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**ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
AND  
ENVIRONMENTAL MANAGEMENT PROGRAMME  
REPORT**

**KOLOMELA MINE AMENDMENT:  
EXPANSION OF ACTIVITIES AT KOLOMELA MINE  
PART B**

**SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002.**

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**FILE REFERENCE NUMBER SAMRAD NC-00039-MR/102**



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**DOCUMENT INFORMATION DOCUMENT INFORMATION**

<b>Title</b>	ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT
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<b>Client</b>	Sishen Iron Ore Company (Pty) Ltd – Kolomela Mine
<b>Keywords</b>	amendment, expansion, environmental authorisation, waste licence
<b>Project Number</b>	755.19038.00006
<b>Report Number</b>	B
<b>Status</b>	Draft for PUBLIC review
<b>Issue Date</b>	2 September 2016

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# KOLOMELA MINE EXPANSION

## ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT PART B

### CONTENTS

<b>1</b>	<b>DETAILS OF THE EAP .....</b>	<b>1</b>
1.1	DETAILS OF THE EAP WHO PREPARED THE REPORT .....	1
1.2	EXPERTISE OF THE EAP .....	1
<b>2</b>	<b>DESCRIPTION OF THE APECTS OF THE ACTIVITY .....</b>	<b>1</b>
<b>3</b>	<b>COMPOSITE MAP .....</b>	<b>2</b>
<b>4</b>	<b>IMPACT MANAGEMENT OBJECTIVES.....</b>	<b>4</b>
4.1	CLOSURE OBJECTIVES.....	4
4.2	PROCESS FOR MANAGING ENVIRONMENTAL DAMAGE, POLLUTION, PUMPING AND TREATMENT OF EXTRANEIOUS WATER OR ECOLOGICAL DEGRADATION .....	4
4.3	POTENTIAL RISK OF ACID MINE DRAINAGE .....	5
4.4	VOLUMES AND RATE OF WATER USE REQUIRED FOR MINING.....	6
4.5	WATER USE LICENCE APPLICATION .....	6
<b>5</b>	<b>ENVIRONMENTAL MANAGEMENT PROGRAMME .....</b>	<b>7</b>
5.1	PLANNING AND DESIGN/PRE-CONSTRUCTION .....	7
5.2	CONSTRUCTION OF INFRASTRUCTURE .....	9
5.3	MINE OPERATIONS .....	11
5.4	DECOMMISSIONING AND CLOSURE.....	14
<b>6</b>	<b>FINANCIAL PROVISION .....</b>	<b>16</b>
6.1	CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED WITH THE BASELINE ENVIRONMENT .....	16
6.2	CONFIRMATION OF CONSULTATION OF CLOSURE OBJECTIVES WITH LANDOWNERS ..	16
6.3	REHABILITATION PLAN .....	16
6.4	EXPLAIN HOW THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES .....	16
6.5	QUANTUM OF FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT.....	16
6.6	CONFIRM THE FINANCIAL PROVISION WILL BE PROVIDED .....	17
<b>7</b>	<b>MECHANISIMS FOR MONITORING COMPLIANCE .....</b>	<b>17</b>
7.1	WATER RESOURCE MONITORING .....	17
7.2	AIR QUALITY MONITORING.....	18
7.3	NOISE MONITORING.....	18
7.4	BIODIVERSITY MONITORING.....	20
<b>8</b>	<b>SUBMISSION OF PERFORMANCE ASSESSMENTS.....</b>	<b>20</b>
<b>9</b>	<b>ENVIRONMENTAL AWARENESS PLAN.....</b>	<b>20</b>
<b>10</b>	<b>SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY .....</b>	<b>20</b>
<b>11</b>	<b>UNDERTAKING .....</b>	<b>21</b>

### LIST OF FIGURES

FIGURE 3.1: PROPOSED REVISED LAYOUT PLAN OF KOLOMELA MINE (EXISTING APPROVED LAYOUT SHOWN IN DARK BROWN) IN RELATION TO ENVIRONMENTAL SENSITIVITIES .....	3
FIGURE 7.1: RECOMMENDED ADDITIONAL SAMPLING LOCATIONS .....	19

**LIST OF TABLES**

TABLE 6.1: UPDATED PREMATURE AND FINAL (LOM) CLOSURE COSTS FOR PROPOSED KOLOMELA  
AMENDMENT (ALL VALUES EXCLUDE SALVAGE VALUES)..... 17

TABLE 5-1: ADDITIONAL SAMPLING LOCATIONS AND PARAMETERS ..... 18

## PART B

### DRAFT ENVIRONMENTAL MANGEMENT PROGRAMME REPORT

#### 1 DETAILS OF THE EAP

##### 1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

DETAILS	PROJECT MANAGER AND AUTHOR
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##### 1.2 EXPERTISE OF THE EAP

###### 1.2.1 QUALIFICATIONS OF THE EAP

Kerry Fairley

BSc Botany Honours (University of the Witwatersrand)

Registered as Professional Natural Scientist with the South African Council for Natural and Scientific Professionals (SACNASP) Registration Number: 400054/03

###### 1.2.2 SUMMARY OF THE EAPS' PAST EXPERIENCE

Kerry Fairley has over 16 years of experience in environmental impact assessment and management in the mining industry. Kerry has been involved in the compilation of numerous environmental impact assessment reports for both green fields mining projects as well as for expansions and amendment to existing mining operations in South Africa and as well as other African countries (Namibia, Malawi).

See Part A: Appendix A for proof of registration.

#### 2 DESCRIPTION OF THE APECTS OF THE ACTIVITY

**The requirement to describe the aspects of the activity that are covered by the draft environmental management programme are already included in PART A, Section 3, as required.**

Kolomela Mine intends increasing production at the mine from the current 9 Mtpa per annum to 13 Mtpa in 2016 and then to 16 Mtpa in 2018. This increased production will be supported by mining from additional pits: Kapstevl South Pit, Tierbult Pit and the Ploegfontein Pits. The incorporation of the additional pits will allow for the LOM to be extended by an additional 2 years until 2040.

Waste Rock Dumps (WRDs) will need to be expanded to accommodate the additional production. Three sites have also been identified for the incorporation of Dense Media Separation (DMS) into processing adding an additional 1-2 Mtpa processing capability. Minor changes to the existing DSO Processing Plant will allow for an increase in capacity to 12 Mtpa in 2015 and then 14 Mtpa in 2018.

Additional infrastructure required to support the accelerated mining includes new haul roads, workshops, refuelling area and a fatigue centre near the Kapstevl Pits (Kapstevl At Pit Facility) and also near the

Klipbankfontein Pit (Klipbankfontein At Pit Facility). A new sewage treatment works and explosives magazine as well as product bed stockpile area are also considered necessary to support the amendment.

Water extracted from pits and which cannot be used by the mine is exported via pipeline to the Vaal-Gamagara Water Supply Scheme, in agreement with Sedibeng Water and in accordance with the Water Use Licence conditions (Ref: 10/D73A/ABCGIJ/2774). However, Sedibeng Water is unable to manage all such water in accordance with the agreement. Kolomela Mine thus has undertaken to look at alternatives options for the management of the water. Environmental authorisation (Permit 16/2014 Ref: NC/BA/12/SIY/TSA/KOL/2013) has been given for Aquifer Recharge activities into the Groenwaterspruit to the east of the Kolomela Mining area. Aquifer Recharge into the Groenwaterspruit is also included in the Integrated Water Use Licence for the Mine (Licence No. 10/DT3A/ABCEGIJ/4125) of 13 March 2016. This application for amendment of activities at Kolomela Mine includes the provision for additional Aquifer Recharge into a tributary of the Soutloop River located to the west of the

Currently groundwater is abstracted at 1 950 m<sup>3</sup>/hr to allow for safe operation of the pits. It is proposed that the abstraction rates be increased by 2040 m<sup>3</sup>/hr to an average rate of 3990 m<sup>3</sup>/hr in order to accommodate the increased production from existing pits and the future development of the new pits at Kapstevel South and Ploegfontein. The increased dewatering will be achieved by increasing pumping rates at the existing boreholes as well as the drilling of 14 new boreholes around the Leeuwfontein and Klipbankfontein Pits. Additional pipelines (250-300mm in diameter) will be laid from the boreholes. The Integrated Water Use Licence is to be amended to accommodate the additional dewatering requirements.

### **3 COMPOSITE MAP**

**A map which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities showing how areas are to be avoided is provided as Figure 3.1.**

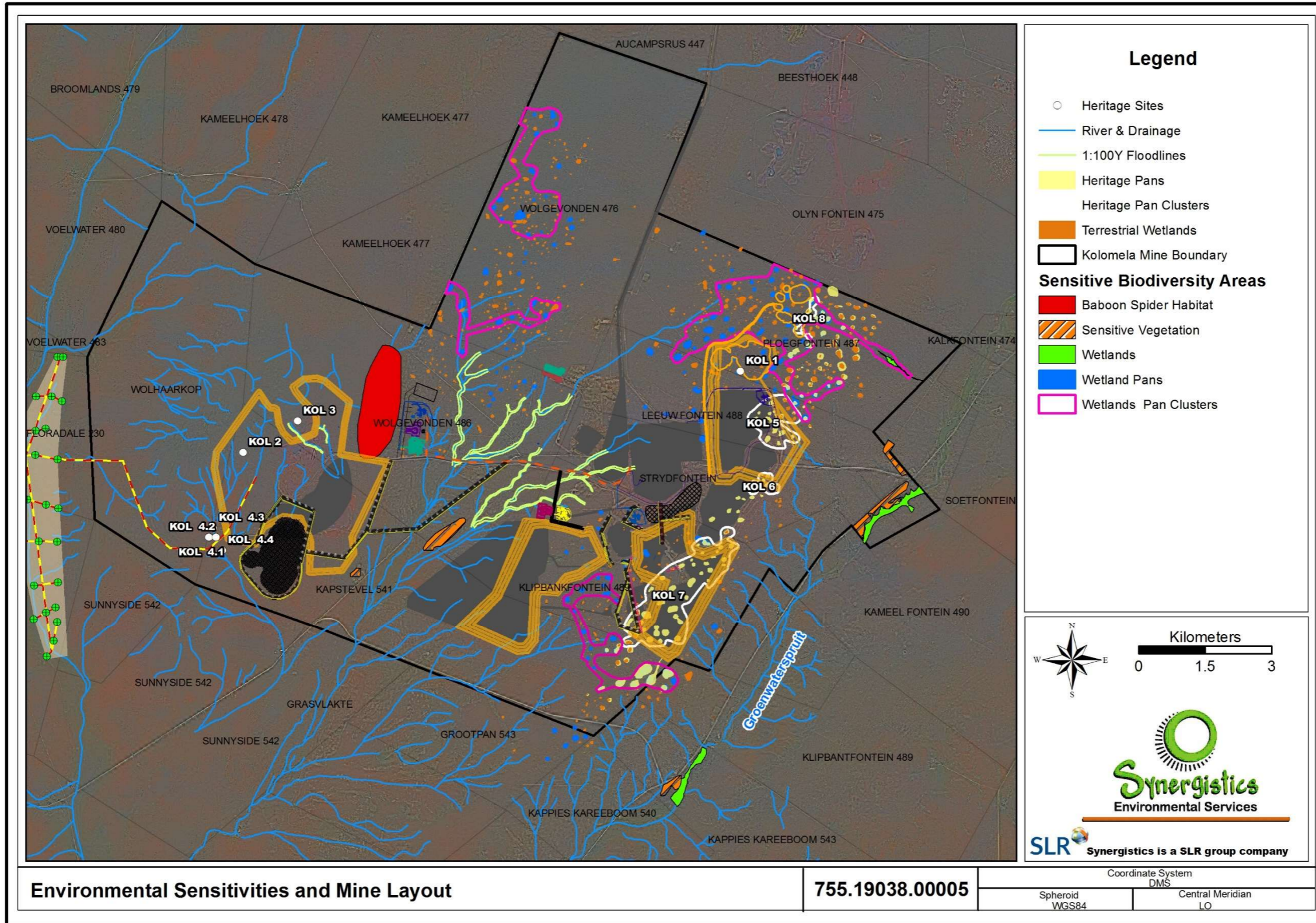


FIGURE 3.1: PROPOSED REVISED LAYOUT PLAN OF KOLOMELA MINE (EXISTING APPROVED LAYOUT SHOWN IN DARK BROWN) IN RELATION TO ENVIRONMENTAL SENSITIVITIES

## 4 IMPACT MANAGEMENT OBJECTIVES

### 4.1 CLOSURE OBJECTIVES

As per the requirements of the Kolomela Mine approved Environmental Management Programme (Synergistics, 2010). The Kolomela Mine will plan for sustainable closure by ensuring that every reasonable effort has been made to achieve rehabilitation closure objectives that will give effect to the following principles:

- Safety and health of people and animals are safeguarded from hazards resulting from the suspended mining operations.
- Environmental damage or residual environmental impacts are minimised to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of the land can be achieved.
- The physical and chemical stability of the remaining structures should be such that risk to the environment through naturally occurring forces is eliminated.
- Mine closure is achieved efficiently, cost effectively, and in compliance with the law.
- The social impacts resulting from mine closure are managed in such a way that establishment of a socially stable community in line with the principles of sustainable development is facilitated.

The rehabilitation objectives for closure are discussed further in Section 6.1 and the Site-Wide Operational Rehabilitation Strategy (Golder, 2016 in Part C -Report J).

The overall rehabilitation goal for Kolomela Mine (as indicated by Golder, 2016 in Part C- Report J) is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amendable to the local habitat types (e.g. Panveld, Sandveld and other) that is suitable for the sustaining of **game farming** as the next land use over the mine site, post closure.

### 4.2 PROCESS FOR MANAGING ENVIRONMENTAL DAMAGE, POLLUTION, PUMPING AND TREATMENT OF EXTRANEIOUS WATER OR ECOLOGICAL DEGRADATION

The Kolomela Rehabilitation Strategy is provided in Part C – Report J (Golder, 2016). This includes the detailed rehabilitation and management methodologies (see Section 8 of Report J) for:

- Mining areas
  - Waste Rock Dumps
  - Tailings Impound Facility
  - Open Pits
  - Borrow Pits
  - Disturbed Land to be rehabilitated once infrastructure is removed
- Non-mining areas including
  - Bush encroachment and alien vegetation control
  - Sensitive and protected species
  - Pans and wetlands



- Site wide water management
  - Catchment yield and integrity
  - Pan and wetland catchment protection
  - Aquifer recharge beneficial ecological use

#### **4.3 POTENTIAL RISK OF ACID MINE DRAINAGE**

##### **4.3.1 STEPS TAKEN TO INVESTIGATE, ASSESS, AND EVALUATE THE IMPACT OF ACID MINE DRAINAGE**

There is a negligible risk of acid mine drainage originating from waste streams at Kolomela Mine (see Part C - Report A). The wastes can be characterised as follows:

- Waste rock is almost entirely non-acid generating, and tailings and ore are entirely non-acid generating;
- Waste rock, tailings and ore will not undergo rapid oxidation, decomposition or spontaneous combustion;
- Leachate from the waste rock dumps and tailings is predicted to be neutral mine drainage with low metal content, even under conditions of maximum oxidation (NAG leach);
- All of the scenarios for the Waste Rock Dumps final profiles have low leachability risk for all parameters specified in terms of the *National Norms and Standards for the Assessment of Waste for Landfill Disposal* (GNR. 635 of 23 August 2013), as do the ore stockpiles and the Tailings Storage Facility (TSF): for all specified parameters the leachable concentration of the specified parameter in the waste is lower than the initial leachable concentration threshold (LC < LCT0); and
- The toxicity bioassay results based on 1:20 leachate extractions from sample from the waste rock dumps indicate a low potential for acute toxicity to be expressed in an aquatic environment should leaching of these waste samples take place.

##### **4.3.2 ENGINEERING/MINE DESIGN SOLUTIONS TO BE IMPLEMENTED TO AVOID OR REMEDY ACID MINE DRAINAGE**

Given the low geochemical, toxicological and waste risk profile of the mineral waste streams, and the low to minimal impact of the mine residue facilities on water resources and biodiversity, a Class C barrier system in terms of the *National Norms and Standards for Disposal of Waste to Landfill* (GNR. 636 of 23 August 2013) would not add value in terms of environmental protection (see Golder, 2016 in Part C -Report A).

Furthermore, given that the waste streams are not hazardous in terms of SANS 10234 and that the leachate from any of the mineral waste streams does not exceed any of the initial leachable concentration thresholds (LC < LCT0 thus the complete definition of Type 3 waste is **not** met), the application of a Class C barrier system, which is prescribed for Type 3 waste, is not justified. (see Golder, 2016 in Part C – Report A).

##### **4.3.3 MEASURES THAT WILL BE PUT IN PLACE TO REMEDY ANY RESIDUAL OR CUMULATIVE IMPACT THAT MAY RESULT FROM ACID MINE DRAINAGE**

Note considered necessary (see Golder, 2016 in Part C – Report A).

#### **4.4 VOLUMES AND RATE OF WATER USE REQUIRED FOR MINING**

No additional water is required to that which is already authorised under the existing Kolomela Mine Water Use Licence (Licence No. 1O/DT3A/ABCEGIJ/4125) of 13 March 2016. No amendments are required under Section 21(a) of the National Water Act (No. 36 of 1998).

#### **4.5 WATER USE LICENCE APPLICATION**

An application for an amendment to the existing Kolomela Water Use Licence (Licence No. 1O/DT3A/ABCEGIJ/4125) of 13 March 2016 will be made. The application includes the amendments to the existing Water Use Licence in terms of the following sections of the National Water Act (No. 36 of 1998).

- Section 21(b) – storing of water
- Section 21(c) – impeding or diverting the flow of water in a water resource
- Section 21(i) – altering the beds, banks, course or characteristics of a watercourse
- Section 21(g) – removing, discharging or disposing of water found underground if it is necessary for the efficient continuation or for the safety of people.

## 5 ENVIRONMENTAL MANAGEMENT PROGRAMME

### 5.1 PLANNING AND DESIGN/PRE-CONSTRUCTION

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
				KAPSTEVEL SOUTH PIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLANT	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE
<b>5.1.1</b>	<b>PROTECTION OF SOILS</b>																	
5.1.1.1	The location of soil stockpiles is to be included in planning and suitable areas are to be identified giving cognisance to: access, erosion control and location of future ore reserves.	Action 8.3.18 Kolomela EMPr	Layout Planning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.1.1.2	Provide for containment measures to prevent contamination of soils by pollutants/waste	Action 8.3.20&21 Kolomela EMPr	Layout Planning & Design	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	-
5.1.13	Disturbance areas are to be planned to minimise that required for safe construction and operation.	Action 8.3.13 Kolomela EMPr	Layout Planning	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.1.2</b>	<b>MINIMISE LANDFORM CHANGE (TOPOGRAPHY)</b>																	
5.1.2.1	Prioritise backfilling of waste rock into open pits.	-	Mine Planning	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.1.2.2	Minimise footprint areas requiring levelling	-	Layout Planning	-	-	-	-	-	-	Y	Y	Y	Y	Y	-	Y	Y	-
<b>5.1.3</b>	<b>PROTECTION OF WATER RESOURCES</b>																	
5.1.3.1	Avoid watercourses as per mitigated final layout plan	IWUL	Layout Planning	-	-	-	-	-	-	Y	-	-	Y	Y	Y	-	Y	-
5.1.3.2	Update stormwater management plan as per final mitigated layout plan	GN704 IWUL	Layout Planning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
5.1.3.3	Provide for measures to prevent contamination of soils/groundwater due to storage of hazardous chemical substances/wastes.	Action 8.3.20&21 Kolomela EMPr	Layout Planning & Design	-	-	-	-	-	-	Y	Y	Y	Y	Y	-	Y	-	-
5.1.3.4	Provide for sediment and oil separators in dirty water areas	Action 8.3.14 Kolomela EMPr	Layout Planning & Design															
<b>5.1.4</b>	<b>MINIMISE DISTURBANCE TO WETLANDS</b>																	
5.1.4.1	Minimise disturbance to wetlands/wetland catchment areas in accordance with final mitigated layout plan.	IWUL	Layout Planning and Design	-	-	Y	Y	Y	Y	-	-	Y	-	-	-	-	-	Y
5.1.4.2	Define the 1 in 100 year flood line for the aquifer recharge area on the Soutloop River.	GN. 704 IWUL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
5.1.4.3	Recharge of the aquifer must be done in a planned and controlled manner to prevent/minimise negative hydrological impact and promote positive impact on hydrology of the resource (to be monitored)	IWUL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
<b>5.1.5</b>	<b>PROTECTION OF SENSITIVE HABITATS, FAUNA &amp; FLORA</b>																	
5.1.5.1	Obtain permits for the removal of protected species	Permit Conditions	Prior to Site Clearance	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y
<b>5.1.6</b>	<b>MINIMISE ATMOSPHERIC EMISSIONS</b>																	
5.1.6.1	Provide for dust management measures in infrastructure planning	-	Infrastructure Planning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
<b>5.1.8</b>	<b>MINIMISE DISTURBANCE OF VIEWS</b>																	
5.1.8.1	Optimise the backfilling of waste rock in mine planning.	-	Mine Planning	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.1.8.2	Optimise concurrent rehabilitation in mine planning.	-	Mine Planning	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
<b>5.1.9</b>	<b>PROTECTION OF HERITAGE RESOURCES</b>																	
5.1.9.1	Therefore, Phase 2 mitigation (sampling) of a significant number of pans is to be undertaken in areas where such pans containing artefacts are to be destroyed by mining activities. This will require a permit issued by the South African Heritage Resources Agency (SAHRA) (African Heritage Consultants 2011:20).	Permit Conditions	ASAP	-		Y	Y	Y	-	-	-	-	-	-	-	-	-	-

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
				KAPSTEVEL SOUTH PIIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLAN T	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE
5.1.9.1	An accredited palaeontologist must be appointed to do a Phase Palaeontological Impact Assessment (PIA) to confirm the presence of significant fossils of stromatolites and possible cave breccia deposits in areas underlain by dolomite of the Ghaap Group, as well as areas underlain by surface limestone, where these limestones are exposed or where they are planned to be exposed during mining operations. The palaeontologist must make the necessary recommendations regarding a possible Phase 2 PIA during the initial mining operations.		ASAP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.1.9.2	Avoid heritage (including historical, archaeological and palaeontological) sites as per mitigated final layout plan	-	Layout Planning	-	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
<b>5.1.10</b>	<b>PROTECTION OF LAND CAPABILITY AND PLANNING FOR END USE</b>																	
5.1.10.1	Financial provision for rehabilitation in mine and new infrastructure planning	GN. 1147	Annual Update	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.1.10.2	Optimise concurrent rehabilitation in mine planning.	-	Mine Planning	-	Y	-	Y	Y	Y	-	-	-	-	-	-	-	-	-
<b>5.1.11</b>	<b>PUBLIC AND LABOUR RELATIONS</b>																	
5.1.11.1	Develop a procedure for the management of contractor's social impacts for implementation by key contractors.	SLP	Prior to placement of new construction contract	-	-	-	-	-	-	Y	-	Y	Y	Y	Y	Y	Y	Y

5.2 CONSTRUCTION OF INFRASTRUCTURE

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES															
				KAPSTEVEL SOUTH PIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOGEFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLAN T	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE	
<b>5.2.1</b>	<b>PROTECTION OF SOILS</b>																		
5.2.1.1	Implement measure for spill prevention, response and clean-up in accordance with Kolomela Mine Spill Management Procedure	Action 8.4.18 Kolomela EMPr Spill Management Procedure	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.1.2	No unnecessary site clearance or compaction to take place outside of the designated disturbance area.	Action 8.4.17 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.1.3	Available topsoil is to be stripped	Action 8.4.22 Kolomela EMPr	Prior to construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.1.4	Topsoil stockpiles are to be protected from erosion and must not pose a risk of pollution of any water resource	8.4.22 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.1.2</b>	<b>MINIMISE LANDFORM CHANGE (TOPOGRAPHY)</b>																		
5.2.2.1	Minimise levelling of areas for construction and laydown areas		Site preparation	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.1.3</b>	<b>PROTECTION OF WATER RESOURCES</b>																		
5.2.3.1	Clean water is to be diverted around construction areas and dirty water run-off is to be prevented from entering the surrounding natural environment.	GN.704 IWUL Action 8.4.23 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.3.2	No discharge of contaminants into the environment.	Action 8.4.23 Kolomela EMPr																	
5.2.3.3	Implement measure for spill prevention, response and clean-up in accordance with Kolomela Mine Spill Management Procedure	Action 8.4.18 Kolomela EMPr Spill Management Procedure	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.3.3	Implement measures for the containment of hazardous chemical substances during storage and handling.	Action 8.4.25 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.3.5	Waste is to be managed in accordance with the Kolomela Waste Management Procedure.	Action 8.4.24 Kolomela EMPr Kolomela Waste Management Procedure	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.3.6	Minimise impedance of flow due to borehole and pipeline construction.	IWUL	Post construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	
<b>5.2.4</b>	<b>MINIMISE DISTURBANCE TO WETLANDS</b>																		
5.2.4.1	No access for contractors to sensitive sites (no-go areas)	Action 8.4.26 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.4.2	Delineate 1 in 100 year flood line or 100 m buffer (whichever is greatest) as sensitive wetland areas of Soutloop River and only restricted activities allowed in that area.	GN. 704 IWUL	Prior to construction	-	-	-	-	-	-	-	--	-	-	-	-	-	-	Y	
<b>5.2.5</b>	<b>PROTECTION OF SENSITIVE HABITATS, FAUNA &amp; FLORA</b>																		
5.2.5.1	No access for contractors to sensitive areas (no-go areas)	Action 8.4.26 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.5.2	Vegetation clearance to be in accordance with permit conditions	Permit Conditions	Site clearance	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.2.5.3	Rehabilitated construction sites to be included in alien invasive management programme for Kolomela Mine	Alien Invasive Monitoring Plan Rehabilitation Strategy	Post construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.2.6</b>	<b>MINIMISE ATMOSPHERIC EMISSIONS</b>																		
5.2.6.1	Dust suppression to be carried out in all areas of work and all access roads.	Action 8.4.19 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.2.7</b>	<b>MINIMISE NOISE DISTURBANCES</b>																		
5.2.7.1	Vehicles are to adhere to speed limits and must be maintained in a roadworthy condition that meets the noise output requirements	-	-	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
				KAPSTEVEL SOUTH PIIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLANT T	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE
<b>5.2.8</b>	<b>MINIMISE DISTURBANCE OF VIEWS</b>																	
5.2.8.1	Night glow/spillage during construction is to be minimised	Action 8.4.16 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2.8.2	All lay-down areas must show good housekeeping, litter control and general site cleanliness	Action 8.4.16 Kolomela EMPr	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2.8.3	New borrow pits are to be rehabilitated	Action 8.4.27 Kolomela EMPr Rehabilitation Strategy	After use	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.9</b>	<b>PROTECTION OF HERITAGE RESOURCES</b>																	
5.2.9.1	Heritage sites are designated no-go areas.	Action 8.4.27 Kolomela EMPr	Throughout construction	-	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.2.9.2	If an unknown grave or artefact is unearthed during earthworks reasonable measures are to be implemented to prevent damage to the artefact or grave. Work is to be stopped and the Kolomela Environmental Manager notified. Works is only to proceed on instruction of the Kolomela Environmental Manager.	Action 8.4.27 Kolomela EMPr	As required	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2.9.3	The Environmental Manager must be informed of the possible presence of fossils. If fossils are observed, the Environmental Manager must be notified and the fossils recorded by the palaeontologist according to SAHRA specifications.		Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.10</b>	<b>PROTECTION OF LAND CAPABILITY AND PLANNING FOR END USE</b>																	
5.2.10.1	All temporary infrastructure is to be removed and disturbed areas not be used are to be rehabilitated.	Action 8.4.28 Kolomela EMPr Rehabilitation Strategy	After construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2.10.2	Borrow pits are to be rehabilitated in accordance with the Rehabilitation Strategy	Action 8.4.28 Kolomela EMPr Rehabilitation Strategy	After construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.11</b>	<b>MAXIMISE LOCAL EMPLOYMENT OPPORTUNITEIS</b>																	
5.2.11.1	Implement SLP commitments through Kolomela Mine's local recruitment policy.	SLP Local Recruitment Policy	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.2.12	Local employment commitments to be adhered to by contractors	SLP Local Recruitment Policy	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.12</b>	<b>MAXIMISE LOCAL ECONOMIC DEVELOPMENT OPPORTUNITIES</b>																	
5.2.12.1	Key contractors to comply with Kumba's preferential procurement policy.	SLP Procurement Policy	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.13</b>	<b>ENHANCEMENT OF LOCAL EDUCATION AND SKILL DEVELOPMENT</b>																	
5.2.11.12.1	Key contractors to contribute to specific skills development programmes and education projects developed by Kolomela.	SLP	Throughout construction	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.2.14</b>	<b>PUBLIC RELATIONS</b>																	
5.3.15.1	Continue to engage with public through existing structures and forums. This is to include clear communication on developments at Kolomela and the management of expectations in terms of employment and local socio-economic development		Throughout Operations	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.15.2	Continue to implement Kolomela's public complaints procedure.	Action 8.4.9 Kolomela EMPr Public Complaints Procedure	Throughout Operations	Y	-	Y	--	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

5.3 MINE OPERATIONS

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
				KAPSTEVEL SOUTH PIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLAN T	TIERBUL T DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE
<b>5.3.1</b>	<b>PROTECTION OF SOILS</b>																	
5.3.1.1	Implement measure for spill prevention, response and clean-up in accordance with Kolomela Mine Spill Management Procedure	Action 8.5.15 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.3.1.2	Available topsoil is to be stripped ahead of advancing mining operations.	Action 8.5.15 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.3.1.3	Soil is to be stockpiled at designated stockpile areas and protected from erosion.	Action 8.5.15 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.3.1.4	The Kolomela Environmental Manager is to maintain an action plan for the utilisation of soil to ensure that soil is utilised as soon as practicable in rehabilitation activities,	Action 8.5.15 Kolomela EMPr	As required	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.3.1.15	Fertility of soil is to be checked and augmented as required for rehabilitation.	Action 8.5.15 Kolomela EMPr	As required	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
<b>5.3.2</b>	<b>MINIMISE LANDFORM CHANGE (TOPOGRAPHY)</b>																	
5.1.2.1	Backfilling of waste rock into pits in accordance with mine planning	Action 8.5.12 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
<b>5.3.3</b>	<b>PROTECTION OF WATER RESOURCES</b>																	
5.3.3.1	No discharge of contaminants into the environment.	Action 8.5.21 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.3.2	Stormwater management plan in place and maintained for the diversion of clean water from potentially contaminated area. All potentially contaminated water is to be contained and prevented from being discharged into the natural environment.	GN704 IWULA Action 8.5.21 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
5.3.3.3	Contaminated run-off from areas used for storage of hydrocarbons and fuel, workshops and washing bays that could potentially contain hydrocarbons is to be directed through an oil separator.	Action 8.5.21 Kolomela EMPr	Throughout operations	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	-	-	-
5.3.3.4	Confirm spatial extent of dewatering cone and update dewatering requirements.	-	Annually															
5.3.3.5	Compensate affected parties impacted on by dewatering in accordance with landowner agreement.	IWUL Action 8.5.21 Kolomela EMPr Landowner Agreement	As required	Y	-	Y	-	-	-	-	-	-	-	-	-	-	-	-
5.3.3.6	Waste is to be managed in accordance with the Kolomela Waste Management Procedure.	Action 8.5.21 Kolomela EMPr	Throughout operations															
5.3.3.7	Appropriate bunding for fuel, oil and other hazardous chemical substances is to be provided and maintained in accordance with procedure.	Action 8.5.21 Kolomela EMPr Kolomela Mine Procedure for the Handling & Storage of Hazardous Chemical Substances.	Throughout operations	-	-	-	-	-	-	Y	Y	Y	Y	Y	-	Y	Y	-
<b>5.3.4</b>	<b>MINIMISE DISTURBANCE TO WETLANDS</b>																	
5.3.4.1	No run-off from any road way or any potentially contaminated areas is to be directed towards a wetland pan.	Action 8.5.21 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.4.2	Monitor recharge volumes for aquifer recharge. Recharge is to be done in a planned and controlled manner to minimise negative hydrological impact on the hydrology of the Soutloop River,	IWUL	Throughout operations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
<b>5.3.5</b>	<b>PROTECTION OF SENSITIVE HABITATS, FAUNA &amp; FLORA</b>																	
5.3.5.1	Vegetation clearance is to be in accordance with permit conditions.	Permit Conditions	Throughout operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.3.5.2	Monitor response of biodiversity of the aquifer recharge area and implement changes to recharge to ensure that biodiversity integrity is maintained.	Action 8.5.21 Kolomela EMPr	As required	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
5.3.5.3	Access to sensitive biodiversity areas is prohibited	Action 8.5.21 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES															
				KAPSTEVEL SOUTH PIIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLAN T	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING PLANT	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE	
5.3.5.4	Off-road driving is prohibited	Action 8.5.21 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.5.5	Alien and invasive species to be removed as part of Kolomela's Alien Invasive Management Programme	Action 8.5.21 Kolomela EMPr	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.3.7</b>	<b>MINIMISE ATMOSPHERIC EMISSIONS</b>																		
5.3.7.1	Dust suppression to be in place at crushers, transfer points and areas where material are handled at processing plants.	Action 8.5.17 Kolomela EMPr	Throughout Operations	-	-	-	-	-	-	Y	Y	Y	-	-	-	-	-	-	
5.3.7.2	Dust suppression is to be in place on all conveyors.	Action 8.5.17 Kolomela EMPr	Throughout Operations	-	-	-	-	-	-	Y	Y	Y	-	-	-	-	-	-	
5.3.7.3	Wet suppression to be in place on all temporary haul roads. Chemical suppression to be in place on all permanent roads.	Action 8.5.17 Kolomela EMPr	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	
5.3.7.4	Air quality monitoring to continue to identify problem sources	Action 8.5.17 Kolomela EMPr	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.3.8</b>	<b>MINIMISE NOISE DISTURBANCES</b>																		
5.3.8.1	Noise monitoring to be conducted to determine the impacts on sensitive receptors.	Action 8.5.14 Kolomela EMPr	Bi-annually	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.8.2	Implement measures to reduce unacceptable noise impacts from problem sources.	Action 8.5.14 Kolomela EMPr	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.8.3	Vehicles are to adhere to speed limits and must be maintained in a roadworthy condition that meets the noise output requirements	Action 8.5.14 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<b>5.3.9</b>	<b>MINIMISE DISTURBANCE OF VIEWS</b>																		
5.3.9.1	All working areas must satisfy the requirements of good housekeeping, litter and general site cleanliness.	Action 8.5.15 Kolomela EMPr	Throughout operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.9.2	Areas of light spill are to be identified and corrected	Action 8.5.15 Kolomela EMPr	As required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.9.3	WRDs are to be rehabilitated concurrently where practicable as part of operations.	Action 8.5.27 Rehabilitation Strategy	Throughout operations	-	Y	-	Y	Y	Y	-	-	-	-	-	-	-	-	-	
<b>5.3.10</b>	<b>PROTECTION OF HERITAGE RESOURCES</b>																		
5.3.10.1	Heritage sites are designated as no-go areas.	Action 8.5.13 Kolomela EMPr	Throughout Operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
5.3.10.2	If an unknown grave or artefact is unearthed during earthworks reasonable measures are to be implemented to prevent damage to the artefact or grave. Work is to be stopped and the Kolomela Environmental Manager notified. Works is only to proceed on instruction of the Kolomela Environmental Manager.	Action 8.5.13 Kolomela EMPr	Throughout Operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
5.3.10.3	The Environmental Manager must be informed of the possible presence of fossils. If fossils are observed, the Environmental Manager must be notified and the fossils recorded by the palaeontologist according to SAHRA specifications		Throughout Operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
<b>5.3.11</b>	<b>PROTECTION OF LAND CAPABILITY AND PLANNING FOR END USE</b>																		
5.3.11.1	Operational activities are to be carried out with the objective of meeting final rehabilitation and closure objectives.	Action 8.5.27 Kolomela EMPr Rehabilitation Strategy	Throughout Operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
5.3.11.2	Opportunities for concurrent rehabilitation during the operational phase to be identified and rehabilitation to be implemented as soon as possible.	Action 8.5.27 Kolomela EMPr Rehabilitation Strategy	Throughout Operations	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
<b>5.3.12</b>	<b>MAXIMISE LOCAL EMPLOYMENT OPPORTUNITIES</b>																		
5.2.12.1	Continue to implement SLP commitments through Kolomela Mine's local recruitment policy.	SLP Local Recruitment Policy	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
5.3.12.1	Continue to collaborate with the municipalities unemployment forum.	SLP Local Recruitment Policy	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	



Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
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<b>5.3.13</b>	<b>MAXIMISE LOCAL ECONOMIC DEVELOPMENT OPPORTUNITIES</b>																	
5.3.13.1	Promote local economic development through collaboration with regional LED structures to enhance economic development in the Gamagara corridor.	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.13.2	Continue to participate in municipal IDP and LED Forums.	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.13.3	Continue to collaborate with local business organisations.	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.3.14</b>	<b>ENHANCEMENT OF LOCAL EDUCATION AND SKILL DEVELOPMENT</b>																	
5.3.14.1	Promote the Kolomela Community Skills Centre in local communities	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.14.2	Continue with bursary and scholarships schemes as well as internship programme.	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.14.3	Investigate the establishment of a technical subject section at Postmasburg secondary school.	SLP		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.14.4	Investigate the establishment of and FET satellite campus in Postmasburg	SLP		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.14.5	Undertake a regular needs assessment at schools	SLP	Annually	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.3.15</b>	<b>SUPPORT MUNICIPAL SERVICE DELIVERY</b>																	
5.3.15.1	Continue to support TSASSAMBA Public Private Partnership Programme aimed at infrastructure development in collaboration with Beeshoek Mine and Tsantsabane Local Municipality	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.15.2	Continue with capacity building programme with DBSA.	SLP	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.15.3	Continue to support municipality in service delivery	SLP Operation & Maintenance Agreement	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.15.4	Continue to implement Kolomela's housing policy	SLP Housing Policy	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.3.16</b>	<b>PUBLIC AND LABOUR RELATIONS</b>																	
5.3.16.1	Continue to engage with public through existing structures and forums. This is to include clear communication on developments at Kolomela and the management of expectations in terms of employment and local socio-economic development		Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.16.2	Continue to implement Kolomela's public complaints procedure.	Action 8.5.6 Kolomela EMP Public Complaints Procedure	Throughout Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.3.17</b>	<b>REDUCING ROAD/TRAFFIC IMPACTS</b>																	
5.3.17	Geometric and structural upgrades to take place at selected links. Some gravel roads may require surfacing and ones affected for short periods may require a more comprehensive maintenance plan including dust suppression. Responsibility should be shared between the developers and the road owners (provincial, municipal and private).		As required through life of operation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

5.4 DECOMMISSIONING AND CLOSURE

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES														
				KAPSTEVEL SOUTH PIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLAN T	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS	AQUIFER RECHARGE
<b>5.4.1</b>	<b>PROTECTION OF SOILS</b>																	
5.4.1.1	All available topsoil or suitable growth medium (where soils is not available) will be replaced on disturbed footprints.	Action 8.6.15 Kolomela EMPr Rehabilitation Strategy r	Commence during operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.1.2	The fertility of the topsoil is to be investigated and augmented as required.	Action 8.6.15 Kolomela EMPr Rehabilitation Strategy	Commence during operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.1.3	Areas where contamination of soil is expected will be investigated and remediated as required.	Action 8.6.15 Kolomela EMPr Rehabilitation Strategy	After decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.4.2</b>	<b>MINIMISE LANDFORM CHANGE (TOPOGRAPHY)</b>																	
5.4.2.1	The waste rock dumps and open pits are to be reshaped and rehabilitated in accordance with the Rehabilitation Strategy	Action 8.6.7 Kolomela EMPr Rehabilitation Strategy r	Commence during operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.4.2.2	All infrastructure (not to be used in the future, through an agreement) will be removed and all surfaces to be reshaped to the pre-mining contours.	Action 8.6.7 Kolomela EMPr Rehabilitation Strategy	After decommissioning	Y	-	Y	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.4.3</b>	<b>PROTECTION OF WATER RESOURCES</b>																	
5.4.3.1	All sources of potential pollution are to identified and be removed at closure.	Action 8.6.10 Kolomela EMPr Rehabilitation Strategy	After decommissioning	-	-	-	-	-	-	Y	Y	Y	Y	Y	-	Y	Y	-
5.4.3.2	Allowance to be made to limit disturbance to natural flow regimes and to allow for flow into drain to natural drainage lines	Action 8.6.12 Kolomela EMPr Rehabilitation Strategy	Commence during operations where possible and complete during decommissioning	Y	-	Y	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Restrict surface water ingress and into pit areas by maintaining diversion berms.	Rehabilitation Strategy	Commence during operations where possible and complete during decommissioning	Y	-	Y	-	-	-	-	-	-	-	-	-	-	-	-
<b>5.4.4</b>	<b>PROTECTION OF SENSITIVE HABITATS, FAUNA &amp; FLORA</b>																	
5.4.5.1	Naturally occurring indigenous plant species are to be used for the rehabilitation of disturbed areas.	Action 8.6.17 Kolomela EMPr	Commence during operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-
5.4.5.2	Vegetation establishment is to be monitored and augmented as required in order to achieve self-sustaining vegetation communities.	Action 8.6.17 Kolomela EMPr Rehabilitation Strategy	Annually until self-sustaining	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
<b>5.4.5</b>	<b>MINIMISE ATMOSPHERIC EMISSIONS</b>																	
5.4.5.1	Create self-sustaining vegetation communities on rehabilitated footprints and WRDs	Rehabilitation Strategy	Commence in operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.5.2	Sources of potential residual air quality impacts are to be investigated and actions implemented as required.	Action 8.6.11 Kolomela EMPr	Reviewed annually and updated as required	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.4.6</b>	<b>MINIMISE DISTURBANCE OF VIEWS</b>																	
5.4.6.1	All infrastructure (not to be used in the future, through an agreement) will be removed and all surfaces to be reshaped to the pre-mining contours.	Action 8.6.7 Kolomela EMPr Rehabilitation Strategy	After decommissioning	Y	-	Y	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.6.2	Create self-sustaining vegetation communities on rehabilitated footprints and WRDs	Rehabilitation Strategy	Commence in operations where possible and complete during decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.3.6.3	Assess residual post-closure impacts and develop measures to reduce residual visual impacts.	Action 8.6.9 Kolomela EMPr	After decommissioning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Action No.	IMPACT MANAGEMENT ACTION	APPLICABLE STANDARD	Scheduling	APPLICABLE ACTIVITIES													
				KAPSTEVEL SOUTH PIIT, EVAPORATION POND & HAUL ROADS	KAPSTEVEL WRD EXPANSION	PLOEGFONTEIN & TIERBUL PITS	LEEUFONTEIN NORTH WRD EXPANSION	LEEUFONTEIN SOUTH WRD EXPANSION	KLIPBANKFONTEIN WRD EXPANSION	KAPSTEVEL DMS PROCESSING PLANT	TIERBULT DMS PROCESSING PLANT	KLIPBANKFONTEIN DMS PROCESSING	KAPSTEVEL AT PIT FACILITY	KLIPBANKFONTEIN AT PIT FACILITY	HAUL ROADS	NEW EXPLOSIVE MAGAZINE	NEW SEWAGE TREATMENT WORKS
<b>5.4.7</b>	<b>PROTECTION OF LAND CAPABILITY AND PLANNING FOR END USE</b>																
5.4.7.1	All land is to be returned to a land capability that matches the surrounding land capability and sufficient to support game farming.	Action 8.6.8 Kolomela EMPr Rehabilitation Strategy	On closure	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>5.4.8</b>	<b>PUBLIC AND LABOUR RELATIONS</b>																
5.4.8.1	Continue to engage with public through existing structures and forums on decommissioning and closure planning.		Throughout decommissioning and closure activities	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.8.2	Continue to implement Kolomela's public complaints procedure.	Action 8.5.6 Kolomela EMPr Public Complaints Procedure	Throughout decommissioning and closure activities	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5.4.8.3	Interested ad affected parties are to be consulted and provided with an opportunity to provide input into proposed rehabilitation measures	Action 8.6.6 Kolomela EMPr	Annually	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

## **6 FINANCIAL PROVISION**

### **6.1 CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED WITH THE BASELINE ENVIRONMENT**

The overall rehabilitation goal for Kolomela Mine is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amendable to the local habitat types (e.g. Panveld, Sandveld and other) that is suitable for the sustaining of **game farming** as the next land use over the mine site, post closure. The strategy to achieve this is provided in the Site-Wide Rehabilitation Strategy in Part C- Report J (Golder, 2016).

### **6.2 CONFIRMATION OF CONSULTATION OF CLOSURE OBJECTIVES WITH LANDOWNERS**

The Environmental Impact Assessment Report and the Environmental Management Programme has been subjected to a public participation process in accordance with Regulations 41 of the EIA Regulations (GN. 982 of 4 December 2014). The annual rehabilitation compiled in terms of Appendix 3 of the Financial Provision Regulations (GN. 1147 of 20 November 2015) will be compiled by Kolomela Mine within 15 months after the coming into effect of the regulations and will be updated annually thereafter. This report will be made available for public review and comment on an annual basis.

### **6.3 REHABILITATION PLAN**

A Site-Wide Operational Rehabilitation Strategy is provided in Part C -Report J (Golder 2016).

Kolomela Mine will submit an annual rehabilitation plan compiled in terms of Appendix 3 of the Financial Provision Regulations (GN. 1147 of 20 November 2015) within 15 months after the coming into effect of the regulations. In accordance with the regulations the rehabilitation plan will be updated annually.

### **6.4 EXPLAIN HOW THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES**

The overall rehabilitation goal for Kolomela Mine (as indicated by Golder, 2016 in Part C- Report J) is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amendable to the local habitat types (e.g. Panveld, Sandveld and other) that is suitable for the sustaining of **game farming** as the next land use over the mine site, post closure.

### **6.5 QUANTUM OF FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT**

**The derivation of the Quantum of the Financial Provision is given in Section 11.1 of Part A.**

Onno Fortuin Consulting was contracted by Synergistics Environmental Services to conduct a detailed closure estimate for the planned new Kolomela Mine Amendment. The Closure Costing Report is provided as Part C, Appendix M. An annual increase has of 6% has been added as the report was completed in 2015.

Based on the information provided at the time of the assessment, the closure costs the following adjustments to the pre-mature and final closure costs:

**TABLE 6.1: UPDATED PREMATURE AND FINAL (LOM) CLOSURE COSTS FOR PROPOSED KOLOMELA AMENDMENT (ALL VALUES EXCLUDE SALVAGE VALUES)**

	DEC 2015	KOLOMELA AMENDMENT	REVISED TOTAL
PRE-MATURE CLOSURE COST	R490 380 704	R19 520 331	R509 901 035
LOM CLOSURE	R734 937 017	R1 461 441 144	R2 196 378 160

## 6.6 CONFIRM THE FINANCIAL PROVISION WILL BE PROVIDED

The quantum of the financial provision for premature closure is updated on an annual basis. The 2016 provision will be updated to meet the requirements of the proposed changes to Kolomela Mine.

Kolomela Mine undertakes to submit an annual update of the financial provision in accordance with the Financial Provision Regulations (GN. 1147 of 20 November 2015), within n 15 months after the coming into effect of the regulations, and annually thereafter submit updated rehabilitation plan in support of an updated calculation of the financial provision.

## 7 MECHANISIMS FOR MONITORING COMPLIANCE

Kolomela Mine is to continue with environmental monitoring in accordance with the authorised Environmental Management Programme (Synergistics, 2010) and in accordance with the Environmental Authorisation Environmental Authorisation (NC 30/5/5//3/2/1/069EM) of 3 March 2011. The monitoring is to be expanded in accordance with the recommendations as set out below.

### 7.1 WATER RESOURCE MONITORING

Kolomela Mine has a comprehensive groundwater and surface water monitoring network. No changes to the monitoring has been proposed for the proposed amendments and monitoring is to continue in accordance with the existing EMPr and the Water Use Licence (Licence No. 10/DT3A/ABCEGIJ/4125). The following recommendations have been made by Itacsa (see Part C – Report D2) in terms of groundwater monitoring and improvements to the groundwater model:

- Conduct an audit of the borehole data to ensure that the information related to the monitoring and dewatering boreholes is consistent.
- Conduct an audit of the pumps in the dewatering boreholes. This audit would ensure that the pumps perform as expected and would provide beneficial information for future dewatering designs.
- Based on the recommended Items 1 and 2 above, construct various cross sections that show the geologic setting, locations of the pits, locations of the pumps, the measured water levels from the monitoring and dewatering boreholes, and the water strikes.
- Continue to install multi-level piezometers or monitoring boreholes in various geologic units and monitor the water levels over time using automatic data loggers. This task is critical to improving the understanding of dynamic groundwater conditions in the mine area as well as the confidence level of the groundwater flow model because the current dewatering at the Kolomela Mine essentially acts as a long-term, large-volume pumping test. For this reason, well-designed piezometers will provide much-needed data that can be used to predict and plan for future dewatering requirements. Furthermore, the groundwater levels at each geologic unit are critical to the slope stability design.
- Evaluate the performance of the dewatering boreholes. Currently, the maximum pumping rate from the existing boreholes is approximately 200 m<sup>3</sup>/hr. Increasing the pumping rate would decrease the

number of dewatering boreholes. In order for the Kolomela Mine to conduct a cost–benefit analysis, the performance of the dewatering boreholes must be investigated. These investigation activities may include hydraulic testing, logging, data collection, and data analysis.

- Create a dewatering folio.
- As soon as additional data become available, the groundwater flow model should be updated.
- Work with the mine planning group to assess the option of installing in-pit dewatering boreholes as the pits deepen.

With respect to the aquifer recharge the following recommendation is made (see Part C – Report K, Golder 2016) based on experience at the existing Groenwaterspruit Aquifer Recharge Facility:

Groundwater quality and the water table depth should be monitored on a quarterly basis in all monitoring boreholes in all monitoring boreholes surrounding the aquifer recharge wellfield. For a better understanding of the fluctuation of the water table at the recharge site, continuous logging of water depth in selected boreholes is recommended.

## 7.2 AIR QUALITY MONITORING

It is recommended (see also Air Quality Assessment in Part C – Appendix B) that Kolomela’s continuous dustfall, PM<sub>10</sub> and PM<sub>2.5</sub> as well as meteorology, NO<sub>2</sub> and SO<sub>2</sub> sampling be continued as part of the air quality management plan. The existing monitoring programme should be amended to include 3 additional monitoring station (see Table 7.1 and Figure 7.1).

**TABLE 7-1: ADDITIONAL SAMPLING LOCATIONS AND PARAMETERS**

No.	Description	Parameter to be Sampled
A	Just off southern boundary and downwind of all operations	Dustfall
B	North of proposed Ploegfontein pit	Dustfall
C	Just off R383 – south east of operations	Dustfall

The following cost effective sampling methods are recommended:

- For dustfall, the NDCR specifies that the method to be used for measuring dustfall and the guideline for locating sampling points shall be ASTM D1739 (1970), or equivalent method approved by any internationally recognized body.
- For PM<sub>10</sub> and PM<sub>2.5</sub> the method as set out by British Standards (BS EN 12341) is recommended.
- For NO<sub>2</sub>, SO<sub>2</sub> and VOC Radiello™ passive diffusive sampling is recommended.

## 7.3 NOISE MONITORING

Kolomela has already adopted a noise monitoring programme as part of its Environmental Management Programme. It is recommended it be kept to by conducting short term 20 minute to 24-hour sampling at the already established NSRs and monitoring points. Monitoring should always be conducted in accordance with the procedures specified by SANS 10103 (2008). Samples should include the following parameters: L<sub>Aeq</sub>, L<sub>Aeq</sub>, L<sub>A90</sub>, and the un-weighted octave band sound pressure levels (L<sub>Zeq</sub>). In the interpretation and reporting of sampled environmental noise levels, use should be made of a trained specialist.

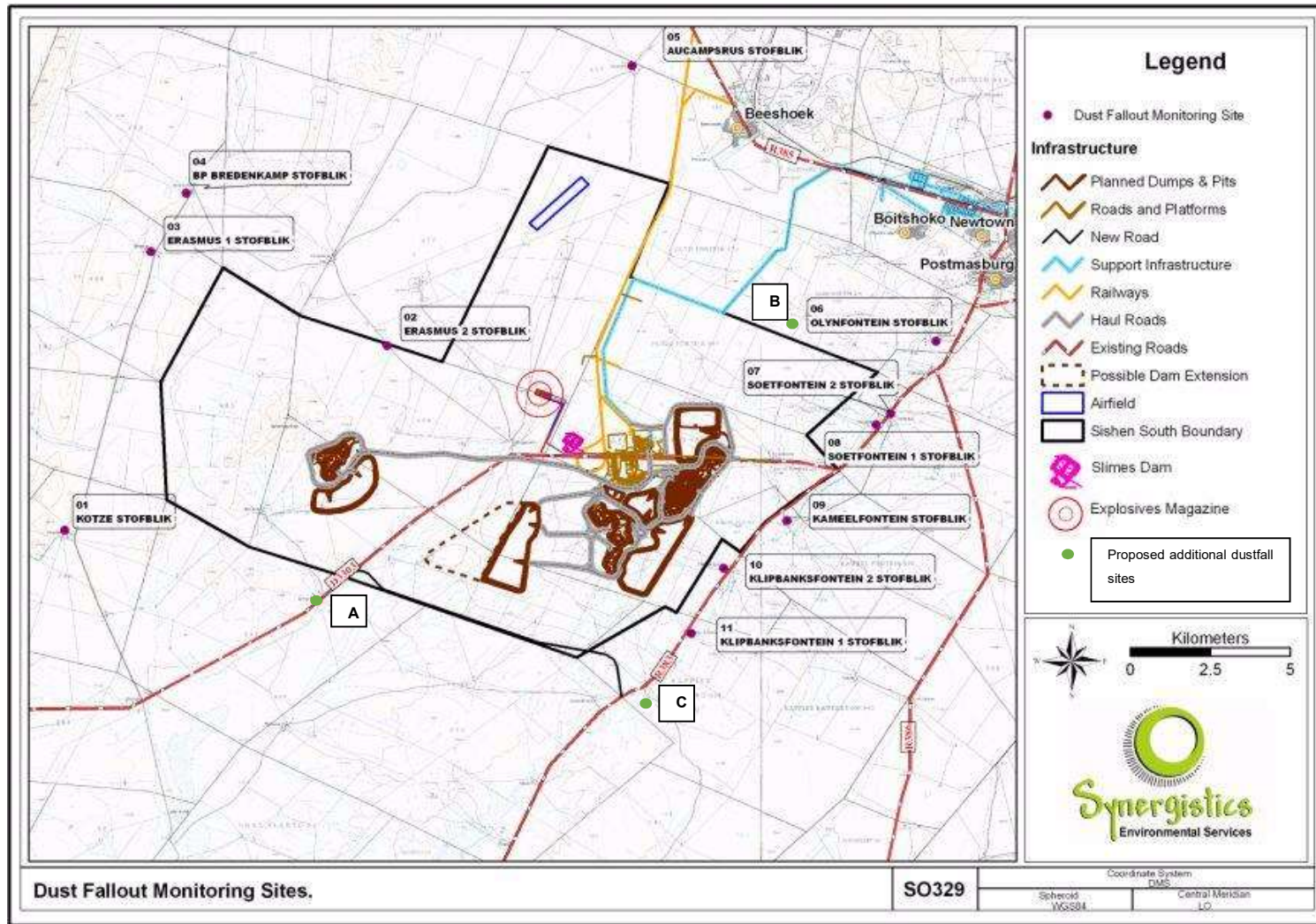


FIGURE 7.1: RECOMMENDED ADDITIONAL SAMPLING LOCATIONS

## 7.4 BIODIVERSITY MONITORING

Kolomela Mine has implemented a comprehensive biomonitoring programme focussed on assessing the secondary impacts of the mining operations. The monitoring programme is outlined in Section 4.4.9 in the Report Addressing Issues Related to Sensitive Habitats and Biodiversity (Golder, 2016 Part C - Report K). The biomonitoring includes:

- Soil and land capability
- Aquatic invertebrates in the Groenwaterspruit and wetland pans
- Amphibians
- Reptiles
- Birds
- Mammals (small and large)
- Vegetation
- Alien invasive species
- Bush encroachment

The biodiversity monitoring is to be expanded to include the proposed aquifer recharge area and the response of the wetland vegetation is to be monitored and recharging activities altered to minimise impacts on the wetland system in the Soutloop River.

## 8 SUBMISSION OF PERFORMANCE ASSESSMENTS

Performance Assessments/Compliance Audits will be compiled in accordance with legislative requirements (as applicable at the time) including:

- (1) Regulation 34 of the EIA Regulations (GN. 982 of 4 December 2014);
- (2) Regulation 55 of the Minerals and Petroleum Resource Development Act.

The Performance Assessments/Compliance audits will be submitted bi-annually in accordance with the existing Environmental Authorisation (NC 30/5/5//3/2/1/069EM) of 3 March 2011.

## 9 ENVIRONMENTAL AWARENESS PLAN

The Kolomela Mine has an existing environmental training and awareness programme which has been developed as part of the health and safety system for the mine. This programme includes:

- Induction training for new employees;
- Job-specific and procedures training;
- Ad hoc environmental awareness training; and
- Contractor training.

All persons employed by the Mine will undergo the above training. A separate induction will be provided to visitors of the Mine.

## 10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

None applicable.



## 11 UNDERTAKING

I, **Kerry Colleen Fairley**, acting as independent environmental assessment practitioner hereby confirm:

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from specialist reports, where relevant; and
- The acceptability of the project in relation to the finding of the assessment and the level of mitigation proposed.

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**Kerry Colleen Fairley**

Environmental Assessment Practitioner

Pr.Sci. Nat.