EXM ENVIRONMENTAL SCIENCE

SISHEN IRON ORE COMPANY (PTY) LTD

KOLOMELA MINE

INFRASTRUCTURE EXPANSION PROJECT

FINAL REHABILITATION, DECOMMISSIONING AND MINE CLOSURE PLAN

IN ACCORDANCE WITH REGULATION 11(B) OF THE FINANCIAL PROVISION REGULATIONS, 2015 AS AMENDED

DRAFT

DMRE REF:

NC 30/5/1/2/3/2/1/ (00205) MR

October 2021

REV00

AngloAmerican

IRON ORE
KUMBA IRON ORE LTD

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Name	**Designation**	**Responsibility**	**Signature**	**Date**
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General Information	
Client	Anglo American – Sishen Iron Ore Company (Pty) Ltd
Project Number	EX00012
Project Name	Kolomela Mine Infrastructure Expansion Project_Closure Plan
DMR Reference No.	(NC) 069 MR
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Address (Mine)	Kolomela Mine Farm Strydfontein Postmasburg

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ACRONYMS AND ABBREVIATIONS

	Definition
AA	Anglo American
BGL	below ground level
CBA	Critical Biodiversity Areas
DMRE	Department of Mineral Resources and Energy
DMS	Dense Media Separation
DSO	Direct Shipping Ore
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ELU	End Land Use
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GNR	Government Notice Regulation
HME	Heavy Mining Equipment
IAP	Interested and Affected Party
IWWMP	Integrated Water and Waste Management Plan
KS	Kapstevel
LDV	Light Driving Vehicles
LOM	Life of Mine
mamsl	Metres above mean sea level
Mt	Million Tonnes
MPRDA	Mineral and Petroleum Resources Development Act
MW	Megawatt
NAAQS	National Air Quality Standards
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management Air Quality Act
NEM: BA	National Environmental Management Biodiversity Act
NEM: WA	National Environmental Management Waste Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NIA	Noise Impact Assessment
PM	Particulate Matter
PV	Photovoltaic
ROM	Run of Mine
SACNASP	South African Council for Natural & Scientific Professionals
SAHRA	South African Heritage Resource Agency
SANS	South African National Standards
SIOC	Sishen Iron Ore Company (Pty) Ltd
TIF	Tailings Impoundment Facility
SLP	Social Labour Plan
TOPS	Threatened or Protected Species
TSF	Tailings Storage Facility
WRD	Waste Rock Dump
WUL	Water Use Licence

1. INTRODUCTION

1.1 Kolomela Mine Background

The Sishen Iron Ore Company (Pty) Ltd ("SIOC"), part of Kumba Iron Ore Limited ("Kumba"), owns and operates Kolomela Mine located approximately 8 km southwest of Postmasburg in the Tsantsabane Local Municipality, Northern Cape Province (see Figure 1-1). SIOC is the holder of a mining right {Ref: (NC) 069 MR} granted by the Department of Mineral Resources and Energy ("DMRE") in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) ("MPRDA") for the exploitation of iron ore at Kolomela Mine. The mining right remains valid until 17 September 2038. The mining right area extends ~ 17 000 hectares (ha), of which ~ 4,340 ha is used, or is planned to be used for mining activities. SIOC owns all the properties associated with the mining right as well as several farm properties adjacent to the mining right and within the towns of Postmasburg and Postdene, with total land ownership at ~ 39,000 ha (see Figure 1-2). The details of the Kolomela mining right are provided in Table 1-1.

Table 1-1: Kolomela Mine Mineral Right Details

Licensee	Project	Mining Right No.	Properties	Area (ha)	Status
Sishen Iron Ore Company (Pty) Ltd	Kolomela Mine	(NC) 069MR	Farm Leeuwfontein No. 488 Remaining Extent Farm Strydfontein No. 614 Plaas No. 476 Farm Ploegfontein No. 487 Remaining Extent Farm Klipbankfontein No. 489 Remaining Extent Farm Kapstevel No. 541 Portion 1 Remaining Extent Farm Kapstevel No. 541 Portion 3 Farm Kapstevel No. 541 Portion 2 Farm Kapstevel No. 541 Remaining Extent Plaas No. 485 Plaas No. 486 Farm Kappies Kareeboom 540	17,000	Active

The mine operates as a conventional open cast mine, exploiting iron ore by means of drilling, blasting, loading and hauling. Three pits have been established, including Leeuwfontein Pit (on the farm Leeuwfontein 488), Klipbankfontein Pit (on the farm Strydfontein 614) and Kapstevel North Pit (on the remainder of farm Kapstevel 489 and portion 1, 2, 3, and the remainder of Kapstevel 541). Kolomela is also in the process of constructing the Kapstevel South Pit. Mined ore is transported to a direct shipping ore

("DSO") plant for crushing and screening of recovered ore material into stockpiles of 'lump' and 'fines'. The processed iron ore is loaded onto an internal railway line which is connected to a direct rail link to Transnet's Sishen-Saldanha railway line from where the iron ore is transported to the Port of Saldanha for export. Kolomela Mine also utilises a Modular Dense Media Separation ("DMS") Processing Plant for the processing of low-grade ore not suitable for processing at the DSO plant. Run of Mine ("ROM") production reached 10.8 million tonnes during its first full year of operation in 2013 and has increased to 13-14 million tonnes per annum ("Mtpa") at current production rates facilitated by enhanced stripping techniques and processing of 1-3 Mtpa of lower grade of ore at the Tierbult DMS Modular Plant. The current planned life of mine ("LoM") is 11 years (i.e., 2032).

Kolomela proposes to expand and amend some of the existing activities and also develop new infrastructure to support continued and future production at the mine. Authorisation is thus being sought from the Department of Mineral Resources & Energy ("DMRE") for activities listed under the National Environmental Management Act (No. 107 of 1998) and the National Environmental Management: Waste Act (No. 59 of 2008) as well as amendment of the environmental management programme in terms of Section 102 of the Minerals & Petroleum Resources Development Act (No. 28 of 2002). The application process is supported by an Environmental Impact Assessment ("EIA") process and the development of an associated closure plan and financial liability quantum for decommissioning and rehabilitation of new activities and/ or expansion of existing approved activities.

1.2 Mining Right Holder Contact Details

The Kolomela Mine representative contact details are provided in Table 1-2.

Table 1-2: Kolomela Mine Contact Details

Rights Holder:	Sishen Iron Ore Company (Pty) Ltd
Site Name:	Kolomela Mine
Contact Person:	Mr. Izak Gous
Email:	Email: izak.gous@angloamerican.com
Telephone Number:	Mobile: +27 60 501 6625

1.3 Purpose and Aim of the Report

EXM Environmental Advisory (Pty) Ltd ("EXM") has been appointed by SIOC to develop a Final Rehabilitation, Decommissioning and Mine Closure Plan, in support of an application for Environmental Authorisation ("EA"), to authorise the proposed expansion and amendment of existing activities as well as the development of new infrastructure to support continued and future production at the mine.

This Final Rehabilitation, Decommissioning and Mine Closure Plan has been developed to align with the requirements of Appendix 4 of the NEMA Financial Provision Regulation. According to the Regulations, the final rehabilitation, decommissioning and mine closure plan will form a component of the Environmental Management Programme to be submitted in terms of section 24N of the Act and the EIA Regulations, (GNR 326 of 2017) and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing.

In addition to the above, this plan has been developed to align with the existing Kolomela Mine Closure Plan[1] and will serve as an appendix to that document. The closure vision, objectives, conceptual closure design and closure relinquishment criteria associated with the proposed activities has been aligned to the current commitments and obligations of Kolomela Mine and its current Closure Plan. It is therefore noted that this plan only relates, addresses, and reports on the additional environmental impacts and financial liability associated with the proposed new infrastructure and amendment of existing and/or approved activities.

1.4 Legal and Governance Framework

Financial provision and its updates were previously regulated under the MPRDA and its Regulations (GN R. 527 of 2004). In September 2014, all provision related to environmental management in the MPRDA was removed and included in Section 24 of the NEMA. In November 2015, the Minister of Environmental Affairs promulgated the Regulation pertaining to the financial provisioning for prospecting, exploration, mining or production operations of 2015 (GN R.1147 of 2015) ("NEMA Financial Provision Regulation") in order to fulfil the requirements of the NEMA. The NEMA Financial Provision Regulations also details the transitional arrangements for existing mining right holders as well as annual reporting requirements.

A holder of a mining right is now required to make financial provision for rehabilitation and remediation; decommissioning and closure activities at the end of mining; and remediation and management of latent or residual environmental impacts. This must be done though a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:

1. Annual rehabilitation, as reflected in an annual rehabilitation plan;

[1] Kolomela Mine Closure Plan, Redkem & Uvuna Sustainability, 2020

2. Final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and
3. Remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Additionally, the holder of a mining right must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans listed above. SIOC, as an existing holder, is required to provide the DMRE with annual updates on their financial provisions for closure in terms of Regulation 54 of the MPRDA regulations (GN R. 527 of 2004). However, since SIOC is now in the process of applying for authorisation of new listed activities, it is required to support the application process by developing a Final Rehabilitation, Decommissioning and Mine Closure Plan and Environmental Risk Report for the proposed activities along with the calculation of associated financial liability aligned to the requirements of the NEMA Financial Provision Regulations, 2015. According to the transitional arrangements of the Regulations, SIOC has until 19 June 2022 to ensure full alignment with the NEMA Financial Provision Regulation.

The Minister of Environmental Affairs also published draft Regulations to replace the abovementioned NEMA Financial Provision Regulation of 2015 on the 17 May 2019. These regulations have however not been promulgated and therefore will not be considered during the development of this document. Once these regulations are enacted, suitable alignment would need to be undertaken to ensure compliance.

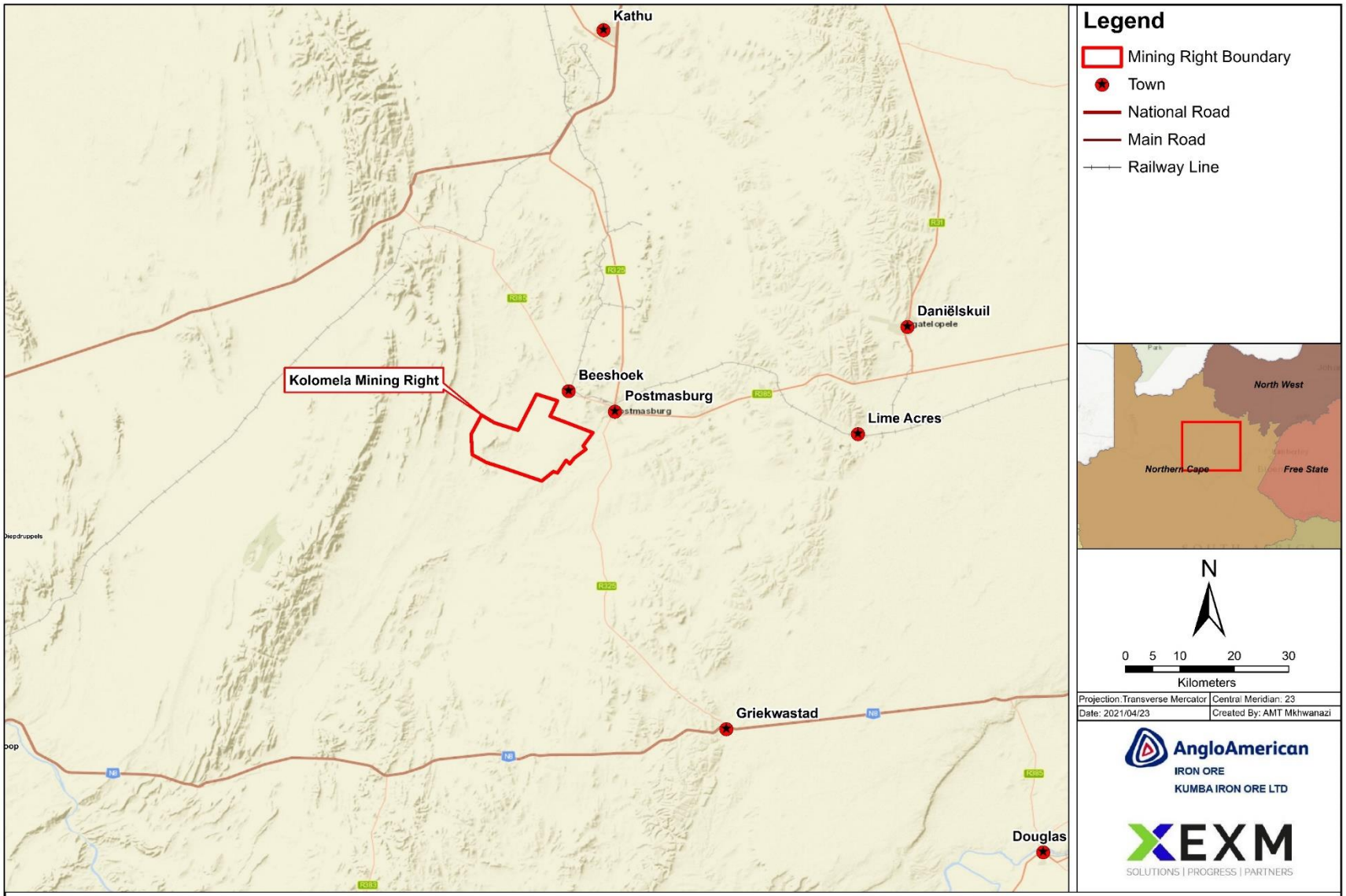
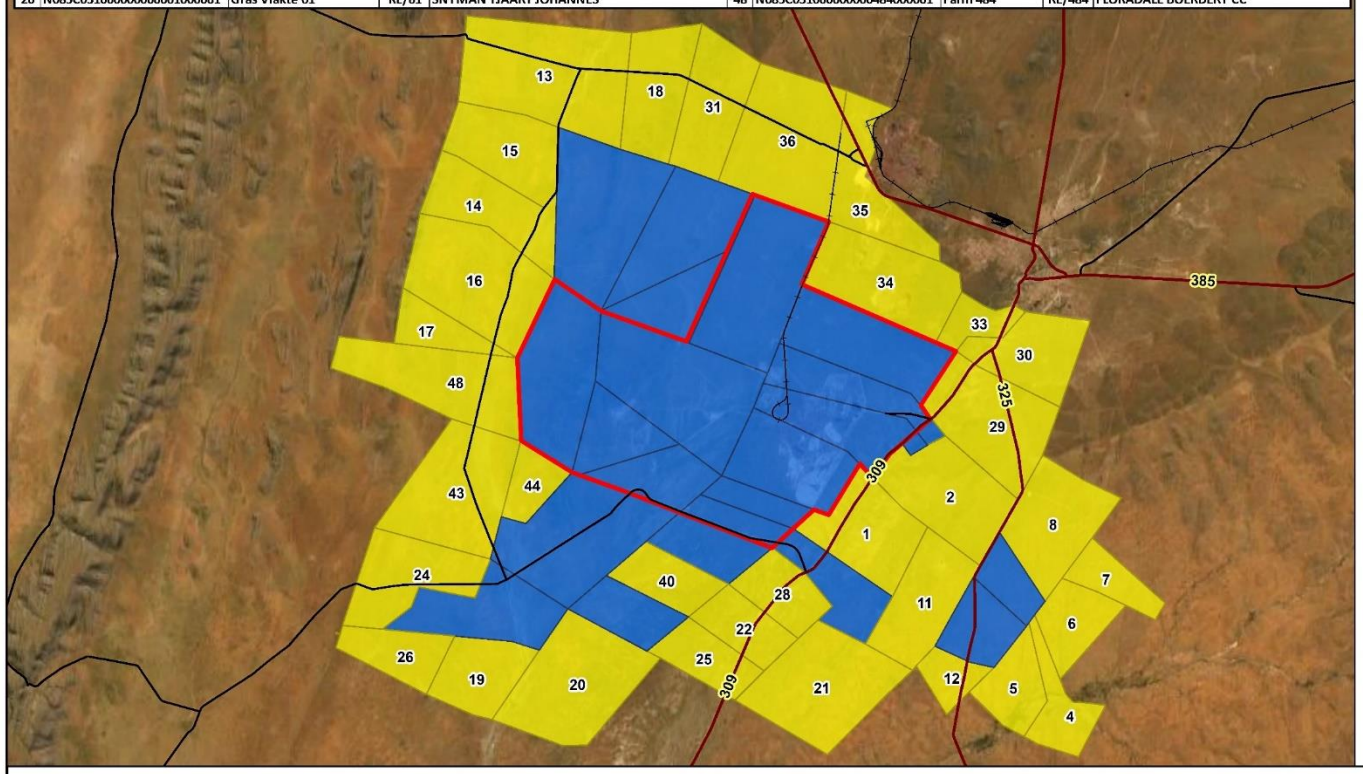
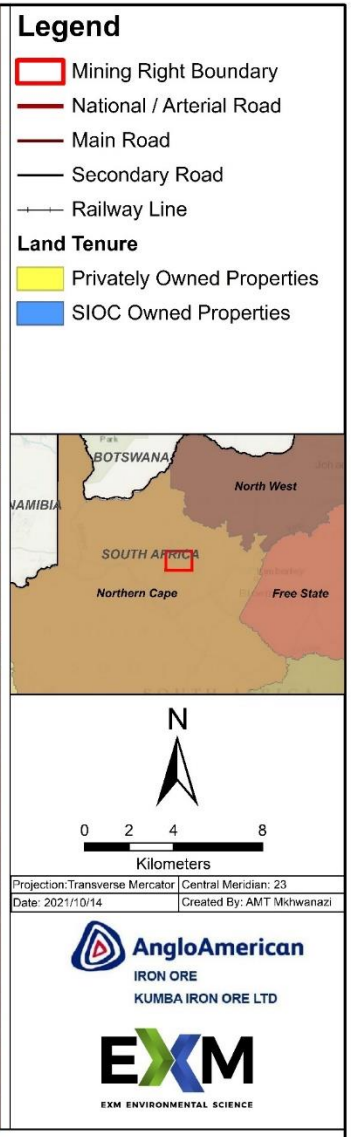


Figure 1-1: General Location of the Kolomela Mine

FID	SG Code	Farm Name	Portion	Owner	FID	SG Code	Farm Name	Portion	Owner
1	N085C03100000000607000000	Klipbanksfontein 607	607	BREDENKAMP DEITLIEF CHRISTIAAN	21	N085C03100000000544000001	Farm 544	RE/544	HENQUE 4362 CC
2	N085C03100000000490000001	Kameel fontein 490	RE/490	ZYL JOHAN DE KLERK VAN	22	N085C03100000000543000040	Farm 543	4/543	COETZEE JOHANNA MARIA
4	N085C03100000000537000001	Waterstroom Vley 537	RE/537	S & L VERMEULEN FAMILY TRUST	24	N085C03100000000583000040	Bermolli 583	4/583	LAMBRECHTS PIETER JOHAN VAN DER BYL
5	N085C03100000000537000040	Waterstroom Vley 537	4/537	PLOOY ALETTA MARIA MAGTELENE DU	25	N085C03100000000543000050	Farm 543	5/543	VILJOEN CHARL FRANCOIS
6	N085C03100000000537000050	Waterstroom Vley 537	5/537	PLOOY ALETTA MARIA MAGTELENE DU	26	N085C03100000000585000000	Watervlak 585	585	SNIJMAN HENNIE TJAART
7	N085C03100000000537000070	Waterstroom Vley 537	7/537	WILLIE LANGBERG TRUST	28	N085C03100000000543000001	Farm 543	RE/543	KLERK TOBIAS GERHARDUS DE
8	N085C03100000000538000001	Farm 538	RE/538	MERWE JOHANNES CHRISTIAAN VAN DER	29	N085C03100000000606000000	Soetfontein 606	606	VILJOEN FAMILIE TRUST
11	N085C03100000000540000010	Kappies Kareeboom 540	1/540	PLOOY ALETTA MARIA MAGTELENE DU	30	N085C03100000000474000001	Kalkfontein 474	RE/474	VAN DER WALT ANDRIES JOHANNES
12	N085C03100000000569000010	Boschpoort 569	1/569	POSTMASBURG BOSPOORT BOERDERY PTY LTD	31	N085C03100000000431000001	Farm 431	RE/431	NORTHWEST DIAMOND CO PTY LTD
13	N085C03100000000402000001	Lucas Dam 402	RE/402	LUCASDAM BOERDERY PTY LTD	33	N085C03100000000475000020	Olynfontein 475	2/475	VILJOEN CHARL FRANCOIS
14	N085C03100000000479000001	Farm 479	RE/479	BREDENKAMP BENJAMIN PHILIPPUS	34	N085C03100000000475000040	Olynfontein 475	4/475	ASSMANG PTY LTD
15	N085C03100000000479000010	Farm 479	1/479	BREDENKAMP BENJAMIN PHILIPPUS	35	N085C03100000000448000001	Beesthoek 448	RE/448	ASSMANG PTY LTD
16	N085C03100000000480000001	Farm 480	RE/480	RPB ANERI TRUST	36	N085C03100000000447000000	Farm 447	447	ABRAHAM WILLEM ADRIAAN VAN WYK TESTAMENTARY TRUST IN FAVOUR OF A
17	N085C03100000000483000001	Farm 483	RE/483	RPB ANERI TRUST	40	N085C03100000000543000020	Farm 543	2/543	HUMAN REGINA JOHANNA
18	N085C03100000000431000010	Farm 431	1/431	RUFCO ENGINEERING CC	43	N085C03100000000230000001	Farm 230	RE/230	FLORADALE BOERDERY CC
19	N085C03100000000060000020	Watervlakte 60	2/60	HENNIE TJAART SNIJMAN TESTAMENTERE TRUST	44	N085C03100000000542000010	Farm 542	1/542	FLORADALE BOERDERY CC
20	N085C03100000000061000001	Gras Vlakte 61	RE/61	SNYMAN TJAART JOHANNES	48	N085C03100000000484000001	Farm 484	RE/484	FLORADALE BOERDERY CC





Kolomela Mine: Land Tenure

Figure 1-2: Kolomela Mining Right and Property Ownership

1.5 Project Team

This report was developed by Mr. Renier Ellis and Mr. Trevor Hallatt from EXM as the appointed competent person(s) to prepare the closure plan for the Kolomela Mine Expansion Project. The details of these persons are provided below:

Name: Renier Ellis
Affiliation: Senior Environmental Advisor, EXM Advisory Services (Pty) Ltd
Tel No.: +27(72) 605 7900
Email address: renier@exm.co.za
Qualifications
BSc Chemistry and Biochemistry (UJ)

Expertise and Experience
Mr. Renier Ellis is a Senior Environmental Consultant with 7 years' experience in the environmental management sector, focusing on the mining industry. He has been responsible for several environmental management projects for major Mining Houses within South Africa. His responsibilities include mine closure planning, assessment of financial provision and financial liability, Environmental Risk Assessments and legal compliance auditing. He has been responsible for numerous independent financial liability assessment reports and rehabilitation plans for mining operations throughout South Africa.). Renier is also registered associate member of the Land Rehabilitation Society of Southern Africa (Reg nr: 30057).

Name: Trevor Hallatt
Affiliation: Senior Environmental Advisor, EXM Advisory Services (Pty) Ltd
Tel No.: +27(71) 689 2229
Email address: trevor@exm.co.za
Qualifications
BSc Geography & Environmental Management (NWU)
BA Hons Environmental Management (NWU)
MA Environmental Management (NWU)
Expertise and Experience
Trevor Hallatt has more than 10 years of environmental management experience in mining, power generating, industrial and local government sectors. His duties entail the planning and execution of projects related to environmental management, including ISO 14001: 2004 and legal compliance audits, Environmental Impact Assessments (EIA), Financial Provisioning, Compilation of Environmental Management Programmes,

Environmental Risk Assessments and Environmental Management Systems. Furthermore, he performed different functions in the planning and delivery of environmental short courses, including the development of modules and presenting on different topics. Trevor is also a registered Natural Science Professional with the South African Council for Natural Scientific Professions (Reg nr: 300123/15).

2. SCOPE AND METHODOLOGY

2.1 Content of the Report

The content of a Final Rehabilitation Decommissioning and Mine Closure Plan, as required by Appendix 4 of the NEMA Financial Provision Regulations, 2015, is provided in Appendix A.

It should be noted that this plan is a component of a set of three reports required for closure planning and financial provisioning for mining right holders. This report has been developed to specifically support an application for authorisation, currently being undertaken by SIOC, to authorise the proposed expansion and amendment of existing activities as well as the development of new infrastructure to support continued and future production at the mine. It therefore does not address all the reporting requirements for the Kolomela mining right in terms of the NEMA Financial Provision Regulations, 2015.

Additionally, to prepare a separate annual rehabilitation plan and environment risk assessment report which only relates to this project will not provide a representative picture of the mine closure risks. There will also not be any potential for annual rehabilitation during the first 12 months of the project as shown in the detailed LoM schedule included in the closure liability cost model.

2.2 Plan Applicability and Scope of the Provision

This closure plan and associated closure liability estimate is developed in support of an EIA process that is submitted by EXM Environmental Advisory to authorise various new amendments planned for at Kolomela Mine. It does not cover the entire scope and footprint of the existing or approved activities associated with Kolomela Mine, but rather only focusses on the proposed expansions, amendments and/ or new activities as described below:

1. **Offices, Contractors and Support Infrastructure:**
    - Construction of a new Photovoltaic ("PV") Solar Facility.
    - Construction of a Waste Tyre Management Facility.

2. **Other On-Site Infrastructure:**
    - Expansion of the Kapstevel At-Pit Facility footprint.
    - Construction of additional park-up, laydown and topsoil stockpiling areas.
    - Construction of new radio masts.

3. **Pit Amendments:**
    - Provision for an area of relaxation and safety berms around pits and rehabilitation of backfilled pit footprints.
    - Amendment of the Kapstevel South Pit footprint area.

4. **Mineral Residue Deposits:**
    - Amendment of the Kapstevel Waste Rock Dumps.
    - Construction of additional Waste Rock Dumps.
    - Construction of the new Tierbult DMS tailings impoundment facility.

5. **Ore Stockpiles & Topsoil Stockpiles:**
    - Additional Low Grade Ore Storage Areas.

6. **Water Related Infrastructure:**
    - Amendment of Kapstevel Evaporation Ponds and stormwater management infrastructure.
    - Construction of the Tierbult DMS TIF Return Water Dam.
    - Construction of the Tierbult DMS Evaporation Dams/ Paddocks.

7. **Overland & General Infrastructure:**
    - Expansion of the existing Kapstevel haul roads and construction of new haul roads.
    - Construction of a new Kapstevel At-Pit Facility access road.
    - Amendment of the approved Kapstevel DMS conveyor footprint to facilitate widened haul roads.
    - Construction of the new Tierbult DMS Plant conveyor and storage bunkers.

2.3 Objectives of the Closure Plan

The objectives of this final rehabilitation, decommissioning and mine closure plan, as stated in Appendix 4 of the NEMA Financial Provision Regulations, are to identify a post mining land use for the project that is measurable and auditable through development of the following:

- Provide a vision, targets, principles, objectives, and criteria for final rehabilitation, decommissioning and mine closure;
- Explain the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- Detail the closure actions;
- Provide a detailed schedule, budget, roles and responsibilities for final closure;
- Identify knowledge gaps and how to address these;
- Detail full closure costs for life of project; and
- Outline monitoring, auditing and reporting requirements.

This rehabilitation and closure plan in support of the EA application for the planned expansion of Kolomela mine should serve as an appendix to the existing Kolomela Mine Closure Plan and is catered to be integrated during its next update.

3. PROJECT DESCRIPTION AND SCHEDULE

3.1 Current and Approved Activities of the Kolomela Mine

Kolomela Mine is an open pit iron ore mine located approximately 8 km southwest of Postmasburg in the Tsantsabane Local Municipality, Northern Cape Province. It currently operates in terms of an approved mining right ((NC) 069 MR) and associated Environmental Management Programme. The following primary processes are undertaken at Kolomela Mine:

- Site establishment and site clearance, i.e., topsoil and vegetation removal.
- Waste/Overburden Stripping.
- Extraction/ Mining of ore bodies.
- Construction of Waste Rock Dumps (WRD's).
- In-pit dumping/ backfilling.
- Ore primary processing (including crushing and screening).
- Product export (via railway line).
- Various supporting services.

Iron ore is currently extracted from three pits, namely Leeuwfontein Pit, Klipbankfontein Pit and Kapstevel North Pit. Construction of the Kapstevel South Pit is currently ongoing. Conventional drill and blast mining techniques are implemented to strip waste and extract ore. Each pit also has an associated and approved waste rock dump ("WRD"). Haul Trucks transport the extracted ore from the pits, via haul roads, to the primary crusher. From here it undergoes a series of crushing and screening processes through the DSO plant to ultimately transport the product via railway to the Saldanha Port for export to the

international markets. Kolomela Mine also utilises a DMS Processing Plant ("Tierbult DMS") for the processing of low-grade ore not suitable for processing at the DSO Plant. Other associated supporting activities include *inter alia* various workshops, stores, office complexes, sewage treatment plants, roads, stockpiling areas, water management infrastructure and waste management facilities.

Table 3-1 provides a summary of the currently approved activities undertaken or planned to be undertaken at the Kolomela Mine. Activities applicable to or affected by the current authorisation process are noted and will be discussed further in Section 3.2 along with the proposed additional and/or new activities. The existing and approved infrastructure at Kolomela Mine is show in Figure 3-1.

Table 3-1: Summary of Existing and Approved Activities of the Kolomela Mine

Activity	**Associated with this Application Process (Marked with an X where applicable to application).**
(1) Haul roads	
a. Kolomela Access Road	
b. Perimeter fence and road	
c. Haul roads and secondary roads	**X**
d. Kapstevel Atpit Facility Access Road	**X**
e. Haul roads to Klipbankfontein Pit and Leeuwfontein South WRD.	
f. Kapstevel haul roads.	**X**
(2) Other linear infrastructure	
a. Sishen South Pipeline and Reservoir	
b. Railway Line to Beeshoek	
c. DMS to DSO conveyor	**X**
d. DMS to load out station railway	**X**
e. DSO to DMS conveyor	**X**
f. Artificial aquifer discharge pipeline	
g. Kapstevel DMS conveyor	**X**
(3) Storage and management of hazardous substances	
a. Fuel Depot – Diesel and Lubricants	
b. Other fuel storage tanks i. Loco refuelling station. ii. LDV refuelling.	
c. Explosives magazine	
(4) Tailings Management Infrastructure	
a) DMS Tailings Management Infrastructure i. TSF on WRD. ii. Pipelines.	**X**

Activity	Associated with this Application Process (Marked with an X where applicable to application).
iii. Return water dam for TSF. iv. DMS return water dam. v. Paddocks.	
b) Slimes dam for receiving material from the DSO plant	**X**
(5) Supporting Infrastructure	
a. Supporting infrastructure i. Offices. ii. Security centre. iii. On-boarding centre. iv. Parking for support staff and haul roads. v. Workshops/laydown areas. vi. Warehouses.	
b. Construction village – currently used for offices.	
c. Kapstevel At Pit Facility	**X**
d. Parking at Klipbankfontein	
e. Park Up and Soil Stockpile Areas	**X**
f. Solar PV Facility	**X**
g. Aucampsrus Access Gate Area	**X**
h. Welgevonden exploration core yard	**X**
(6) Processing Plants and Supporting Infrastructure	
a. DSO plant and product stockpile areas	
b. DMS Processing Plants (Kapstevel and Tierbult)	
(7) Opencast Pits	
i. Leeuwfontein	**X**
ii. Ploegfontein (North and South)	
iii. Klipbankfontein	**X**
iv. Tierbult	
v. Kapstevel (North and South)	**X**
(8) Waste Management Activities	
a. Waste Rock Dumps	
i. Leeuwfontein North and South	
ii. Klipbankfontein	
iii. Kapstevel	**X**
b. Use of plant discard and waste rock for construction of roads and other infrastructure	
c. Waste Tyre Management Facility	**X**
d. Co-disposal of tailings with waste rock (backfilling and on WRDs)	
e. Backfilling of waste rock (Kapstevel, Tierbult, Leeufontein, Klipbankfontein and Ploegfontein Pits)	**X**

Activity	Associated with this Application Process (Marked with an X where applicable to application).
(9) Kapstevel Stormwater Infrastructure	
a. Kapstevel Evaporation dams	
b. Amended Kapstevel diversion berm	**X**
(10) Sewage Management	
a. Sewage Treatment Works	
(11) Stockpile areas	
a. Ore Stockpile Area	
b. Low Grade Product Storage Areas	**X**
(12) Exploration sites	
a. Exploration sites	

3.2 Proposed Expansions of Existing Activities and New Activities

The proposed project involves the expansion of approved footprint areas and the construction of new activities, all within the area covered by the existing Mining Right {Ref: (NC) 069 MR}, as described in Table 3-2 and Figure 3-2 below. The table also provides concise detail regarding each of the activities included in the scope of the closure plan. The cumulative footprint areas are given in Figure 3-3.

Table 3-2: Proposed New Activities Specifically included in the Closure Plan and Liability Estimate

Zone Description	Main Activity Description	Proposed Activity Description
Offices, Contractors & Support	Photovoltaic Solar Facility	Construction of a new Photovoltaic (PV) Solar Facility. The PV Solar Facility will cover a total footprint of approximately 227 ha on of which most of the area have been previously disturbed (Borrow Pit #4 and TIF) and will only require additional vegetation clearance of 72,7 ha. Infrastructure to remain post-closure. Assume areas disturbed during construction will be rehabilitated during/post construction of the project, thereafter no rehabilitation liability; infrastructure to be retained post-closure and integrated with ELU.
Offices, Contractors & Support	Waste Tyre Management Facility	The waste tyre manage facility will cover approximately 10.2 ha. Facility to be developed on an undisturbed area.
Other Onsite Infrastructure	Kapstevel At-Pit Facility (Additional park-up and laydown)	The existing/approved Kapstevel At-Pit Facility to be extended. Current infrastructure includes roads, berms, haul truck parking, container offices and a small workshop area, larger haul truck parking area, fatigue area for accommodating off-shift workforce, larger workshops for the maintenance of haul trucks, a wash bay, a small sewage treatment plant (which will also service the future Kapstevel DMS Plant) and a refuelling area, including facilities for the storage of 1 million litres of diesel (1 000 m^3) and petrol and lubricants. Kolomela proposes to expand the footprint of the At Pit facility slightly to allow for the establishment of stormwater infrastructure and fencing. The current approved footprint is 110 ha and will be amended by an additional 25 ha to allow for the additional infrastructure.
Other Onsite Infrastructure	Kapstevel South Park-up and Soil Stockpile Area	Establishment of a truck park-up area at Kapstevel South Pit. The Kapstevel South Pit park-up area will also be used for the stockpiling of soil. The facility will cover approximately 53 ha. Runoff from the facility will be diverted to one of the Kapstevel Evaporation Dams. The area will also be used for the stockpiling of topsoil stripped during pit development.
Other Onsite Infrastructure	Kapstevel North & Leeuwfontein Pit Park-up Areas	Establishment of the Kapstevel North Pit park-up area and establishment of a park-up area west of the Leeuwfontein. These areas will cover a total area of 140 ha of which 93 ha will be located on existing authorised/disturbed areas. Additional allowance made for the expansion of the footprint areas. These areas will also be used for the stockpiling of topsoil stripped during pit development.
Other Onsite Infrastructure	New radio masts/LTE towers	Kolomela has initiated a process to migrate their analogue communication systems to a digital radio technology to comply with the requirements of the Independent Communications Authority of South Africa. Assumptions made based on existing infrastructure. KLM confirmed that six new radio masts/LTE towers will be constructed with reasonable assumptions made regarding the extent of disturbed area at each site.
Pits	Leeuwfontein Pit: Backfill, Area of relaxation and safety berms around pits	The Leeuwfontein Pit will be completely backfilled at end of LoM. The southern section will be backfilled up to natural ground level ("NGL") and the northern section backfilled to above NGL (construction of WRD) - already approved activity. No additional allowance required for premature closure of the Leeuwfontein Pit and associated rehabilitation. Current provision (June 2021) allows for the construction of a trench and bund around the entire perimeter (approx. 7940m) of the pit ~ R39 mil. Trench and

Zone Description	Main Activity Description	Proposed Activity Description
		bund wall only required for premature closure of the pit. Include southern section backfilled footprint rehabilitation and discount any premature closure provision for construction of bund and trenches.
Pits	Klipbankfontein Pit: Backfill, Area of relaxation and safety berms around pits	The largest portion of the Klipbankfontein pit (South and Central) will be completely backfilled by 2028 with the construction of the Leeuwfontein South WRD. The Klipbankfontein West pit and a portion of the south pit section will be backfilled up to NGL. No additional allowance required for premature closure of the Klipbankfontein Pit and associated rehabilitation. Current provision (June 2021) allows for the construction of a trench and bund around the entire perimeter (approx. 4960m) of the pit ~ R25 mil. Trench and bund wall only required for remaining portion of Klipbankfontein pit (north). Already approved and provided for.
Pits	Kapstevel North Pit: Backfill, Area of relaxation and safety berms around pits	The entire Kapstevel North Pit will be backfilled in total or even above the surrounding NGL as per the latest mine stage plans (October 2020). Additionally, the northern section of Kapstevel North pit (Stage 2) has been removed from the planned mining areas. No additional allowance required for Kapstevel North Pit rehabilitation or exclusion trench/ abandonment bund wall, as the pit will be completely backfilled with a new WRD (Kapstevel WRD West) being established on the backfilled footprint. Allowance for rehabilitation of the Kapstevel West WRD has been made elsewhere under E6 and in the current KLM CC Estimate, June 2021. Current provision (June 2021) allows for the construction of a trench and bund around the entire perimeter (approx. 4930m) of the pit ~ R23 mil. No trench or bund wall required at LoM. Provisions already allocated to rehabilitation of Kapstevel North Pit should be aligned to LoM plan and reallocated to rehabilitation liability estimate associated with the Kapstevel West WRD (EG - Dump).
Pits	Amendment of the Kapstevel South Pit footprint area	The Kapstevel South Pit is being developed with the first ore to be extracted in 2024 and mining will continue until LoM and it will remain as an open pit. Kapstevel North (KSN) Pit will be mined until 2025 where after backfilling will commence from the Kapstevel South (KSS) Pit. KSN will be completely backfilled. The current approved footprint for the Kapstevel South Pit is 147 ha and will be extended to 200 ha. Remaining pit perimeter at LoM is approx. 5000m. Rehabilitation of remaining open pits - manage residual safety risk, i.e. restrict access. Access to the open pit will be limited with the following measures where the pits are already deeper than two benches.
MRD's	Amendment of the Kapstevel Waste Rock Dump - East (EF-3)	Kolomela proposes to establish two WRDs to the south and east of the existing WRD footprint to avoid ore bodies should they be deemed feasible to be mined in the future. The newly proposed eastern WRD (EF-3) will cover approximately 220 hectares, of which 27 ha are located on the approved Kapstevel WRD footprint. The original approved footprint of the Kapstevel WRD has also been amended to the north of Kapstevel North Pit avoid heritage resource of high significance in that area.

Zone Description	Main Activity Description	Proposed Activity Description
MRD's	Amendment of the Kapstevel Waste Rock Dump - South (EF-4 & EF-5)	Kolomela proposes to establish two WRDs to the south and east of the existing WRD footprint to avoid the ore bodies should they be deemed feasible to be mined in the future. The newly proposed southern WRD will cover approximately 115 ha.
MRD's	Development of new DMS tailings management infrastructure	Kolomela proposes to develop a TSF on the existing Leeuwfontein North WRD to dispose of slimes produced at the DMS plant (Figure 5-10). The facility will cover approximately 24 ha. The TSF will comprise of four tailings containment cells with a volumetric airspace (cumulative) of 1,445,000 m3 and an estimated tailings disposal capacity: 2,890,000. The containment cell walls will be constructed by using compacted waste rock. The total quantity of waste rock required is 1,011,000 m3 or 1,819,800 tonnes with a crest height of waste rock containment walls: 17.5 m. Current initial tailings rates-of-rise (ROR) will be approximately 1.8 m / year (150 mm per month), reducing to 1.0 m / year (85 mm per month) towards the end-of-life of the facility.
Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	Low Grade Ore Storage Area - Railway Loop	Additional low grade stockpile areas; Within the rail loop
Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	Low Grade Ore Storage Area - Old Borrow Pit	Additional low grade stockpile areas; On an existing borrow pit footprint (F6)
Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	Low Grade Ore Storage Area - North of DSO	Additional low grade stockpile areas; On undisturbed land near the DSO
Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	Ore stockpile areas	Project to be constructed on already approved stockpile footprint areas; forms part of the application only for clarity to define activity undertaken on footprint areas; already approved and provided for; excluded from this assessment.
Water Related Infrastructure	Tierbult DMS TIF Return Water Dam	Storm water run-off from the TSF cells will be collected and attenuated at a fixed location in each of the cells and diverted to a central Return Water Dam which will cover approximately 3 ha. A minimum freeboard of 0.8 m will be catered for above the maximum predicted water level in each of the cells, when based on the 1 in 50 year, 24 hour storm event. Collected storm water run-off will be pumped to the pollution control dam facilities at the DMS Plant site for reuse. The RWD will be developed on the footprint of the existing/approved Leeuwfontein evaporation dam.

Zone Description	Main Activity Description	Proposed Activity Description
Water Related Infrastructure	Tierbult DMS Evaporation Dams/ Paddocks	The facility will comprise of four (4) drying paddocks with a cumulative volume of 42,500 m3. Dirty storm water run-off and bleed water collection facilities (dams) will be constructed on both sides of the paddocks. Clean water will be diverted around the DMS plants by means of soil berms and drains. Dirty water run-off from the Kapstevel DMS plant area is to be collected in a pollution control dam (PCD). This system will comprise a sediment trap and oil separator as appropriate.
Water Related Infrastructure	Amendment of Kapstevel Stormwater management infrastructure	The diversion berm will be approximately 3 km in length. The main purpose of the berm will be divert runoff from the environment away from the WRD.
Overland & General	Amendment to the main Kapstevel haul road	It is proposed to widen the existing main haul road towards Kapstevel.
Overland & General	New Kapstevel Haul Roads	It is proposed to widen the existing Kapstevel haul roads and to establish additional haul roads / amend the position of the approved haul roads..
Overland & General	New Kapstevel At-Pit Facility Access Road	Access road for construction vehicles. The existing farm access roads to the north of the facility will be used and only a small section for the new road will be required. The road will be approximately 1.6 km in length and will be 30 m wide with a reserve of 20 meters. An area will also be developed on Aucampsrus as indicated in the Figure below for the parking of construction vehicle which will be less than a hectare in extent.
Overland & General	Amendment to the future Kapstevel DMS conveyor footprint	To allow for the widening of the Kapstevel Haul Road. Conveyor infrastructure already approved. No additional allowance made for removal/ demolition of conveyor infrastructure. Only provided and reported on liability associated with the extended footprint area.
Overland & General	DMS Plant Conveyor and Storage Bunkers	Construction of stockpiles (bunkers) to the north of the DSO plant with a conveyor from the DMS plant to the 4 stockpiles (Low grade and high-grade lump and fine). These stockpiles would typically be reinforced earth bunkers with a central tunnel under the stockpiles fed by feeders, with the conveyor ending up on the load out conveyor. The conveyor length is estimated at 4,450 m.
Overland & General	Railway line to transfer material to and from the DMS plant	The second strategy for transfer of material from the Tierbult DMS Plant will entail construction of a new rail siding / spur from the main line, towards the DMS plant. This will entail a direct railway shipment of the material and will include a loading mechanism onto the rail trucks. It is however a very unlikely option to be implemented. No cost estimate developed at this stage.

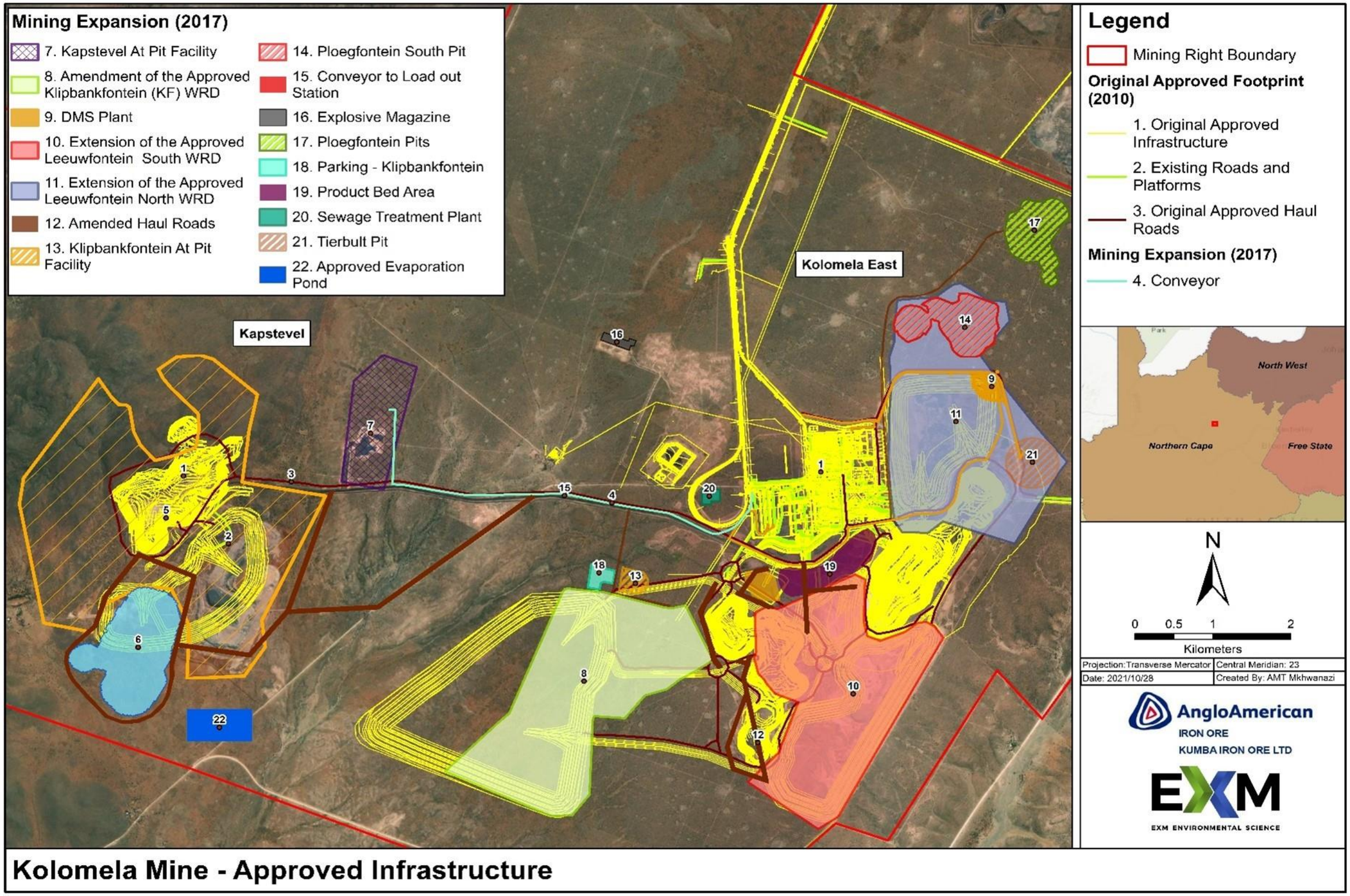


Figure 3-1: Existing Infrastructure and Approved Activities Associated with Kolomela Mine

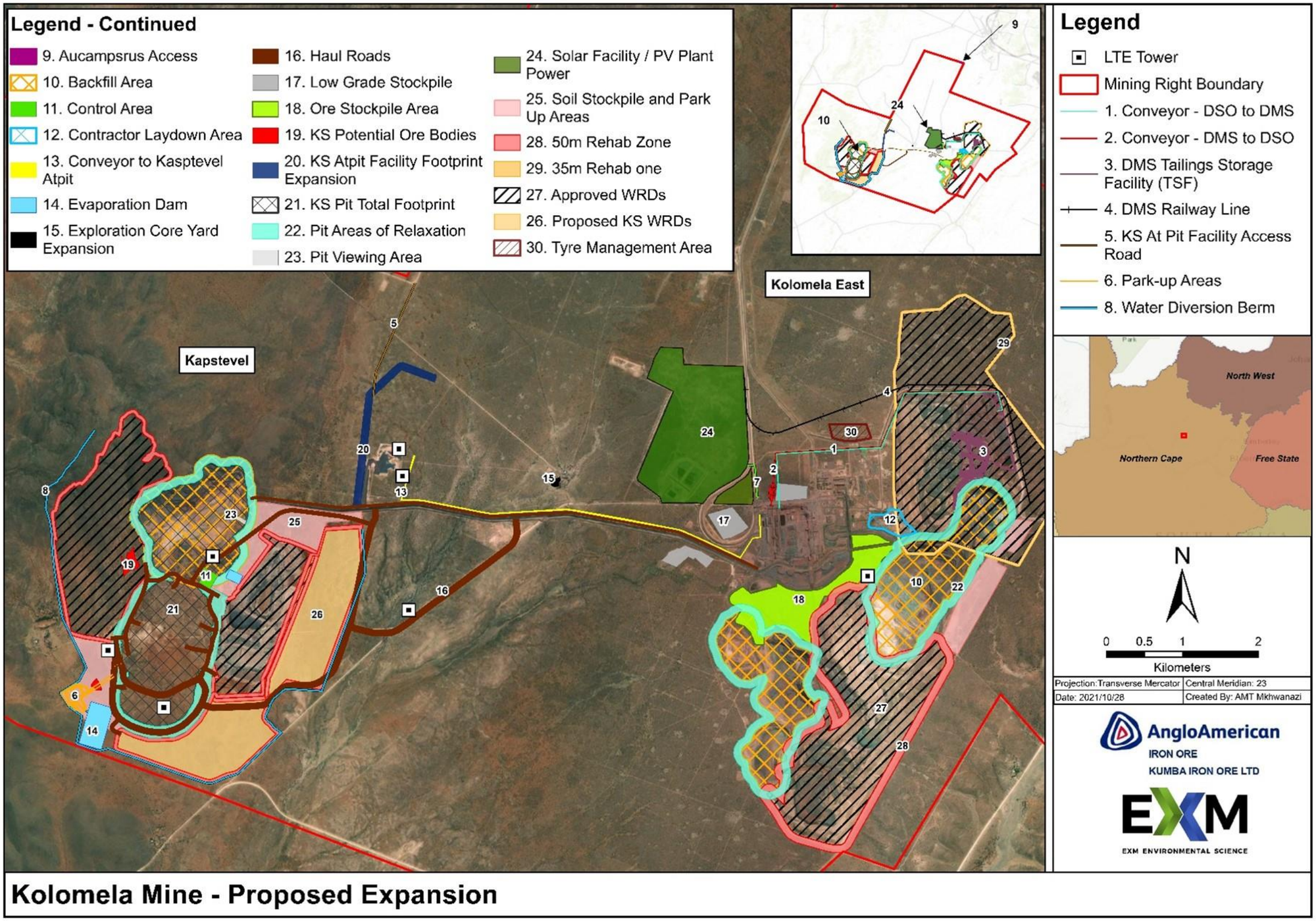


Figure 3-2: Proposed Infrastructure and Expansion of Approved Footprints Associated with Kolomela Mine

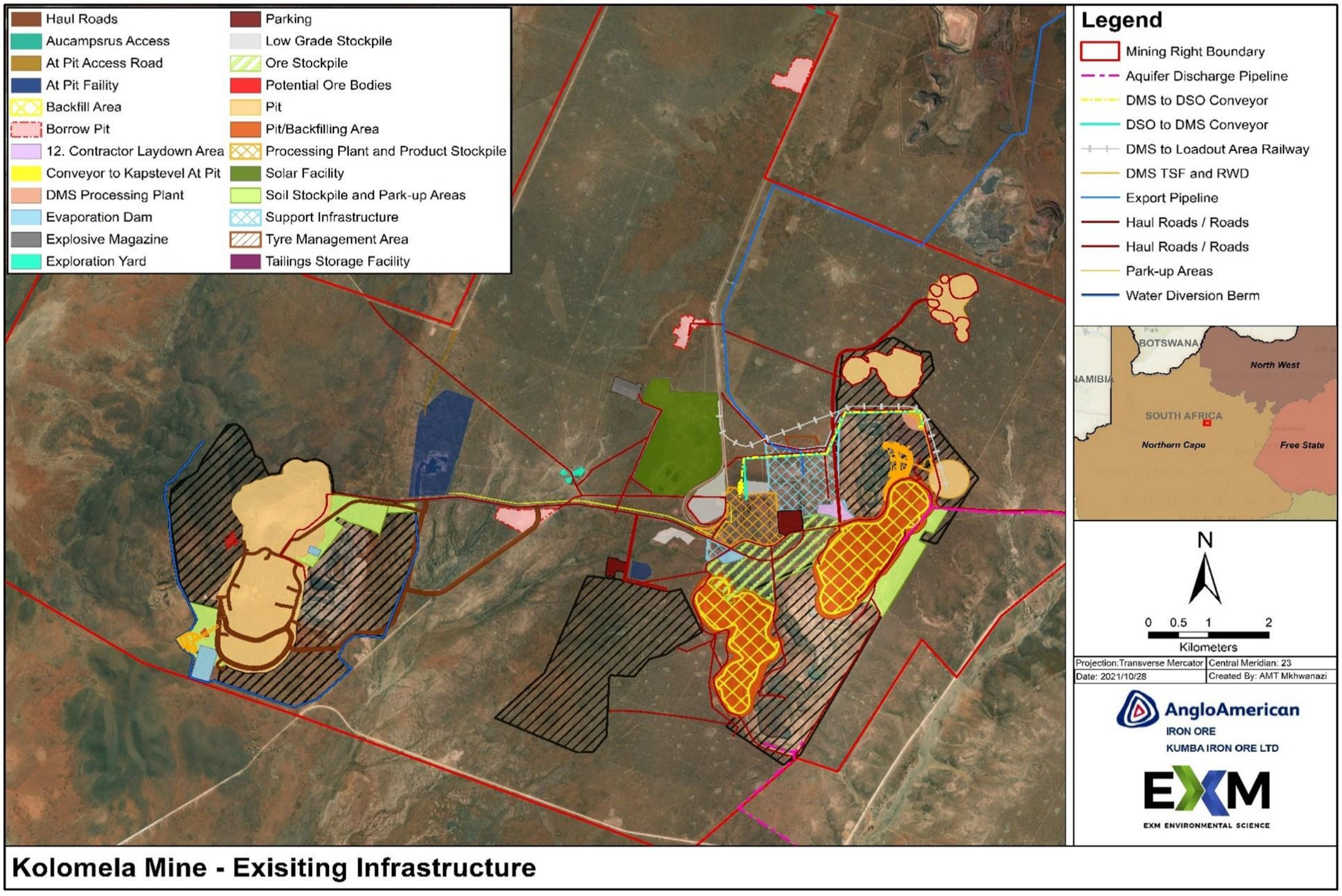


Figure 3-3: Cumulative Footprint Existing and Expanded/New Infrastructure and Activities at Kolomela Mine

3.3 Planned Life of the Kolomela Mine Operations

The LoM scenario for closure, referenced in this plan and the existing Kolomela Mine Closure Plan, is based on the Resource Development Plan and 2020 LoM Plan as reflected in the Project Charter for the Kapstevel South development (Anglo American, March 2019). Information received from Mine Planning and representatives of the Kolomela Mine SHEQ Department were also used to schedule the project activities over LoM.

Iron ore is currently extracted from three opencast pits, namely Klipbankfontein, Leeuwfontein and Kapstevel North. Kolomela is in the process of developing the Kapstevel South Pit. The current the Life of Mine ("LoM") including the Kapstevel South Pit currently stands at 2032 as per the Kolomela Mine Closure Plan.

It is assumed that the proposed additional WRDs will be constructed over LoM, starting with site construction of the EF-3 dump within the first 12 month after approval. Construction of the EF-4 and EF-5 dumps will only commence in the year 2022/23. Table 3-3 provides detail on the expected scheduling of the proposed projects/ activities and Figure 3-4 illustrates the LoM plan for the pits and WRDs.

Table 3-3: High-Level Scheduling of the Proposed New Activities and Expansions

Proposed Activity Description	LOM Scheduling
Photovoltaic Solar Facility	2023/24
Waste Tyre Management Facility	2023
Kapstevel At-Pit Facility (Additional park-up and laydown)	Premature Closure - 2021/22
Kapstevel South Park-up Area	To be built with autonomous fleet (2024)
Kapstevel North & Leeuwfontein Pit Park-up Areas	To be built with autonomous fleet (2024)
New radio masts	To be built with autonomous fleet (2024)
Leeuwfontein Pit: Backfill, Area of relaxation and safety berms around pits	2030 - Cost for rehab of backfilled footprint area (areas not covered by currently approved WRD footprint
Klipbankfontein Pit: Backfill, Area of relaxation and safety berms around pits	2028 - Cost for rehab of backfilled footprint area (areas not covered by currently approved WRD footprint
Kapstevel North Pit: Backfill, Area of relaxation and safety berms around pits	Cost for rehab of backfilled footprint area (areas not covered by currently approved WRD footprint
Amendment of the Kapstevel South Pit footprint area	Check LOM schedule to confirm premature closure cost
Amendment of the Kapstevel Waste Rock Dump - East (EF-3)	Zone H - Kapsetevel Haul Roads To be constructed 2024/25
Amendment of the Kapstevel Waste Rock Dump - South (EF-4 & EF-5)	Zone H - Kapsetevel Haul Roads EF - 4: To be constructed 2022 EF - 5: Construction to start 2024

Proposed Activity Description	LOM Scheduling
Development of new DMS tailings management infrastructure	Zone G - DMS TIF RWD & Evaporation Dams To be constructed 2024
Low Grade Ore Storage Area - Railway Loop	2022
Low Grade Ore Storage Area - Old Borrow Pit	2023
Low Grade Ore Storage Area - North of DSO	2021/22
Ore stockpile areas	NA
Tierbult DMS TIF Return Water Dam	2024
Tierbult DMS Evaporation Dams/ Paddocks	2024
Amendment of Kapstevel Stormwater management infrastructure	2025
Amendment to the main Kapstevel haul road	2024/25
New Kapstevel Haul Roads	2024/25
New Kapstevel At-Pit Facility Access Road	2021
Amendment to the future Kapstevel DMS conveyor footprint	2026
DMS Plant Conveyor and Storage Bunkers	2024

Construction of the PV Solar Facility, expansion of haul roads and construction of additional radio masts will only commence in 2024. Initiation of these projects are aligned to, and will mainly support, the introduction of the proposed autonomous HME fleet of Kolomela Mine as well as the commencement of ore extraction at Kapstevel South. Construction of the proposed waste tyre management facility will start in 2023/24.

		WASTE STRIPPING & MINING		IN-PIT FILLING		DEPOSITION		END STATE
								
		Commence	Complete	Commence	Complete	Commence	Complete	
OPEN PITS	Klipbankfontein Pit - South	Currently active	2026	2026	2028			TOTAL BACKFILL 
	Klipbankfontein Pit - Central	Currently active	2023	2023	2028			
	Kapstevel North - Stage 1	Currently active	2025	2026	2032			
	Tierbult	2024	2026	2027	2028			
	Ploegfontein Pit South	2027	2029	2030	2032			
	Leeuwfontein Pit	Currently active	2029	Currently active in northern portion	2030			PARTIAL BACKFILL 
	Klipbankfontein Pit - West	Currently active	2028	No Backfill				VOID REMAINS 
	Kapstevel North - Stage 2	2023	2025					
	Kapstevel South	Currently active	2032					
	Ploegfontein Pit North	2030	2032					
WRDs	C-Dump					Currently active	2023	REHABILITATED WRDs 
	BD-Dump					Currently active	2028	
	EF-Dump					Currently active	2025	
	EG-Dump					Currently active	2026	
	Ploegfontein (abut against Dump C)					2027	2032	

Figure 3-4: LoM Scheduling for Pits and WRDs of Kolomela Mine[2]

[2] Information and image sourced from Kolomela Mine Closure Plan, Redkem & Uvuna Sustainability, 2020; Table 9

4. BASELINE ENVIRONMENTAL CONTEXT

Table 4-1 is based on available information of the study areas' environmental setting. It provides an overview of the environmental context, to assist in the understanding of key issues that need to be addressed during rehabilitation, decommissioning and ultimately closure of the proposed activities. The environmental context described in the table below mainly focuses on the aspects expected to be impacted on by the proposed new activities and expansion of existing footprints with specific reference to decommissioning and closure considerations. The baseline data used in this report was mainly obtained from the current EIA, including additional specialist assessments done previously as now as part of the current proposed project. Further detail regarding the environmental context of the Project Area can be found by referring to the Environmental Impact Assessment, Environmental Management Programme and associated specialist studies in support of the application.

Table 4-1: Environmental and Social Context

Description	Closure Implications/Considerations
CLIMATE	
• Temperatures range between -7.2 °C and 40 °C. • The highest temperatures occur in December and the lowest in July. • The area has a predominant daytime wind blowing from the north-east. • At night winds tender to blow from the southwest and west southwest. • Strong winds in excess of 6 m/s occurred most frequently during winter and spring months. • Postmasburg is located within a low rainfall area. • Average yearly rainfall at is approximately 285 mm. • Rainfall patterns are highly unpredictable but most rainfall occur during the months of November through April. The rainfall usually falls as a result of thunderstorms when tropical thunderstorm activity extends southwards over the Kalahari. • Mean annual evaporation (2 450mm) is higher than annual rainfall, which results in a major net moisture deficit of over 2 000 mm throughout the year.	• The Project Area is located in a water deficit region; however, the area is very rich in biodiversity. Endemic flora species should, as far as possible, be utilised with rehabilitation, thereby promoting the re-establishment of endemic biodiversity and achieving visual/aesthetic objectives for closure. Considering the climatic factors, the use of endemic floral species will also improve the likelihood of successful vegetation establishment.
TOPOGRAPHY	
• The regional topography is characterised by a flat, gently undulating plains interspersed with hills and mountains as the surrounds; with the valleys. • General surface topography of the mining area is relatively flat with an ephemeral stream, the Groenwaterspruit, incising a dendritic drainage pattern up to 40 m deep along the eastern border of the Kolomela mining right area. • Most of the mining right area slopes gently to the southwest from the Ploegfontein area (approximately 1 290 masl) to Welgevonden (1 220 masl) with several drainage courses converging to the south into a small spruit, generally known as the Welgevondenspruit, a tributary of the Soutloop River. • A second tributary of the Soutloop River flows in a southerly direction along the eastern sections of the Floradale and west of Kolomela Mine boundary. • Several pans are distributed across the flat-lying, central portions of the area which collect and hold rainwater for short periods after seasonal rainfall • The Leeuwfontein, Klipbankfiontein and Kapstevel pits can act as runoff sinks. • The topography of the area has already been altered as a result of the mining operations at the mine, the most significant being the development of the Kapstevel, Leeuwfontein and Klipbankfontein pits and associated WRDs.	• To rehabilitate disturbed areas to blend in with the surrounding landscape as far as practically possible. Closure measures must be established to resonate with the existing topographical character of the Project Area. • The slope of the terrain and soil types prone to erosion could make vegetation reestablishment challenging during closure of certain areas. • Appropriate sloping and shaping techniques need to be implemented during rehabilitation of the waste rock dumps and other waste management facilities. • Concurrent rehabilitation and the optimisation of backfilling has the potential to reduce the impact of the mine on the local topography.
AIR QUALITY	
• According to Air Quality Impact Assessment (Airshed, 2021), the region is characterised as being a relatively dry, arid, and dusty environment. It is expected that various local and far-a-field sources contribute to suspended fine particulate (PM 2.5 and PM 10) concentrations in the region. • Local sources include wind erosion from exposed areas. • Dust fallout monitoring results show in some cases elevated dust fall levels exceeding limits prescribed by the National Dust Control Regulations. • The PM 10 concentrations recorded around Kolomela Mine exceed the National Air Quality Standards ("NAAQS"), mostly during the months following winter (a period of low rainfall). Wind speeds also tend to increase during this time of the year. • The PM 2.5 concentrations recorded around Kolomela Mine are generally compliant with the NAAQS	• The risk of additional impacts on air quality should be considered during closure. • Rehabilitation (especially concurrent) of cleared and/ or disturbed areas should include the revegetation of these areas to prevent generation of dust and increased dust fallout.
VISUAL IMPACT	
• A Visual Impact Assessment ("VIA") (EXM, 2021) identified various sensitive receptors for the existing and proposed expansion project. • It is anticipated that the existing and proposed expansion will have a moderate to high visual impact on the immediate receiving environment. • The highest visual impacts will be due to construction of the WRDs.	• Concurrent rehabilitation and the optimisation of backfilling has the potential to reduce the impact of the mine on the local topography and visual impacts on sensitive receptors.

<table>
<tr><th>Description</th><th>Closure Implications/Considerations</th></tr>
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- According to the viewshed models generated for the mine, the decommissioning and rehabilitation phase will remain at a minor negative significance for both before and after mitigation. This is mainly due to the fact that the landscape has already been altered by mining activities. The proposed new activities will however add to the cumulative impact.

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<tr><td colspan="2"><u>SOILS, LAND CAPABILITY AND LAND USE</u></td></tr>
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- **<u>Soils:</u>**
  - The dominant soil types are CM and LP2.
    - The CM soil type is characterised by red soils with high base status.
    - LP2 soil type is generally considered to have minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soil forms. Lime is generally present in part or most of the landscape. The LP2 soil type dominates the Kolomela mining right area.
  - Recently updated assessments of the soil characteristics corresponds well with the general soil description. According to the Hydropedology Assessment (Zimpande Research Collaborative, 2021), the soils associated with the mine can be described as sandy with loose and single grained structure.
  - A calcrete layer is present at shallow depth within most part of the landscape and is deemed to have a moderate impermeability with a moderate to good water holding capability.
  - The dominant soil forms in the mining area are Nkonkoni/ Plooysburg, Glenrosa, Coega, Kolke, Augrabies, Mispah and Witbank soils.
  - Soil forms can typically be characterised as follows:
    - The Augrabies soils is characterised by an Orthic A-Horizon overlying Neo-carbonate B-Horizon material which overlies unspecified material.
    - The Coega soils comprise an Orthic A-Horizon overlying a Hard Carbonate B-Horizon.
    - The Mispah soil is characterised by an Orthic A-Horizon overlying rock.
    - Nkonkoni/ Plooysburg and Glenrosa forms – Recharge (shallow) soils allow for rapid infiltration of water
    - Coega and Kolke soil forms – stagnating soils with limited outflow of water due to underlaying impeding layers. Kolke soil forms are generally found in depressional areas or wetland areas.
  - In the Wolhaarkop and Welgevonden sections of the mining area, Mispah soils are dominant and have an average depth of less than 300 mm.
  - The Ploegfontein, Leeuwfontein and Klipbankfontein areas are dominated by Coega soil with an average soil depth also less than 300 mm.
  - Augrabies soils are present on a portion of Wolhaarkop and also some sections of Kapstevel. These soils are deeper (< 1200 mm).
  - Average soil depth ranges form 450 – 750 mm in depth. The area has a low – moderate susceptibility to water erosion and such the soils have low – moderate erodibility. The soils in the area are typically not susceptible to acidification. The pH ranges 6.5 – 7.4 rendering the soils saline in nature. The soils have a high clay content > 55% resulting in soils with a high moderate – high swelling capacity. The high content impedes drainage as resulting in a low water holding capacity of between 21-40 mm.
- **<u>Land Capability</u>**
  - The agricultural potential of the soils, specifically Augrabies, Coega and Mispah soils are considered to be low under dryland conditions and medium to high under irrigation conditions (>10- 15mm/week 33-1,500 kPa plant available water) in areas where soil depth exceeds 600 mm.
  - The mining area is generally described as suitable for livestock grazing purposes.
  - The low plant biomass on account of the dry climate limits the volume of organic material that enters the soil profile, further reducing the agricultural potential of the soil.

Soil Form	Effective Depth (mm)	Agricultural Potential (Dryland)	Agricultural Potential (Irrigated)
Mispah	<300	Low	Low
Coega	<300	Low	Medium
Augrabies	<1200	Low	High

  - The soils are generally of neutral pH with low electrical conductivity levels indicating that there are no signs of soil salinisation.
  - Low sodium levels indicate that there is a low risk of erosion due to dispersion of clay particles by sodium ions.
  - Inhabitants of plant growth are not of concern.
- **<u>Land Use:</u>**
  - Prior to the development of the mine, the area on which the current mine site is located was relatively undeveloped, having been used for agricultural (primarily grazing) purposes.
  - Land uses of the mining right area include mining, areas affected by exploration and large areas of undisturbed veld.

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- The soil is chemically and physically suitable for rehabilitation. However, due to their shallow effective depth in this area, limited topsoil is available to be stripped and stockpiled for rehabilitation purposes and it is likely that there may be a deficit of available soil for use in rehabilitation.
- Localised rehabilitation should be informed by baseline soil surveys of areas. Soil replacement should, as far as practically possible, emulate baseline soil environments.
- Clean-up of contaminated soils (affected by organic and inorganic contamination) will be required at closure, particularly at the park-up areas and At-Pit facilities.
- Return land to pre-mining land capability where possible and align with the proposed end land use (“ELU”) plan. Cattle and game farming are both viable long-term land use options for the post mining land use, provided the field quality is maintained by not exceeding the grazing capacity.

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Description	Closure Implications/Considerations
• The land surrounding Kolomela consists predominantly of agricultural activities, grassland and towns (Postmasburg). The dominant land use in the area is grazing (sheep, cattle and goats) with an average stocking ratio is one large stock unit per 15 hectare (ha).	
TERRESTRIAL ECOLOGY	

• **Flora**
  • Kolomela falls within the Savanna Biome in the Eastern Kalahari Bushveld Bioregion. It falls within the Kuruman Mountain Bushveld (SVk10) and Postmasburg Thornveld (SVk 14).
  • The Groenwaterspruit at Leeuwfontein falls within the Postmasburg Thornveld and the Southern Kalahari Salt Pans (Azi4) vegetation type is represented at Ploegfontein.
  • Five broad habitat units have been delineated, specifically associated with the proposed project, with varying levels of ecological importance. The watercourse habitat is considered to be important from a floral as well as resource management perspective. It includes wetlands and liear drainage lines.
  • Eight vegetation types are identified at Kolomela mine (Zietsman, 2019), none of which are regarded as needing protection.
• **Sensitive Biodiversity Areas**
  • The National Web-based Screening Tool identified the focus area to be in a low sensitivity area for the Plant Species Theme.
  • The centre of the Kolomela mining right has been classified as a Critical Biodiversity Area ("CBA").
  • The CBA is associated with the "Welgevondenspruit" that is also classified as a National Freshwater Ecosystem Priority Areas (NFEPA).
  • The current project layout (see figure below) shows that the development will not have a direct impact on the CBA except for a small section of the proposed Kapstevel WRD (EF-3).
• **Species of Conservation Concern (SCC) and Sensitive Areas**
  • The following should be considered
  o Nananthus community
  o Boophone disticha – Mesem community
  o Lithops aucampiae subsp. aucampiae community
  o Euphorbia wilmaniae and Prepodesma orpenii
  o Pachypodium succulentum
  o Nerine community
  o Groenwaterspruit community (sedges)
• **Alien Invasive Species**
  • The following alient and invasive species should be considered:
  o Prosopis glandulosa
  o Senegalia mellifera
• **Fauna**
  • Five broad habitat units have been delineated in terms of a faunal perspective.
  • The Thornveld habitat generally comprise of similar mammal, avian and herpetofaunal assemblages. It also provides good grazing and browsing habitat for most faunal species and offers valuable shelter and foraging areas, especially bird species.
  • The Calcrete habitat is characterised by the absence of trees with reduced value for browsers, concurrently limiting the available shelter for larger species.
  • The cryptic wetlands and depressions offer unique habitat for waterfowl, invertebrates and amphibians while providing a water source for fauna. The drainage lines tend to be more well wooded offering better browsing for herbivores and greater structural diversity which is often favoured by avifauna. These habitats support the highest diversity and abundance of avifauna and will also provide valuable habitat for water dependant fauna during high rainfall events.
  • The Mountain bushveld habitat with its rocky nature provides sufficient burrows and basking locations for reptiles and invertebrates, particularly scorpions.
  • The Transformed habitat is generally characterised by mining activity and usually offer reduced forage and shelter availability.
	• The site-specific vegetation, along with the soils required to reintroduce appropriate species needs to be considered during rehabilitation and ELU planning.
	• As a biodiversity rich area, the endemic flora species should, as far as possible, be utilised with rehabilitation, thereby promoting the re-establishment of endemic biodiversity and achieving visual/aesthetic objectives for closure. This could be supported by development of a site nursery to support rehabilitation activities.
	• Biodiversity objectives are to be established with closure planning and appropriate rehabilitation measures included.
	• Alien and invasive plant species management in the closure planning process is essential to ensure relinquishment criteria for closure is achieved.
	• Rehabilitation and closure planning should integrate consideration of faunal reintroduction and ecological restoration.
	• Specific focus should be on enhancing established micro-habitats and reintroduction of faunal species that may have migrated away from the area due to mining activity.

Description	Closure Implications/Considerations
SURFACE/FRESH WATER RESOURCES	
Catchments, Watercourses and Wetlands: • Kolomela is located in Quaternary catchment D73A of the Orange River Primary Drainage Region. • The main watercourse in the vicinity of the mine are the Groenwaterspruit which flows along the eastern boundary of the mine. Tributaries of the Soutloop River flow from the northeast to south western sections of the mining area which is referred to as the "Welgevondenspruit". A tributary of the Soutloop River also flows from north to south through the Farms Floradale. • The Groenwaterspruit River, the Soutloop River and its tributaries including the "Welgevondenspruit" are classified as NFEPAs. • The southern portion of the EF-3 WRD as well as the EF-4/EF-5 WRD's will impact on two tributaries of the Welgevondenspruit. • Two wetland types were identified within Kolomela, namely cryptic wetlands and seasonal depressions. Several episodic drainage lines with riparian vegetation including those associated with a system locally referred to as the Welgevondenspruit and various unnamed tributaries of the Groenwaterspruit are also identified (see image below). **Cryptic Wetland** / **Episodic Drainage Line**  	• Any deterioration in water quality, flow or a change in the hydrological regime can have significant negative impacts on the aquatic biodiversity and downstream users. This is also relevant to long terms mine closure planning, specifically relevant to post-closure stormwater management planning and design. • Surface water monitoring will be required during operations and post-closure to determine any adverse effects on the post-closure local water regime. • It is essential that the closure objectives be aligned to the baseline PES and IES. • The PES and EIS needs to be maintained and/or improved during LOM, including mine closure.
GROUNDWATER	
Aquifer Description: • The geohydrological regime in the study area is made up of two main aquifer systems. The first, the upper, unconfined to semi-confined aquifer occurs in the calcrete that cover most of the surface area of Kolomela. • The second aquifer is associated with fractures, fissures, joints and other discontinuities within the consolidated bedrock and associated intrusive of the Transvaal/Griqualand West Sequences. The aquifer occurs at depths from 40 to more than 200 meters below surface in the area **Groundwater Quantity:** • Although relative low yields occur in the upper aquifer, it is developed widely throughout most of the region and has been the sole reliable source of water supply to most of the farms in the area for more than a century. Yields of up to 2 litres per second occur in this aquifer with shallow water table and spring formation common in especially the lower-lying topography. • The deep aquifer is semiconfined and has greatly varying yields that are directly associated with the geology and geological structure. Yields of the aquifer are as high as 40 litres per second in mainly the chert breccia and banded iron formation and iron ore formations. • In the Postmasburg area, static groundwater levels vary from zero meters (springs flowing out at surface), usually in the topographically lower lying areas, to a maximum of approximately 75 meters below surface to the north-east of Postmasburg. • In the mining area, static groundwater levels vary from 35 m below surface in the Welgevonden area, about 12 m on Ploegfontein, 8 m on Leeuwfontein and 5 m on Klipbankfontein, which is the lowest lying area. • Static groundwater levels can be highly irregular, depending on the depth at which a fissure or fracture intercept a borehole. • The natural groundwater flow direction generally mimics surface topography, with groundwater moving in a south-south-easterly direction. • The effective recharge to the aquifer is considered to be as high as 10% of rainfall and even higher in certain areas. • Groundwater is abstracted for irrigation and to a much larger extent mine dewatering, not only at Kolomela Mine, but the neighbouring Beeshoek Mine as well. The surface area covered by the groundwater zone is approximately 350 km2. If a conservative recharge estimate of 4% of MAP is assumed, the annual aquifer recharge to the maximum affected groundwater zone is in the order of 5 300 000 m^3/y. • The dewatering operation at Kolomela (and Beeshoek) is conducted at a higher rate than the aquifer recharge, which has an effect on the aquifer(s) in the area. The area influenced by the abstraction and associated water level decline/impact is referred to as the cone of depression.	• Based on the current groundwater modelling results, it can be accepted that the groundwater regime of the area has been impacted on by the dewatering activities of the Kolomela Mine, as well as that of the Beeshoek Mine. • Although the current impacts on the groundwater are localised, and the impacts on surface water quality are expected to be low, groundwater remediation actions should focus on minimising these impacts. • Local and regional water use potential could be affected in the long-term by the continued dewatering of the of local groundwater sources. • Groundwater quality and groundwater level monitoring must be implemented throughout LOM to ensure continued calibration of groundwater models, thus improving the accuracy of expected post closure scenarios and mitigation requirements.

Description	Closure Implications/Considerations
• A Geohydrological Impact Assessment will be conducted as part of this application to determine the extent of the cone of depression over the Kolomela LOM and assess impacts (if any) on water users in the area. **Groundwater Quality:** • Process water at Kolomela mine has a neutral to alkaline, very hard profile with pH, total dissolved solids (TDS), calcium, magnesium, sodium and sulphate exceeding the WUL limits; • The receiving environment has a neutral, very hard profile, also with TDS, calcium, magnesium, sodium and sulphate exceeding the WUL limits in some of the boreholes; • At Klipbankfontein magnesium exceeded the WUL limits in one (1) borehole and at Leeuwfontein magnesium (two boreboreholes), chloride (one borehole) and total coliforms (one borehole) exceeded the WUL limits; • At Kapstevel no variables exceeded the WUL limits whereas at Welgevonden only one borehole had elevated levels of total coliforms whereas no constituents were found to be elevated at Moolmans Farm; • The boreholes at Kapstevel pit had average magnesium concentrations of 56.8 mg/ℓ, TDS (521.7 mg/ℓ), nitrate (3.6 mg/ℓ) and chloride (22 mg/ℓ); • Average concentrations for the boreholes located around the plant were 54.4 mg/ℓ (magnesium), 529.8 mg/ℓ (TDS), 3.2 mg/ℓ (nitrate) and 100.3 mg/ℓ (chloride); • At the slimes dams the average concentrations were 65.2 mg/ℓ (magnesium), 523.3 mg/ℓ (TDS), 1.5 mg/ℓ (nitrate) and 255.3 mg/ℓ (chloride); • For the Kappieskaree recharge boreholes the average concentrations were 65.6 mg/ℓ (magnesium), 570.8 (TDS), 1.7 mg/ℓ (nitrate) and 79.4 mg/ℓ (chloride); • The Klipbankfontein recharge boreholes average concentrations were 88.8 mg/ℓ (magnesium), 656.5 mg/ℓ (TDS), 3.5 mg/ℓ (nitrate) and 83.6 mg/ℓ (chloride); • The Leeuwfontein aquifer recharge boreholes had average magnesium concentrations of 82.8 mg/ℓ, TDS of 592.9 mg/ℓ, nitrate of 3.2 mg/ℓ and chloride of 43.2 mg/ℓ; • A number of variables in the aquifer recharge boreholes exceeded WUL limits including, pH (most localities), electrical conductivity, alkalinity (many locations), magnesium (most localities) and manganese (certain localities); • The deep aquifer monitoring boreholes had average magnesium concentrations of 23.2 mg/ℓ, TDS 3205 mg/ℓ, nitrate 1.5 mg/ℓ and chloride 19.8 mg/ℓ. The deep aquifer boreholes that are used to monitoring dewatering impacts all have good water qualities not exceeding any of the guidelines. • The water fill points (dust suppression) have very high salt and organic contents. **Acid Generating Potential of Waste:** • The mineralogy of the waste rock and tailings is dominated by silica (quartz), ferric oxide (hematite), aluminium oxide and dolomite. • In terms of acid generating potential all studies agree that the potential is low to zero for the waste rock or tailings material. • Waste rock and tailings are classed as Type 3 Waste (low risk).	
SOCIO-ECONOMIC STATUS	
According to Demacon Market Studies (2015), the major economic drivers in Postmasburg area include: • Mining – 41% • Transport and communication – 18.4% • General government – 11.7% Mining activity is dominated by iron ore operation while the transport and communication sectors include activity such as freight transport (the transport of goods), toll operations, passenger transport by road, air and postal and courier services. The economic growth is an indication of increased demand for goods and services within the Trsantsabane economy as a result of a number of new developments, mainly driven by the mining sector. The mining sector is the anchor to the local economy in both economic value and employment. Recent trends indicate an increase in both economic size and employment in the local economy. The sector furthermore serves as inputs to other sectors and activities in the economy and as a result forms part of the initial stages of the value chain, which can create additional opportunities in the local economy both downstream and upstream.	Mine closure will impact on the local economy and local communities. Mine closure will lead to significant job losses in the area, potentially affecting the greater area and supply chain. • To ensure integrated planning, the closure plan and the SLP should be aligned to ensure successful social transition at closure. • Stakeholder expectations as well as local economic development in the area must be considered during land use planning. • The ongoing success of closure outcomes following the closure of the mine will rely on local communities being empowered to operate and maintain any land use and remaining/relevant infrastructure, particularly that provided to support and improve closure outcomes.

5. STAKEHOLDER ISSUES

The project application is subjected to the required public participation process as defined by the EIA Regulations, 2017. Specific details regarding the Public Participation Process ("PPP") can be found in the EIR and has also been included in a PPP Report. PPP involved the placement of site notices on the boundary of the affected properties as well as publicly accessible areas, issuance of notification letters and publishing advertisements to invite interested and affected parties ("I&APs") to register on a database and submit comments on the project.

The comments, as well as response by the Environmental Assessment Practitioner ("EAP"), are captured in the draft EIA report as a comments and response section that forms part of the draft EIA report. Additionally, this Rehabilitation and Closure Plan also forms part of the draft EIA report issued for public review. Comments received during this review period will be captured and included in the Final EIA Report for submission to the Authorities for review and consideration.

6. ALTERNATIVE CLOSURE AND POST CLOSURE OPTIONS

The alternative options analysis has been guided by the EIA process and information contained in the existing Kolomela Mine Closure Plan, which defines the following aspects that need to be considered:

- The assessment of the existing and potential land uses;
- Investigation of available and feasible sustainable projects;
- Closure risk management;
- Kolomela Mine internal strategic land use planning;
- Existing Mine closure plans;
- Social and labour plans;
- Life of Mine plans;
- Sustainable development strategies; and
- Impacts to the Biodiversity Standard requirements, objectives, and strategies.

A comprehensive alternative options analysis for the existing operations have been done previously and numerous post-closure opportunities have already been identified by Kolomela Mine to mitigate post-closure risks and maximise opportunities for a beneficial ELU. The proposed expansion of footprints and construction of new activities associated

with this project needs to be aligned to the current preferred alternatives framework, as defined in the existing Kolomela Mine Closure Plan.

Table 6-1 provides project specific alternatives to be considered and the preferred closure option is shaded in grey. In some cases, where proposed projects will be constructed on existing, approved and/or already disturbed footprints, or where the proposed activity is similar to activities currently undertaken, the preferred alternative described in the existing Kolomela Mine Closure Plan will apply.

The preferred closure actions aim to leave behind a positive post-mining legacy. This would be achieved by progressively re-instating the natural landscape areas, that are safe, stable and non-polluting, and taking into account the unavoidable remaining disturbances. It may further involve the repurposing of existing infrastructure at Kolomela Mine to ensure a just economic transition from mining to future sustainable ELU's as described in the existing Kolomela Mine Closure Plan and Section 9 of this report.

The current baseline site understanding, risk assessment undertaken, and inputs obtained from the existing Kolomela Mine Closure Plan were used to select the preferred alternatives of how the rehabilitated site could function. There is a worldwide trend directing industries towards contributing to sustainable development and positive land use outcomes. This is especially relevant during planning for closure of Kolomela Mine, which should ensure a sustainable contribution or outcome. Achieving sustainable closure remains a pressing legacy issue and industries throughout the world continue to fall short of addressing even the most predictable closure impacts. The main closure strategy in the part for Kolomela Mine has only focused on rehabilitation of disturbed areas, which involves the demolition of infrastructure and revegetation of mining footprints where operations have been completed to achieve a predetermined ELU capability.

Table 6-1: End-State Alternative Analysis for New Activities

Project	End-State Alternative 1	End-State Alternative 2	Motivation for Preferred Alternative
Surface Infrastructure – PV Solar Facility	All surface infrastructure, including linear infrastructure and foundations, is to be decommissioned, dismantled, and removed from the mining area. Thereafter the area will be ripped and revegetated to a land capability capable of sustaining a grazing land use	Retaining the infrastructure to supply additional services to nearby towns and ELU's. This can potentially support specific municipal mandates. Retaining the infrastructure would however require additional management strategies to identify potential third-party candidates for transfer.	**Alternative 2:** The site and its immediate surroundings are not endowed with significant development centres which highlights opportunities in this regard. End land uses at Kolomela should likely focus on establishing an energy, industrial and agricultural centre. This will be supported by the construction of the proposed Photovoltaic Solar Facility, planned to be retained post closure. This alternative could also mitigate expected job losses due to mine closure. No current third-party transfers of infrastructure have been identified during the development of the plan, but it is likely to be realised closer to end of LoM. However, Kolomela Mine should develop a strategy to transfer identified infrastructure to third parties as part of the closure planning process during LOM.
Waste Tyre Management Facility	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. Infrastructure will be demolished and/ or removed from site and the disturbed footprint area will be rehabilitated to a predetermined end land use capability.		

Project	End-State Alternative 1	End-State Alternative 2	Motivation for Preferred Alternative
Kapstevel At-Pit Facility (Additional park-up and laydown)	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. Infrastructure will be demolished and/ or removed from site and the disturbed footprint area will be rehabilitated to a predetermined end land use capability.		
Truck park-up areas, and topsoil stockpile areas	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. Infrastructure will be demolished and/ or removed from site and the disturbed footprint area will be rehabilitated to a predetermined end land use capability.		
New radio masts	All surface infrastructure, including linear infrastructure and foundations, is to be decommissioned, dismantled, and removed from the mining area. Thereafter the area will be ripped and revegetated to a land capability capable of sustaining a grazing land use.	Retaining and repurposing the infrastructure to supply communication services to nearby towns. Further investigation required to support this proposed closure alternative.	**Alternative 1:** Transfer of communication infrastructure has not been assessed as a viable option aligned to the proposed ELU described in the existing Kolomela Mine Closure Plan, 2020.
Leeuwfontein (LF) Pit: Backfill, Area of relaxation and safety berms around pits	As per the current Kolomela Mine Closure Plan, the southern portion of LF Pit will be deepened and extended to the south, but mining will cease in 2029. It will remain as an open pit at LoM.	The LF Pit will be completely backfilled at end of LoM. The southern section will be backfilled up to natural ground level ("NGL") and the northern section backfilled to above NGL with the construction of the approved Leeuwfontein WRD expansion.	**Alternative 2:** Optimise and expand backfilling efforts to enhance the proposed ELU by reducing the extent of areas sterilised by remaining voids.
Klipbankfontein (KB) Pit: Backfill,	The central portion of KB Pit will be expanded and mined until 2023 where after	The largest portion of the KB pit (South and Central) will be completely backfilled by	**Alternative 2:** Optimise and expand backfilling efforts to enhance the proposed

Project	End-State Alternative 1	End-State Alternative 2	Motivation for Preferred Alternative
Area of relaxation and safety berms around pits	backfilling will start from the western portion. The southern portion of KB Pit will be expanded and mined until 2028 where after backfilling will start from the western portion. Mining in the western portion of KB Pit has started and will continue until 2028. The pit will remain an open pit at LoM.	2028 with the construction of the new approved Klipbankfontein WRD expansion. The KB West pit and a portion of the KB south pit section (not included in the WRD expansion footprint) will be backfilled up to NGL.	ELU by reducing the extent of areas sterilised by remaining voids.
Kapstevel North (KSN) Pit: Backfill, Area of relaxation and safety berms around pits	KSN Pit will be mined until 2025 where after backfilling will commence from the Kapstevel South (KSS) Pit. The proposed northern portion of the KSN Pit will remain post-closure.	The northern portion of the KSN Pit is removed from the planned mining footprint. The KSN Pit will be backfilled up to NGL and in some sections to above NGL with the construction of the already approved KS West WRD.	**Alternative 2:** Optimise and expand backfilling efforts to enhance the proposed ELU by reducing the extent of areas sterilised by remaining voids.
Amendment of the Kapstevel South Pit footprint area	Construction of the KSS Pit has started (site clearance) and mining will continue until LoM. The KSS Pit will remain as an open pit after mine closure. Stabilisation of the pit perimeter and construction of access control measures to prevent unauthorised access to the remaining open pit.	Backfill the KSS Pit at LoM using waste rock from nearby WRD's. This option would delay potential concurrent rehabilitation of completed WRD's as the facility would need to remain unrehabilitated until mining is completed at KSS Pit. This option will also require double handling of material, having significant cost implications.	**Alternative 1:** Optimise the cost effectiveness of closure. Where possible, pits will be backfilled concurrently during LoM using waste material stripped during mining of adjacent pits. Mining from KSS Pit will continue until end of LoM, and therefore opportunity for backfill is low and would not be practical.
Waste Rock Dumps	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. The WRDs will be rehabilitated to a predetermined end land use capability.		

Project	End-State Alternative 1	End-State Alternative 2	Motivation for Preferred Alternative
Ore Stockpile Areas	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. The footprint areas will be rehabilitated to a predetermined end land use capability.		
Water Management Infrastructure	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. Infrastructure will be demolished and/ or removed from site and the disturbed footprint area will be rehabilitated to a predetermined end land use capability. Although not removed from the closure calculation to decommission this infrastructure, it is very likely that this infrastructure will have a valued supporting contribution to preferred ELU.		
Overland and General Infrastructure	No alternative analysis undertaken for closure options. Similar activities are already undertaken at Kolomela Mine. Infrastructure will be demolished and/ or removed from site and the disturbed footprint area will be rehabilitated to a predetermined end land use capability. Although not removed from the closure calculation to decommission this infrastructure, it is very likely that this infrastructure will have a valued supporting contribution to preferred ELU.		

7. ENVIRONMENTAL RISK ASSESSMENT

7.1 Risk Assessment Methodology

A risk is the potential for adverse negative impacts that may be realized in the future with respect to achieving explicitly established and stated performance requirements. Risks can be avoided through the implementation of pre-emptive actions or mitigation measures. Risk analysis is the technique used to identify and examine risks in detail to determine the extent and relationships among them. As part of risk analysis, the risks are classified and ranked according to significance for prioritisation. An essential part of risk analysis is evaluating identified risks to estimate likelihood of occurrence, consequences of realization, recommended mitigation and suitable timeframes for implementation of mitigation actions.

7.1.1 Risk Ranking Criteria

A Risk Matrix is a mechanism to characterise and rank risks that have been identified and reviewed. The Risk Matrix is presented as a table with categories of the likelihood and consequence rating of a risk. The risk analysis used a 5x5 Matrix risk assessment process that consists of criteria divided into five rows and five columns with the rows of the Risk Matrix representing likelihood scores, while the columns represent the consequence scores. Each cell in the Risk Matrix is represented by a Priority Score (Risk Level), with associated guidelines for corrective action as indicated in Table 7-1.

Once the risk score is determined for each risk identified (Inherent risk), adequate management measures (or controls) are identified, and the risk assessment process is repeated to determine the risk level after the appropriate controls have been successfully implemented (residual risk). The various risks associated with rehabilitation, decommissioning and closure of the proposed activities were assessed according to the following categories: Environment; Legal, Regulatory and Financial; Social; and Health and Safety. These risks are applicable to unscheduled and final closure.

Table 7-1: Risk Assessment Matrix

CONSEQUENCE (Where an event has more than one 'Consequence Type', choose the 'Consequence Type' with the highest rating)						
Consequence Type		**1 - Insignificant**	**2 - Minor**	**3 - Moderate**	**4 - High**	**5 - Major**
M Financial		No disruption to operation / Less than 1% loss of budgeted operating profit and listed assets	Brief disruption to operation / 1 % to less than 3% loss of budgeted operating profit and listed assets	Partial shutdown of operation / 3 % to less than 10% loss of budgeted operating profit and listed assets	Partial loss of operation / 10% to less than 30% loss of budgeted operating profit and listed assets	Substantial or total loss of operation / 30% or higher loss of budgeted operating profit and listed assets
S Harm to People – Safety		First aid case	Medical treatment case	Lost time injury	Permanent disability or single fatality	Numerous permanent disabilities or multiple fatalities
H Harm to People - Occupational Health		Exposure to health hazard resulting in temporary discomfort	Exposure to health hazard resulting in symptoms requiring medical intervention and full recovery (no lost time)	Exposure to health hazards/ agents (over the OEL) resulting in reversible impact on health (with lost time) or permanent change with no disability or loss of quality of life	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life or single fatality	Exposure to health hazards/ agents (significantly over the OEL) resulting in irreversible impact on health with loss of quality of life of a numerous group/population or multiple fatalities
E Environmental Impact		Lasting days or less; limited to small area (metres); receptor of low significance/ sensitivity (industrial area)	Lasting weeks; reduced area (hundreds of metres); no environmentally sensitive species/ habitat)	Lasting months; impact on an extended area (kilometres); area with some environmental sensitivity (scarce/ valuable environment).	Lasting years; impact on areas outside development footprints; environmentally sensitive environment/ receptor (endangered species/ habitats)	Permanent impact; affects a whole basin or region; highly sensitive environment (endangered species, wetlands, protected habitats)
L&R Legal & Regulatory Impact		Technical non-compliance. No warning received; no regulatory reporting required	Breach of regulatory requirements; report/involvement of authority. Attracts administrative fine	Minor breach of law; report/investigation by authority. Attracts compensation/ penalties/ enforcement action	Breach of the law; may attract criminal prosecution, penalties/ enforcement action. Individual licence temporarily revoked	Significant breach of the law. Individual or company lawsuits; permit to operate substantially modified or withdrawn
C Social / Community Impact		Minor disturbance of culture/ social structures	Some impacts on local population, cultural aspects which mostly repairable. Single stakeholder complaint in reporting period	Ongoing cultural/social issues. Isolated complaints from community members/ stakeholders	Significant cultural/social impacts. Organized community protests threatening continuity of operations	Major widespread cultural/social impacts. Community reaction affecting business continuity. "License to operate" under jeopardy
R Impact on Reputation		Minor impact; awareness/ concern from specific individuals	Limited impact; concern/ complaints from certain groups/ organizations (e.g. NGOs) period	Local impact; public concern/ adverse publicity localised within neighbouring communities	Suspected reputational damage; local/ regional public concern and reactions	Noticeable reputational damage; national/ international public attention and repercussions
LIKELIHOOD		**RISK RATING**				
5 - Almost Certain 1 year	The unwanted event has occurred frequently; occurs in order of one or more times per year & is likely to reoccur within 1 year *	**11 (Medium)**	**16 (Significant)**	**20 (Significant)**	**23 (High)**	**25 (High)**
4 - Likely 3 years	The unwanted event has occurred infrequently; occurs in order of less than once per year & is likely to reoccur within 3 years *	**7 (Medium)**	**12 (Medium)**	**17 (Significant)**	**21 (High)**	**24 (High)**
3 - Possible 10 years	The unwanted event has happened at some time; or could happen within 10 years*	**4 (Low)**	**8 (Medium)**	**13 (Significant)**	**18 (Significant)**	**22 (High)**
2 - Unlikely 30 years	The unwanted event has happened at some time; or could happen within 30 years *	**2 (Low)**	**5 (Low)**	**9 (Medium)**	**14 (Significant)**	**19 (Significant)**
1 - Rare >30 years	The unwanted event has never been known to occur; or it is highly unlikely that it will occur within 30 years *	**1 (Low)**	**3 (Low)**	**6 (Medium)**	**10 (Medium)**	**15 (Significant)**

Risk Rating	**Risk Level**	**Guidelines for Risk Matrix**
21 to 25	High	A high risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised immediately.
13 to 20	Significant	A significant risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as soon as possible.
6 to 12	Medium	A moderate risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as part of the normal management process.
1 to5	Low	A low risk exists that management's objectives may not be achieved. Monitor risk, no further mitigation required.

7.2 Environmental Risk Assessment for the final rehabilitation, decommissioning and closure

Table 7-2 provides the risk analysis that has been developed for the various risks associated with the decommissioning, rehabilitation and closure phase of the proposed activities, including the identification of the potential residual post closure risks. The table further summarises and assesses the anticipated impacts associated with physical closure of the proposed activities, based on the environmental context description of Section 4 and further detail provided in Annexure D of the existing Kolomela Mine Closure Plan. From a closure perspective, the risks associated with the proposed expansion of footprints and construction of new activities are very similar to what is expected as a result of the activities currently undertaken on site, as defined in the existing Kolomela Mine Closure Plan. None of the proposed activities associated with the authorisation process is expected to result in any new or previously unidentified mine closure impacts and the known risks are generally well understood. Majority of the risks can largely be mitigated at closure through implementation of the currently accepted controls and mitigation measures. The expansion of footprint areas and construction of new activities may however contribute to the cumulative environmental impacts of the Mine.

Table 7-2: Inherent and Residual Closure Risk Levels

EX00012_KLM Infrastructure Expansion Project – Risk Assessment	**Reference Number**	**EX00012_KLM Infrastructure Expansion Project**
	Revision Number	**0**
	Date of Assessment	**4-Nov-21**

Risk Assessment Team:		
No	**Name & Surname**	**Designation**
1	Roelof Letter	Environmental Specialist
2	Trevor Hallatt	Environmental Specialist

Impact / Consequence Description	
S	Harm to People - Safety
H	Harm to People - Occupational Health
E	Environmental Impact
C	Social / Community Impact
L&R	Legal & Regulatory Impact
M	Material Losses / Damage / Business Interruption
R	Impact on Reputation

Risk Classification	
1 - 5	Low
6 - 12	Medium
13 - 20	Significant
21 - 25	High

Legend	
L	Likelihood / Probability of the event occurring
C	Maximum Reasonable Consequence if the event occurs
RR	Risk Rating

No.	Environmental Aspect	Area/Activity	Final Land Use	Closure Risk/ Opportunity (What can go wrong/right?)	Consequences (What would the impact be?)	Impact Type	INHERENT / RAW RISK			Recommended Controls (How do we minimise the impact?)	RESIDUAL RISK		
							L	C	RR		L	C	RR
1	Air Quality (Dust & Fugitive Emissions)	1) Vehicle tailpipe: Transport and general decommissioning activities 2) Demolitions of structures and dust generated during rehabilitation activities. 3) Exposure of footprints	Grazing / Wilderness	Dust generation and fugitive emissions	Increase in fugitive dust emissions particularly due to an increase in particulate dust levels (PM10 and PM 2.5) during decommissioning and closure of the mine. Windblown dust from exposed unrehabilitated areas.	E, S & L&R	4	2	12	1) Implementation of air quality management as part of the Kolomela Mine EMPr. This should include utilising a combination of watering/chemical stabilization 2) Ensure the extent of disturbed areas are limited to approved areas, reduction of frequency of disturbance, early revegetation and stabilisation of disturbed soil. Disturbed footprint areas during operations should also be kept to absolute minimum. 3) Concurrent rehabilitation of WRDs. 4) Vegetation is very effective control measure in terms of its ability to also control water erosion/sedimentation. Vegetation cover must be re-established on exposed areas as early as possible. 5) Maintain fire breaks and avoid burning of any material onsite. 6) Vehicle speeds be limited to 40 km/h on any unsurfaced roads unless these have bound paving. All vehicles are to be properly maintained to minimize the emission of fumes 7) Dust and PM monitoring must continue during the entire decommissioning phase, until all exposed areas have been stabilised/revegetated.	2	2	5
2	Biodiversity, including wetlands and riparian habitats	Demolition of infrastructure & Final Rehabilitation	Grazing / Wilderness / Repurposing	1) Potential negative Risk on biodiversity. 2) Possibility of failing to control alien invasive species on rehabilitated land. 3) Permanent loss of biodiversity. 4) Ineffective Indigenous Biodiversity reestablishment (Seed mix applied to rehabilitated land not meeting desired successional trajectory). 5) Fires 6) Impedance onto wetlands due to decommissioning activities (expansion of WRD footprints during sloping etc.) 7) Removal of infrastructure crossing/within wetlands	1) Ineffective re-established indigenous vegetation on rehabilitated areas. 2) Loss of biodiversity, increased soil erosion, increased siltation of rivers etc due to in effected rehabilitation of exposed areas. Long-term loss of and reduced ecological and habitat functionality. 3) Failure to implement a well-conceived biodiversity action plan, rehabilitation plan and alien floral control plan during the decommissioning and closure phase. 4) Uncontrolled fires from community resulting in the delay in re-establishment of vegetation cover in rehabilitated areas 5) Territorialisation of wetlands with loss of wetland biodiversity, function and flood buffering capacity 6) Invasive plant species settlement in wetlands	E, S & L&R	4	3	17	1) All buffer areas must be avoided and maintained. 2) Compacted soil will be ripped and slope and vegetation re-established; If required, vegetation will be watered to assist in the rehabilitation process; Additional topsoil and/or fertilizer may be required to enhance plant establishment and succession; Rehabilitate using, inter alia, local indigenous plants from the recommended nursery, and an appropriate indigenous seed mix that excludes TEF, aliens, hybrids, cultivars and other unfavourable flora. 3) Wetland pan catchments not disturbed by approved mining activities/footprints must be dedicated no-go areas and no material will be stored in wetland buffer zones during decommissioning. 4) Implement alien invasive control/eradication programme developed during operational phase and monitor alien invasive species during the post closure phase. 5) Edge effect control needs to be implemented within affected areas, with specific consideration to erosion control and alien floral species management. 6) Continuous monitoring and maintenance of rehabilitated areas. 7) Erosion protection measures will be implemented all areas. 8) Rehabilitation of the disturbed surface caused by operation at all times must comply with the approved EMPr; 9) Fire control teams to be available and firebreaks needs to be maintained. 10) Continue to undertake biomonitoring during mine decommissioning phases	3	2	8

No.	Environmental Aspect	Area/Activity	Final Land Use	Closure Risk/ Opportunity (What can go wrong/right?)	Consequences (What would the impact be?)	Impact Type	INHERENT / RAW RISK			Recommended Controls (How do we minimise the impact?)	RESIDUAL RISK		
							L	C	RR		L	C	RR
3	Financial	All decommissioning, rehabilitation and mine closure activities	Grazing / Wilderness / Repurposing	1) Failure to implement the final rehabilitation, decommissioning and closure plan (due to budget restraints and/or shortcomings) 2) Failure of completed closure actions 3) Failure to implement backfilling according to the LoM schedule and pit infill programme, resulting in additional voids remaining at closure. This would result in significant increases in closure liability.	The following environmental consequences were considered: •Inadequate establishment of vegetation; Soil erosion and contamination; Loss of soil, land use and land capability; Siltation of rivers and streams; Failure to control alien and invasive plant species; Loss of biodiversity; Contamination of surface water resources and Uncontrolled GW pollution plume migration The following Legal and Regulatory consequences were considered: •Failure to meet relinquishment criteria, as set out in the final rehabilitation, decommissioning and closure plan will result in the mine not being issued a closure certificate; and Potentially posing risk to humans and animals The following Social / Health and Safety consequences were considered: •Abandoned areas will be unsafe and pose a significant risk to humans and animals and Deterioration of structural integrity of unrehabilitated mine infrastructure could lead to human injury and/or fatalities	E, L and S	4	4	21	1) Ensure that annual updates of the Financial Provision reflect true and accurate assessment of activities and impacts of mining operations at Kolomela Mine. 2) Update the existing BOQ and Financial Provision to include the proposed new activities and proposed expansion of current activities that form part of the Kolomela Mine Expansion Project 3) Establish agreements for transfer/hand-over of buildings and/or infrastructure (including linear); 4) Adjust the quantum of provisioning required accordingly with remaining LOM (as per legislative requirements). Accuracy must improve as LOM progresses and adjustments should be include the development of a detailed measurement of all infrastructure; and Compile a measured bill of quantities; 5) Liaise with the DMRE regarding adjustment of the quantum to include the proposed activities associated with the Kolomela Mine Expansion Project. It is recommended to annually update the Kolomela Mine Financial Provision (based on mine progression and the proposed project implementation schedule) and to include activities expected to be constructed within each 12-month period to the premature closure liability. 5) Undertake concurrent rehabilitation during operation of the mine. 6) Provided that sufficient financial resources are available, undertake concurrent rehabilitation of redundant infrastructure, using operational expenditure to reduce final quantum of liability at the end of LoM 7) Ensure that the pit infill schedule is maintained and backfilling is done according to the schedule to avoid backlog at the end of LoM	2	2	5
4	Visual	Final rehabilitated footprints (incl. TIFs, WRDs, Pits and other disturbed areas) and remaining infrastructure	Grazing / Wilderness / Repurposing & PV Solar Plant	1) Visual intrusion of decommissioned activities associated with a mine on the existing views of sensitive visual receptors in the surrounding landscape. 2) Reduced post-closure visual appeal due to disrepair/unmaintained transferred infrastructure.	1) After mining ceases the majority of the infrastructure will be removed and the area rehabilitated. During this period the sense of place created by the operational mine will still remain and be visible to sensitive receptors. The lack of vegetation cover once all infrastructure has been removed would significantly impact the visual quality of the rehabilitated site. 2) The WRDs and TIF's will remain indefinitely post-closure, albeit rehabilitated/ revegetated. This will change	E & C	5	2	16	1) Exposed areas need to be reshaped and revegetated as soon as possible. This would significantly contribute to reestablishment of the scenic setting of the impacted landscape. Dust control measures implemented during operations should remain to minimise dust emissions from the area. 2) The residual WRDs and TIFs needs to be sloped and vegetated as soon as possible. This would ensure the residual visual aesthetics of the area is re-established and therefore improve the scenic quality. 3) Backfilling of pits should be done during LOM where possible to successfully reinstate a functional land use. 4) Construction of access control measures around remaining pits should, as far as practically possible, blend with the surroundings. This includes revegetation of the berms with trees/ shrubs. 5) The PV Solar Plant should be managed and maintained by competent persons. Kolomela to start negotiations with	2	2	5

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							L	C	RR		L	C	RR
					the visual landscape of the area. 3) KSS pit will remain post-closure 4) PV Solar Plant to remain post-closure					possible receiving parties during LOM to ensure all agreements for transfer are in place at closure.			
5	Topography	1) MRDs2) Remaining Pits3) Backfilled Pits4) Other Rehabilitated Footprints	Grazing / Wilderness / Repurposing	1) Altering the topographical characteristics2) Unstable final landforms3) Visual intrusion Instability with H&S risk	1) All slopes will be highly susceptible to soil erosion. 2) Soil erosion will lead to the physical degradation of the soils.3) Sediments and contaminants could be transported to the surrounding watercourses and other tributaries, resulting in sedimentation and alteration of aquatic habitats. Additionally, soil erosion will lead to changes in the ecological characteristics of any disturbed area i.e.. establishment of alien invasive species resulting in the loss of natural habitat for indigenous fauna and flora. 4) Additionally, soil erosion will lead to a shortage of soil/material for the successful rehabilitation of disturbed area.5) Poor vegetation coverage, surface ponding and soil and surface/groundwater contamination due to leachate from residual contamination.6) Inability to achieve self-sustaining and functioning rehabilitation areas7) Unauthorised access to pits and rehabilitation sites	E	4	3	17	1) Removal of all surface infrastructure except which will support the ELU 2) Sloping of all remaining features including MRDs and TIFs 3) Re-vegetation all disturbed areas (excl. the ZoR around remaining voids) 4) Rehabilitate all areas to resemble as far as feasible the pre-mining landscape or alternatively to blend in with the natural landscape and support the ELU 5) Use existing roads during closure to avoid additional scarring; 6) The maximum height, area and shape of the final landforms (MRDs etc.) should be designed to optimise the area of land available, and as far as practical the final angle and shape of the facilities should blend with the natural landscape, providing that surface stability can be achieved 7) The gradient of the side slopes must be designed to accommodate self-succession of natural vegetation 8) Application of topsoil and grass seeding of the side slopes of the facilities should form part of concurrent rehabilitation. 9) A combination of indigenous trees and shrubs should be planted adjacent to the facilities and auxiliary infrastructure as a 'buffer' and to partially screen views to the facilities where feasible	2	2	5
6	Soil	Activities include: 1) Demolition of infrastructure; 2) Backfilling of the pits (excluding KSS); 3) Capping of TIF's; 4) Reshaping Areas; 5) Placement of topsoil for rehabilitation purposes; and 6) Final rehabilitation footprints.	Grazing / Wilderness	1) Improperly stored topsoil may have an effect on its long term agricultural or rehabilitation potential. Inadequate quantity of quality topsoil to sustain growth medium on rehabilitated areas. 2) Inadequate management of soil stockpiles will lead to erosion due to environmental factors. 3) Rehabilitation activities will also lead to soil erosion without proper mitigation. 4) Rehabilitated areas damaged by erosion over	1) Areas where infrastructure demolition will take place will be highly susceptible to soil erosion. This would also occur should there be unmanaged soil stockpiles during the mining operations. 2) Soil erosion will lead to the physical degradation of the soils. 3) Sediments and contaminants could be transported to the surrounding watercourses and other tributaries, resulting in sedimentation and alteration of aquatic habitats.	E, S & L&R	4	4	21	1) Implement measures stipulated in the Kolomela topsoil and vegetation stripping procedure. 2) Soil that is placed on disturbed areas during rehabilitation should be protected by establishment of vegetation as soon as possible to prevent water run-off from causing erosion and transportation of sediments. Topsoil replaced from stockpiles should be protected from erosion. 3) Any operational procedures relating to erosion, sediment and stormwater control must be implemented during the decommissioning phase as well. Maintain and add stormwater management measures until after rehabilitation is deemed successful 4) Contaminated soil should be appropriately excavated and treated a the Kolomela bioremediation facility. 5) The soil volume survey needs to be updated to ensure that sufficient topsoil is available for the rehabilitation of	3	2	8

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							L	C	RR		L	C	RR
				time. 5) Soil contamination - Including the unknown extent/depth of contamination from spillages at fuelling bays and workshops. This includes possible sewage spills. This can reduce the land capability influencing the desired end land use. 6) Incorrect assessment of demolition waste prior to backfilling material. 7) Compaction of soil and loss soil depth, fertility and volume (Not enough soil for mine closure rehabilitation). 8) Residual contamination from the TIF footprints affecting soil and rehabilitation success.	Additionally, soil erosion will lead to changes in the ecological characteristics of any disturbed area i.e., establishment of alien invasive species resulting in the loss of natural habitat for indigenous fauna and flora. 4) Additionally, soil erosion will lead to a shortage of soil/material for the successful rehabilitation of disturbed area. 5) Potential hazardous material (hydrocarbon, sewage etc.) could contaminate soil resources. Should control measures not be implemented, the soils subject to contamination and could lose their functions. General waste, as well as demolished infrastructure and materials could contaminate and compact soil resources should the waste not be disposed off or utilised in backfilling. 6) Localised adverse effects on soil properties, surface water and groundwater, and potential to sustain the desired end land use. 7) Poor vegetation coverage, surface ponding and soil and surface/groundwater contamination due to leachate from TIFs and residual contamination. 8) Inability to achieve self-sustaining and functioning rehabilitation areas 9) Not enough soil material to undertake planned rehabilitation.					additional activities associated with the expansion project. Estimated soil requirements must be measured against actual volumes available for rehabilitation and any deficit identified a soil strategy need to be developed to obtain sufficient topsoil over time. 6) All waste should be removed from the area and managed according to the Kolomela waste management procedure. Inert waste can be backfilled within the pits, only if not uncontaminated. 7) Shape and profile areas to match surrounding topography and to be free draining. Erosion protection measures should be installed to protect rehabilitated areas. 8) Ripping of soil will be undertaken in compacted areas, as required.			
7	Land capability	All activities during decommissioning pose a risk to the desired agricultural potential and land capability. Land use will have been transformed to mining during operations at Kolomela.	Grazing / Wilderness	1) Use of land for mining purposes will result in a loss of agricultural land. 2) General shortage of on-site topsoil for rehabilitation of infrastructure footprints on site 3) The land capability may be altered through the disturbance of soils by a long-term mining process.	1) Final landforms may not be free-draining and prone to erosion or have reduced next land use potential. 2) Unstable landforms can cause soil erosion, soil contamination and soil compaction, which all contribute to the loss of agricultural potential and soil fertility. This risk will most likely be residual. Mitigation measures and rehabilitation	E	4	4	21	1) The aim of rehabilitation should be to change the land use from mining back to the desired ELU (grazing/wilderness). Rehabilitation should be done according to guidelines set out in the Guidelines for Rehabilitation of Mined Land. 2) Disturbed areas should be shaped to conform to surrounding and pre-development landscapes as far practical. 3) The post-mining landscape should be stable and free draining. This can be assessed by using site specific data, GIS data and modelling in order to determine erodibility of the post-mining area, as well as suitability for a specific land use.	3	2	8

No.	Environmental Aspect	Area/Activity	Final Land Use	Closure Risk/ Opportunity (What can go wrong/right?)	Consequences (What would the impact be?)	Impact Type	INHERENT / RAW RISK			Recommended Controls (How do we minimise the impact?)	RESIDUAL RISK		
							L	C	RR		L	C	RR
					will be undertaken, but experience have shown that difficult to reinstate pre-mining land use and agricultural capability.					4) Land capability should be restored to at least Class VI and V, which can support commercial grazing/wilderness or in the best case emulate pre-mining land capability. 5) Soil cover should be applied to a depth of at least 200mm. 6) Soil fertility testing should be done prior to revegetation to determine whether fertilization is needed for effective vegetation establishment. 7) Rehabilitation sites need to be maintained (re-seeding, alien and invasive plan species management etc.) to ensure that the sites become sustainable and the desired ELU is achieved			
8	Surface Water	General decommissioning and rehabilitation	Grazing / Wilderness / Repurposing	1) Surface water quality and watercourse sedimentation 2) Failure to decontaminate dirty areas/ infrastructure areas prior to dismantling and demolition. 3) Reduced functionality of wetland due soil and water contamination. 4) Impeding on surface water resources during decommissioning and mine closure phase	Risks resulting from general decommissioning and rehabilitation works will be similar to those during the construction phase, with earthworks related to rehabilitation and the movement of equipment on the site. Risk to the surface water environment includes: 1) Erosion of soils during rainfall events, with elevated suspended solids in the runoff water. 2) Resultant elevated suspended solids in the watercourses/wetlands, as well as sedimentation in the watercourses. 3) Hydrocarbon spillages from fuel storage, servicing areas or decommissioning equipment itself, with resultant elevated hydrocarbon concentrations in runoff water, watercourses and the adjacent watercourses/rivers. 4) Downstream water quality impacts due to uncontrolled runoff from contaminated footprints within the mining area.	E, S & L&R	3	4	18	1) The footprint of disturbed areas will be minimised. The mining areas will be rehabilitated and disturbed areas stabilised and sloped to be free draining as far as practically possible. 2) Servicing of vehicles will take place only in dedicated areas. Bunded containment and settlement facilities will be provided for hazardous materials, such as fuel and oil. Spill-sorb or a similar type product will be kept on site and used to clean up hydrocarbon spills in the event that they should occur. 3) The storm water management infrastructure will be decommissioned last, if at all, to ensure adequate storm water management during the rehabilitation phase. 4) Erosion protection measures will be implemented where required, specifically in areas with steep slopes or areas near sensitive habitats. 5) Waste management procedure to continue during decommissioning and rehabilitation phases. Contaminated soils must be excavated and treated. 6) All traces of hydrocarbons and residual waste will be removed before infrastructure is demolished. 7) Sewage management infrastructure and requirements must be maintained during the decommissioning phase. 8) Water quality monitoring will continue to be undertaken downstream of the mining areas, in order to detect any increase in suspended solids or turbidity.	2	2	5

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							L	C	RR		L	C	RR
9	Surface Water	General decommissioning and rehabilitation	Grazing / Wilderness / Repurposing & PV Solar Plant	1) Contamination of surface water quality in streams, rivers and wetlands downstream. 2) Possible sedimentation of streams, rivers and wetlands. 3) Failure to adequately remove or remediate mineral residue or other sources of contamination.	1) Possible downstream water quality impacts due to uncontrolled runoff from contaminated TIF footprints within the mining area. 2) Erosion of TIF's and cover material leading to sedimentation of water resources should material be left on surface after mine closure. 3) Poor vegetation coverage and reduced land capability, higher waste loads to groundwater	E, S & L&R	3	4	18	1) Create a sustainable landform that can be integrated into the surrounding landscape that will not compromise the future land uses in the long term 2) Ensure that the end state of the TIF is aesthetically acceptable 3) Investigate suitable capping material, including slop stabilisation and re-vegetation requirements for the TIF. Revegetation of side slopes of the TIF must be undertaken concurrently within LOM activities. 4) All pollution control infrastructure must be maintained during operations and possibly post-closure depending on the stability of the TIF. 5) Alternative closure uses of TIF footprint to be implemented (Solar plant, farming etc.) 6) Also refer to general surface management measures. 8) Rehabilitation initiatives should consider edge effects, specifically for surface water resources and wetland areas	2	3	9
10	Groundwater	1) MRDs2) Remaining Pits3) Backfilled Pits4) Other Rehabilitated Footprints	Grazing / WildernessSterilised Areas (Open Pits and ZoR)	1) Failure to safely and fully extract all potential sources of contaminants from rehabilitation areas.2) Totally backfilled voids may be subject to consolidation and subsidence with time. Consolidation and subsidence may be aggravated by a fluctuating groundwater level.3) An open water body with unstable underlying conditions may form if the subsidence is below NGL, i.e. increase safety risk.4) Backfill material will come into contact with and potentially interact geochemically with groundwater as the levels rebound after dewatering has stopped. This may result in contamination of groundwater sources, e.g. nitrates from blasting residue. This is however expected to be temporary (several years).5) Potential contamination of groundwater due to MRDs	1) Long-term groundwater contamination.2) Adverse water quality impacts caused by water levels increases in the remaining voids and contamination due to remaining MRDs.3) Interception and ingress of surface runoff into voids resulting in increased contaminated water load.	E, S & L&R	3	3	13	Backfilled Pits:1) Fill the open pit above the surrounding NGL to allow for future consolidation and ensure a free draining surface.2) Deep rip the backfilled open pit to increase infiltration.3) Divert surface runoff away from the backfilled pit.4) Reshape the remaining steep slopes to less than 18 degrees.5) Retain or construct benches during reshaping to the designed specifications for the specific slope length, material type and vegetation.6) Cover the waste rock material with growth medium.7) Rip the reshaped slopes on contour to increase infiltration, surface roughness and mix the growth medium and underlying waste rock material.8) Establish the recommended mixture of indigenous vegetation.9) Restrict access to the backfilled pit. Do not allow access for grazing before vegetation establishment is sustainable and do not allow grazing during wet periods10) Investigate and model impacts to the water table post closure and continue post-closure groundwater level monitoring. Remaining Voids:1) Investigate and model impacts to the water table post closure and continue post-closure groundwater level monitoring. MRDs:1) Continue to monitor the potential impact so that corrective action can be taken.2) Design final landforms that spread rainfall and runoff on several smaller areas to reduce seepage.3) Establish vegetation cover over the entire facility. Seed mix should include deep rooted species to increase evapotranspiration and reduce seepage.	2	2	5

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							L	C	RR		L	C	RR
11	Safety	1) MRDs 2) Remaining Pits 3) Backfilled Pits 4) Other Rehabilitated Footprints	Grazing / Wilderness / Repurposing	1) Totally backfilled voids may be subject to consolidation and subsidence with time. 2) Access to an open water body, i.e. increase safety risk. 3) Unstable in-pit highwalls and highwalls with unconsolidated material remaining over the long term. These areas will be prone to erosion and slope failure. 4) Potential failure/ relaxation of the pit perimeter	1) Unsafe conditions for surrounding land owners and community members leading to injury or death 2) Collapse of remnant infrastructure which could lead to human injury or fatality.	S	4	5	24	Backfilled Pits: 1) Fill the open pit above the surrounding NGL to allow for future consolidation and ensure a free draining surface. 2) Deep rip the backfilled open pit to increase infiltration. 3) Divert surface runoff away from the backfilled pit. 4) Reshape the remaining steep slopes to less than 18 degrees. 5) Retain or construct benches during reshaping to the designed specifications for the specific slope length, material type and vegetation. 6) Cover the waste rock material with growth medium. 7) Rip the reshaped slopes on contour to increase infiltration, surface roughness and mix the growth medium and underlying waste rock material. 8) Establish the recommended mixture of indigenous vegetation. 9) Restrict access to the backfilled pit. Do not allow access for grazing before vegetation establishment is sustainable and do not allow grazing during wet periods 10) Investigate and model impacts to the water table post closure and continue post-closure groundwater level monitoring. Remaining Voids: 1) Prevent access to the remaining void by constructing an abandonment bund and trench around the entire pit perimeter. 2) Locate the access control measures outside the ZoR or potential failure zone of the backfilled material. 3) Erect a security fence around the mining area, reducing the risk of free access to the area by people. 4) Decommission ramps into the pit, i.e. drill and blast, excavate trenches or dump waste rock. MRDs: 1) Continue to monitor the potential impact so that corrective action can be taken. 2) Design final landforms that spread rainfall and runoff on several smaller areas to reduce seepage. 3) Establish vegetation cover over the entire facility. Seed mix should include deep rooted species to increase evapotranspiration and reduce seepage.	1	2	3
12	Waste	Demolition of infrastructure & Final Rehabilitation	N/A	1) Generation and disposal of demolition waste on site	1) Contamination of underlying aquifers and surface water resources due to storage and handling of potential pollutants at workshops and laydown areas.	E	3	4	18	1) Identify structures that can be beneficially re-used, and establish agreements for transfer/hand-over. 2) Demolish and remove concrete and/or brick structures and dispose of at a registered site and/or apply for necessary regulatory permits to dispose of demolition waste into pits (if inert). 3) Dismantle steel structures, and sell salvageable scrap metal. 4) All material recovered from the demolition of building structures will either be transported to a permitted disposal site, sold as scrap metal or made available to the local community as building materials – provided that the material is still in a satisfactory condition and pose no health risks.	1	2	3

No.	Environmental Aspect	Area/Activity	Final Land Use	Closure Risk/ Opportunity (What can go wrong/right?)	Consequences (What would the impact be?)	Impact Type	INHERENT / RAW RISK			Recommended Controls (How do we minimise the impact?)	RESIDUAL RISK		
							L	C	RR		L	C	RR
13	Socio-economic	Decommissioning of the Kolomela Mine	Grazing / Wilderness / Repurposing	1) Loss of income and jobs and inadequate timeously implement and design an exit strategy for employees. 2) Not ensuring adequate skills training and capacity building to employees. 3) No alternative work opportunities to obtain work elsewhere once mine stopped 4) No alignment with stakeholders regarding this closure plan, including desired next land use. 5) Loss of opportunities to supply chain contractors	1) The major social implication associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. 2) Social and labour unrest because of dissatisfaction at loss of employment followed by economic hardship and physical displacement of employees and/or exacerbated employment loss. 3) Conflict in desired post-closure land use/s and unalignment with municipal SDF; 4) Forced closure of suppliers, with further cumulative impact of loss of jobs / contracts and income	C	5	5	25	1) The impacts associated with mine closure and decommissioning needs to be addressed in the SLP. Undertake investigations into long-term livelihood sustenance project creation incorporating Kolomela Mine to reskill and enable mine employees to be sustainable post closure. 2) Kolomela Mine needs to continue investigating feasibility of various alternative end land use scenarios. The closure planning and SLP integration is required to investigate potential sustainable economic land uses that might offset the economic impact of closure of the mine. These could include transferring of infrastructure to local business and /or creating economic sustainable business during LOM. 3) Develop skills required for end land use through the SLP i.e. ecotourism etc.	2	2	5
14	Other	Regulator	N/A	1) Misalignment between Kolomela Mine and provincial departments of end land use; 2) Change in regulatory requirements guiding closure planning and/or costing and uncertainty over regulatory requirements for closure. 3) Mis-understanding of government requirements (compliance)	N/A	R	3	3	13	1) Develop and present a regional closure framework to respective provincial department aligned with the regional spatial development framework. 2) Engage with regulatory stakeholders to remain informed and provide commentary where suitable. 3) Engagement with DMRE on regular basis.	2	2	5

7.3 Residual Risk Assessment

The risk assessment undertaken in section 7.2 above also included an assessment of the residual risk that would remain after implementation of the closure actions and management interventions during the decommissioning and rehabilitation phase of mine closure. The residual risk was determined utilising the same risk assessment methodology as outlined in section 6.1, but revaluating the risk, assuming that all closure criteria has been implemented successfully.

Residual risks included all post mitigation risks that are classified as "medium" and above. The identified residual risks were all classified as "medium" risks, indicating that a moderate risk exists that closure management objectives may not be achieved, even after implementation of proposed mitigation measures and closure criteria. The risk should be managed through development of an appropriate mitigation strategy as part of the normal operational management process. The residual risks identified, considering the information available, are:

- Sustainability of rehabilitation initiatives (successful reinstatement of the desired ELU and achieving the biodiversity objectives), specifically at backfilled pit footprints and the rehabilitated MRDs post mine closure.
- The edge effect should be monitored, specifically for surface water resources and wetland areas. Rehabilitation initiatives should avoid sensitive areas as far as practically possible.
- Possible continued impacts surface water resources due to rehabilitation initiatives failing in the future, even after successful closure. Erosion on rehabilitated sites, specifically MRDs, leading to sediment transport into surrounding surface water resources. Long-term interaction of backfill material with the groundwater regime and increased infiltration on backfilled footprints may pose a risk but is unlikely.

According to the NEMA Financial Provisioning Regulations, a separate environmental risk assessment report needs to be prepared for the remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water. This report has been prepared only to support the environmental approval process for the proposed activities associated with the Kolomela Mine Expansion Project. It therefore does not address all the latent environmental risk associated with all activities undertaken at the entire Kolomela Mine. It must also be noted that the proposed activities that were identified to pose a latent risk are similar to those already undertaken at the mine. These risks can therefore be

addressed and mitigated through implementation of mitigation measures as described in this plan in combination with those given in the existing Kolomela Mine Closure Plan.

In considering only the new proposed activities, there are negligible residual risks associated with the project only, considering the majority of the latent environmental risks relate to the existing authorised activities (specifically existing and future mining expansion). It is recommended that residual environmental liabilities be addressed holistically as part of the existing operational requirement in terms of the NEMA Financial Provisioning Regulations for the Kolomela Mine. The proposed new activities, once approved, will need to form part of this requirement. To prepare a separate environment risk assessment report which only relates to this project residual liabilities will not provide a holistic picture of the mine and related risks.

8. CLOSURE DESIGN PRINCIPLES & OBJECTIVES

The design principles of this Closure Plan considers several interconnected components including legal and other obligations, the closure vision, closure objectives, environmental and social considerations, technical design criteria, closure assumptions, and relinquishment conditions. These are all derived from and aligned with the existing Kolomela Mine Closure Plan and therefore aligned to mines' overall closure strategy.

8.1 Legal Framework for Mine Closure

This closure report has been prepared in support of an application for authorisation in terms of Regulation 31 of Part 2 of Chapter 5 of the EIA Regulations (GNR. 326 of 2017 for the amendment of the existing Environmental Management Programme.

As discussed previously, this report has been drafted as a separate final rehabilitation, decommissioning and mine closure plan for only the proposed project and associated activities to primarily support the application for authorisation and ensure all rehabilitation and closure related aspect of the proposed project are addressed. The report has been developed to serve as an appendix to the existing Kolomela Mine Closure Plan and has also been aligned with the requirements outlined in terms of Regulation 31 of the NEMA EIA Regulation and Appendix 4 of the NEMA Financial Provision Regulation.

The closure report should be read together with all the conditions and commitments provided in the amendment application and supporting documentation prepared for the proposed expansion project, but also align to the requirements of the final rehabilitation, decommissioning and mine closure plan still to be developed for the entire Kolomela Mine.

In addition to this, there are several legal and regulatory frameworks with which SIOC must comply. The legislation influencing closure is varied, however, a common thread is that after mitigation, the impacts of the operation on the environment need to be mitigated and the solutions implemented are required to be sustainable within the existing constraints presented by the biophysical environment. The legislation applicable to closure is provided below:

- The Constitution of South Africa Act, 1996;
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- MPRDA Regulations, 2004, as amended (GN R. 527 of 2004);
- National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA);
- NEMA Environmental Impact Assessment Regulations, 2017 (GNR 326 of 2017), as amended including the following listed notices;
- NEMA Financial Provisioning Regulations for Prospecting, Exploration, Mining or Production Operations, 2015 (GN 1147 of 2015);
- National Environmental Management: Biodiversity Act, 2004 (Act No, 10 of 2004);
- Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (GNR 151 of 2007);
- List of Ecosystems that area Threatened or in need of Protection, 2011 (GN. 1002 of 2011);
- Alien and Invasive Species Regulations, 2014 (GNR 598 of 2014);
- Alien and Invasive Species Lists, 2016 (GN 864 of 2016); and
- Threatened or Protected Species Regulations (GNR 152 of 2007).
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA):
- NEMWA List of Waste Management Activities with a Detrimental Effect on the Environment (GN 921 of 2013);
- NEMWA Waste Classification and Management Regulations, 2013 (GNR 634 of 2013);
- NEMWA regulations regarding the planning and management of residue stockpiles and residue deposits, 2015 (GN R. 632 of 2015);
- National Norms and Standards for the Assessment of Waste for Landfill Disposal (GNR 635 of 2013);
- National Norms and Standards for Disposal of Waste to Landfill (GNR 636 of 2013); and

- National Norms and Standards for Screening and Assessing Contaminated Sites (GN 331 of 2014).
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004):
- National Ambient Air Quality Standards (GN 1210 of 2009);
- National Ambient Air Quality Standard for Particulate Matter <PM2.5 (GN 486 of 2012); and
- National Dust Control Regulations, 2013 (GNR 827 of 2013).
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- Environment Conservation Act, 1989 (Act No. 73 of 1989);
- National Water Act, 1998 (Act No. 36 of 1998) (NWA):
- NWA Regulations on Use of Water for Mining and Related Activities (GNR 704 of 1999).
- National Forests Act, 1998 (Act No. 84 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Health Act, 2003 (Act No. 61 of 2003);
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Hazardous Substance Act, 1973 (Act No. 15 of 1973);
- Mine Health and Safety Act, 1996 (Act No. 29 of 1996);
- Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013);
- Northern Cape Nature Conservation Act (No. 9 of 2009)

8.2 Legal Obligation relating to Closure

In preparation of developing this closure plan for it was important to identify and integrate the closure obligations contained in the existing approvals. The summary of all these environmental legal commitments and obligations is presented in Annexure C of the existing Kolomela Mine Closure Plan but should be referred to in the approved EMPr(s). These obligations have been considered during preparation of the action plan for final rehabilitation, decommissioning and closure.

8.3 Closure Vision

The current vision for closure for Kolomela Mine is:

"To relinquish the mining lease and assets cost-effectively, in line with relevant legislative requirements and ensuring that the Kolomela mine Area of Influence is left to be sustainable, safe, stable, and non-polluting by establishing feasible post closure land uses and supporting sustainable social performance objectives"[3]

8.4 Closure Targets, Principles and Objectives

The closure targets, principles and objectives have been defined in the existing Kolomela Mine Closure Plan, 2020. This report contains no deviation to these factors. Underpinned by the closure vision, Kolomela Mine aims to achieve the following closure targets:

- Mine closure should be efficient and cost effective.
- Mine closure should be conducted peacefully.
- Closure actions should ensure an ELU with positive socio-economic benefits and no long-term liabilities.

The closure targets, as set out above are supported by closure principles, which in turn is used to define specific physical, biophysical and social closure objectives. Table 8-1 defines the overreaching mine closure principles for Kolomela Mine.

Table 8-1: Mine Closure Principles (as per the existing Kolomela Closure Plan)

Closure Aspect	Closure Principle
Economic sustainability	The operational costs associated with post closure opportunities should have no reliance on mine provided funding in order to be sustainable. Where relevant, this excludes capital costs required for the initiation of potential opportunities.
Protection of biodiversity value	The post-closure landscape should ensure the protection of biodiversity value by driving Nett Positive Impact ("NPI") objectives. This aims to minimise degradation and maximise improvement of biodiversity indicators.
Socio-economic value creation	Long-term social performance objectives should be anchored around the Anglo American Sustainable Mining Plan (2018) objective of building thriving communities with better health, education and levels

[3] As per the Kolomela Mine Closure Plan, 2020

Closure Aspect	Closure Principle
	of employment, specifically achieving the associated objectives for education, livelihoods, and health & wellbeing: • Education: All children in host communities to have access to excellent education and training. • Health & Wellbeing: The Sustainable Development Goal (SDG) targets for health to be achieved in all host communities; and • Livelihoods: Shared, sustainable prosperity in host communities. The post closure landscape should aim to reduce community dependence on the Mine, facilitate/ promote employment opportunities and provide communities with access to services through the development of value chains and training

The mine closure principles are supported by the specific mine closure objectives as given below (as per the existing Kolomela Closure Plan):

- Identify and mitigate risk (Safety, Health, Environment and Social) to achieve legal compliance;
- Ensure that proposed post-closure land uses are sustainable and pose an acceptable level of risk to public health and safety;
- Restore the mining area to a condition consistent with the pre-determined post closure land use objectives;
- Develop and implement rehabilitation objectives, including the structural and ecological stability of landforms and associated pollution control (air, soils, groundwater and surface water);
- Ensure that post-closure remnants will conform to the concept of sustainability and the post-closure land use plan, with limited long-term liabilities;
- Ensure that rehabilitation work is based on sound reasoning and that rehabilitation execution occurs concurrent with mining activities, is of high quality and is sustainable into the predictable future;
- Ensure that social closure will contribute to local economic development and that socio-economic impacts will be considered and managed via continuous, inclusive (internal and external) stakeholder engagement;
- Manage all workforce transition processes in line with regulatory requirements and commitments to mitigate socio-economic impacts;

- Develop programmes throughout the remaining life of mine to enable municipalities, suppliers and stakeholders to manage social transition (External capacity development (municipal capacity development and support) will in the long-term assist the local municipality to provide basic services (Health & wellbeing) and create an environment that is conducive for investment and job creation by the private sector (Livelihoods)).
- Obtain agreement from relevant authorities regarding the extent of rehabilitation and achievement of closure / success criteria; and
- Facilitate the issuing of a closure certificate with achievable conditions by relevant authorities.

8.5 Timeframes of Final Decommissioning and Mine Closure

It's estimated that actions required to complete final decommissioning and rehabilitation of Kolomela Mine will be implemented over a period of approximately two years, assuming that concurrent rehabilitation will be done during LoM where possible. Once these actions have been completed, the operation should ensure an additional five-year post closure monitoring period for the area. This includes undertaking ongoing monitoring and implementing any required remedial actions (such as repairs of erosion, re-vegetation, surface, and groundwater monitoring etc) where required. The proposed five-year period is considered adequate for biological processes to demonstrate sustainability and stability. During this period sufficient data will also need to be collected to prove that the relinquishment criteria have been achieved and a closure certificate can be applied for.

8.6 Closure Cost Assumptions

Assumptions have been made during the preparation of the preferred closure actions applicable to the activities relevant to the Kolomela Mine Expansion Project. General assumptions and noted are given below a.

General Notes and Assumptions:

- The risk assessment undertaken is a quantitative assessment rather than qualitative and therefore only based on the information available at the time and interpretation of that information by the authors.
- Preferred alternatives have been costed for, but may be subject to change if feasibility cannot be proven.
- Kolomela Mine annually updated it financial liability for premature closure of the mine. Selected activities associated with the Kolomela Mine Expansion Project is

proposed to be constructed on areas that have previously been disturbed and is therefore already included in the mines' existing financial provision quantum. In these cases, to avoid double accounting, the reported quantum of financial provision for the Kolomela Mine Expansion Project discounted decommissioning and rehabilitation actions already provided for in the existing provision.

- All demolition rubble is considered General Waste as per the definition of Demolition waste in Category B of Schedule 3 of the NEMWA, as amended. Based on this classification this material can be incorporated into backfill during the closure of the declines, open cast areas and/or vertical shafts. No contaminated building rubble can be backfilled within the shafts. This material will be disposed of in suitable offsite licensed facilities.
- The top and sub-soils will have been stripped and stockpiled separately during operation. The soil stockpiles will also have been located as close as possible to the areas that will be rehabilitated.
- Rehabilitation of Mineral Residue Deposits:
    - Provision is made for the construction of the EF-3 WRD and the EF-4 and EF-5 WRD.
    - It is assumed that the natural angle of repose is 37 degrees; acceptable slope angles after reshaping is 18 degrees
    - No detailed dump design was available at the time of this assessment; cut to fill volumes for reshaping of WRD slopes were derived from a technical calculation to estimate the cubic meters (m^3) material to be dozed down over the entire length of the WRD perimeter, i.e., 88 m^3/m to be moved to reshape dump slopes from its 37-degree angle to the 18-degree closure criteria.
- Remaining pit voids and backfilled pit footprints:
    - The Leewufontein Pit, Kipbankfontein Pit and Kapstevel North Pit will be completely backfilled at LoM, according to the pit infill schedule.
    - The reported quantum provides for the rehabilitation of the backfilled pit footprints and additional provision required for construction of access control infrastructure (i.e., construction of an abandonment bund wall and trench) along the entire perimeter of the remaining pit void.

- Provision for access control at the Leeuwfontein Pit, Klipbankfontein Pit and Kapstevel North Pit is already provided for in the current Kolomela Mine Closure Quantum and has not been included in this assessment. The exclusion prevented double accounting.

- All general rehabilitation will involve the following:
  - General clean-up of the affected area.
  - Appropriate contouring will be done to predetermined final topography and drainage requirements as per design.
  - Growth medium of a minimum of 100 mm to 200 mm will be placed as the last layer of earthworks in any rehabilitation activity.
  - Once topsoil is replaced the soil will be ripped/tilled as required and fertilizer and/or organic matter as required will be incorporated before final seeding/planting of the area.
  - Seeding of the entire area will be undertaken and vegetation establishment will be supported by follow-up inspection and revegetation as required.
  - Post closure monitoring and maintenance will continue for a period of five years after operations cease. It is believed that this is the minimum likely to be required under current circumstances. However, it should be noted that ultimately the required period of monitoring would be subject to physical performance of the rehabilitation and the authorities' decisions.
- Construction of a new Photovoltaic Solar Facility:
  - All infrastructure will remain post-closure and integrated into proposed ELU.
  - Infrastructure to be transferred to third-party service provider.
  - Erection of security fencing around the perimeter of the activity to prevent unauthorised access post mine closure is included in project construction cost and has not been provided for at mine closure.
- Construction of a Waste Tyre Management Facility:
  - All surface infrastructure will be removed.
  - Waste tyres and will be removed and transported to authorised management sites.
  - Rehabilitation of the disturbed footprint area will be implemented.

- Closure water quality compliance criteria (surface and groundwater) will be governed by the Water Use Licence ("WUL"). However, water qualities will also need be compared to the targets set in the Reserve/ special limits/ drinking water standards/ as set by DWS to determine if additional post-closure management measures are required.
- All hazardous and domestic waste will be transported to designated areas on site or offsite for disposal in licenced landfills where required or recycled.

9. POST-MINING LAND USE

9.1 Criteria to Identify End Land Use

The identified end land use ("ELU") is a function of the status of the land, feasibility of rehabilitation options that can be applied to certain infrastructure and feasible surrounding land uses. As part of the closure strategy development various objectives have been established to ensure the environment can achieve long term sustainability after successful rehabilitation of the areas. The post-closure land use needs to be informed by suitable consultation with stakeholders. Identification of the ELU stated in this plan has been aligned with the current Kolomela Closure Plan.

Considering the regional context, agricultural practices (specifically livestock grazing) have been identified as the preferred ELU for Kolomela Mine. It is also considered to be the ELU most likely to be sustainable in the long term. The activities associated with the proposed Kolomela Infrastructure Expansion Project will be aligned and integrated with the overreaching ELU plan proposed for Kolomela Mine and defined as:

- Reinstate the grazing potential of the land, over an area as large as possible;
- Reinstate the grazing potential on the mining areas (including the backfilled pits, WRDs, TIF, and infrastructure footprints, but control the grazing utilisation to protect the rehabilitated areas that will remain more sensitive and be more prone to erosion (e.g. steeper slopes) than the surrounding natural or other grazing areas;
- Allow grazing by game and/or livestock on sensitive biodiversity areas (as determined to be appropriate by a Biodiversity Management Plan ("BMP")), but control the grazing utilisation to protect the biodiversity; and
- Restrict access to remaining voids due to the safety risk; these areas will therefore have a zero to limited land use after closure (until feasible, novel land uses are identified in the future).

An ELU map has been developed for the activities related to the Kolomela Mine Expansion Project, considering the above criteria, preferred alternatives selected in section 6 and objectives set in Section 8.4, (refer to Figure 9-1). The ELU map only highlights the desired ELU for the activities associated with the Expansion Project. It is however recommended to integrate the new activities into the overall Kolomela Mine ELU plan.

9.2 End Land Use

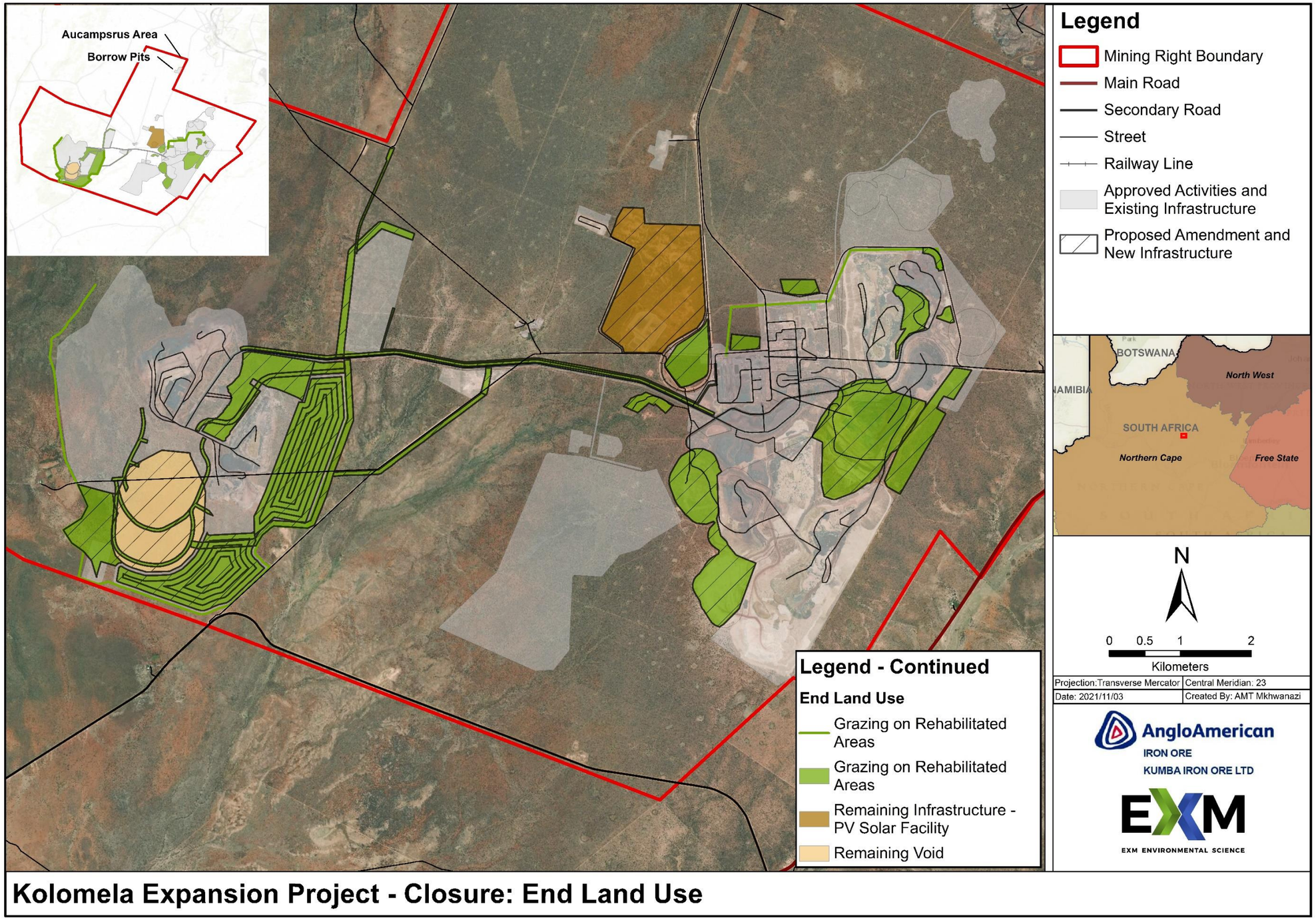


Figure 9-1: End Land Use Plan for the Kolomela Mine Expansion Project

10. CLOSURE CRITERIA AND CLOSURE ACTIONS

Closure criteria are proposed actions that would need to be implemented by the mine at closure to mitigate environmental risks and negative environmental impacts as a result of mining. The criteria can therefore be considered as a list of specific actions that form the basis of mine closure implementation and estimation of closure liability. These may include actions such as demolition of surface infrastructure, transfer and repurposing of selected infrastructure, access control, site specific earthworks, placement of growth medium, seeding, stormwater management and monitoring.

The closure criteria and closure actions described in Table 10-1 below relates only to the activities associated with the Kolomela Mine Expansion Project but have been aligned with those described for the entire Kolomela Mine in Annexure K[4] of the existing Kolomela Mine Closure Plan. These actions have been developed to align with the requirements of the objectives identified in section 8.4 and was also aligned with the strategies identified to mitigate potential risk during the risk assessment undertaken (Section 7). It should further be noted that numerous commitments have been made during various previous environmental approval processes relating to actions required during decommissioning and closure. The table below should therefore be read together with these commitments and as outlined in Annexure C of the existing Kolomela Mine Closure Plan[5].

[4] Kolomela MCP 2020_ANNEXURE K_Mine Closure Criteria FINAL DRAFT

[5] Kolomela MCP 2020_ANNEXURE C_Closure Conditions and Commitments_FINAL DRAFT

Table 10-1: Closure Criteria and Closure Actions

Nr.	Zone	Activity	Closure Criteria	Action Description
1	**Zone A & Zone C - Offices, Contractors and Support Infrastructure and Other Support Infrastructure**	Infrastructure to be transferred or decommissioned/ demolished, and the footprints rehabilitated for the establishment of vegetation.	Planning	Develop the required repurposing and infrastructure transfer strategy and initiate negotiations with potential receiving third-parties; Develop an asset register; develop demolition strategy
				Prior to commencement of demolition all salvageable equipment will be removed from site, according to an asset disposal and salvage strategy. Note, the closure cost calculation did not discount the closure liability with the value of salvable equipment.
			Decontamination	Equipment and other infrastructure that may cause pollution are to be drained of all lubricants, hydraulic oils, fuels etc. and the hydrocarbons disposed of appropriately; Hydrocarbon contaminated areas to be Bio-remediated in situ where possible or treat contaminated material at on-site bio-remediation facility
			Decommissioning and Demolition	Dismantle/demolish surface infrastructure.
				Demolish and remove all concrete and brick structures to a depth of 500mm below ground level; dispose all clean and inert concrete and building rubble in one of the backfilled pits and cover with 500 mm compacted waste rock material (as fine as possible); disposed material to be above the final expected groundwater elevation; Break and remove all walkways and paved areas and dispose with other inert building rubble in open pit void;
				Remove all container and mobile buildings and transport off site for resale
			Earthworks	Re-shape and profile areas to ensure the area is free draining and stable. If required, implement additional erosion, sediment and stormwater controls to ensure medium-term protection until suitable establishment of vegetation cover is achieved.
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m; Cover with 200 mm soil from stockpiles or borrow pit.

Nr.	Zone	Activity	Closure Criteria	Action Description
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
2.1	**Zone D - Pits**	Provision for an area of relaxation and safety berms around remaining pits	Planning	Align the LoM plan and existing Kolomela Mine Closure Plan to include the rehabilitation of backfilled pit footprints
				Annually adjust the quantum of financial provision to reflect backfill progression, cost associated with rehabilitation of the backfilled footprint areas and reduced need for access control measures.
			Decommissioning and Demolition	Remove all container and mobile buildings and transport off site for resale
				Implement access control measures around remaining pit voids - Blast access ramps, excavate trenches or block with waste rock heaps across ramps to prevent easy access; Construct trench and abandonment bund 10 m outside Zone of Relaxation ("ZoR") - total distance from pit perimeter 120 m; Trench bottom width 2 m, side slopes 1:2 and 1:0.5; Abandonment bund height 2 m dumped at angle of repose of large waste rock boulders and rocks.
				Align trench and abandonment bund to divert clean storm water away from the pit where possible; Construct diversion berms and / or shallow channels upstream from trench and bund to reduce

Nr.	Zone	Activity	Closure Criteria	Action Description
				runoff reporting to trench – dependent on surrounding topography.
			Earthworks	Re-shape and profile areas to ensure the area is free draining and stable. If required, implement additional erosion, sediment and stormwater controls to ensure medium-term protection until suitable establishment of vegetation cover is achieved.
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m; Cover with 200 mm soil from stockpiles or borrow pit.
			Soil Amelioration and Revegetation	No action between the abandonment bund and pit perimeter; Establish thorny vegetation and less palatable species on abandonment bund and trench depending on quality of material; Control weeds and invader plant species
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
2.2		Rehabilitation of backfilled pit footprints.	Planning	Align the LoM plan and existing Kolomela Mine Closure Plan to include the rehabilitation of backfilled pit footprints
				Annually adjust the quantum of financial provision to reflect backfill progression, cost associated with rehabilitation of the backfilled footprint areas and reduced need for access control measures.
			Decommissioning and Demolition	Remove all container and mobile buildings and transport off site for resale
			Earthworks	Re-shape and profile areas to ensure the area is free draining and stable. If required, implement additional erosion, sediment and stormwater controls to ensure medium-term protection until suitable establishment of vegetation cover is achieved.
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m; Cover with 200 mm soil from stockpiles or borrow pit.

Nr.	Zone	Activity	Closure Criteria	Action Description
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
3.1	**Zone E - MRD's**	Rehabilitation of WRDs	Planning	Align the LoM plan and existing Kolomela Mine Closure Plan to include the rehabilitation of additional WRDs
				Annually adjust the quantum of financial provision to reflect liability increase associated with WRD construction and progression.
			Decommissioning and Demolition	Remove all container and mobile buildings and transport off site for resale
			Earthworks	Reshape all WRD slopes to a maximum of 18° with balanced cut and fill as far as possible; Limit slope lengths to 65 – 70 m after reshaping; Load and haul excess cut material and fill selected areas on the dumps and reshape to form the designed landform; Construct 9 m wide benches at 20 m lifts during reshaping (to be confirmed with storm water design);
				Construct storm water management measures - Contain rainfall and runoff on rehabilitated facilities, except for bottom slopes; Construct structures based on storm water plan (designed for 1:200-year return period); Shape the top areas to slope inwards or away from dump crests; Reshape or fill low laying top areas next to dump edges to drain away from edges; Construct crest walls with height 1 m, side slopes 1:3 and top width 500 mm; Construct

Nr.	Zone	Activity	Closure Criteria	Action Description
				paddock walls on top of facility to spread runoff and increase habitat diversity (based on storm water design after reshaping); Slope the benches inwards during reshaping to contain runoff, Construct cross berm walls on the benches at 50 m intervals; Construct contour walls on remaining slopes where benches could not be constructed and where the contour drains can discharge on the surrounding NGL.
				Cover reshaped slopes and top areas with 200 mm soil from stockpiles or borrow pits to form growth medium together with underlying material;
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m; Cover with 200 mm soil from stockpiles or borrow pit.
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
3.2		Rehabilitation of the Tierbult TIF	Planning	Align the LoM plan and existing Kolomela Mine Closure Plan to include the rehabilitation of additional TIF
				Annually adjust the quantum of financial provision to reflect liability increase associated with TIF construction and rehabilitation.
			Decommissioning and Demolition	Remove all container and mobile buildings and transport off site for resale

Nr.	Zone	Activity	Closure Criteria	Action Description
				Demolish and remove all structures, e.g. pump houses, pipes etc.
			Earthworks	Reshape outside slopes of embankment and divider embankment to maximum of 18° with balanced cut and fill as far as possible; Rip top area to alleviate compaction and mix soil with underlying material.
				Cover reshaped slopes with 200 mm soil from stockpiles or borrow pits to form growth medium together with underlying material;
				Cover top area with 600 mm coarse waste rock material to serve as pioneer layer and armouring to encapsulate fine silt;
				Rip covered slopes on contour at 500 mm depth and tine spacing of 1.1 m to alleviate compaction and mix cover layers with underlying material.
				Cover coarse armouring layer with 200 mm soil to form growth medium together with underlying material
				Rip top area to alleviate compaction and mix soil with underlying material.
				Construct storm water management measures - Contain rainfall and runoff on rehabilitated facilities, except for outside slopes; Construct structures based on storm water plan (designed for 1:200-year return period); Shape the top areas to slope inwards or away from dump crests; Reshape or fill low laying top areas next to dump edges to drain away from edges; Construct top paddock walls with cross walls at intervals of 100m maximum.
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;

Nr.	Zone	Activity	Closure Criteria	Action Description
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
4	**Zone F - Ore Stockpiles & Topsoil Stockpiles**	Rehabilitation of disturbed footprints	Planning	Annually adjust the quantum of financial provision to reflect additional areas of disturbance and cost associated with rehabilitation of these footprint areas.
			Decommissioning and Demolition	Remove all container and mobile buildings and transport off site for resale
			Earthworks	Re-shape and profile areas to ensure the area is free draining and stable. If required, implement additional erosion, sediment and stormwater controls to ensure medium-term protection until suitable establishment of vegetation cover is achieved.
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m; Cover with 200 mm soil from stockpiles or borrow pit.
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.
5	**Zone G - Water Related Infrastructure**	Decommissioning and demolition of infrastructure	Planning	Annually adjust the quantum of financial provision to reflect additional infrastructure and cost associated with decommissioning and rehabilitation of these footprint areas.

Nr.	Zone	Activity	Closure Criteria	Action Description
		and rehabilitation of disturbed footprints		Assess what infrastructure would potentially be required for management post-closure; Assess what infrastructure may have potential post-closure use to support the proposed ELU.
			Decommissioning and Demolition	Remove all infrastructure with no beneficial post-closure use. Retain selected infrastructure based on its post-closure ELU integration and manage in terms of a land management plan.
				Demolish and remove all structures, e.g. pump houses, as for other infrastructure areas; Dewater dam and use water for dust suppression or pump to open pit depending on water quality;
			Decontamination	Treat water and sludge in bio-remediation facility if contaminated with hydrocarbons; Remove HDPE liner and dispose at registered waste site;
			Earthworks	Reshape embankments inwards to fill dam basin as far as possible and cover remaining sediment; Import additional waste rock material to fill basin if cutting of embankment does not make the dam footprint free draining;
				Cover with 200 mm growth medium where dam basins were filled with coarse waste rock material; No additional growth medium required if material from embankments were sufficient to fill and cover the area.
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.

Nr.	Zone	Activity	Closure Criteria	Action Description
6	**Zone H - Overland & General Infrastructure**	Decommissioning and demolition of infrastructure and rehabilitation of disturbed footprints	Planning	Identify which roads are to remain and those to be removed – it is assumed at this stage that the main sealed access road will remain, as well as a connecting gravel road to the Kapstevel / Sunnyside area and smaller. All other gravel roads and haul roads are to be rehabilitated.
				Assess what roads would potentially be required for management post-closure and may have potential post-closure use to support the proposed ELU.
			Decommissioning and Demolition	Remove all infrastructure with no beneficial post-closure use. Retain selected infrastructure based on its post-closure ELU integration and manage in terms of a land management plan.
				Demolish and remove all structures, e.g. culverts chevrons etc.
			Earthworks	Reshape road surface, wind rows, safety berms and road shoulder to make roads free draining and to fit in with surrounding drainage pattern. Reshaping should allow water to be shed off the sides of the footprint areas to prevent ponding. If required, implement additional erosion, sediment and stormwater controls to ensure medium-term protection until suitable establishment of vegetation cover is achieved. Make cuttings through build-up sections to allow storm water to flow freely;
				Rip the area up to 500 mm depth, unless natural soil depth is less and limited by solid rock formations, at a tine spacing of 1.1 m.
				No additional growth medium required. It is assumed that sufficient volumes will be available on site to cover the area.
			Soil Amelioration and Revegetation	Ameliorate the growth medium (in situ soil and topsoil mixed during ripping) based on soil analysis of final mixture of growth medium;
				Seed the area with a mixture of local indigenous grass and tree seeds that are adapted to the area (Seed mix similar to that described in the existing Kolomela Mine Closure Plan – Annexure M); Apply follow-up fertiliser where specified or required; Control weeds and invader plant species;

Nr.	Zone	Activity	Closure Criteria	Action Description
			Care and Maintenance	Disturbed surface areas will need to establish suitable vegetation over. Care and maintenance for approximately 5 years post rehabilitation is required to confirm the area has become self-sustaining.

11. CLOSURE AND REHABILITATION SPATIAL PROGRESSION PLAN

The mine closure schedule needs to be linked to the financial provision estimate and forecast that is undertaken for each year of mining. The schedule should consider areas that become available for decommissioning and/or rehabilitation and costs should be provided to undertake such rehabilitation. Table 11-1 below presents a high-level schedule for closure of the activities associated with the Kolomela Mine Expansion Project. The proposed schedule should be included in the overall Kolomela Mine Closure Plan to ensure alignment with the current quantum of financial provision of Kolomela Mine. It should further be integrated during update of the overall Kolomela Mine Final Rehabilitation, Decommissioning and Mine Closure Plan.

Most closure activities will only be undertaken once mining ceases and therefore surface infrastructure will likely remain relatively consistent throughout LoM, only to be demolished and rehabilitated at mine closure in 2032. Decommission and rehabilitation is planned to be implemented over an estimated period of two years. Once these actions have been completed, the operation will ensure an additional five-year post closure monitoring (Care and maintenance) of the area.

During this time sufficient data will also need to be collected to prove that relinquishment criteria is achieved (as provided in Table 14-1 below).

Table 11-1: High-Level Spatial Progression Schedule for the Kolomela Mine Expansion Project

Area Decription*	Year			
	Construction Phase	Operational Phase	Decommisioing, Rehabilaiton and Mine Closure Phases	
	"Site Clearnace and Infrastructure Establishment"	*"Operational Infrastructure" & "Waste Stipping and Mining'*	*"Demolition & rehabilitation of the infrastructure" & "Backfilling of Pits"*	*"Care and maintenance"*
Zone A & Zone C – Offices, Contractors and Support Infrastructure and Other Support Infrastructure				
Photovoltaic Solar Facility	2023/24	2024 – 2032	NA	NA
Waste Tyre Management Facility	2023	2023 – 2032	2032	2032 - 2037
Kapstevel At-Pit Facility (Additional park-up and laydown)	2021/22	2022 – 2032	2032	2032 - 2037
Additional Park-up Area	2024	2024 – 2032	2032	2032 - 2037
New radio masts	2024	2024 – 2032	2032	2032 - 2037
Zone D – Pits				
Leeuwfontein Pit: Backfill, Area of relaxation and safety berms around pits	Currently active	LF North – 2021 LF South – 2029	2021 – 2030 (concurrent backfilling)	2031 - 2036
Klipbankfontein Pit: Backfill	Currently active	KB Central – 2023 KB South – 2026 KN West – 2028	2023 – 2029 (concurrent backfilling)	2030 - 2035
Kapstevel North Pit: Backfill	Currently active	2025	2025 – 2032	2032 - 2037
Amendment of the Kapstevel South Pit footprint area; Area of relaxation and safety berms around pits	2021/22	2032	2032 (Void to remain with Acces Control)	NA
Zone E – MRDs				
Construction of the Kapstevel Waste Rock Dump - East (EF-3)	2024 – 2025	2025 – 2032	2026 – 2032	2032 - 2037

Area Decription*	Year			
	Construction Phase	**Operational Phase**	**Decommisioing, Rehabilaiton and Mine Closure Phases**	
	"Site Clearnace and Infrastructure Establishment"	*"Operational Infrastructure" & "Waste Stipping and Mining'*	*"Demolition & rehabilitation of the infrastructure" & "Backfilling of Pits"*	*"Care and maintenance"*
Construction of the Kapstevel Waste Rock Dump - South (EF-4 & EF-5)	EF - 4: 2022 EF - 5: 2024	EF - 4: 2022 – 2030 EF - 5: 2024 – 2032	EF - 4: 2023 – 2032 EF - 5: 2025 – 2032	2032 - 2037
Development of new DMS tailings management infrastructure	2024	2024 – 2032	2032	2032 - 2037
Zone F – Ore Stockpiles, Topsoil Stockpiles & Borrow Pits				
Low Grade Ore Storage Area - Railway Loop	2022	2022 – 2032	2032	2032 - 2037
Low Grade Ore Storage Area - Old Borrow Pit	2023	2023 – 2032	2032	2032 - 2037
Low Grade Ore Storage Area - North of DSO	2021 - 2022	2022 – 2032	2032	2032 - 2037
Zone G – Water Related Infrastructure				
Tierbult DMS TIF Return Water Dam	2024	2024 – 2032	2032	2032 - 2037
Tierbult DMS Evaporation Dams/ Paddocks	2024	2024 – 2032	2032	2032 - 2037
Amendment of Kapstevel Stormwater management infrastructure	2025	2025 – 2032	2032	2032 - 2037
Zone H – Overland & General Infrastructure				
Amendment to the main Kapstevel haul road and Construction of New Haul Roads	2024/2025	2025 – 2032	2032	2032 - 2037
New Kapstevel At-Pit Facility Access Road	2021/22	2022 – 2032	2032	2032 - 2037
Amendment to the future Kapstevel DMS conveyor footprint	2026	2026 – 2032	2032	2032 - 2037
DMS Plant Conveyor and Storage Bunkers	2024	2024 – 2032	2032	2032 - 2037

12. THREATS AND OPPORTUNITIES ASSESSMENT LIST ASSOCIATED WITH THE PREFERRED CLOSURE OPTION

The assessment of the treats and opportunities with the preferred closure option selected for Kolomela Mine has taken into account the key biophysical, social and economic mine closure issues expected to occur. A focus has been to overcome and/or avoid threats, while exploiting opportunities and strengths during the closure planning process. This was guided by the overall closure vision and goal of determining the most viable and realistic post closure land use. The treats and opportunities are reflected in Table 12-1 below and needs to inform revisions of the plan.

Table 12-1: Treats and opportunities Closure Options

Aspect	Threat	Opportunity
Biophysical	• After rehabilitation of the area the land capabilities, habitat integrity and biodiversity are generally lower than pre-mining capacities. • The climatic condition of the mining area will make rehabilitation efforts challenging and may also limit long-term functioning of sites economically viable for farming operations. • Proliferation of alien and invasive species on rehabilitated area post-closure.	• High likelihood that productive agricultural activities can be undertaken on rehabilitated footprint areas (likely grazing/wilderness). • LoM in excess of 10 years with the potential of further extending LoM based on available resources and therefore provides enough time to investigate and pilot alternative closure options/actions. • Kolomela Mine implements concurrent rehabilitation of WRDs and backfilling of mined-out pits. This provides the mine with the opportunity to test and monitor its current rehabilitation initiatives to adapt where necessary and define the most effective measures during LoM. • Surface water and groundwater quality monitoring during the operational LoM to determine trends overtime and to monitor changes in water quality overtime to determine if the mine is impacting on water quality resources and site sensitive environments. Biomonitoring can also be continued over this period.
Socio-Economic	• Unrealistic terms of reference by municipality and or landowners regarding infrastructure transfers. • Dependency of local communities/ workforce/ companies due to limited alternative economic options/alternatives. • Mine closure will have a direct influence on livelihoods of surrounding community.	• Post closure re-use potential of surface infrastructure, including service infrastructure (water, power, etc.). • Kolomela Mine prioritise local procurement and has a well-established database and channels with local community and landowners. • A viable sustainable utilisation of land can be achieved through specialist investigation and analysing the feasibility of alternative closure options and potential business

Aspect	Threat	Opportunity
	• Risk of informal settlements being created and remaining post-closure due to influx of people looking for job opportunities to the area. • Illegal land occupation/vandalism/theft during the mining decommissioning period	transitioning to mitigate the potential job losses. • Collaborate with surrounding mines to ensure alignment of sustainable closure options. • Create alternative supporting economic activities to supplement mining operations during LoM to ensure impact of mine closure on economic opportunities are offset once mining ceases. • SLP has already been approved and should support operations to alleviate the post closure economic landscape of the area.

13. ORGANISATION CAPACITY TO IMPLEMENT THE CLOSURE PLAN

13.1 Organisational Structure

Anglo American plc currently owns 63% of Kumba Iron Ore. Kumba Iron Ore in turn owned 74% of the Sishen Iron Ore Company that operates the Kolomela Mine.

The organisation of Kolomela Mine generally consists of the following main departments, namely:

- Engineering Department,
- Mining Department,
- Plant Operation Department,
- Finance and Admin Department,
- Human Resources Department, and
- Safety, Health, and Environment Department (SHE)

The responsibility for implementation of the commitments made in this plan is delegated to Environmental Management Section to ensure that the document is developed, communicated to relevant parties, maintained, implemented and updated at regular interval or when needed. The organisational structure for Environmental Management at Kolomela Mine is set out in Figure 13-1.

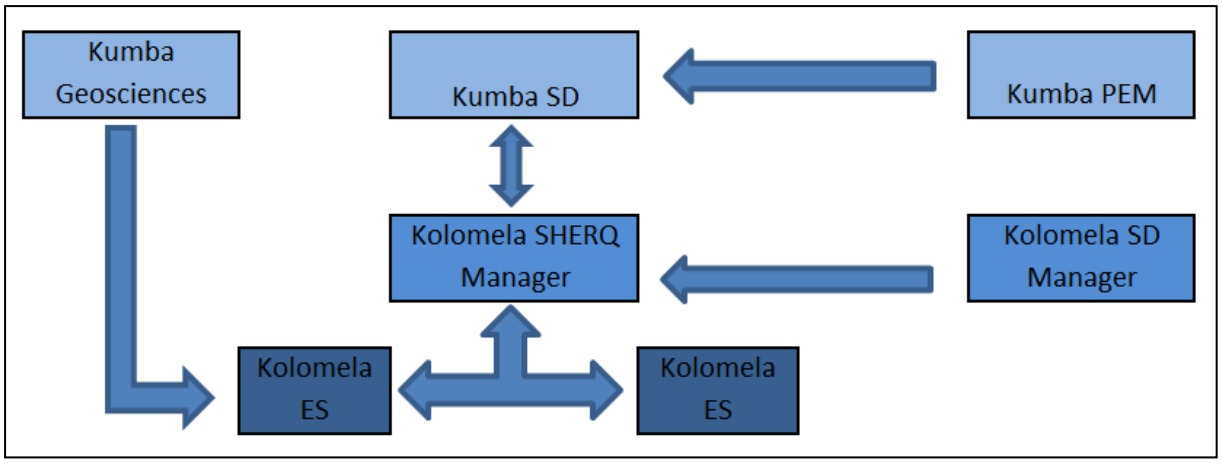


Figure 13-1: Organisational Structure

14. RELINQUISHMENT CRITERIA

Section 10 of this plan identified the various closure actions that needed to be undertaken once the activities ceased. Relinquishment criteria for the activities associate with the Kolomela Mine Expansion Project has been aligned to the Mine Closure Success Criteria that has been developed for Kolomela Mine (Annexure L of the Kolomela Mine Closure Plan, 2020). Measurable success criteria will ensure the effectiveness of the rehabilitation actions and sustainability of the end land use. Achieving the criteria will enable SIOC to legally relinquish responsibility for the activities once mining ceases. Table 14-1 details the relinquishment criteria and includes the achievement indicators for each aspect. It further provides detail on specific reporting to satisfy legislative requirements. The sites would have to be individually assessed against the relinquishment criteria to ensure each site achieves its proposed end land use successfully.

Table 14-1: Relinquishment criteria for the Kolomela Mine Expansion Project

Aspect	Relinquishment Criteria	Indicators	Reporting requirement
Air Quality	National Environmental Management: Air Quality (Act 39 of 2004): Compliance to national air quality standards.	Air quality measurement records (Dust fallout).	Monitoring report
Biodiversity	Sustainable indigenous vegetation establishment. No alien and invasive vegetation proliferation exist.	Species composition and cover.	Monitoring report
Soil, Land, Capability and Land Use	Grazing land capability and productivity to be confirmed. Required species composition to also be confirmed.	Registered qualified scientist to sign-off rehabilitation with the Regulator	Rehabilitation status report
Groundwater	Groundwater quality must comply with qualities stipulated in applicable	Measuring groundwater quality	Monitoring report

Aspect	Relinquishment Criteria	Indicators	Reporting requirement
	authorisations and applicable legislative standards.	and quantity trends over time.	
Surface Water	Surface water qualities must comply with qualities stipulated in applicable authorisations and applicable legislative standards. The rehabilitated areas should conform to design.	Measuring surface water quality and flow trends over time.	Monitoring report Audit report
Social	Regulator and other stakeholders agree rehabilitation has been implemented successfully and the desired end land-use is achieved.	Issuance of Closure Certificate	Final Performance Assessment
Visual	The overall aesthetic appearance must be re-instated to acceptable levels to mirror prior landscape. Rehabilitated areas should re-establish natural vegetation to ensure area is aesthetically pleasing.	Scenic quality determination against baseline prior mining environment.	Visual Assessment Study
Safety	Ensure final landform is stable, non-polluting, and safe for animals and humans.	Registered engineer to sign-off safety of rehabilitated areas.	Engineering safety report

15. CLOSURE COSTING

15.1 Relationship between Concurrent Rehabilitation and the Quantum

It is well documented that the lack of concurrent rehabilitation and clear incentives to rehabilitate leads to inflated long-term liability and more significant environmental risks. In general, environmental liability increase progressively during operations until closure, usually showing an increasing liability trend over LoM. This is particularly significant for opencast mining operations, if no concurrent rehabilitation is undertaken. The link between the application of concurrent rehabilitation and the need for closure rehabilitation is clear – where possible, undertaking concurrent rehabilitation is one of the best ways to ensure that closure rehabilitation requirements and costs are minimised.

Progressive closure results in a clear reduction in the financial assurance/provisions required for final rehabilitation, decommissioning and closure. Kolomela Mine must adopt the principle of "*the earlier the better*" to rehabilitation which can substantially reduce future risks associated with closure of the Mine. Concurrent rehabilitation is undertaken during the operational phase where possible, particularly aimed at backfilling open pits using material from adjacent actively mined pits and rehabilitating WRDs when deposition has been completed. There are limited opportunities for the decommissioning and closure of surface infrastructure, as most surface infrastructure play a supporting role and will remain throughout LoM. Concurrent rehabilitation is therefore limited to disturbed footprints that will not be used in future mining initiatives.

15.2 Closure Costing Methodology

The quantum of financial provision for each of the activities associated with the Kolomela Mine Expansion Project has been estimated based on available information, mine closure objectives and closure criteria, as stated in this plan and aligned to the existing Kolomela Mine Closure Plan. The basis of the methodology complies with the requirements detailed in the MPRDA Regulations, specifically 53 and 54, as well regulation 6 of the NEMA Financial Provision Regulations, 2015. These regulations prescribe the required minimum content as follows: "*a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required*." The regulation further outlines that closure cost estimation must include the following:

1. An explanation of the closure cost methodology.
2. Auditable calculations of costs per activity or infrastructure.
3. Cost assumptions.

Cognisance has also been given to the Guidelines for Evaluation of the Quantum for Closure Related Financial Provision for a Mine issued by DMRE (January 2005). The aim is however to align with the NEMA Financial Provision Regulations to ensure future compliance.

The costing notes, assumptions, and limitation applicable to this financial liability estimate is defined and provided in the detailed cost model and supported by Section 8.6.

15.3 Bill of Quantities Development

The bill of quantities ("BOQ") used to develop the decommissioning and rehabilitation cost was developed in Microsoft Excel. The area under investigation included all new activities and proposed footprint expansions associated with the Kolomela Mine Expansion Project (refer to Annexure B1). Existing and approved activities undertaken at Kolomela Mine were excluded from this assessment and are dealt with separately as part of the annual evaluation of financial liability for Kolomela Mine.

The existing Kolomela Mine Closure Plan and closure cost model categorised operational areas into "Zones" according to the specific activities undertaken (see Table 15-1) in these zones. The BOQ for the expansion project used the same reference system to align with the existing Kolomela Mine closure cost model and allow for seamless integration into the overall Kolomela Mine closure cost model with future updates of the financial liability estimates.

Table 15-1: Operational Zones of Kolomela Mine

Zone	Description
A	Offices, Contractors & Support
B	Plant
C	Other Onsite Infrastructure
D	Pits
E	MRD's
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits
G	Water Related Infrastructure
H	Overland & General
I	Offsite Infrastructure

15.3.1 Zone A – Offices, Contractors and Support Infrastructure

The infrastructure components of the Kolomela Mine fall within Zone A and the existing BOQ referencing system for Zone A runs from A1 through to A66, with A66 providing for the rehabilitation of disturbed footprints. It is recommended that the new surface infrastructure are added to Zone A starting with A67 through A68. Additional footprint

rehabilitation requirements are to be added to A66. See Table 15-2 and Annexure B2 for reference.

Table 15-2: Zone A - Offices, Contractors and Support Infrastructure

Reference No.	Activity	New/ Amendment
A66	General Rehabilitation	New
A67	Photovoltaic Solar Facility	New
A68	Waste Tyre Management Facility	New

15.3.2 Zone C – Other Surface Infrastructure

Similarly, other surface infrastructure falls within Zone C, starting with C1 through C18. It is recommended to add the new activities starting with C19 through C21 and expansion of the approved Kapstevel At-Pit Facility to the existing C13. See Table 15-3 and Annexure B3 for reference.

Table 15-3: Zone C – Other Surface Infrastructure

Reference No.	Activity	New/ Amendment
C13	Kapstevel At-Pit Facility (Additional park-up and laydown)	Amendment
C19	Kapstevel South Park-up Area	New
C20	Kapstevel North & Leeuwfontein Pit Park-up Areas	New
C21	New radio masts	New

15.3.3 Zone D and Zone E – Pits and Mineral Residue Deposits

The mining components, including pits and mineral residue deposits ("MRDs"), fall within Zone D and Zone E respectively. The existing and approved pits are reference from D1 through D7 and it is recommended to amend the existing BOQ for D1 through D4 by updating the premature and final closure estimates according to the proposed amendments. Existing and approved MRDs run from E1 through E6. It is recommended that the new activities are added to Zone E starting with E7 through E9. See Table 15-4 and Table 15-5, as well as Annexure B4 and Annexure B5 for reference.

Table 15-4: Zone D - Pits

Reference No.	Activity	New/ Amendment
D1	Leeuwfontein Pit: Backfill	Amendment
D2	Klipbankfontein Pit: Backfill	Amendment

Reference No.	Activity	New/ Amendment
D3	Kapstevel North Pit: Backfill	Amendment
D4	Amendment of the Kapstevel South Pit footprint area; Area of relaxation and safety berms around pits	Amendment

Table 15-5: Zone E - Mineral Residue Deposits

Reference No.	Activity	New/ Amendment
E7	Construction of the Kapstevel Waste Rock Dump - East (EF-3)	New
E8	Construction of the Kapstevel Waste Rock Dump - South (EF-4 & EF-5)	New
E9	Development of new DMS tailings management infrastructure	New

15.3.4 Zone F – Ore Stockpiles, Topsoil Stockpiles & Borrow Pits

Ore Stockpiles, Topsoil Stockpiles & Borrow Pits are provided for within Zone F. The existing BOQ runs from F1 through F37. New footprint areas should be added to Zone F starting with F38 through F40. See Table 15-6 and Annexure B6 for reference.

Table 15-6: Zone F – Ore Stockpiles, Topsoil Stockpiles & Borrow Pits

Reference No.	Activity	New/ Amendment
F38	Low Grade Ore Storage Area - Railway Loop	New
F39	Low Grade Ore Storage Area - Old Borrow Pit	New
F40	Low Grade Ore Storage Area - North of DSO	New

15.3.5 Zone G – Water Related Infrastructure

Water Related Infrastructure are provided for within Zone G, starting with G1 through G13. It is recommended to add new infrastructure starting with G14 thorough G16 as indicated in Table 15-7 and Annexure B7 below.

Table 15-7: Zone G – Water Related Infrastructure

Reference No.	Activity	New/ Amendment
G14	Tierbult DMS TIF Return Water Dam	New
G15	Tierbult DMS Evaporation Dams/ Paddocks	New
G16	Amendment of Kapstevel Stormwater management infrastructure	Amendment

15.3.6 Zone H – Overland & General Infrastructure

Overland and General Infrastructure are provided for within Zone H, starting with H1 through G7. It is recommended to amend the existing BOQ for H1 and H6 by updating the premature and final closure estimates according to the proposed amendments and adding H8 as indicated in Table 15-8 and Annexure B8.

Table 15-8: Zone H – Overland & General Infrastructure

Reference No.	Activity	New/ Amendment
H1.1	Amendment to the main Kapstevel haul road;	Amendment
H1.2	New Kapstevel Haul Roads	New
H1.3	New Kapstevel At-Pit Facility Access Road	New
H6	Amendment to the future Kapstevel DMS conveyor footprint	Amendment
H8	DMS Plant Conveyor and Storage Bunkers	New

The Zones were further sub-divided into management areas, describing the specific activity which would need to be decommissioned and rehabilitated. The areas of disturbance considered in the financial provision assessment was largely based on high-level information available at the time of the assessment and closure criteria as described for similar activities already undertaken at Kolomela Mine.

An itemised list of the required closure actions was included, which considered demolition estimates, estimated volumes associated with the required earthworks and measurements of the areas to be rehabilitated. Where the information was available the BOQ has also been detailed to include specific sub-infrastructure of buildings as well to improve the accuracy and completeness thereof.

In terms of the NEMA Financial Provision Regulations (GNR 1147, November 2015) cost estimations for operations that are more than 10 years from closure, but less than 30 years need to have an accuracy of 70 percent. The accuracy level of the costing should therefore progressively improve moving towards final rehabilitation, decommissioning of the proposed activities and Kolomela Mine as a whole.

15.4 Development of the Quantum

The quantum is a function of the quantity of a specific structure and cost associated with the demolition and rehabilitation thereof. The quantum has been developed using Microsoft Excel as a database and equation tool. It provides an estimation of the liability associated with the Kolomela Mine Expansion Project to plan and allow for premature

closure of the operations, i.e., expected liability to be realised within the 12-month period following approval. It also considers the scheduled closure of the operations over the remaining LOM (i.e., the year 2032). The scheduled closure cost estimate is important as it provides a high-level view of the projected variation in liability over LOM and associated changes that can be anticipated after implementation of concurrent rehabilitation and initiation of new mining projects.

15.5 Contractor Rates applied to the BOQ

A rate sheet has been developed aligned to the specific closure actions and infrastructure in the BOQ. The rates sheet has been developed using the following datasets:

1. DMRE guidelines (2005)
2. Tender and pay rates from contractors that are available
3. Rates from operations recently evaluated by EXM
4. Associations and industry oversight entities average rate sheets

EXM revises its rates sheets annually using the above data sets. In addition, it considers actual rates where concurrent rehabilitation has taken place at a specific operation. Where rates are carried over from a previous year, 12 months, and where no current rate can be acquired the previous rate is inflated by the annual Building Cost Index ("BCI") as calculated by the Bureau for Economic Research ("BER") of the preceding years which considers competitiveness of tenders or industry role players. The actual demolition cost will be sensitive to the resale value of the plant and the value of the scrap material at that time. As this is uncertain, any benefit from this source is normally excluded from the cost estimate; however, the benefit has a real value and has also been tested in industry.

15.6 Financial Provision Estimate

The financial liability quantum defines both the final (scheduled) and premature (unscheduled) closure estimates for the Kolomela Mine Expansion Project. The quantum includes additional allowances for contingencies at 15% and Preliminary and General ("P&G's") allowance for contractors at 15%. In accordance with the requirements of the NEMA Financial Provision Regulations, the reported quantum of financial lability is not discounted against the potential salvage value of any demolished infrastructure, even though there may be possible re-sale value associated with it. The detailed BOQ and closure cost model is given as Appendix C with associated layout plans given in Appendix B.

15.6.1 Premature Closure – New Activities and Proposed Amendments

Premature closure (unscheduled) cost generally represents the liability, should the mine close and all decommissioning and rehabilitation actions need to be undertaken immediately. The reported premature closure cost for the proposed new activities and amendment of existing activities reflects the liability expected to be realised within the 12-month period following approval. The quantum therefore only considered activities expected to commence within the 12 months following approval. The premature closure liability is estimated at **R23 788 218,21 (excl. VAT)**. The results of the assessment for premature closure liability are summarised in Table 15-9 with a detailed breakdown of decommissioning and rehabilitation costs given in Table 15-10 and Figure 15-1.

Table 15-9: Financial Provision for Premature Closure Liability

	Project	**EX00012_KLM Infrastructure Expansion Project**
	Date	04-Nov-21
	Assessor	Renier Ellis
	Reviewer	Roelof Letter
	Document Version	Draft Rev02 V2
		Estimated Quantum of Financial Liability (12 months)
Zone	**Operation**	**Premature Closure Cost (ZAR)**
A	Offices, Contractors & Support	R0,00
B	Plant	R0,00
C	Other Onsite Infrastructure	R4 894 801,87
D	Pits	R6 572 531,03
E	MRD's	R4 190 663,82
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	R1 052 742,33
G	Water Related Infrastructure	R0,00
H	Overland & General	R1 587 890,34
I	Offsite Infrastructure	
Sub Total		R18 298 629,39
Contingency @ 15%		R2 744 794,41
P&Gs @ 15%		R2 744 794,41
Total		**R23 788 218,21**

Table 15-10: Premature Closure Cost - Decommissioning and Rehabilitation

PROJECT:	EX00012_KLM Infrastructure Expansion Project	REVISION:	Draft Rev02 V2	
YEAR:	FY 2021	DATE:	04-Nov-21	
Summary Premature Closure, 2021				
Zone	**Operational Zones**	**Decommissioning and Demolition**	**Rehabilitation and Restoration**	**Total Unscheduled Liability (Excl. Cont.)**
A	Offices, Contractors & Support	R0,00	R0,00	R0,00
B	Plant	R0,00	R0,00	R0,00
C	Other Onsite Infrastructure	R0,00	R4 894 801,87	R4 894 801,87
D	Pits	R0,00	R6 572 531,03	R6 572 531,03
E	MRD's	R0,00	R4 190 663,82	R4 190 663,82
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	R0,00	R1 052 742,33	R1 052 742,33
G	Water Related Infrastructure	R0,00	R0,00	R0,00
H	Overland & General	R0,00	R1 587 890,34	R1 587 890,34
	Total	**R0,00**	**R18 298 629,39**	**R18 298 629,39**

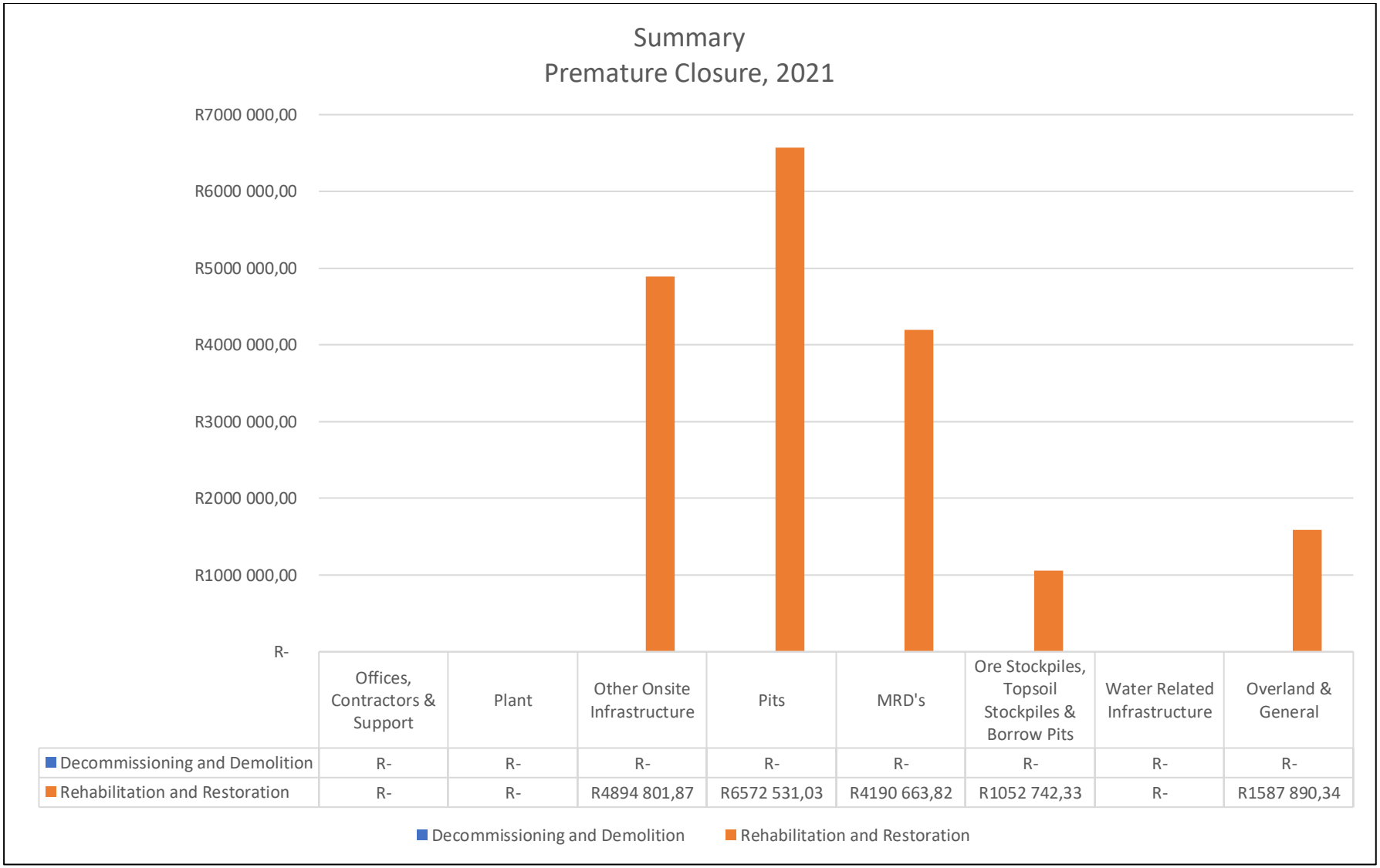


Figure 15-1: Premature Closure Cost - Decommissioning and Rehabilitation

15.6.2 Final Closure – New Activities and Proposed Amendments

The Final closure (Scheduled) cost considers a planned mine closure event according to the overall mine plan. The LoM scenario for closure, referenced in this final cost assessment, is based on the Resource Development Plan and the 2020 LOM Plan as reflected in the Project Charter for the Kapstevel South development (Anglo American, March 2019). The current the LOM projection stands at 2032. Scheduled closure of operations therefore considered the preliminary project schedule as given earlier in Table 3-3.

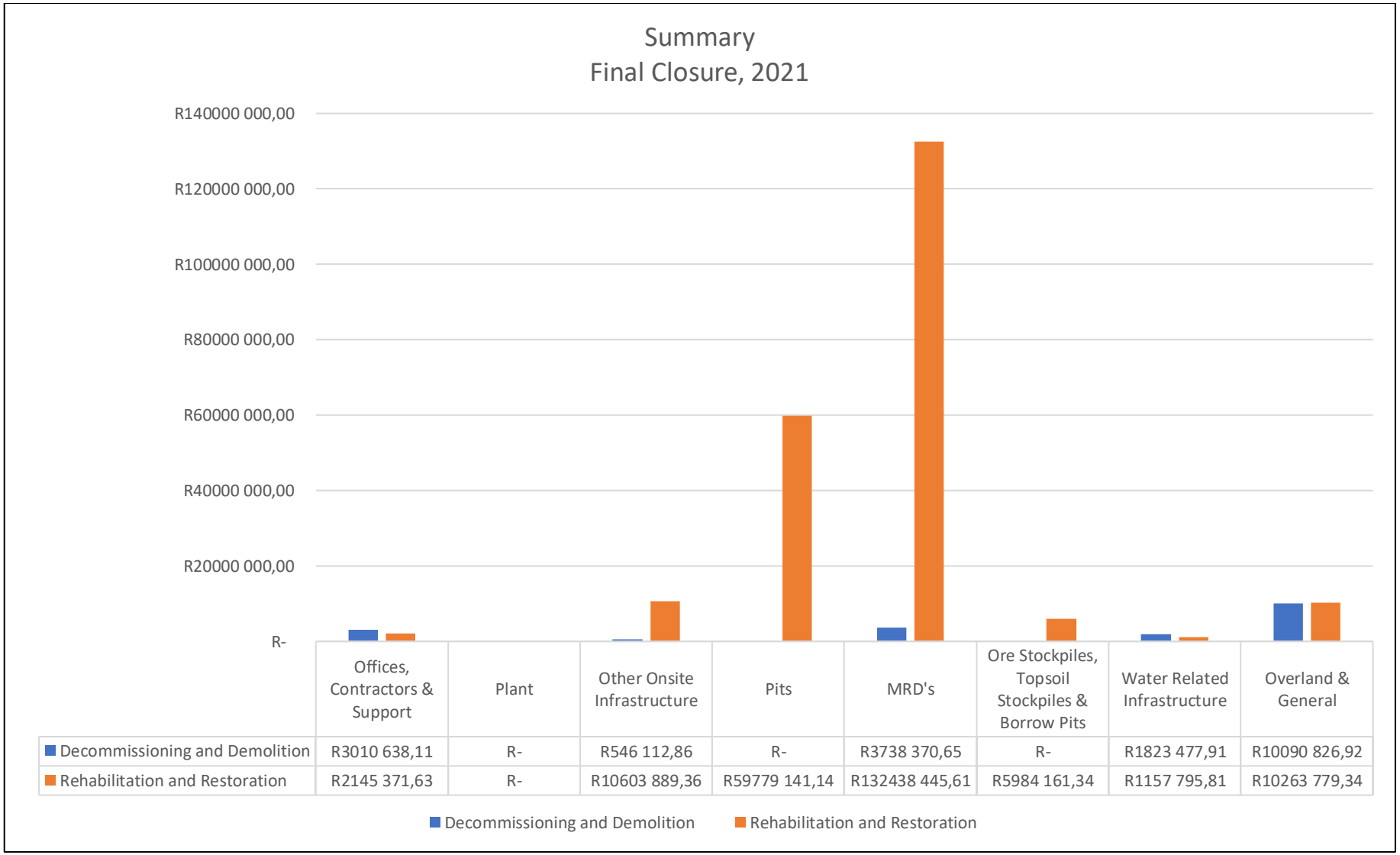
The final closure cost assessment shows a projected increase over LOM with closure liability estimated at **R314 056 613,88 (excl. VAT)** in the year 2032. It assumes successful implementation of concurrent rehabilitation of disturbed areas during LOM, backfill progression and the decommissioning of mining operations at the end of their respective planned life. The results of the assessment for final closure liability are summarised in Table 15-11 with a detailed breakdown of decommissioning and rehabilitation costs given in Table 15-12 and Figure 15-1. A high-level LOM liability schedule is provided in Figure 15-3

Table 15-11: Financial Provision for Final Closure Liability

	Project	**EX00012_KLM Infrastructure Expansion Project**
	Date	04-Nov-21
	Assessor	Renier Ellis
	Reviewer	Roelof Letter
	Document Version	Draft Rev02 V2
		Estimated Quantum of Financial Liability (LoM)
Zone	**Operation**	LoM Closure Cost (ZAR)
A	Offices, Contractors & Support	R5 156 009,74
B	Plant	R-
C	Other Onsite Infrastructure	R11 150 002,22
D	Pits	R59 779 141,14
E	MRD's	R136 176 816,26
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	R5 984 161,34
G	Water Related Infrastructure	R2 981 273,72
H	Overland & General	R20 354 606,26
I	Offsite Infrastructure	
Sub Total		R241 582 010,68
Contingency @ 15%		R36 237 301,60
P&Gs @ 15%		R36 237 301,60
Total		**R314 056 613,88**

Table 15-12: Final Closure Cost - Decommissioning and Rehabilitation

PROJECT:	EX00012_KLM Infrastructure Expansion Project	REVISION:	Draft Rev02 V2	
YEAR:	FY 2021	DATE:	04-Nov-21	
Summary Final Closure, 2032				
Zone	**Operational Zones**	**Decommissioning and Demolition**	**Rehabilitation and Restoration**	**Total Unscheduled Liability (Excl. Cont.)**
A	Offices, Contractors & Support	R3 010 638,11	R2 145 371,63	R5 156 009,74
B	Plant	R0,00	R0,00	R0,00
C	Other Onsite Infrastructure	R546 112,86	R10 603 889,36	R11 150 002,22
D	Pits	R0,00	R59 779 141,14	R59 779 141,14
E	MRD's	R3 738 370,65	R132 438 445,61	R136 176 816,26
F	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	R0,00	R5 984 161,34	R5 984 161,34
G	Water Related Infrastructure	R1 823 477,91	R1 157 795,81	R2 981 273,72
H	Overland & General	R10 090 826,92	R10 263 779,34	R20 354 606,26
	Total	**R19 209 426,45**	**R222 372 584,22**	**R241 582 010,68**



	Offices, Contractors & Support	Plant	Other Onsite Infrastructure	Pits	MRD's	Ore Stockpiles, Topsoil Stockpiles & Borrow Pits	Water Related Infrastructure	Overland & General
Decommissioning and Demolition	R3010 638,11	R-	R546 112,86	R-	R3738 370,65	R-	R1823 477,91	R10090 826,92
Rehabilitation and Restoration	R2145 371,63	R-	R10603 889,36	R59779 141,14	R132438 445,61	R5984 161,34	R1157 795,81	R10263 779,34

Figure 15-2: Final Closure Cost - Decommissioning and Rehabilitation

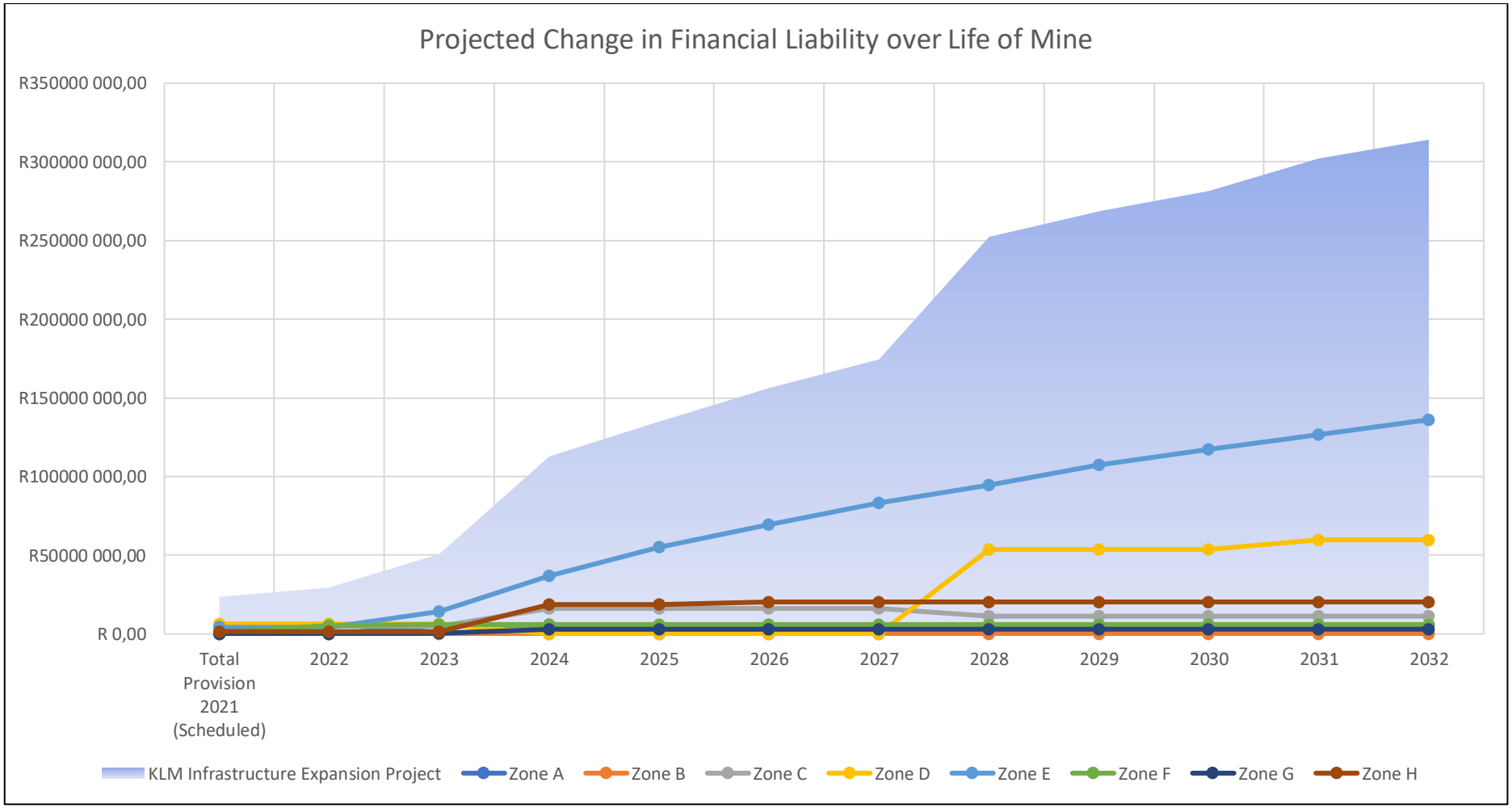


Figure 15-3: LOM Closure Liability Projection for the Kolomela Mine Expansion Project

16. MONITORING, AUDITING AND REPORTING REQUIREMENTS

16.1 Auditing Requirements

External Environmental Compliance Audits is compiled and submitted in accordance with legislative requirements/timeframes (as applicable at the time) including:

(1) Regulation 34 of the EIA Regulations (GN. 982 of 4 December 2014).

(2) Regulation 55 of the MPRDA regulation (GN R 827 of 2004, as amended)

There are now three sets of reviews to which the Kolomela Mine closure plan must be subjected to on an annual basis. It is essential that the proposed project be aligned directly with requirements for the entire Kolomela Mine and that the proposed activities not be evaluated in isolation. The audits required for the entire Kolomela Mine are as follows:

- Internal monitoring, auditing and reporting – a review undertaken by Kumba or appointed consultant to update the plan to account for changes to the environment and risk profile and to update the liability assessment to reflect liability at that point in time.

- External monitoring, auditing and reporting – a review undertaken by the financial auditors as part of the annual financial/accounting audit to determine that the plan is appropriate and that the quantum of the liability is included in the operations provisions.

- Legislated audits – these are the auditing requirements of the Act, Regulation, EIA/EMP and Environmental Authorisations. Pertinent aspects relating to closure, such as changes to the risk assessment, changes in closure options and changes in the quantum of the liability will be reported.

The proposed planning for these audits is presented in Table 16-1. It is currently envisaged that findings of the audit will be reported on within three months of the audit (likely date is included in the table).

Table 16-1: Proposed Auditing Schedule

Audit	Internal Responsibility	Frequency	Likely Date
Internal	Environmental Manger/ Closure Manger	Annual	Q3
External	Financial Manger	Annual	Q4
Legislated	Mine Manger	Annual	Q1 of following year

The findings from the various audits must be captured in the operations Environmental Management System ("EMS") and responsibilities, and timelines allocated to the rectification of the findings, as practical. Once addressed, these findings will be closed-out in a manner similar to the other operational findings captured in the EMS.

16.2 Monitoring Plan Related to Closure

Kolomela Mine is to conduct environmental monitoring in accordance with its Environmental Approvals until all closure related aspects are completed. This section does not address monitoring requirement post closure; however monitoring is required to prove that the relinquishment criteria is achieved. The monitoring requirements applicable to the closure phase is provided below:

- The biodiversity management plan that addresses impacts, mitigation, monitoring, management of offset, rehabilitation targets and alien and invasive irradiation must be implemented during decommissioning, rehabilitation and mine closure.
- Establishment of vegetation: Annual inspections of rehabilitated areas will be undertaken for the first 5 years post rehabilitation or until the area is self-sustaining and targets are reached. The required species density and composition will need to be measured using suitable field techniques to determine success of revegetation on rehabilitated areas. This would include the required re-vegetation poorly established rehabilitated areas; Re-seed bare patches as required; and apply additional fertiliser and/or organic matter, depending on the condition of the vegetation and the initial organic material application.
- Soil monitoring and management which should include a soil quality audit undertaken every second year; post-mining land capabilities must be assessed against predetermined capabilities; and soil, land use and land capability monitoring data must be kept secured, verified and accessible for reference by future landowners and regulators.
- Monitoring of erosion: Monitoring soil erosion assist in the identification of the extent of soil currently eroding on previously rehabilitated area. This will be required to be undertaken, twice a year, for a period of 5 years after decommissioning has been completed.
- Alien and invasive species monitoring: This must include previously rehabilitated areas at Kolomela Mine. An alien invasive plant species management plan will need to be compiled and control methods implemented, as required.
- Biomonitoring: To demonstrate that key floral and faunal habitats and species are sustainable and/ or improving. Implementation of the current biomonitoring

programme needs to continue, as well as monitoring of the aquatic health at key downstream and upstream sites (must be monitored (e.g. SASS5, etc.)).

- Surface water quality: Undertake surface water monitoring (5 years post-closure / or until trends have stabilised). This should include decant positions, if required.
- Groundwater monitoring: Undertake groundwater quality and quantity monitoring at approximately groundwater monitoring boreholes, ensuring that contaminant plumes are receding appropriately (according to agreed-upon abandonment criteria). Groundwater qualities needs be compared to the targets set in the Reserve/ special limits/ drinking water standards/ as set by DWS to determine if additional post-closure management measures are required.
- Subsidence: Monitor areas that have been infilled/backfilled and apply corrective measures as required. For this purpose, a reserve stockpile must be available.

Annual reports must be prepared where applicable to document the results of the monitoring during the closure and post-closure phases. These reports will provide important information required to manage the on-going closure activities, with the data and reports being used to:

- Provide recommendations for improving subsequent rehabilitation activities.
- Indicate where rehabilitation and closure activities have not been successful, requiring a potential change in design criteria.
- Provide information where care and maintenance are required during the post-closure period; and
- Indicate if relinquishment criteria have been achieved.

17. MOTIVATION FOR AMENDMENT OF THE PLAN BASED ON MONITORING

This report has been developed to support the environmental authorisation processes for the proposed activities associated with the Kolomela Mine Expansion Project. The report focused primarily on this project, however also ensured alignment with the existing closure planning undertaken for the Kolomela Mine. Once the required environmental approvals are obtained in terms of applicable environmental legislation for the project it is recommended that this report be integrated into the existing final rehabilitation, decommissioning and mine closure plan for the Kolomela Mine. This can be done during the subsequent annual revision and update. This would include the additional closure liability calculation reported in section 15.

18. CLOSING STATEMENT AND RECOMMENDATIONS

The primary objective of this plan is to support the environmental authorisation process being undertaken for the proposed activities associated with the Kolomela Mine Expansion Project. The document presents the decision-making authorities with Kolomela Mines' plan to decommission the activities associated with the proposed project and to rehabilitate the environment affected by undertaking the activities to a predetermined ELU whereupon their legal liability will be terminated/ relinquished. This can only be realised once it can be proven that rehabilitation has been undertaken successfully and that residual environmental impact can be adequately managed.

In addition to the legislative requirements of the NEMA Financial Provision Regulations, this plan has been developed to align with the existing Kolomela Mine Closure Plan and will serve as an appendix to that document. The closure vision, objectives, conceptual closure design, closure criteria and closure relinquishment criteria associated with the proposed activities has been aligned to the current commitments and obligations of Kolomela Mine and its current Closure Plan. It is therefore noted that this plan only relates, addresses, and reports on the additional environmental impacts and financial liability associated with the proposed new infrastructure and amendment of existing and/or approved activities.

The primary component of the closure plan is to implement the various management actions and closure criteria required to remove, demolish and reinstate the natural landscapes of the project affected areas. However, the plan also provided the required quantification of the additional closure liability relating to the project.

Based on the estimated closure costs, outlined in this document, as part of the proposed Kolomela Mine Expansion Project, additional premature closure liability has been estimated at **R23 788 218,21 (Excluding VAT)**. The reported quantum provides assurance for decommissioning and rehabilitation requirements expected to realise within the 12-month period following approval and authorisation. The final closure liability estimate provides an indication of how implementation of the various projects may affect the mines' closure liability over LOM. It is recommended to update the Kolomela Mine financial provision quantum on an annual basis and include the additional activities 12 month in advance to ensure sufficient provision for premature closure.

The holder would need to provide adequate financial assurance through a required financial instrument to provide for their decommissioning and closure liability cost relating to the proposed construction of the up and downcast ventilation shaft and associated infrastructure.

19. REFERENCES

Anglo American. 2020. Kolomela Mine Compliance Obligations Register - Update May2020(004)

Anglo American. 2019. Mine Closure Toolbox, Version3.

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Redkem & Uvuna Sustainability, 2020. Kolomela Mine Draft Closure Plan.

APPENDIX A – REQUIRED CONTENT OF A CLOSURE PLAN

APPENDIX B – SITE LAYOUT PLANS

APPENDIX B1 – Overall Site Layout Plan

APPENDIX B2 – Zone A

APPENDIX B3 – Zone C

APPENDIX B4 – Zone D

APPENDIX B5 – Zone E

APPENDIX B6 – Zone F

APPENDIX B7 – Zone G

APPENDIX B8 – Zone H

APPENDIX C – DETAILED BOQ AND CLOSURE COST MODEL

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