedure in Table 29-1 in the event any major spillage incident. 	VERY LOW	<ul style="list-style-type: none"> Highly likely to be mitigated. Highly likely to be reversed with remediation. Highly likely to be avoided with mitigation. Highly unlikely to cause irreplaceable loss.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Physical destruction and disturbance of floral species	Biodiversity	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Medium	<ul style="list-style-type: none"> A biodiversity specialist shall do a walkdown of the project footprint prior to land clearing activities to identify protected floral species and floral SCC that may have been lying dormant during initial field observations; Should any protected floral species and floral SCC be located on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal. They are to be relocated and the relocation success of such species should be monitored for three years post-construction. Immediate actions are to be taken if it becomes evident that relocation is not successful; Ensure the removal of indigenous vegetation is restricted to what is absolutely necessary; No collection of floral species and floral SCC is allowed; Limit edge effects to the surrounding environment by: <ul style="list-style-type: none"> Demarcating all footprint areas during construction; Preventing construction rubble or cleared alien vegetation and invasive species to be disposed outside of demarcated areas; Ensuring that construction rubble and cleared alien and invasive species are taken to a registered waste disposal facility; and Managing the spread of alien and invasive species. Provide appropriate sanitary facilities and ensure the disposal thereof at a registered licenced facility; Ensure no temporary dump sites are created on site; No fires are allowed on site; Compile an alien invasive species management or control plan for implementation with the following recommendations: <ul style="list-style-type: none"> A buffer area of 30 m surrounding the railway balloon should be regularly checked for alien invasive species; Remove alien invasive species throughout the construction, operation and maintenance phases; Ensure alien vegetation is removed prior to the removal of indigenous vegetation; Ensure only trained personnel are involved in the chemical control of alien invasive species; Edge effects arising from the proposed project which may affect adjacent areas must be strictly managed; Ongoing alien invasive species monitoring must be undertaken throughout all phases; and 	LOW	<ul style="list-style-type: none"> Very highly likely to be mitigated. Medium likeliness to be reversed. Medium likeliness to be avoided with mitigation. Unlikely to cause irreplaceable loss.

Activity	Potential impact	Aspects affected	Phase	Significance (Unmitigated)	Management actions type	Significance (Mitigated)	Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated
					<ul style="list-style-type: none"> Removed alien invasive species must not be placed on unprotected ground as seeds may disperse upon it. All cleared alien invasive species must be disposed of at a licenced waste facility. 		
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Physical destruction and disturbance of faunal species	Biodiversity	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Medium	<ul style="list-style-type: none"> A biodiversity specialist shall do a walkdown of the project footprint prior to land clearing activities to identify faunal species on site and to assist with the relocation thereof; It is recommended that culverts of sufficient size be placed beneath the railway line so as to allow for the movement of small faunal species between the remaining habitat inside the railway loop and that of the larger habitat outside. Culverts must be regularly inspected for infilling and blockages, ensuring they are kept clear of debris; No collection, trapping and harming of faunal species and faunal SCC is allowed; Construction personnel are to undergo environmental awareness training pertaining to the potential faunal species located on site; While no protected faunal species were identified on site, if any species are encountered on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal/relocation; Perimeter fencing installed as part of the proposed project must allow for the movement of small animals (e.g., palisade fencing or cattle fencing). Should impermeable fencing be installed, small openings must be created to allow for the continuous movement of small animals. Such openings must be continuously monitored and cleared of debris; and Smaller species that are not readily able to move out of an area ahead of vegetation and ground clearing activities (such as scorpions and reptiles), will be less mobile during rainfall events and cold days. As such, care must be taken to look for these species prior to these activities and should these species be encountered, they are to be carefully and safely moved to an area of similar habitat outside of the project footprint. A suitably trained specialist shall be instructed to carry out the removal of venomous snake species. 	LOW	<ul style="list-style-type: none"> Very highly likely to be mitigated. Medium likelihood to be reversed. Medium likelihood to be avoided with mitigation. Unlikely to cause irreplaceable loss.
N/A	Alteration of natural drainage patterns	Surface water resources	N/A	INSIGNIFICANT			
N/A	Contamination of surface water resources		N/A	INSIGNIFICANT			
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Contamination of groundwater resources	Groundwater resources	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Insignificant	<ul style="list-style-type: none"> Implement approved management actions pertaining to the containment of dirty water in accordance with Regulation 704 (June 1999); Any sheet runoff from compacted areas must be slowed down by the strategic placement of berms; and Control stormwater through the implementation of HMM's existing Stormwater Management Plan. 	INSIGNIFICANT	
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems 	Air pollution	Air Quality	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Insignificant	<ul style="list-style-type: none"> Continue the implementation of HMM's dust fallout monitoring programme; Reduce vehicle exhaust emissions through the use of better-quality diesel; Implement inspection and maintenance programmes; and Implement dust suppression measures (wet and dry) to limit dust impacts. 	INSIGNIFICANT	

Activity	Potential impact	Aspects affected	Phase	Significance (Unmitigated)	Management actions type	Significance (Mitigated)	Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated
<ul style="list-style-type: none"> General site management Demolition Rehabilitation Maintenance and aftercare 							
N/A	Increase in disturbing noise levels	Noise	N/A	INSIGNIFICANT			
N/A	Negative visual views	Visual	N/A	INSIGNIFICANT			
NA	Road disturbance and traffic safety	Traffic	N/A	INSIGNIFICANT			
<ul style="list-style-type: none"> Site preparation Civil works Earthworks 	Loss of cultural/heritage and paleontological resources	Cultural/heritage and paleontological resources	<ul style="list-style-type: none"> Construction 	Insignificant	<ul style="list-style-type: none"> Implement the chance find procedure (see Table 10-1) in the event of the discovery of cultural/heritage and/or palaeontological resources on site. 	INSIGNIFICANT	
N/A	Inward migration and economic impact	Socio-economic	N/A	INSIGNIFICANT			
N/A	Change in land use		N/A	INSIGNIFICANT			

10. SUMMARY OF SPECIALIST REPORTING FINDINGS

The aim of this chapter is to list the various specialist studies undertaken for the proposed project, including the main findings of their reports, which are used to inform the compilation of this BAR.

The relevant specialist studies that were undertaken as part of the proposed project including the recommendations made by the specialists are provided in Table 10-1. All relevant specialist reports have been attached as Appendix E.

Table 10-1: A List of Specialist Studies and Recommendations

Specialist Study	Recommendation of Specialist	Specialist Recommendations that have been included in the BAR (Mark with X)	Reference to Applicable Section in this Report
Biodiversity Study (inclusive of Plant, Animal and Aquatic Biodiversity Compliance Statements)	<ul style="list-style-type: none"> • Prior to any vegetation clearance activities taking place a walkdown of the final railway footprint must be undertaken and all floral and faunal SCC encountered must be GPS marked and the necessary permits applied for with the relevant national and provincial departments. The site walkdown is to be conducted prior to clearance activities and ideally post good rains between November and February when the smaller bulbous plants are growing and visible; • The construction footprint must be kept as small as possible to minimise impact on the surrounding environment (edge effect management); • Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved footprint; • Clearing of vegetation should take place in a phased manner from north to south or vice versa. This will allow for any faunal species within the proposed railway loop alternatives to flee and avoid harm; • It is recommended that culverts of sufficient size be placed under the railway line so as to allow for movement of small faunal species between the remaining habitat inside the railway loop and that of the larger habitat outside. Culverts should be regularly inspected for infilling and blockages, ensuring that they are kept clear and open; • Smaller species such as scorpions and reptiles will not as readily be able to move out of an area ahead of ground clearing. As such should any be observed in the construction site during clearing and construction activities, they are to be carefully and safely moved to an area of similar habitat outside of the disturbance footprint. Construction personnel are to be educated about these species and instructed not to kill them. Smaller scorpion species and harmless reptiles (that are likely present within the proposed railway loop alternatives) should be carefully relocated by a suitably nominated construction person. For larger venomous snakes, a suitably trained specialist, or on-site personnel, should be contacted to carry out the relocation of the species, should it not move off on its own; • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal; • No hunting or trapping of faunal species is to be allowed by construction personnel; • It is recommended that should a perimeter fence be erected, this fence must allow for the movement of small mammals, such as palisade fencing or cattle fencing, as opposed to solid constructions such as walls. Should the perimeter be walled in with an impermeable fence, it is recommended that small openings be left to allow for continuous movement of small terrestrial faunal species. Such openings must be continuously monitored and cleared of debris to ensure continued movement is possible; • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; • Care should be taken during the construction of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by: <ul style="list-style-type: none"> ○ Demarcating all footprint areas during construction activities; ○ No dumping of litter, rubble or cleared vegetation on site should be allowed. Rubble/waste should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation. It is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste; ○ All soils compacted as a result of construction activities should be ripped and profiled and reseeded; and ○ Manage the spread of alien invasive species, which may affect remaining natural habitat within surrounding areas. • Appropriate sanitary facilities must be provided during the construction of the development and must be removed to an appropriate waste disposal site; • If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site at all times. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil; • Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area; • Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b alien invasive species (as listed in the NEM: BA Alien species lists, 2020), in line with the NEM: BA Alien and Invasive Species Regulations (2020); • Alien invasive species monitoring and clearing/control should take place throughout the construction phase of the development, and a 30 m buffer surrounding the proposed railway loop should be regularly checked for alien invasive species proliferation and to prevent inward and/or outward spread of alien invasive species, notably into non infested areas outside of the proposed railway loop or into newly rehabilitated areas; 	X	Chapter 9 and Table 9-1

Specialist Study	Recommendation of Specialist	Specialist Recommendations that have been included in the BAR (Mark with X)	Reference to Applicable Section in this Report
	<ul style="list-style-type: none"> • Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards; • Should any floral SCC be observed and relocated, the relocation success of such species should be monitored during the construction phase to ensure immediate actions can be taken if it becomes evident that relocation is not successful; • No collection of floral SCC must be allowed by construction personnel; • Edge effect control needs to be implemented to prevent further degradation and potential loss of floral and faunal SCC outside of the proposed development footprint area; • Should the presence of any faunal or floral SCC be noted within the development footprint post walkdown and during vegetation clearance/construction activities, a suitably qualified specialist should be consulted on the best way to proceed; and • If any relocation of SCC took place, monitoring of relocation success should continue for at least three years after the completion of the construction phase, or until it is evident that the species have established self-sustaining populations. 		
Cultural/Heritage Study and Paleontological Desktop Study	<ul style="list-style-type: none"> • Workmen and foremen need to be trained in the following procedure in instances of accidental discovery of fossil material, in a similar way to the Health and Safety (H&S) protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated ECO for the project, or the foreman or site agent in the absence of the ECO; • It is recommended that copies of the preliminary recording form (see Appendix F) and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place; • One person in the staff must be identified and appointed as responsible for the implementation of the following protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material; • Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to follow if it is likely that the material identified is a fossil: <ul style="list-style-type: none"> ○ The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found; ○ The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and co-ordinates; and ○ The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: Preliminary Record Form (see Appendix F) within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including: <ul style="list-style-type: none"> – The date; – A description of the discovery; – A description of the fossil and its context (e.g., position and depth of find); – Where and how the find has been stored; and – Photographs to accompany the preliminary report (the more the better): <ul style="list-style-type: none"> ▪ A scale must be used; ▪ Photos of location from several angles; ▪ Photos of vertical section should be provided; ▪ Digital images of hole showing vertical section (side); and ▪ Digital images of fossil or fossils. • Upon receipt of the Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary; • Exposed finds must be stabilised where they are unstable and the site capped, e.g., with a plastic sheet or sandbags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation; • If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all fossil material and any breakage of fossil material must be avoided at all costs; and • No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed. 	X	Chapter 9 and Table 9-1
Soils and Land Capability Agricultural Compliance Statement	<ul style="list-style-type: none"> • Limit vegetation clearance to only the areas where the surface infrastructure will be constructed; • Avoid parking of vehicles and equipment outside of designated parking areas; • Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring); • Design and implement a Stormwater Management System where run-off from surfaced areas is expected; • Re-establish vegetation along the railway infrastructure to reduce the impact of run-off from the compacted surface of the railway area; • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; • Unnecessary land clearance must be avoided; 	X	Chapter 9 and Table 9-1

Specialist Study	Recommendation of Specialist	Specialist Recommendations that have been included in the BAR (Mark with X)	Reference to Applicable Section in this Report
	<ul style="list-style-type: none"> • Level any remaining topsoil that were removed from the railway area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface; • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. 		

11. ENVIRONMENTAL IMPACT STATEMENT

The aim of this chapter is to provide a summary of the potential biophysical, cultural/heritage and socio-economic impacts identified as part of the proposed project, as well as their significance.

11.1 SUMMARY OF KEY FINDINGS

This section provides a summary of the findings of identified as part of the proposed project and assessed potential impacts on the receiving environment in both the unmitigated and mitigated scenarios, including cumulative impacts. A summary of the potential impacts (as per chapter 9), associated with the preferred alternative (as per chapter 6), in the unmitigated and mitigated scenarios for all project phases is included in Table 11-1.

The assessment of the proposed project presents the potential for negative impacts to occur (in an unmitigated scenario) on the biophysical environments both on the project footprint and in the surrounding area. With the implementation of management actions, these potential impacts can be prevented or reduced to acceptable levels.

It follows that provided the EMPR is effectively implemented, there is no biophysical, cultural/heritage or socio-economic reason why the proposed project should not proceed.

Table 11-1: Summary of Potential Impacts

Aspect	Potential impact	Cumulative impact significance of the impact (the ratings are negative unless otherwise specified)	
		Unmitigated	Mitigated
Geology	Loss and sterilisation of mineral resources	INSIGNIFICANT	
Topography	Altering topography	INSIGNIFICANT	
	Hazardous excavations and infrastructure resulting in safety risks to third parties and animals	Medium	INSIGNIFICANT
Soil and land capability	Soil erosion	High	MEDIUM
	Disturbance of original soil profiles	Medium	VERY LOW
	Chemical pollution of soils	Medium	VERY LOW
Biodiversity	Physical destruction and disturbance of floral species	Medium	LOW
	Physical destruction and disturbance of faunal species	Medium	LOW
Surface water resources	Alteration of natural drainage patterns	INSIGNIFICANT	
	Contamination of surface water resources	INSIGNIFICANT	
Groundwater	Contamination of groundwater resources	INSIGNIFICANT	
Air quality	Air pollution	INSIGNIFICANT	
Noise	Increase in disturbing noise levels	INSIGNIFICANT	
Visual	Negative visual views	INSIGNIFICANT	
Traffic	Road disturbance and traffic safety	INSIGNIFICANT	
Cultural/heritage and palaeontological resources	Loss of cultural/heritage and palaeontological resources	INSIGNIFICANT	
Socio-economic	Inward migration and economic impact	INSIGNIFICANT	

Aspect	Potential impact	Cumulative impact significance of the impact (the ratings are negative unless otherwise specified)	
		Unmitigated	Mitigated
	Change in land use	INSIGNIFICANT	

11.2 FINAL SITE MAP

The final preferred alternative site layout map is included in Figure 3-1.

11.3 SUMMARY OF THE POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

The positive and negative impacts and risks of the proposed activity are summarised above in Section 11.1.

As noted in chapter 6, the proposed project entails the extension of the existing railway infrastructure and therefore it is most effective if it is adjacent to the existing railway line. It follows that no site alternatives were considered due to this fixed position.

12. IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES FOR INCLUSION IN THE EMPR

Based on the outcome of the impact assessment (refer to chapter 9 and see Appendix C), and where applicable the recommendations from specialists (refer to chapter 10), the proposed management objectives and outcomes are provided in this chapter.

12.1 PROPOSED MANAGEMENT OBJECTIVES AND OUTCOMES FOR ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

Specific environmental objectives and outcomes to control, remedy or prevent potential impacts from the proposed project are provided in Table 12-1.

Table 12-1: Environmental Objectives and Outcomes

Aspect	Environmental Objective	Environmental Outcome
Topography	The objective is to minimise changes to natural topography.	The outcome is to limit the alteration of topography during the proposed project and through rehabilitation.
	The objective is to prevent physical harm to third parties and animals resulting from potentially hazardous excavations and infrastructure.	The outcome is to ensure no third parties or animals are harmed during the proposed project.
Soils and Land Capability	The objective is to minimise the loss of soil resources and related land capability from erosion.	The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.
	The objective is to minimise the loss of soil resources and related land capability from physical disturbance and compaction and soil pollution.	
	The objective is to minimise the loss of soil resources and related land capability from soil pollution.	
Biodiversity	The objective is to prevent the unacceptable loss and disturbance to floral species, and to prevent the proliferation of alien invasive species within and surrounding the project area.	The outcome is to prevent the spread of alien species in the project area, as well to limit disturbance as far as practically possible.
	The objective is to prevent the unacceptable destruction and disturbance to faunal species.	The outcome is to ensure that no faunal species are harmed or disturbed in the project area.
Groundwater Resources	The objective is to prevent pollution of groundwater resources.	The outcome is to ensure that groundwater quality remains within acceptable limits for both domestic and agricultural purposes.
Air Quality	The objective is to prevent air pollution health impacts.	The outcome is to ensure that any pollutants emitted as a result of the proposed project

Aspect	Environmental Objective	Environmental Outcome
		remains within acceptable limits so as to prevent health related impacts.
Cultural/Heritage and Palaeontology	The objective is to minimise the disturbance of cultural/heritage and paleontological resources.	The outcome is to protect heritage resources where possible. If disturbance is unavoidable, then mitigate impact in consultation with a specialist and the SAHRA and in line with regulatory requirements.

12.1.1 Impacts That Require Monitoring Programme

Outcomes of the environmental objectives listed in the section above are the implementation of monitoring programmes. Impacts that require monitoring include:

- Hazardous excavations and infrastructure resulting in safety risks to third parties and animals;
- Physical destruction and disturbance of biodiversity; and
- Air quality.

Environmental impacts requiring monitoring are discussed further in chapter 28.

12.1.2 Activities and Infrastructure

The source activities of potential impacts which require management include:

- Site preparation;
- Earthworks;
- Civil works;
- Transport systems;
- General site management;
- Demolition;
- Rehabilitation; and
- Maintenance and aftercare.

The phases of development associated with the above-mentioned source activities are provided in Table 3-2.

12.1.3 Management Actions

Management actions which will be implemented to control the proposed project activities or processes which have the potential to pollute or result in environmental degradation are provided in chapter 9 and Table 9-1.

12.1.4 Roles and Responsibilities

The key personnel to ensure compliance to this BAR and EMPR are the operations executive and the Environmental Department Manager and officers. As a minimum, their roles, as they relate to the implementation of monitoring programmes and management activities, include:

- Ensuring that monitoring programmes and audits are scoped to be fit for purpose and included in the annual mine budget;
- Identifying and appointing appropriately qualified specialists/engineers to undertake the monitoring programmes;
- Appointing specialists in a timeous manner to ensure work can be carried out to acceptable standards;
- Liaising with the relevant company, municipal and community structures in terms of the commitments in the Social and Labour Plan (SLP);
- Ensuring that commitments in the SLP are developed and implemented timeously;
- Establishing and maintaining good working relations with surrounding communities and landowners; and
- Facilitating stakeholder communication, information sharing and a grievance mechanism.

13. ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

Management actions (refer to chapter 9 and Table 9-1) including monitoring requirements (see chapter 28), should form part of the conditions of the EA. With reference to Regulation 26 of Government Notice Regulation (GNR) 982 of NEMA, additional conditions that should form part of the EA that are not specifically included in the EMPR report, include compliance with all applicable environmental legislation, whether specifically mentioned in this document or not, and which may be amended from time to time.

14. ASSUMPTIONS, UNCERTAINTIES, LIMITATIONS AND GAPS IN KNOWLEDGE

This chapter outlines the assumptions, uncertainties, limitations and gaps in knowledge associated with the BA process and the proposed project.

14.1 ENVIRONMENTAL ASSESSMENT LIMIT

The BA process focuses on third parties only and does not assess H&S impacts on employees and contractors because the assumption is made that these aspects are separately regulated by H&S legislation, policies and standards, and that HMM will adhere to these.

14.2 BIODIVERSITY

The following assumptions and limitations apply to the Biodiversity Study (inclusive of Plant, Animal and Aquatic Biodiversity Compliance Statements) compiled for the proposed project:

- The biodiversity assessment was confined to the assessment zone and did not include the neighbouring and adjacent properties. These were considered as part of the desktop assessment;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is however, expected that most floral and faunal communities have been accurately assessed and considered. Relevant online sources and background information were further accessed to improve on the overall understanding of the assessment zone's ecology;
- Due to most faunal taxa's nature and habits, it is unlikely that all species would have been observed during a field assessment of limited duration. Due to the locality of the proposed railway loop alternatives (adjacent to current mining activities), the cyclical nature of many species' life stages, as well as the season of the assessment, few faunal species were observed during the site visit. As such, background data (desktop) and literature studies (previous studies undertaken in the immediate area) were used to further infer faunal species composition and sensitivities in relation to the available habitat;
- Due to the season of assessment (winter), many of the geophytes had died back and were not observable or identifiable. Similarly, many of the smaller herbaceous species, without the distinctive flowers, inflorescences or seeds made identification difficult. As such some species were only identifiable to species levels whilst other species that only show in summer were likely missed during this assessment. However, the data presented within the report is deemed suitable and accurate in order to make the necessary decisions pertaining to the project;
- Sampling, by its nature, means that not all individuals are assessed and identified. Some species and taxa associated with the assessment zone may therefore have been missed during the assessment; and
- The data presented in the report are based on one site visit, undertaken on the 10 June 2021 (winter). A more comprehensive assessment would require that assessments take place in all seasons of the year. However, on-site data were augmented with all available desktop data. Together with project experience in the area, the findings of this assessment are considered an accurate reflection of the ecological characteristics of the assessment zone.

14.3 CULTURAL/HERITAGE

The following assumptions and limitations apply to the HIA compiled for the proposed project:

- The significance of heritage resources is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these;
- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed on site during construction, such activities should be halted, and it would be required that the heritage consultants be notified for an investigation and evaluation of the finds to take place; and
- It is further assumed that the fossil potential of a formation in the project area will be typical of that found in the region and more specifically, similar to that already observed in the surrounds of the project area. In many cases the information on fossil content is limited to the basics, such as in the case of geological mapping when the fossils are not the immediate focus. Scientifically important fossil shell and bone material are expected to be sparsely scattered in these coastal-plain deposits, but unless large and obvious, is not generally seen, under-estimating the fossil prevalence. Much depends on careful scrutiny of exposures and on spotting fossils as they are uncovered during digging i.e., by monitoring excavations. A limitation on predictive capacity exists in that it is not possible to predict the buried fossil content of an area or formation other than in general terms.

14.4 SOILS AND LAND CAPABILITY

The following assumptions and limitations apply to the Soils and Land Capability Compliance Statement compiled for the proposed project:

- The assessment of the anticipated impacts assumes that the proposed surface footprint of the project will stay within the confines as depicted in the layout maps in the report;
- It was assumed that the layout will consist of the components stipulated in the final project layout and description that was provided by the applicant; and
- Assumptions regarding the impacts of the proposed railway extension were made and based on the author's knowledge of the nature and extent of the planned infrastructure.

15. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

The aim of this chapter is to provide a reasoned independent opinion, whether or not the proposed project should proceed or not. This opinion is informed by the outcome of the impact assessment and recommendations made by specialists and I&APs.

15.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

The assessment of the proposed project presents the potential for negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural/heritage and socio-economic environments, both on the project footprint and in the surrounding area. With the implementation of management actions, these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMPR is effectively implemented, there is no reason from a biophysical, cultural/heritage or socio-economic standpoint why the proposed project should not proceed.

15.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

15.2.1 Specific Conditions for Inclusion in the EMPR

Refer to chapter 13.

15.2.2 Rehabilitation Requirements

Refer to chapter 9.

16. PERIOD FOR WHICH AUTHORISATION IS REQUIRED

With specific reference to Table 3-2, the identified project activities relate to all phases of development (construction, operation, decommissioning and closure). Given that the proposed project will supplement mining operations at Wessels Mine, it follows that authorisation is required for the remaining life of mine, until 2035.

17. UNDERTAKING

We, Sharon Meyer and Rizqah Baker, undertake that:

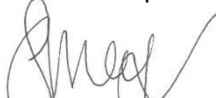
- The information provided herein is correct;
- Comments and inputs from I&APs have been included and correctly recorded in this report;
- Inputs and recommendations from the specialist reports have been included, where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.



Signature of Report Author

9 September 2021

Date



Signature of EAP

9 September 2021

Date

To be provided in revised BAR (hard copy)

Signature of Commissioner of Oaths

Date

18. FINANCIAL PROVISION

The aim of this chapter is to provide information pertaining to the methodology considered as part of the closure liability calculation determination.

18.1 CLOSURE LIABILITY ESTIMATION PROCEDURE

18.1.1 Closure Activities

The closure liability was calculated as per the current closure activities identified by Wessels Mine for the existing railway infrastructure on site, namely:

- Lift and remove railway channels;
- Remove ballast and concrete sleepers, and dispose on discard dump;
- Deep rip the compacted footprint area associated with the railway line;
- Spread 250 mm topsoil (and apply fertilizer) to ripped railway footprint area;
- Revegetate railway footprint area; and
- Maintain and monitor revegetated area until vegetation suitably established.

Only the newly disturbed areas associated with the proposed railway extension project were considered for deep ripping, topsoiling, fertilizing, revegetation, maintenance and monitoring. Current disturbed areas (where the proposed railway extension project will traverse) have not been considered for these specific closure activities since they are already included for, and costed, in the current closure liability estimate for Wessels Mine.

Furthermore, the proposed upgrade to the existing line is not expected to influence the current liability estimate for Wessels Mine and has therefore not been included here.

18.1.2 Quantities

The quantities associated with the proposed railway extension were measured off the infrastructure layout provided (refer to Figure 3-1).

18.1.3 Unit Rates

The unit rates for each closure activity were taken from the current closure liability estimate for Wessels Mine. These unit rates are considered to be independent third-party rates and are applicable as of 1 July 2021. No allowance for salvage and/or recycling scrap material has been considered in the closure liability estimate.

18.1.4 Time, Fee and Contingency Costs

The time, fee and contingency costs were taken from the current closure liability estimate for Wessels Mine, namely:

- Preliminary and General (P&G), 15%; and
- Contingency, 30%.

18.2 CONFIRM THAT THE AMOUNT CAN BE PROVIDED FROM OPERATING EXPENDITURE

Wessels Mine's financial provision will be funded by South32 SA Holdings (Pty) Ltd: Hotazel Manganese Operations (Pty) Ltd.

19. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

19.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The impacts associated with socio-economic conditions are discussed in Appendix C. Management actions identified to address any socio-economic impacts are provided in chapter 9 and Table 9-1.

No person will be directly affected by the project given that no I&APs currently reside within the project footprint area and no I&APs undertake any activities (i.e., farming, etc.) activities within the project footprint. However, other impacts include:

- Road disturbance and traffic safety (**INSIGNIFICANT**);
- Inward migration which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security (**INSIGNIFICANT**); and
- Employment and procurement of goods and services (**INSIGNIFICANT**).

Indirect socio-economic impacts include:

- Hazardous excavations and infrastructure resulting in safety risks to third parties and animals (**INSIGNIFICANT**);
- Alteration of drainage patterns by reducing the volume of runoff into the downstream catchments (**INSIGNIFICANT**);
- Contamination of surface water resources (**INSIGNIFICANT**);
- Contamination of groundwater resources (**INSIGNIFICANT**);
- Air pollution sources that can have a negative impact on ambient air quality (**INSIGNIFICANT**);
- Increase in disturbing noise levels (**INSIGNIFICANT**); and
- Visual impacts on this receiving environment may be caused by activities and infrastructure (**INSIGNIFICANT**).

19.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NHRA

No national estate will be affected by the proposed project.

19.3 SCREENING TOOL

DFFE developed an online screening tool which identifies environmental sensitivities within the project area. The screening tool report for the proposed project was generated using the DFFE online screening tool and was attached to the NEMA application form as supporting documentation. The screening tool report recommended specialist studies to be undertaken as part of the BA process. The specialist studies that were identified in the screening tool report are included in Table 19-1, as well as explanations for why or why not they were undertaken as part of the BA process.

Table 19-1: Specialist Studies and Environmental Sensitivities Identified by the Screening Tool

Theme	Sensitivity	Specialist Study	Reason for in/exclusion
Agriculture	Medium	Compliance Statement	The proposed project entails the clearance of approximately 20 ha of vegetation and the removal of

Theme	Sensitivity	Specialist Study	Reason for in/exclusion
			topsoil. Given the medium sensitivity, the homogenous nature of the soils within the region and the requirements as per the assessment protocols, a Compliance Statement was deemed sufficient.
Animal Species	Low	Compliance Statement	The proposed project entails the clearance of approximately 10 ha of indigenous vegetation that may provide a habitat for protected fauna and fauna SCC. Due to the low sensitivity, a Compliance Statement was deemed sufficient.
Aquatic Biodiversity	Very High	Compliance Statement	No aquatic resources were identified within the project area and thus a Compliance Statement was deemed sufficient.
Archaeological and Cultural Heritage	Low	HIA	In accordance with the NHRA, a full HIA was deemed appropriate.
Geotechnical	Unspecified	Geotechnical Study	A geotechnical study was undertaken as part of the engineering team's investigations.
Landscape/Visual	Unspecified	SSVR	The proposed project is located adjacent to an existing mining complex. A SSVR was deemed sufficient.
Palaeontology	Medium	Palaeontology Desktop Study	The proposed project, according to the SAHRIS, is located within an area of moderate sensitivity. In this regard, a desktop palaeontology study was deemed appropriate.
Plant Species	Low	Compliance Statement	The proposed project entails the clearance of approximately 10 ha of indigenous vegetation that may contain protected floral species or floral SCC. Due to the low sensitivity, a Compliance Statement was deemed sufficient.
Terrestrial Biodiversity	Very High	Biodiversity Study	The proposed project entails the clearance of approximately 10 ha of indigenous vegetation. Due to the very high sensitivity, a full biodiversity study was deemed appropriate.

20. OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4)(A) AND (B) OF THE ACT

No other matters are required.

PART B – ENVIRONMENTAL MANAGEMENT PROGRAMME

21. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

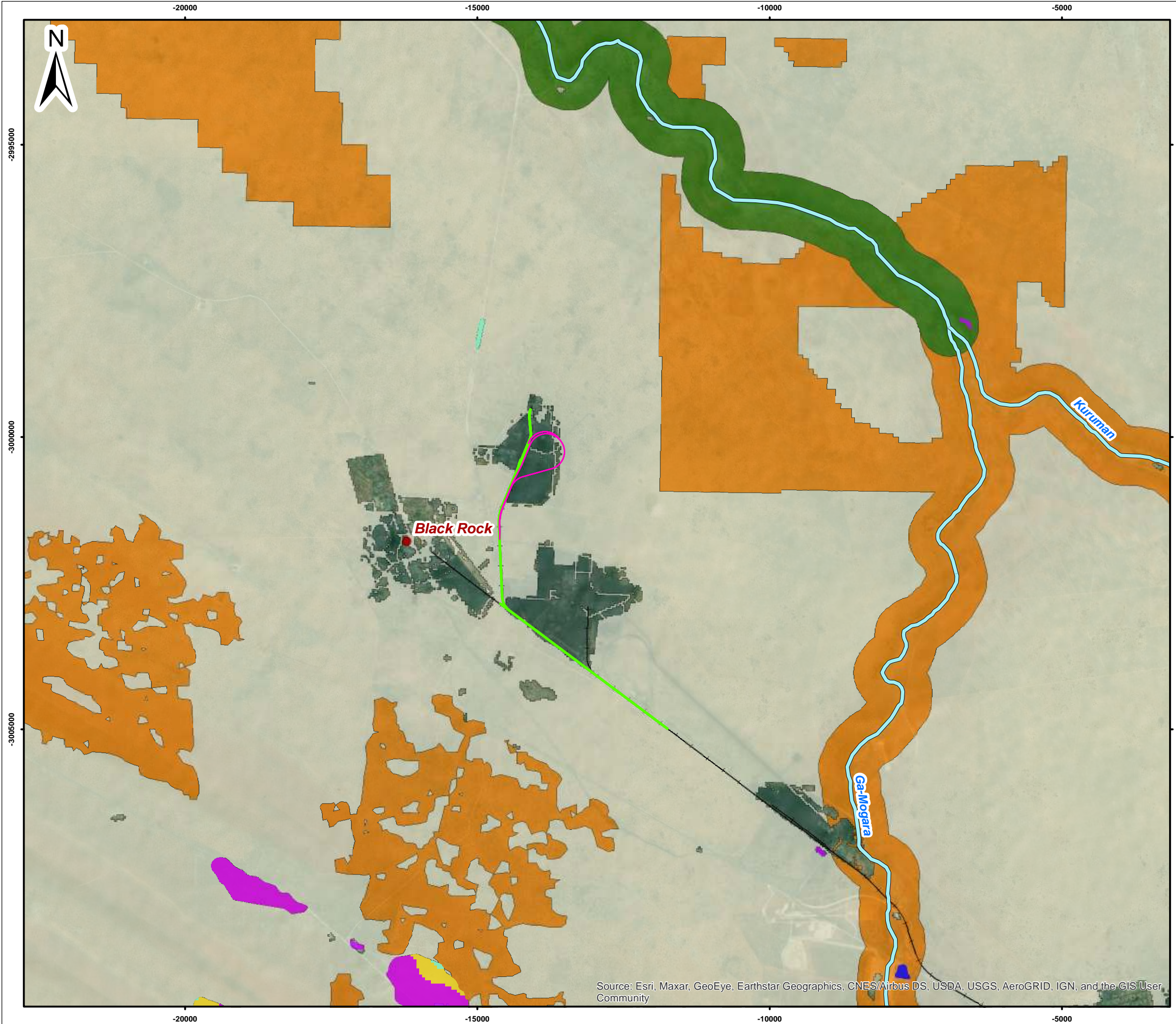
The details of the EAPs who undertake the BA process and prepared this BAR are provided in chapter 1.

22. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The activities associated with the proposed project that are covered in the EMPR are included in chapter 3 and Table 3-2.

23. COMPOSITE MAP

A composite map of the environmental sensitivities of the project area superimposed on the project footprint is provided in Figure 23-1.



- Legend**
- Towns
 - +— Railway
 - Proposed Railway Extension Layout
 - Upgrade to Existing Line
 - Northern Cape Critical Biodiversity Areas**
 - Critical Biodiversity Area (CBA1)
 - Ecological Support Area (ESA)
 - Other Natural Areas (ONA)
 - NFEPA Rivers**
 - CLASS B: LARGELY NATURAL
 - NFEPA Wetlands**
 - Flat
 - Valleyhead seep
 - Channelled valley-bottom wetland
 - Unchannelled valley-bottom wetland

0 1 2 Kilometers
 Scale: 1:63 360 @ A3
 Projection: Transverse Mercator
 Datum: Hartebeeshoek, Lo 23

South32 Limited

Figure 23-1
Composite Map of Environmental Sensitivities

SLR
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24. DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES, INCLUDING THE MANAGEMENT STATEMENT

This chapter outlines the determination of the closure objectives and provides a list of the management measures specifically identified to mitigate impacts associated with the project activities.

24.1 DETERMINATION OF CLOSURE OBJECTIVES

The closure objectives for the project were determined taking into account the existing type of environment as described in section 7.4.1, in order to ensure that the closure objectives strive to achieve a condition approximating its natural state as far as possible. Further information pertaining to the closure objectives identified for the proposed is provided in section 27.1.1.

24.2 VOLUMES AND RATE OF WATER USED FOR MINING

The proposed project will require minimal volumes of water as part of the construction phase.

24.3 HAS A WATER USE LICENCE BEEN APPLIED FOR?

The proposed project does not trigger any activities in the NWA. It follows that a Water Use Licence (WUL) is not required.

24.4 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

The assessment of potential impacts associated with the proposed project is provided in chapter 9 and Appendix C. Management actions which will be implemented to avoid, reduce and minimise impacts to acceptable levels are detailed in chapter 9 and Table 9-1. Table 24-1 outlines the management actions that are specific to the Listed Activities triggered by the proposed project in terms of NEMA.

Table 24-1: Measures to Rehabilitate the Environment Affected by the Undertaking of a Listed Activity

Activity (Listed in terms of NEMA)		Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Number	Description					
Listing Notice 1, GN No. R983, Listing Activity 27:	The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding - (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in mines; or (iii) additional railway lines within the railway line reserve.	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	Approximately 10 ha	<ul style="list-style-type: none"> The project area will be fenced off to prevent inadvertent access by third parties and animals; Access control will be implemented to ensure access is only granted to those who have authorisation; Barriers will be erected around all hazardous excavations; Warning signage will be erected at all hazardous excavations; Where the proposed project has caused injury to third parties or animals, appropriate compensation will be provided; Minimise the area of disturbance by designing and constructing the most compact infrastructure practically possible; Implement the soil conservation procedure as set out in Table 26-3; Rehabilitate in accordance with the approved mine closure plan that ensures a suitable post-closure land use is achieved; Establish short term perennial vegetation that will stabilise the site but allow the indigenous vegetation to establish over the site; Use existing established roads; Conduct potentially polluting activities (i.e., loading, hauling, tipping, transportation, handling and storage) in a manner that pollutants are contained at source and do not pollute soils. In this regard: <ul style="list-style-type: none"> Service all vehicles and mobile equipment regularly in workshops, service bays and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps; Design and operate all new and used chemical, fuel and oil storage and handling facilities in a manner that all spillages are contained in impermeable areas and cannot be released into the environment; Report ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) to the environmental manager immediately and clean up and/or remediate immediately; Implement and maintain a dirty water management system; Implement the waste management practices, as set out in Table 26-2; Educate and train all employees (temporary and permanent) and contractors in pollution prevention; and Implement formalised action plans to enable fast and efficient reaction to contain and remediate pollution incidents. Consider the requirements for long term soil pollution prevention, land function and confirmatory monitoring in the design of any permanent and potentially polluting structures; Implement the emergency response procedure in section Table 29-1 in the event any major spillage incident; A biodiversity specialist will do a walkdown of the project footprint prior to land clearing activities to identify protected floral and faunal species and floral and fauna SCC that may have been lying dormant during initial field observations; Should any protected floral and fauna species and floral and fauna SCC be located on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal, they are to be relocated and the relocation success of such species should be monitored for three years 	<ul style="list-style-type: none"> Implementation of an alien invasive species management or control plan is in accordance with the NEM: BA Alien and Invasive Species List (2020) that require the control of alien invasive species. Obtaining permits to remove protected flora and faunal species is in accordance with the NFA, NCNCA and NEM: BA. Construction, operation and maintenance of storm water management facilities is in a manner that ensures compliance with Regulation 704 of 1999 in terms of the NWA. Dust fallout monitoring will comply with the NDCR. Implementation of a Chance Find Procedure is in accordance with the NHRA. 	<ul style="list-style-type: none"> Prior to construction Prior to construction Construction Construction As necessary Prior to construction Construction, Decommissioning and Closure Construction, Decommissioning and Closure Construction Construction Construction, Decommissioning and Closure Construction Construction Construction

Activity (Listed in terms of NEMA)		Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Number	Description					
				<p>post-construction. Immediate actions are to be taken if it becomes evident that relocation is not successful;</p> <ul style="list-style-type: none"> • Ensure the removal of indigenous vegetation is restricted to what is absolutely necessary; • Additional road construction is to be limited to what is absolutely necessary and the footprint thereof kept to a minimum; • Ensure vegetation clearing is undertaken in phases, so as to limit the potential for erosion; • No collection, trapping and harming of floral and fauna species and floral and fauna SCC is allowed; • No fires are allowed on site; • Limit edge effects to the surrounding environment by: <ul style="list-style-type: none"> ○ Demarcating all footprint areas during construction ○ Preventing construction rubble or cleared alien and invasive species to be disposed outside of demarcated areas; ○ Ensuring that construction rubble and cleared alien and invasive species are taken to a registered waste disposal facility; and ○ Managing the spread of alien and invasive species. • Provide appropriate sanitary facilities and ensure the disposal thereof at a registered licenced facility; • Ensure no temporary dump sites are created on site; • Compile an alien invasive species management or control plan for implementation with the following recommendations: <ul style="list-style-type: none"> ○ A buffer area of 30 m surrounding the railway loop must be monitored continuously for alien invasive species; ○ Remove alien invasive species throughout the construction, operation and maintenance phases; ○ Ensure alien vegetation is removed prior to the removal of indigenous vegetation; ○ Ensure only trained personnel are involved in the chemical control of alien invasive species; ○ Edge effects arising from the proposed project which may affect adjacent areas must be strictly managed; ○ Ongoing alien invasive species monitoring must be undertaken throughout all phases; and ○ Removed alien invasive species must not be placed on unprotected ground as seeds may disperse upon it. All cleared alien invasive species must be disposed of at a licenced waste facility. • It is recommended that culverts of sufficient size be placed beneath the railway line so as to allow for the movement of small faunal species between the remaining habitat inside the railway loop and that of the larger habitat outside. Culverts must be regularly inspected for infilling and blockages, ensuring they are kept clear and open; • Smaller species that are not readily able to move out of an area ahead of vegetation and ground clearing activities (such as scorpions and reptiles), will be less mobile during rainfall events and cold days. As such, care must be taken to look for these species prior to these activities and should these species be encountered, they are to be carefully and safely moved to an area of similar habitat outside of the project footprint. A suitably trained specialist shall be instructed to carry out the removal of venomous snake species; • Perimeter fencing installed as part of the project must allow for the movement of small animals (e.g., palisade fencing or cattle fencing). Should impermeable fencing be installed, small 		<ul style="list-style-type: none"> • Construction • Construction • Construction • All phases • All phases • Construction, Decommissioning and Closure • Construction • Construction • All phases • Construction • Construction • Construction

Activity (Listed in terms of NEMA)		Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Number	Description					
				<p>openings must be created to allow for the continuous movement of small animals. Such openings must be continuously monitored and cleared of debris;</p> <ul style="list-style-type: none"> • Construction personnel are to undergo environmental awareness training pertaining to the potential faunal species located on site; • Implement approved management actions pertaining to the containment of dirty water in accordance with Regulation 704 (June 1999); • Any sheet runoff from compacted areas must be slowed down by the strategic placement of berms; • Control stormwater through the implementation of HMM's existing Stormwater Management Plan; • Continue the implementation of HMM's dust fallout monitoring programme; • Reduce vehicle exhaust emissions through the use of better-quality diesel; • Implement inspection and maintenance programmes; • Implement dust suppression measures (wet and dry) to limit dust impacts. • Implement dust suppression measures (wet and dry) to limit dust impacts; and • Implement the chance find procedure (see Table 10-1) in the event of the discovery of cultural/heritage and/or palaeontological resources on site. 		<ul style="list-style-type: none"> • Prior to construction • Construction • Construction • Construction • All phases • Construction • All phases • Construction • Construction • Construction

25. IMPACT MANAGEMENT OUTCOMES AND OBJECTIVES

The purpose of this chapter is to outline the impact management objectives and outcomes for the potential biophysical, cultural/heritage and socio-economic impacts identified for the proposed project.

Table 25-1 provides a description of the outcomes and objectives of the management actions recommended to manage, remedy, control or modify potential impacts associated with the proposed project. The management actions identified to achieve these outcomes and objectives are also provided.

Table 25-1: Description of Impact Management Outcomes and Objectives

Activity	Potential Impact	Affected Aspect	Phase	Management Action	Standard to be Achieved (Impact Management Objective and Outcomes)
N/A	Loss and sterilisation of mineral resources	Geology	N/A	INSIGNIFICANT	
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Rehabilitation Maintenance and aftercare 	Altering topography	Topography	<ul style="list-style-type: none"> Construction Decommissioning Closure 	<ul style="list-style-type: none"> Minimise the area of disturbance by designing and constructing the most compact infrastructure practically possible; and Rehabilitate in accordance with the approved mine closure plan that ensure a suitable post-closure land use is achieved. 	<ul style="list-style-type: none"> The objective is to minimise changes to natural topography. The outcome is to limit the alteration of topography during the proposed project and through rehabilitation.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks 	Hazardous excavations and infrastructure resulting in safety risks to third parties and animals		<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> The project area will be fenced off to prevent inadvertent access by third parties and animals; Access control will be implemented to ensure access is only granted to those who have authorisation; Barriers will be erected around all hazardous excavations; Warning signage will be erected at all hazardous excavations; and Where the proposed project has caused injury to third parties or animals, appropriate compensations will be provided. 	<ul style="list-style-type: none"> The objective is to prevent physical harm to third parties and animals resulting from potentially hazardous excavations and infrastructure. The outcome is to ensure no third parties' animals are harmed during the proposed project.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Soil erosion	Soils and Land Capability	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> Implement the soil conservation procedure as set out in Table 26-3; Establish short-term perennial vegetation that will stabilise the site but will allow the indigenous vegetation to establish over the site; Ensure vegetation clearance is undertaken in phases; Limit vegetation clearance to only areas where the infrastructure will be constructed; Avoid parking of vehicles and equipment outside of designated parking areas; Plan vegetation clearance for dry seasons (late autumn, winter and early spring); and Re-establish vegetation along the railway infrastructure to reduce the impact of run-off from the compacted surface of the railway area. 	<ul style="list-style-type: none"> The objective is to minimise the loss of soil resources and related land capability from erosion. The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Disturbance of original soil profiles		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> Land clearance must only be undertaken immediately prior to construction activities within the development footprint; and Level any remaining topsoil that was removed from the railway area and that remained on the surface instead of allowing small stockpiled of soil to remain on the surface. 	<ul style="list-style-type: none"> The objective is to minimise the loss of soil resources and related land capability from physical disturbance and compaction. The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.

Activity	Potential Impact	Affected Aspect	Phase	Management Action	Standard to be Achieved (Impact Management Objective and Outcomes)
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Chemical pollution of soil		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> Conduct potentially polluting activities (i.e., loading, hauling, tipping, transportation, handling and storage) in a manner that pollutants are contained at source and do not pollute soils. In this regard: <ul style="list-style-type: none"> Service all vehicles and mobile equipment regularly in workshops, service bays and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps; Design and operate all new and used chemical, fuel and oil storage and handling facilities in a manner that all spillages are contained in impermeable areas and cannot be released into the environment; Report ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) to the environmental manager immediately and clean up and/or remediate immediately; Implement and maintain a dirty water management system; Implement the waste management practices, as set out in Table 26-2; Educate and train all employees (temporary and permanent) and contractors in pollution prevention; and implement formalised action plans to enable fast and efficient reaction to contain and remediate pollution incidents. Take into account the requirements for long term soil pollution prevention, land function and confirmatory monitoring in the design of any permanent and potentially polluting structures; and Implement the emergency response procedure in section Table 29-1 in the event any major spillage incident. 	<ul style="list-style-type: none"> The objective is to minimise the loss of soil resources and related land capability from soil pollution. The outcome is to handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Physical destruction and disturbance of floral species	Biodiversity	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> A biodiversity specialist shall do a walkdown of the project footprint prior to land clearing activities to identify protected floral species and floral SCC that may have been lying dormant during initial field observations; Should any protected floral species and floral SCC be located on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal. They are to be relocated and the relocation success of such species should be monitored for three years post-construction. Immediate actions are to be taken if it becomes evident that relocation is not successful; Ensure the removal of indigenous vegetation is restricted to what is absolutely necessary; No collection of floral species and floral SCC is allowed; Limit edge effects to the surrounding environment by: <ul style="list-style-type: none"> Demarcating all footprint areas during construction; Preventing construction rubble or cleared alien vegetation and invasive species to be disposed outside of demarcated areas; Ensuring that construction rubble and cleared alien and invasive species are taken to a registered waste disposal facility; and Managing the spread of alien and invasive species. Provide appropriate sanitary facilities and ensure the disposal thereof at a registered licenced facility; Ensure no temporary dump sites are created on site; No fires are allowed on site; Compile an alien invasive species management or control plan for implementation with the following recommendations: <ul style="list-style-type: none"> A buffer area of 30 m surrounding the railway balloon should be regularly checked for alien invasive species; Remove alien invasive species throughout the construction, operation and maintenance phases; Ensure alien vegetation is removed prior to the removal of indigenous vegetation; Ensure only trained personnel are involved in the chemical control of alien invasive species; Edge effects arising from the proposed project which may affect adjacent areas must be strictly managed; Ongoing alien invasive species monitoring must be undertaken throughout all phases; and Removed alien invasive species must not be placed on unprotected ground as seeds may disperse upon it. All cleared alien invasive species must be disposed of at a licenced waste facility. 	<ul style="list-style-type: none"> The objective is to prevent the unacceptable loss and disturbance to floral species, and to prevent the proliferation of alien invasive species within and surrounding the project area. The outcome is to prevent the spread of alien species in the project area, as well to limit disturbance as far as practically possible.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation 	Physical destruction and disturbance of faunal species		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> A biodiversity specialist shall do a walkdown of the project footprint prior to land clearing activities to identify faunal species on site and to assist with the relocation thereof; It is recommended that culverts of sufficient size be placed beneath the railway line so as to allow for the movement of small faunal species between the remaining habitat inside the railway loop and that of the larger habitat outside. Culverts must be regularly inspected for infilling and blockages, ensuring they are kept clear of debris; No collection, trapping and harming of faunal species and faunal SCC is allowed; Construction personnel are to undergo environmental awareness training pertaining to the potential faunal species located on site; 	<ul style="list-style-type: none"> The objective is to prevent the unacceptable destruction and disturbance to faunal species. The outcome is to ensure that no faunal species are harmed or disturbed in the project area.

Activity	Potential Impact	Affected Aspect	Phase	Management Action	Standard to be Achieved (Impact Management Objective and Outcomes)
<ul style="list-style-type: none"> Maintenance and aftercare 				<ul style="list-style-type: none"> While no protected faunal species were identified on site, if any species are encountered on site, the necessary permits need to be obtained from DENC and/or DFFE prior to removal/relocation; Perimeter fencing installed as part of the proposed project must allow for the movement of small animals (e.g., palisade fencing or cattle fencing). Should impermeable fencing be installed, small openings must be created to allow for the continuous movement of small animals. Such openings must be continuously monitored and cleared of debris; and Smaller species that are not readily able to move out of an area ahead of vegetation and ground clearing activities (such as scorpions and reptiles), will be less mobile during rainfall events and cold days. As such, care must be taken to look for these species prior to these activities and should these species be encountered, they are to be carefully and safely moved to an area of similar habitat outside of the project footprint. A suitably trained specialist shall be instructed to carry out the removal of venomous snake species. 	
N/A	Alteration of natural drainage patterns	Surface Water Resources	N/A	INSIGNIFICANT	
N/A	Contamination of surface water resources		<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	INSIGNIFICANT	
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Contamination of groundwater resources	Groundwater Resources	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> Implement approved management actions pertaining to the containment of dirty water in accordance with Regulation 704 (June 1999); Any sheet runoff from compacted areas must be slowed down by the strategic placement of berms; Implement the emergency response procedure in Table 29-1 in the event any major spillage incident; and Control stormwater through the implementation of HMM's existing Stormwater Management Plan; 	<ul style="list-style-type: none"> The objective is to prevent pollution of groundwater resources. The outcome is to ensure that groundwater quality remains within acceptable limits for both domestic and agricultural purposes.
<ul style="list-style-type: none"> Site preparation Civil works Earthworks Transport systems General site management Demolition Rehabilitation Maintenance and aftercare 	Air pollution	Air Quality	<ul style="list-style-type: none"> Construction Operation Decommissioning Closure 	<ul style="list-style-type: none"> Continue the implementation of HMM's dust fallout monitoring programme; Reduce vehicle exhaust emissions through the use of better-quality diesel; Implement dust suppression measures (wet and dry) to limit dust impacts; and Implement inspection and maintenance programmes. 	<ul style="list-style-type: none"> The objective is to prevent air pollution health impacts. The outcome is to ensure that any pollutants emitted as a result of the project remains within acceptable limits so as to prevent health related impacts.
N/A	Negative visual views	Visual	N/A	INSIGNIFICANT	
N/A	Road disturbance and traffic safety	Traffic	N/A	INSIGNIFICANT	
<ul style="list-style-type: none"> Site preparation Civil works Earthworks 	Loss of cultural/heritage and paleontological resources	Cultural/Heritage and Paleontological Resources	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Implement the chance find procedure (refer to Table 10-1) in the event of the discovery of cultural/heritage and/or palaeontological resources on site. 	<ul style="list-style-type: none"> The objective is to minimise the disturbance of cultural/heritage and paleontological resources. The outcome is to protect heritage resources where possible. If disturbance is unavoidable, then mitigate impact in consultation with a

Activity	Potential Impact	Affected Aspect	Phase	Management Action	Standard to be Achieved (Impact Management Objective and Outcomes)
					specialist and the SAHRA and in line with regulatory requirements.
N/A	Inward migration and economic impact	Socio-Economic	N/A	INSIGNIFICANT	
N/A	Change in land use		N/A	INSIGNIFICANT	

26. IMPACT MANAGEMENT ACTIONS

Table 26-1: Description of Impact Management Actions

Activity	Potential Impact	Management Action	Time Period for Implementation	Compliance with Standards
N/A	Loss and sterilisation of mineral resources	INSIGNIFICANT		
Refer to Table 25-1	Altering topography	Refer to Table 25-1	Refer to Table 24-1	N/A
Refer to Table 25-1	Hazardous excavations and infrastructure resulting in safety risks to third parties and animals	Refer to Table 25-1	Refer to Table 24-1	N/A
Refer to Table 25-1	Soil erosion	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
Refer to Table 25-1	Disturbance of original soil profiles	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
Refer to Table 25-1	Chemical pollution of soil	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
Refer to Table 25-1	Physical destruction and disturbance of floral species	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
Refer to Table 25-1	Physical destruction and disturbance of faunal species	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
N/A	Alteration of natural drainage patterns	INSIGNIFICANT		
N/A	Contamination of surface water resources	INSIGNIFICANT		
Refer to Table 25-1	Contamination of groundwater resources	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
Refer to Table 25-1	Air pollution	Refer to Table 25-1	Refer to Table 24-1	N/A
N/A	Negative visual views	INSIGNIFICANT		
N/A	Road disturbance and traffic safety	INSIGNIFICANT		
Refer to Table 25-1	Loss of cultural/heritage and paleontological resources	Refer to Table 25-1	Refer to Table 24-1	Refer to Table 24-1
N/A	Inward migration and economic impact	INSIGNIFICANT		
N/A	Change in land use	INSIGNIFICANT		

Additional procedures to manage waste and conserve soil resources are provided in Table 26-2 and Table 26-3. These measures must be implemented in the relevant phases, in addition to those already mentioned in afore-mentioned sections.

Table 26-2: Waste Management Procedures for General Waste

Items to be considered		Intentions
General	Specific	
Classification and record keeping	General	HMM’s general and hazardous waste management procedure will cover the collection, storage, handling, transportation and disposal of waste to and from the mine. HMM will ensure that the responsible contractor(s) are made aware of these procedures.
	Waste opportunity analysis	In line with the DWS’ strategy to eliminate waste streams in the longer term, HMM will assess each waste type to see whether there are alternative uses for the material. This will be done as a priority before the disposal option.
	Safety data sheets	HMM will maintain, where required in terms of the regulations, the safety data sheets for hazardous waste (prepared in accordance with SANS 10234).
	Inventory of wastes produced	HMM will keep an accurate and up to date record of the waste that is generated, which records must reflect: <ul style="list-style-type: none"> • The classification of the wastes; • The quantity of each waste generated, expressed in tons or cubic metres per month; • The quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of; and • By whom the waste was managed.
	Disposal record	Written evidence of safe disposal of waste will be kept.
	Record keeping	Records will be retained for a period of at least five years and will be made available to the DWS on request.
Waste management	Collection points	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity and that these are serviced frequently.
	Laydown/ salvage areas	During construction, operations, decommissioning and closure, lay down areas for re-usable non-hazardous materials will be established.
	General (Non-hazardous) waste	Will be stored in designated skips and removed by an approved contractor for disposal at a licenced facility.
	Hazardous wastes	Medical waste, laboratory chemicals and related packaging, used chemicals and chemical containers will be temporarily stored in sealed containers in a bunded store before removal by an approved waste contractor and disposed of in a licenced facility.
	Used and/or spilled hydrocarbons such as oil and grease	Used and/or spilt oil and grease will be collected in suitable containers at designated collection points. The designated collection points will be bunded and underlain by impervious materials to ensure that any spills are contained. In general areas used and/or spilt oil and grease will be collected in suitable containers and deposited in a designated storage area. Notices will be erected at each waste oil point giving instructions on the procedure for waste oil discharge and collection. An approved subcontractor will remove oil from site.

Items to be considered		Intentions
General	Specific	
	Any soil polluted by a spill	<p>If soil (whether stockpiled or in its undisturbed natural state) is polluted, the first management priority is to treat the pollution by means of in-situ bioremediation at the designated site. In situ remediation is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in-situ options include bio-remediation at the point of pollution, or removal of soils for washing and/or bioremediation at a designated area after which the soils are returned.</p> <p>If remediation of the soil in-situ is not possible, the soils will be classified as a waste in terms of the Waste Regulations and will be disposed of at an appropriate permitted waste facility.</p>
	Mixing of wastes	Waste will not be mixed or treated where this would reduce the potential for re-use, recycling or recovery; or result in treatment that is not controlled and not permanent.
Disposal	Offsite waste disposal facilities	<p>Waste will be disposed of at appropriate licenced waste disposal facilities.</p> <p>Unless collected by the municipality, the mine must ensure that the disposal of their waste to landfill is in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of Section 7(1) of the NEM: WA.</p>
Waste transport	Contractor	A qualified, reputable waste management subcontractor will undertake the waste transport. The contractor will provide an inventory of each load collected and of proof of disposal at a licenced facility.
Banned practices	Long-term stockpiling of waste	Stockpiling of waste is a temporary measure. Waste stockpiling sites must have an impervious floor, be bunded and have a drainage system for collection and containment of water on the site.
	Burying of waste	No wastes will be placed on site.

Table 26-3: Soil Conservation Procedures

Steps	Factors to consider	Detail
Delineation of areas to be stripped		Stripping will only occur where soils are to be disturbed by activities that are described in the EMPR, and where a clearly defined end rehabilitation use for the stripped soil has been identified.
Stripping	Planning	Wherever possible, stripping and replacing of soils will be done in a single action. This is both to reduce compaction and to increase the viability of the seed bank contained in the stripped surface soil horizons. All machines will be in efficient and safe working condition and only operated when ground conditions enable their maximum operating efficiency.
	Topsoil	A thickness of 150 cm of topsoil will be stripped.
	Soft and hardpan carbonate horizons	Soft and hardpan carbonate horizons (deeper than 150cm) will be stripped separately and not mixed with the A and B horizons.
Delineation of stockpiling areas	Designation of the areas	All topsoil will be stockpiled in areas clearly demarcated on the infrastructure layout and should be defined as no-go areas.
Stockpile management	Vegetation establishment and erosion control	The upper material of topsoil does not have high nutrient values, and their primary value is due to the presence of seed bank. Stockpiles will be examined after a reasonable rainy period/season, and then annually to determine whether vegetation has naturally established itself on the stockpiles. In the case of no or sparse vegetation establishment, geo-textiles or other methods will be used on the topsoil stockpiles to prevent wind erosion.
	Slope	The stockpile side slopes should be flat enough to promote vegetation growth and reduce runoff related erosion. In addition to this, the topsoil stockpiles need to be established on a gradual slope if possible. Should erosion be noted, the slopes should be stabilised with geotextiles or other appropriate methods.
	Waste	No waste material will be placed on the soil stockpiles.
	Vehicles	Equipment movement on top of the soil stockpiles will be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank.
Management of disturbed land	Erosion control	To prevent the erosion of topsoil, management actions may include one or more of the following; vegetation, berms, soil traps, hessians and storm water diversions away from areas susceptible to erosion.
Rehabilitation of disturbed land: restoration of land capability	Placement of soil	Areas to be rehabilitated should be ripped in order to reduce soil compaction. As a general rule, a minimum layer of 50 cm of topsoil must be replaced unless a soils expert advises otherwise.
	Restore land function and capability	Apply landscape function analysis and restoration interventions to areas where soil has been replaced as part of rehabilitation, but the land function and capability has not been effectively restored.

27. FINANCIAL PROVISION

The aim of this chapter is to outline the closure objectives, the rehabilitation plan and the financial liability determined for the proposed project.

27.1 DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION

27.1.1 Closure Objectives Description and the Alignment with the Baseline Environment

The closure objectives for the Wessels Mine were determined based on the principles for Mine Closure, as specified in the MPRDA, as well as based on the outcomes of previous specialist investigations. The high-level closure objectives for Wessels Mine are as follows:

- To leave the site in a safe condition for post-closure land users;
- To create stable, non-polluting and functioning landforms that are, as far as practically achievable, consistent with the surrounding landscape and other environmental values; and
- Rehabilitation should seek to minimise environmental impacts and disturbance to the eco-system resulting from mining activities.

Integration of surrounding land use with the established baseline conditions on-site has also informed the final land use option for the Wessels Mine. Therefore, the outcomes of these objectives are aligned to baseline conditions. The final land use indicated for Wessels Mine is that of is grazing.

27.1.2 Confirmation that Closure Objectives Have Been Consulted with I&APs

The closure objectives are outlined in this report and is made available to I&APs for review and comment (refer to section 7.2).

To date, no comments regarding the closure objectives have been received from I&APs (refer to Table 7-2).

27.1.3 Rehabilitation Plan

The proposed project does not require the development of an annual rehabilitation plan as outlined in the Financial Provisioning Regulations, 2015 (GNR 1147 of 20 November 2015) that focusses on rehabilitation for the forthcoming 12 months. The Wessels Mine, inclusive of the proposed railway balloon, will be operational for many years to come and the rehabilitation of this area would only be considered nearer to the end of life of mine, in approximately 14 years (life of mine 2035).

27.1.4 Compatibility of the Rehabilitation Plan with the Closure Objectives

It is confirmed that HMM's rehabilitation plan is compatible with the closure objectives given that the closure objectives were taken into account during the determination of the financial provision. The rehabilitation plan is in line with the minimum requirement of the EMPR.

27.1.5 Calculate and State the Quantum of the Financial Provision

The closure liability for the proposed project (the extension of the railway) has been calculated at **R 2 552 016.90 (excl. VAT)**. This figure includes P&Gs (15%) and Contingencies (30%). The calculation is at Current Value as of 1 July 2021.

27.1.6 Confirmation that the Financial Provision will be Provided

The financial provision is provided in the form of a bank guarantee, a top up bank guarantee and a trust fund.

28. MECHANISMS FOR MONITORING COMPLIANCE AND PERFORMANCE AGAINST THE EMPR

The aim of this section is to outline the monitoring programme that will need to be implemented during the proposed project.

There are no environmental impacts specifically associated with the proposed project that require monitoring. HMM currently has monitoring programmes in place for its existing mining operations at Wessels Mine. It is recommended that the implementation of those monitoring programmes be continued.

As a general approach, HMM will ensure that existing monitoring programmes comprise the following:

- Adherence to a formal monitoring procedure;
- Use of appropriately calibrated equipment by personnel trained to use the equipment;
- The preservation of samples according to laboratory specifications, where samples require analysis;
- The identification of monitoring parameters in consultation with a specialist in the relevant field and/or the relevant authority;
- The amendment or removal of monitoring parameters, where necessary, following the initial monitoring results and in consultation with a specialist and/or the relevant authority; and
- The interpretation of data and reporting of trends will be undertaken by an appropriately qualified person.

28.1 FREQUENCY OF PERFORMANCE ASSESSMENT REPORT

HMM will, for the period during which the EA and the EMPR is valid, submit environmental audit reports to the DMRE. These audits will focus on the mine's compliance with the conditions of the EA and the commitments in the EMPR. These audits will be undertaken by a qualified independent person and will comply with the relevant EIA Regulations, 2014 (as amended).

The Environmental Manager will conduct internal management audits against the commitments in the EMPR in accordance with an annual audit plan. During the operation phase, these audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

28.2 CLOSURE COST REPORTING

The financial provision for the mine (inclusive of the railway extension) will be updated on an annual basis and be submitted to the DMRE for the duration of the operation in accordance with the relevant legislation.

29. ENVIRONMENTAL AWARENESS PLAN

This chapter outlines the environmental awareness plan that has been developed for the proposed project.

29.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM EMPLOYEES OF THE ENVIRONMENTAL RISKS

Wessels Mine has a well-established internal and external communication strategy that was developed and successfully implemented as part of the integrated management system of the mine. Wessels Mine has implemented OHAS 18001 in August 2005. The Environmental Awareness Plan forms a major part of the communication strategy, together with other issues such as health, safety, operations, productions, etc. The communication strategy is reviewed on a regular basis (at least annually) and revised if necessary. In addition, the following is implemented:

- Internal Communication and Awareness Campaign: The mine has a newsletter, as well as various Communication Meetings; and
- External Communication and Awareness Campaign: The mine holds meetings with I&APs and issues an annual Health, Safety, Environment and Community Report.

29.2 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION

29.2.1 Ongoing Monitoring and Management Actions

Implementation of HMM's existing monitoring programmes, as mentioned in chapter 28, will be continued to provide early warning systems necessary to avoid environmental emergencies.

29.2.2 Procedures in Case of Environmental Emergencies

Emergency procedures apply to incidents that are unexpected and may be sudden, and which may lead to serious danger to employees/contractors, the public and/or potentially serious pollution of, or detriment to the environment (immediate and delayed). Procedures to be followed in case of environmental emergencies are described in the sections below.

29.2.2.1 General Emergency Procedure

The general procedure that should be followed in the event of all emergency situations is as follows.

- Applicable incident controller, defined in HMM's existing emergency plans, must be notified of an incident upon discovery;
- Area to be cordoned off to prevent unauthorised access and tampering of evidence;
- Undertake actions defined in HMM's existing emergency plans to limit/contain the impact of the emergency;
- If residue facilities/dams, stormwater diversions, etc., are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Operations Engineer on shift must be notified;
- Take photographs and samples as necessary to assist in investigation;
- Report the incident immediately to the Environmental Department for emergencies involving environmental impacts or to the safety department in the case of injury;

- The Environmental Department must comply with Section 30 of the NEMA such that:
 - The Environmental Department must immediately notify the relevant departments of:
 - The nature of the incident;
 - Any risks posed to public health, safety and property;
 - The toxicity of the substances or by-products released by the incident; and
 - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
- The Environmental Department must, as soon as is practically possible, after the incident:
 - Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
 - Undertake clean up procedures;
 - Remedy the effects of the incident;
 - Assess the immediate and long-term effects of the incident (environment and public health); and
 - Within 14 days, the Environmental Department must report to the Director-General DWS and DFFE, the provincial head of DFFE, the regional manager of the DMRE, the head of the district and local municipalities and the head of the regional DWS office such information as is available to enable an initial evaluation of the incident, including:
 - The nature of the incident;
 - The substances involved and an estimation of the quantity released;
 - The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
 - Initial measures taken to minimise the impacts;
 - Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
 - Measures taken to avoid a recurrence of the incident.

Identification of Emergency Situations

The project-specific emergency situations that have been identified together with specific emergency response procedures are outlined in Table 29-1.

Table 29-1: Emergency Response Procedures

Item	Emergency situation	Response in addition to general procedures
1	Spillage of chemicals, engineering substances and waste	<ul style="list-style-type: none"> • Where there is a risk that contamination will contaminate the land (leading to a loss of resource), surface water and/or groundwater, HMM will: <ul style="list-style-type: none"> ○ Notify residents/users downstream of the pollution incident; ○ Identify and provide alternative resources should contamination impact adversely on the existing environment; ○ Cut off the source if the spill is originating from a pump, pipeline or valve (e.g., refuelling bays) and the infrastructure 'made safe'; ○ Contain the spill (e.g., construct temporary earth bund around source such as road tanker); ○ Pump excess hazardous liquids on the surface to temporary containers (e.g., 210 litre drums, mobile tanker, etc.) for appropriate disposal; and ○ Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired.
2	Discharge of dirty water to the environment	<ul style="list-style-type: none"> • Apply the principals listed for Item 1 above. • To stop spillage from the dirty water system, HMM will: <ul style="list-style-type: none"> ○ Redirect excess water to other dirty water facilities where possible; ○ Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; ○ Carry out an emergency discharge of clean water and redirect the spillage to the emptied facility; and ○ Apply for emergency discharge as a last resort.
3	Pollution of surface water (where relevant)	<ul style="list-style-type: none"> • Apply the principals listed for Item 1 above; • Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants; • Contamination entering the surface water drainage system will be redirected into the dirty water system; and • The Environmental Department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination.
4	Groundwater contamination	<ul style="list-style-type: none"> • Apply the principals listed for Item 1 above; and • Investigate the source of contamination and implement control/management actions.
5	Falling into hazardous excavations	<ul style="list-style-type: none"> • Personnel discovering the fallen individual or animal must mobilise the emergency response team to the location of the incident and provide a general appraisal of the situation (e.g., human or animal, conscious or unconscious, etc.); • The injured party should be recovered by trained professionals such as the Wessels Mine emergency response team; and • A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport individual to hospital.
6	Uncovering of graves and sites and fossils	<ul style="list-style-type: none"> • Refer to the Chance Find Procedure provided in Table 10-1.

29.3 TECHNICAL, MANAGEMENT AND FINANCIAL OPTIONS

Technical, management and financial options that will be put into place to deal with the remediation of impacts in cases of environmental emergencies are described below:

- HMM will appoint a competent management team with the appropriate skills to develop and manage the proposed project of this scale and nature;
- To prevent the occurrence of emergency situations, the HMM will implement, as a minimum, the mine plan and mitigation measures as included in this BAR and EMPR;
- HMM has an environmental management system in place where to identify, report, investigate, address and close out environmental incidents;
- As part of its annual budget, HMM will allow a contingency for handling of any risks identified and/or emergency situations; and
- Where required, HMM will seek input from appropriately qualified people.

30. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

As mentioned in chapter 28, HMM will, for the period during which the EA and the EMPR is valid, submit environmental audit reports to the DMRE. These audits will focus on the mine's compliance with the conditions of the EA and the commitments in the EMPR. These audits will be undertaken by a qualified independent person and will comply with the relevant EIA Regulations, 2014 (as amended).

The Environmental Manager will conduct internal management audits against the commitments in the EMPR in accordance with an annual audit plan. During the operation phase, these audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

Furthermore, the financial provision for the mine will be updated on an annual basis and be submitted to the DMRE for the duration of the operation in accordance with the relevant legislation.

31. UNDERTAKING

We, Sharon Meyer and Rizqah Baker, undertake that:

- The information provided herein is correct;
- Comments and inputs from I&APs have been included and correctly recorded in this report;
- Inputs and recommendations from the specialist reports have been included, where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.



Signature of Report Author

9 September 2021

Date



Signature of EAP

9 September 2021

Date

To be provided in revised BAR (hard copy)

Signature of Commissioner of Oaths

Date

32. REFERENCES

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