Table 3.4.3 Possible Closure Phase Impacts

	Closure Phase:				
Activity:	**Environmental Aspect:**	**Impact**	**Mitigation Measures**	**Annual Cost**	**Final Cost**
Final Backfilling and Sloping:	**Geology:**	Partially restores geology although to an altered state.	The backfilling of overburden restores the geological material, but with an altered geological structure.	R0-00 Already catered for.	R0-00 Already catered for.
	Topography:	Partially restores topography although to an altered state.	There will be no void left because only loose sand on top will be mined. The backfilling be done to level out the area for planting grass and the use of a cemetery.	R0-00 Already catered for.	R0-00 Already catered for.
	Soil:	Partially restores topography although to an altered state.	Sloping will result in a new, altered soil structures.	R0-00 Already catered for.	R0-00 Already catered for.
	Flora:	Final backfilling and sloping will have no impact on flora, other than preparing the ground for replacing of topsoil and vegetating.	No mitigation measures required.	R0-00 Already catered for.	R0-00 Already catered for.
	Fauna:	Final backfilling and sloping will have no impact on fauna.	No mitigation measures required.	R0-00 Already catered for.	R0-00 Already catered for.
	Surface Hydrology:	Change in surface water runoff patterns.	Backfilling will alter the topography and cause a change in surface water runoff patterns.	R0-00 Already catered for.	R0-00 Already catered for.
	Groundwater:	Final backfilling and sloping will have no impact on groundwater.	No mitigation measures required.	R0-00 Already catered for.	R0-00 Already catered for.
	Air Quality:	Movement of vehicles and machinery will increase dust levels.	Mitigation already catered for in previous phase.	R0-00 Already catered for.	R0-00 Already catered for.
	Noise:	Movement of vehicles and machinery will increase noise levels.	Mitigation already catered for in previous phase.	R0-00 Already catered for.	R0-00 Already catered for.
	Visual Aspects:	There is no visual impact as the mining site is not visible from any roads.	Mitigation already catered for in previous phase.	R0-00 Already catered for.	R0-00 Already catered for.

		Because this is a degraded area between a cemetery and a dumping site it requires no mitigation.			
Final Replacing of Topsoil:	**Geology:**	The backfilling of overburden restores the geological material, but with an altered geological structure.	Backfilling is taken from the overburden stockpiled referred to above as to prepare the site for replacing of topsoil.	R0-00 Cost already catered for in the excavating phase.	R0-00 Cost already catered for in the excavation phase.
	Topography:	There will be no void left because only loose sand on top will be mined. The backfilling be done to level out the area for planting grass and the use of a cemetery.	Backfilling with overburden.	R0-00	R0-00
	Soil:	Topsoil replacement.	The topsoil stockpiled for rehabilitation purposes referred to above are placed on top of the overburden.	R0-00 Cost already catered for in the excavation phase.	R0-00 Cost already catered for in the excavation phase.
	Flora:	Re-vegetation of site.	This mitigation measure has already been catered for in the topsoil removal phase.	R0-00	R0-00
	Fauna:	Impact already exists.	The end use of this mining site will be a cemetery thus the fauna will only partially return.	R0-00	R0-00
	Surface Hydrology:	The replacing of topsoil over the partially backfilled pit or excavation areas will have the final alteration on the topography and changed runoff patterns.	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm	R0-00 Cost already included in previous phase.	R0-00 Cost already included in previous phase.

		water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.		
Groundwater:	Groundwater will not be impacted.	No mitigation measures required.	R0-00	R0-00
Air Quality:	Movement of vehicles and machinery will increase the dust levels.	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	R0-00 Cost already included in previous phase.	R0-00 Cost already included in previous phase.
Noise:	Movement of vehicles and machinery will increase the noise levels.	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	R0-00	R0-00
Visual Aspects:	There is no visual impact as the mining site is not visible from any roads. Because this is a degraded area between a cemetery and a dumping	No mitigation measures required.	R0-00	R0-00

		improve as re-vegetation commences.			
	Noise:	Noise levels will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Visual Aspects:	Positive impact – will dramatically improve as re-vegetation commences.	No mitigation measures required.	R0-00	R0-00
Dust Suppression:	**Geology:**	Geology will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Topography:	Topography will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Soil:	Soil will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Flora:	Flora will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Fauna:	Fauna will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Surface Hydrology:	Surface hydrology will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Groundwater:	Water spayed on the roads or disturbed areas may seep into the groundwater system.	Water will be obtained from the municipality. The mine will make sure to optimise the water usage and not to contaminate any groundwater.	R0-00	R0-00
	Air Quality:	Positive impact - water sprayed on the roads or disturbed areas will reduce dust pollution of moving vehicles.	No mitigation measures required.	R0-00	R0-00
	Noise:	The movement of vehicles will increase the noise levels.	Frequent maintenance of vehicles required - refer to above.	R0-00 Already catered for above.	R0-00 Already catered for above.
	Visual Aspects:	Visual aspects will not be impacted.	No mitigation measures required.	R0-00	R0-00

Table 3.4.4 Possible Post-closure Phase Impacts

Activity:	Environmental Aspect:	Impact	Mitigation Measures	Annual Cost	Final Cost
Erosion Control:	**Geology:**	Erosion control will have no impact on geology.	No mitigation measures required.	R0-00	R0-00
	Topography:	Only impacted in severe cases.	Erosion control and monitoring will limit erosion and disturbance of the rehabilitated surfaces by means of stone packing and 20mm wire mesh.	R10,000-00	R220,000-00
	Soil:	Definite impact.	Erosion control and monitoring will limit erosion and disturbance of the rehabilitated surfaces by means of stone packing and 20mm wire mesh.	R0-00 Already catered for under topography.	R0-00 Already catered for under topography.
	Flora:	Erosion control and monitoring will limit erosion and protect the growth medium.	Erosion control and monitoring will limit erosion and disturbance of the rehabilitated surfaces by means of stone packing and 20mm wire mesh.	R0-00 Already catered for under topography.	R0-00 Already catered for under topography.
	Fauna:	Erosion control will not have an impact on fauna.	No mitigation measures required.	R0-00	R0-00
	Surface Hydrology:	Definite impact.	Erosion control will maintain the newly formed, changed runoff patterns.	R0-00 Already catered for under topography.	R0-00 Already catered for under topography.
	Groundwater:	Possible impact.	Erosion control and monitoring will limit erosion and disturbance of the rehabilitated surfaces by means of stone packing and 20mm wire mesh.	R0-00 Already catered for under topography.	R0-00 Already catered for under topography.
	Air Quality:	Erosion control will not have an impact on air quality.	No mitigation measures required.	R0-00	R0-00
	Noise:	Erosion control will not have an impact on noise.	No mitigation measures required.	R0-00	R0-00
	Visual Aspects:	Erosion control will not have an impact on visual aspects.	No mitigation measures required.	R0-00	R0-00
Dust Suppression:	**Geology:**	Geology will not be impacted.	No mitigation measures required.	R0-00	R0-00
	Topography:	Topography will not be	No mitigation measures required.	R0-00	R0-00

	impacted.			
Soil:	Soil will not be impacted.	No mitigation measures required.	R0-00	R0-00
Flora:	Flora will not be impacted.	No mitigation measures required.	R0-00	R0-00
Fauna:	Fauna will not be impacted.	No mitigation measures required.	R0-00	R0-00
Surface Hydrology:	Surface hydrology will not be impacted.	No mitigation measures required.	R0-00	R0-00
Groundwater:	Water spayed on the roads or disturbed areas may seep into the groundwater system.	Water will be obtained from the municipality. The mine will make sure to optimise the water usage and not to contaminate any groundwater.	R0-00	R0-00
Air Quality:	Positive impact - water sprayed on the roads or disturbed areas will reduce dust pollution of moving vehicles.	No mitigation measures required.	R0-00	R0-00
Noise:	The movement of vehicles will increase the noise levels.	Frequent maintenance of vehicles required - refer to above.	R0-00 Already catered for above.	R0-00 Already catered for above.
Visual Aspects:	Visual aspects will not be impacted.	No mitigation measures required.	R0-00	R0-00

3.5 Assessment of Potential Impacts

Impacts in this section are considered by the following criteria:
Extent, Duration, Intensity (processes) and Probability, with a value awarded to each of the aspects considered.

The extent of each impact if described as either:

- Local: on the property (1)
- Regional: within municipal boundaries (2)
- Provincial: within provincial boundaries (3)
- National: within national boundaries (4)
- International: crossing national boundaries (5)

The duration of each impact is described as either:

- Short term less than a month (1)
- Medium term: a month or more (2)
- Long term: until the end of the life of the mine (3)
- Permanent: after mining activities ceased (4)

The intensity is described as either:

- Undisturbed: natural processes continue undisturbed (1)
- Changed: natural processes continue, but are altered (2)
- Stop: natural processes stop (3)

The probability is described as either:

- Impossible: the impact will not take place (0)
- Unlikely: the impact may occur occasionally (up to 30%) (1)
- Likely: the impact may occur regularly (up to 60%) (2)
- Definite: the impact will definitely occur (up to 100%) (3)

The awarded values are used to determine the significance rating in the following way:

Rating = (Extent + Duration + Intensity) x Probability

The significance of each impact is then awarded according to the following scale:

RATING:	SIGNIFICANCE:
0	No impact
3 -14	Low impact
15 – 26	Medium impact
27 – 36	High impact

Table 3.5.1 Impact Scale

The following table shows the possible impacts during the construction phase:

Table 3.5.2 Construction Phase Impact Assessment

Construction Phase:								
Activity	**Environmental Aspect**	**Impact**	**Extent**	**Duration**	**Processes**	**Probability**	**Rating**	**Significance**
Due to the fact that no permanent infrastructure will be established on the mining area, there will be no construction phase (Non permanent structures are confined to the mobile screen and portable toilets).								

The following table shows the possible impacts during the operational phase:

Table 3.5.3 Operational Phase Impact Assessment

Operational Phase:								
Activity	**Environmental Aspect**	**Impact**	**Extent (A)**	**Duration (B)**	**Processes (C)**	**Probability (D)**	**Rating(E) (A+B+C)xD=E**	**Significance**
Topsoil Removal	Geology:	No Impact				Impossible (0)	0	No Impact
	Topography	Lowered	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Soil:	Removed	Local (1)	Long Term (3)	Stop (3)	Definite (3)	21	Medium Impact
	Flora:	Removed	Local(1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local(1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Excavating	Geology:	Removed	Local (1)	Permanent (4)	Stop (3)	Definite (3)	24	Medium Impact
	Topography	Lowered	Local (1)	Permanent (4)	Stop (3)	Definite (3)	24	Medium Impact
	Soil:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Flora:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Hauling:	Geology:	Removed	Local (1)	Permanent (4)	Stop (3)	Definite (3)	24	Medium Impact
	Topography	Lowered	Local (1)	Permanent (4)	Stop(3)	Definite (3)	24	Medium Impact
	Soil:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Flora:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Backfilling:	Geology:	Changed geological structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Topography	Altered topography	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Soil:	Overburden replaced	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Flora:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact

	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Loading:	Geology:	No Impact				Impossible (0)	0	No Impact
	Topography	No Impact				Impossible (0)	0	No Impact
	Soil:	No Impact				Impossible (0)	0	No Impact
	Flora:	No Impact				Impossible (0)	0	No Impact
	Fauna:	No Impact				Impossible (0)	0	No Impact
	Surface Hydrology:	No Impact				Impossible (0)	0	No Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increased visual level	Local (1)	Long Term (3)	Undisturbed (1)	Likely (2)	10	Low Impact
Transport:	Geology:	No Impact (off site)				Impossible (0)	0	No Impact
	Topography	No Impact (off site)				Impossible (0)	0	No Impact
	Soil:	No Impact (off site)				Impossible (0)	0	No Impact
	Flora:	No Impact (off site)				Impossible (0)	0	No Impact
	Fauna:	No Impact (off site)				Impossible (0)	0	No Impact
	Surface Hydrology:	No Impact (off site)				Impossible (0)	0	No Impact
	Groundwater:	No Impact (off site)				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increased traffic	Regional (2)	Long Term (3)	Changed (2)	Unlikely (1)	7	Low Impact
Replacing Topsoil:	Geology:	Changed geological structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Topography	Altered topography	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Soil:	Altered soil structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Flora:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust level	Regional (2)	Long Term (3)	Changed (2)	Unlikely (1)	7	Low Impact
	Noise:	Increased noise level	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Vegetating:	Geology:	Changed geological structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Topography	Altered topography	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Soil:	Prevent erosion (Positive Impact)	Local (1)	Permanent (4)	Changed (2)	Likely (2)	14	Low Impact
	Flora:	Re-vegetating (Positive Impact)	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact

	Fauna:	**New Habitat (Positive Impact)**	**Local (1)**	**Permanent (4)**	**Changed (2)**	**Definite (3)**	**21**	Medium Impact
	Surface Hydrology:	**Changed runoff (Positive Impact)**	**Local (1)**	**Permanent (4)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
	Groundwater:	**No Impact**				**Impossible (0)**	**0**	No Impact
	Air Quality:	**Positive Impact – back to natural state**	**Regional (2)**	**Permanent (4)**	**Changed (2)**	**Definite (3)**	**24**	Medium Impact
	Noise:	**Positive Impact**	**Regional (2)**	**Permanent (4)**	**Changed (2)**	**Definite (3)**	**24**	Medium Impact
	Visual Aspects:	**Increase visual level – Positive Impact**	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact
Dust Suppression:	**Geology:**	**No Impact**				**Impossible (0)**	**0**	No Impact
	Topography	**No Impact**				**Impossible (0)**	**0**	No Impact
	Soil:	**No Impact**				**Impossible (0)**	**0**	No Impact
	Flora:	**No Impact**				**Impossible (0)**	**0**	No Impact
	Fauna:	**No Impact**				**Impossible (0)**	**0**	No Impact
	Surface Hydrology:	**No Impact**				**Impossible (0)**	**0**	No Impact
	Groundwater:	**Groundwater recharge (Positive Impact)**	**Local (1)**	**Short Term (1)**	**Changed (2)**	**Unlikely (1)**	**4**	Low Impact
	Air Quality:	**Reduced dust levels (Positive Impact)**	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
	Noise:	**Increased noise level**	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
	Visual Aspects:	**Increase visual level**	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact

The following table shows the possible impacts during the closure phase:

Table 3.5.4 Closure Phase Impact Assessment

Closure Phase:								
Activity	**Environmental Aspect**	**Impact**	**Extent (A)**	**Duration (B)**	**Processes (C)**	**Probability (D)**	**Rating(E) (A+B+C)xD=E**	**Significance**
Final Backfilling And Sloping:	Geology:	Changed geological structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Topography	Altered topography	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Soil:	Altered soil structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Flora:	Removed	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust levels	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise levels	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Final Replacing of Topsoil:	Geology:	No Impact				Impossible (0)	0	No Impact
	Topography	Altered topography	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Soil:	Altered soil structure	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Flora:	Restore growth medium (Positive Impact)	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Fauna:	Temporarily vacate	Local (1)	Short Term (1)	Changed (2)	Definite (3)	12	Low Impact
	Surface Hydrology:	Changed runoff	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	Increased dust levels	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Noise:	Increased noise levels	Regional (2)	Long Term (3)	Changed (2)	Likely (2)	14	Low Impact
	Visual Aspects:	Increase visual level	Local (1)	Long Term (3)	Changed (2)	Definite (3)	18	Medium Impact
Final Vegetating:	Geology:	No Impact				Impossible (0)	0	No Impact
	Topography	No Impact				Impossible (0)	0	No Impact
	Soil:	Prevent Erosion (Positive Impact)	Local (1)	Long Term (3)	Changed (2)	Likely (2)	12	Low Impact
	Flora:	Re-vegetating (Positive Impact)	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact
	Fauna:	New Habitat (Positive Impact)	Local (1)	Permanent (4)	Changed (2)	Definite (3)	21	Medium Impact

	Surface Hydrology:	Changed runoff (Positive Impact)	**Local (1)**	**Permanent (4)**	**Changed (2)**	**Definite (3)**	**21**	Medium Impact
	Groundwater:	No Impact				**Impossible (0)**	**0**	No Impact
	Air Quality:	No Impact				**Impossible (0)**	**0**	No Impact
	Noise:	No Impact				**Impossible (0)**	**0**	No Impact
	Visual Aspects:	Increase visual level	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact
Dust Suppression:	**Geology:**	No Impact				**Impossible (0)**	**0**	No Impact
	Topography	No Impact				**Impossible (0)**	**0**	No Impact
	Soil:	No Impact				**Impossible (0)**	**0**	No Impact
	Flora:	Removed	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact
	Fauna	Temporarily vacate	**Local (1)**	**Short Term (1)**	**Changed (2)**	**Definite (3)**	**12**	Low Impact
	Surface Hydrology:	Changed runoff	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact
	Groundwater:	Groundwater recharge (Positive Impact)	**Local (1)**	**Short Term (1)**	**Changed (2)**	**Unlikely (1)**	**4**	Low Impact
	Air Quality:	Reduced dust levels (Positive Impact)	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
	Noise:	Increased noise levels	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
	Visual Aspects:	Increase visual level	**Local (1**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact

The following table shows the possible impacts during the post-closure phase:

Table 3.5.5 Post-Closure Phase Impact Assessment

Post-Closure Phase:								
Activity	**Environmental Aspect**	**Impact**	**Extent (A)**	**Duration (B)**	**Processes (C)**	**Probability (D)**	**Rating(E) (A+B+C)xD=E**	**Significance**
Erosion Control:	**Geology:**	No Impact				Impossible (0)	0	No Impact
	Typography	No Impact				Impossible (0)	0	No Impact
	Soil:	Limit erosion (Positive Impact)	Local (1)	Long Term (3)	Changed (2)	Likely (2)	12	Low Impact
	Flora:	Protect growth medium (Positive Impact)	Local (1)	Long Term (3)	Changed (2)	Likely (2)	12	Low Impact
	Fauna:	No Impact				Impossible (0)	0	No Impact
	Surface Hydrology:	Changed runoff (Positive Impact)	Local (1)	Long Term (3)	Changed (2)	Likely (2)	12	Low Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	No Impact				Impossible (0)	0	No Impact
	Noise:	No Impact				Impossible (0)	0	No Impact
	Visual Aspects:	No Impact				Impossible (0)	0	No Impact
Vegetation Monitoring:	**Geology:**	No Impact				Impossible (0)	0	No Impact
	Typography	No Impact				Impossible (0)	0	No Impact
	Soil:	No Impact				Impossible (0)	0	No Impact
	Flora:	Re-vegetating (Positive Impact)	Local (1)	Long Term (3)	Changed (2)	Likely (2)	12	Low Impact
	Fauna:	No Impact				Impossible (0)	0	No Impact
	Surface Hydrology:	No Impact				Impossible (0)	0	No Impact
	Groundwater:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	No Impact				Impossible (0)	0	No Impact
	Noise:	No Impact				Impossible (0)	0	No Impact
	Visual Aspects:	No Impact				Impossible (0)	0	No Impact
	Air Quality:	No Impact				Impossible (0)	0	No Impact
	Noise:	No Impact				Impossible (0)	0	No Impact
	Visual Aspects:	No Impact				Impossible (0)	0	No Impact

3.6 Assessment of Potential Cumulative Impacts:

The following table indicates the assessment of possible cumulative impacts as a result of mining activities during all mining phases:

Table 3.6 Cumulative Impacts Assessment

Post-Closure Phase:								
Environmental Aspect	**Impact**	**Activities**	**Extent (A)**	**Duration (B)**	**Processes (C)**	**Probability (D)**	**Rating(E) (A+B+C)xD=E**	**Significance**
Air Quality:	**Increased dust levels**	**Topsoil Removal, Excavating, Hauling, Backfilling, Loading, Transport, Replacing Topsoil, Final Backfilling and Sloping And Final Replacing of Topsoil.**	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
Flora:	**Removed**	**Topsoil Removal and Stockpiling**	**Local (1)**	**Long Term (3)**	**Changed (2)**	**Definite (3)**	**18**	Medium Impact
Noise:	**Increased noise levels**	**Topsoil Removal, Excavating, Hauling, Backfilling, Loading, Transport, Replacing Topsoil, Dust Suppression, Final Backfilling and Sloping And Final Replacing of Topsoil.**	**Regional (2)**	**Long Term (3)**	**Changed (2)**	**Likely (2)**	**14**	Low Impact
Surface Hydrology:	**Changed runoff**	**Topsoil removal, Excavating and Stockpiling.**	**Local (1)**	**Permanent (4)**	**Changed (2)**	**Definite (3)**	**21**	Medium Impact

3.7 Knowledge Gaps

Due to the fact that this is an extension of an existing operation, the possible impacts were known at the onset of the compilation of this document.

Chapter 4 – Socio-economic Impact Assessment:

MPRDA Regulation 39 (3) (b)(ii)
MPRDA Regulation 50 (c)
MPRDA Regulation 50 (g)

4.1 Engagement Process with I&AP's:

Please refer to subsection 3.1 above.

4.2 Potential Impacts Identified by affected parties:

Please refer to subsection 3.2 above.

4.3 Potential Impacts Identified by State Departments:

Please refer to subsection 3.3 above.

4.4 Assessment of Potential Impacts Identified:

Please refer to section 3 above.

4.5 Comparative Land Use Assessment:

After consulting with said land owner, no comparative land use and / or development alternatives were considered.

Chapter 5 – Heritage Impact Assessment:

MPRDA Regulation 39 (3) (b)(ii)
MPRDA Regulation 50 (c)
MPRDA Regulation 50 (g)

5.1 Engagement Process with affected parties:

See Subsection 3.1 above for the engagement process in progress.

5.2 Potential Impacts Identified by affected parties.

None please refer to subsection 3.2 above.

5.3 Potential Impacts Identified by State Departments:

None please refer to subsection 3.3 above.

6.4 Assessment of Potential Impacts identified:

No impacts were indicated by any affected parties or State Departments.

6.5 Knowledge Gaps:

Due to the fact that no known sites of historical or cultural value occur on the area, the potential possible impacts were known at the onset of the compilation of this document.

Chapter 6 – Environmental Awareness Plan:

MPRDA Section 39 (3) (c)
MPRDA Regulation 51 (b) (vi)

6.1 Environmental Awareness Plan:

Inzulu Mining Co (Pty) Ltd recognises the importance of environmental training and is committed to training its employees. Through environmental awareness training the mine is aiming to reduce the frequency of environmental incidents and ultimately improve environmental management of the mine.

The mine recognises the importance of making all employees aware of the potential environmental impact that could result from conducting their jobs and how this potential can be minimised through effective training.

6.2 Green Area Meetings:

Green area meetings are 10 to 15 minute interactive sessions between all mine personnel and are an ideal opportunity to facilitate awareness of job specific environmental dangers and to educate employees on how they can live a more sustainable lifestyle away from the workplace. The mine undertakes to have green area meetings on a quarterly base. The method and medium of communication during the green area meetings is limited by the facilities available at the mine. As there are no meeting rooms or formal presentation facilities, the meetings will be held as discussions between the appointed responsible person for the meeting and the group. The tropics discussed in each of the environmental green area meetings will be recorded in a logbook, with all employees present signing and attendance register.

6.3 Discussion Topics:

Environmental topics selected for discussion can be general topics that are applicable to the entire operation, activity specific topics as identified in the impact assessment of the EMPR, or topics that can be "taken home" and implemented off-site.

6.3.1 General Topics:

General topics include, but are not limited to those impacts identified in the previous section and have been listed below:

- Dust generation and related impacts (particularly health related).
- Noise generation and related impacts (particularly health related).
- Vehicle emissions and related impacts (particularly health related).
- Waste management and the impacts related to incorrect disposal.
- Practical training regarding the clean-up of a major and minor hydrocarbon spills.

6.3.2 Specific Topics:

Some activities may have environmental impacts that are unique to that activity. These must be addressed in the green area meetings at least one curing the year. Activity specific topics include, but are not limited to, those impacts, which are ranked as having a negative "medium" to "high significance" as determined in the impact assessment. Some of these topics may be a repeat of those covered under general and will therefore not need to be covered again the same year, unless the appointed responsible person feels that is necessary.

- The importance of topsoil and the seed bank contained therein.
- Alien vegetation identification and removal, and the importance of indigenous vegetation.
- Dust generation from vehicles and materials handling, and the related impacts (particularly health related).
- Noise generation from vehicles and machinery, and the related impacts (particularly health related).
- Vehicle emissions and related impacts (particularly health related).
- Practical training regarding the clean-up of hydrocarbon spills.
- Waste management and the impacts related to incorrect disposal.

6.3.3 Take-home Topic:

Environmental awareness should not stop at the work place. Many of the concepts learned at work can be applied to employees' life styles at home. Topics that can be covered under "take home topics" include, but are not limited to:

- Water consumption and conservation.
- Energy consumption and conservation.
- Waste minimization and recycling.

6.3.4 Type and Frequency of Meetings

The mine will hold one green area meeting every three months to discuss job-specific and/or off-site (take home) environmental concerns and ways of minimizing the potential for pollution generation. The topics of discussion will be determined by the appointed responsible person (as described above). If an environmental incident occurred during the previous month, this aspect must be the topic for the next quarterly green area meeting. During this meeting, the following topics will be discussed (this is not an exhaustive list):

- How and why the incident occurred?
- How the incident was cleaned up? (if applicable)
- Evaluation of the clean-up or response by staff.
- Can the clean-up or response be improved?
- What preventative measures should be implemented?
- What can be done to reduce the likelihood of the incident recurring?

6.4 Induction Training:

All new employees will undergo induction training when they are employed by the mine and all employees will undergo a repeat induction course annually. Environmental awareness will form part of this induction training. The outcome of the environmental component is to educate all employees of the concepts of sustainability and how this applies to the mine a well as the individual.

The following syllabus of environmental training will be included within the induction training:

6.4.1 Ecological Environment:

Personnel will be trained in the interaction between different environmental aspects and the effect of mining activities thereon. It is important to note that the aim is to inform employees of the implications of their actins on the environment, and to promote an understanding that the responsibility for preservation of the environment is a universal one rather than the sole responsibility of either government or the mining industry.

6.4.2 Socio-economic Environment:

Personnel will be informed of the interaction between different economic activities and the contribution of responsible mining towards sustainable economic development. It is important for employees to understand the balance that must exist between development and preservation of the environment.

6.4.3 Mining Activities:

Relate mining activities that will be undertaken by the staff members to the effects that they can have on their health, the health of those living close to the mine and the activities taking place on neighbouring properties. It is preferable to ensure that these issues are linked to the environmental goals and objectives in order for personnel to understand what the mine is trying to achieve. It is important to note that if goals change the induction course must be updated accordingly.

Topics to be covered should include, but are not limited to the following:

Rehabilitation using indigenous vegetation:
Objective: To encourage the establishment of indigenous vegetation, thereby reducing the spread of alien vegetation and ensuring the ground can be used after mining.
Goal: Rehabilitate plant and mined-out areas using indigenous vegetation contained in the seed bank of the topsoil.
Benefits:

- The site can be utilized for a cemetery after mining, earmarked by the municipality (lawful owners of the land).
- Many alien vegetation species use large quantities of ground water (more than indigenous vegetation) and often fuel veldt fires.

Waste minimisation:
Objective: Ensure no staff member discards litter on-site.
Goal: Keep the site free of litter.
Benefits:

6.4.4 Sustainable lifestyle

Concepts surrounding the living of a sustainable lifestyle, that can be implemented both at work and at home, should be discussed. These could include, but are not limited to the following:

Save water

- Turn the tap off when not using water, e.g. while brushing your teeth.
- Only water subsistence crops when necessary and not during the heat of the day (between 10am and 3pm).
- Use grey water for watering crops.

Waste – Reduce Reuse and Recycling.

- Recycle where possible.
- Collect used oil for recycling.

6.4.5 Preventative and Corrective Actions:

Employees will be trained in the various relevant preventative and corrective measures that may apply to possible impacts of mining activities and their actions. It is important that employees be informed of the differences between preventative and corrective measures, and the fact that preventative actions are preferred over corrective actions.

6.4.6 Question / Comments:

Employees are afforded an opportunity to comment on previous training sessions and ask questions regarding any unclear points of discussion.

Chapter 7 – Mitigatory Measures for Significant Impacts:

MPRDA Section 39 (3) (d)
MPRDA Regulation 50 (e)
MPRDA Regulation 50 (f)
MPRDA Regulation 50 (i)
MPRDA Regulation 50 (b) (i)
MPRDA Regulation 50 (b) (ii)
MPRDA Regulation 50 (b) (iii)

7.1 Mitigation Measures for Impacts Identified in Chapter 3:

The following table summarise the mitigation measures for potential impacts during the construction phase:

Table 7.1.1 Construction Phase Mitigation Measures

Construction Phase:				
Activity	***Environmental Aspect:***	***Impact:***	***Significance:***	***Mitigation Measures:***
Due to the fact that no permanent infrastructure will be established on the mining area, there will be no construction phase (Non permanent structures are confined to the mobile screen and portable toilets).				

The following table summarise the mitigation measures for potential impacts during the operational phase:

Table 7.1.2 Operational Phase Mitigation Measures:

Operational Phase:				
Activity	***Environmental Aspect:***	***Impact:***	***Significance:***	***Mitigation Measures:***
Topsoil Removal	Geology:	No Impact	No Impact	No Mitigation required
	Typography	Lowered	Medium Impact	The negative impact on the topography of the mining site will be addressed during backfilling and sloping of all excavated and disturbed areas.
	Soil:	Removed	Medium Impact	The following design parameters will be taken into account when designing the topsoil stockpiles: • Topsoil will be removed up to a depth of 100mm or the available depth. • The stockpiles must be constructed on the most gradual slope possible and limited to a height of no more than 2m. • The slope of the stockpile material must be kept as low as possible to avoid extensive erosion of the natural resource. • The stockpiles must be vegetated when stored for a period longer than six months. • If erosion does occur the stockpiles can be stabilized through re-vegetation with pioneering grass species. Species include *Eragrostis curvula* and *Melinis repens*. • Soil fertility need to be assessed and ameliorated where necessary prior to re-vegetation in order to ensure optimal growth.
	Flora:	Removed	Medium Impact	Spreading topsoil over the disturbed areas during the closure phase and then seeding the areas with an endemic seed mixture address the impact on vegetation. It is recommended that six monthly monitoring sessions be undertaken after the topsoil was restored to assess the success of the re-vegetation. During these monitoring sessions additional measures such as fertilisation can be implemented if necessary.
	Fauna:	Removed	Low Impact	After the rehabilitation of the mining area and successful re-vegetation, the displaced animal life will return in the time to come. It is however recommended that the mine manager must inform all labourers that they are not allowed to hunt or trap the local fauna.
	Surface Hydrology:	Changed runoff	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will

				make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased noise levels	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Excavating	Geology:	Removed	Medium Impact	The mine will be committed to optimise the use of the mined mineral in order to ensure no resources are wasted. No other management measures will be possible.
	Typography	Lowered	Medium Impact	The negative impact on the topography of the mining site will be addressed during backfilling and sloping of all excavated and disturbed areas.
	Soil:	Removed	Medium Impact	The impacts of excavating on soil will be addressed during the Replacing Topsoil activities. Overburden will be stockpiled according to the measure described above under the soil utilisation guide.
	Flora:	No Impact	No Impact	No mitigation required.
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	Changed runoff	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased dust	Low Impact	The following steps will be taken:

		levels		• A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Backfilling:	Geology:	Changed geological structure	Medium Impact	The mine will be committed to optimise the use of the mined mineral in order to ensure no resources are wasted. No other management measures will be possible.
	Typography	Altered topography	Medium Impact	The negative impact on the topography of the mining site will be addressed during backfilling. All the sidewalls of the mined out quarry will be sloped to 20°, after which the topsoil stored during the mining operation will be spread evenly over the disturbed areas to facilitate re-vegetation.
	Soil:	No Impact	No Impact	No mitigation required.
	Flora:	No Impact	No Impact	No mitigation required.
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	Changed runoff	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased dust levels	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly

				impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Loading:	Geology:	No Impact	No Impact	No mitigation required.
	Typography	No Impact	No Impact	No mitigation required.
	Soil:	Compacting of soil structure	Low Impact	The impacts of stockpiling on the soil structure will be addressed when topsoil is returned to these areas during the closure phase. If the topsoil is compacted (where it was not removed), it will be ripped before vegetation is introduced.
	Flora:	No Impact	No Impact	No mitigation required.
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	No Impact	No Impact	No mitigation required.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased dust levels	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Transport	Geology:	No Impact	No Impact	No mitigation required.
	Typography	No Impact	No Impact	No mitigation required.
	Soil:	No Impact	No Impact	No mitigation required.
	Flora:	No Impact	No Impact	No mitigation required.
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	No Impact	No Impact	No mitigation required.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased dust levels	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence.

				• Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Replacing Topsoil:	Geology:	No Impact	No Impact	No mitigation required.
	Typography	Altered topography	Medium Impact	The negative impact on the topography of the mining site will be negated once all the stockpiled material is removed to the processing plants or backfilling into the quarry pit.
	Soil:	Altered soil structure	Medium Impact	No mitigation of the soil structure is possible. The growth medium is however returned to facilitate the establishment of vegetation.
	Flora:	Restore growth medium (Positive impact)	No impact	No mitigation required
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	Changed runoff	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	Increased dust levels	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
	Noise:	Increased noise levels	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels

				on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Vegetating:	Geology:	No Impact	No Impact	No mitigation required.
	Typography	No Impact	No Impact	No mitigation required.
	Soil:	Prevent erosion (Positive Impact)	Low Impact	No mitigation required.
	Flora:	Re-vegetating (Positive Impact)	Medium Impact	No mitigation required.
	Fauna:	New Habitat (Positive Impact)	Medium Impact	No mitigation required.
	Surface Hydrology:	Changed runoff (Positive Impact)	Medium Impact	No mitigation required.
	Groundwater:	No Impact	No Impact	No mitigation required.
	Air Quality:	No Impact	No Impact	No mitigation required.
	Noise:	No Impact	No Impact	No mitigation required.
	Visual Aspects:	No Impact	No Impact	No mitigation required.
Dust Suppression:	Geology:	No Impact	No Impact	No mitigation required.
	Typography	No Impact	No Impact	No mitigation required.
	Soil:	No Impact	No Impact	No mitigation required.
	Flora:	No Impact	No Impact	No mitigation required.
	Fauna:	No Impact	No Impact	No mitigation required.
	Surface Hydrology:	No Impact	No Impact	No mitigation required.
	Groundwater:	Groundwater recharge (Positive Impact)	Low Impact	No mitigation required.
	Air Quality:	Reduced dust levels (Positive Impact)	Low Impact	No mitigation required.
	Noise:	Increased noise levels.	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
	Visual Aspects:	No Impact	No Impact	No mitigation required.

7.2 Mitigation Measures for Impacts Identified by affected parties:

N/A, already addressed in this programme.

7.3 Mitigation Measures for Impact Identified by State Departments:

N/A, already addressed in this programme.

7.4 Mitigation measures for Cumulative Impacts:

The following table indicates the mitigation measures for cumulative impacts:

Table 7.4 Mitigation Measures for Cumulative Impacts

Environmental Aspect:	Impact:	Activities:	Significance	Mitigation Measures:
Air Quality	Increased dust levels	Topsoil Removal, Excavating, Hauling, Backfilling, Loading, Transport, Replacing Topsoil, Final Backfilling and Sloping, and Final Replacing of Topsoil.	Low impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..
Flora:	Removed	Topsoil Removal and Stockpiling.	Medium Impact	Spreading topsoil over the disturbed areas during the closure phase and then seeding the areas with an endemic seed mixture address the impact on vegetation. It is recommended that six monthly monitoring sessions be undertaken after the topsoil was restored to assess the success of the re-vegetation. During these monitoring sessions additional measures such as fertilisation can be implemented if necessary.
Noise:	Increased noise levels	Topsoil Removal, Excavating, Hauling, Stockpiling, Backfilling, Loading, Transport, Replacing Topsoil, Dust Suppression, Final Backfilling and Sloping and Final Replacing of Topsoil.	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.
Surface Hydrology:	Changed runoff	Topsoil Removal, Excavating.	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified

				that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.

7.5 Mitigation Measures for Socio-economic Impacts:
Due to the lack of impacts in this regard, no mitigation measures are proposed.

7.6 Mitigation Measures for Cultural Impacts:
Due to the lack of impacts in this regard, no mitigation measures are proposed.

7.7 Frequency of Mitigation Measures:
No mitigation measures are required during the construction phase. The following table summarise the mitigation measures for potential impacts during the operational phase:

Table 7.7 Frequencies of Mitigation Measures

Activity:	*Environmental Aspect:*	*Impact Significance:*	*Mitigation Measures:*	*Frequency:*
Topsoil Removal:	Topography:	Medium Impact	The negative impact on the topography of the mining site will be addressed during sloping.	Continues
	Soil:	Medium Impact	The following design parameters will be taken into account when designing the topsoil stockpiles: • Topsoil will be removed up to a depth of 100mm or the available depth. • The stockpiles must be constructed on the most gradual slope possible and limited to a height of no more than 2m. • The slope of the stockpile material must be kept as low as possible to avoid extensive erosion of the natural resource. • The stockpiles must be vegetated when stored for a period longer than six months. • If erosion does occur the stockpiles can be stabilized through re-vegetation with pioneering grass species. Species include *Eragrostis curvula* and *Melinis repens*. • Soil fertility need to be assessed and ameliorated where necessary prior to re-vegetation in order to ensure optimal growth.	When required
	Flora:	Medium Impact	Spreading topsoil over the disturbed areas during the closure phase, and then seeding the areas with an endemic seed mixture address the impact on vegetation. It is recommended that six monthly monitoring sessions be undertaken after the topsoil was restored to assess the success of the re-vegetation. During these monitoring	When required.

			sessions additional measures such as fertilisation can be implemented if necessary.	
	Fauna:	Low Impact	After the rehabilitation of the mining area and successful re-vegetation, the displaced animal life will return in the time to come. It is however recommended that the mine manager needs to make it clear to labourers not to hunt or trap the local fauna especially the smaller mammals.	Continues
	Surface Hydrology:	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of berms and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.	Continues
	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	Daily
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Excavating:	Geology:	Medium Impact	The mine will be committed to optimise the use of the mined mineral in order to ensure no	Continuous

			resources are wasted. No other management measures will be possible.	
	Topography:	Medium Impact	The negative impact on the topography of the mining site will be addressed during sloping.	Continuous
	Soil:	Medium Impact	The impacts of excavating soil will be addressed during the Replacing Topsoil activities.	When required
	Surface Hydrology:	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of berms and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.	Continues
	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	Daily
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Hauling:	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be	Daily

			pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Backfilling	Geology:	Medium Impact	The mine will be committed to optimise the use of the mined mineral in order to ensure no resources are wasted. No other management measures will be possible.	Continuous
	Topography:	Medium Impact	The negative impact on the topography of the mining site will be addressed during backfilling. All the sidewalls of the mined out quarry will be sloped to 20°, after which the topsoil stored during the mining operation will be spread evenly over the disturbed areas to facilitate re-vegetation.	Continuous
	Surface Hydrology:	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.	Continues
	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be	Daily

			pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Loading:	Soil:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	During closure phase
	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	Daily
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be	Quarterly

			repaired immediately to dampen noise levels on site.	
Transport:	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	Daily
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Replacing Topsoil:	Topography:	Medium Impact	The negative impact on the topography of the mining site will be negated once all the stockpiled material is removed to the processing plants or backfilling into the quarry pit.	During closure phase
	Surface Hydrology:	Medium Impact	The regulations promulgated in Government Notice No 704 of 4 June 1999, in terms of the NWA (the National Water Act, (Act No. 36 of 1998)) shall apply to the water management and pollution control at the mine. The mine will make use of beams and other structures surrounding the mine areas to ensure that clean and dirty water are separated. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.	Continues
	Air Quality:	Low Impact	The following steps will be taken: • A sprinkler system will be used. Water will be drawn from the municipality. The water will from there be pumped into the sprinkler	Daily

			system. • Periodic watering of the access roads will be conducted if and when required, especially in August and September before the raining season commence. • Speed limits will be instated within the boundaries of the site to minimize the dust impact as a result of heavy trucks. • If dust levels on site are significantly impacted on and the dust level rise above 10mg/m³ dust masks must be made available to workers..	
	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly
Dust Suppression	Noise:	Low Impact	All machinery will be kept in good working order, to ensure that no unwanted noise is generated. Noisy vehicles or machinery will be repaired immediately to dampen noise levels on site.	Quarterly

7.8 Action Plan and Time Schedule:

The mitigation Measures indicated in **Table 7.1.2 (Operational Phase Mitigation Measures)** will be implemented immediately upon approval of this document. The time schedule as indicated in **Table 7.7 (Frequency of Mitigation Measures)** will apply.

7.9 Procedures for Environmental Emergency Incidences:

The following procedures must be made known to all employees:

7.9.1 Hydrocarbon spills:

The leakage of hydrocarbons from vehicles, containers etc. can cause the pollution of soil, groundwater and surface water. In the event of a hydrocarbon spill, the following steps must be taken:

a) Management must be notified immediately.
b) The responsible person must immediately assess the extent of the spill.
c) If possible, the contaminated soil must be treated *in situ*.
d) If *in situ* treatment is not possible, all contaminated soil must be removed and disposed of at an approved disposal facility in an appropriate manner

7.9.2 Slope failure:

In the event of slope failure on stockpiles or in the quarry pit, the following steps must be taken:

a) Management must be notified immediately.
b) The responsible person must immediately assess the risk to personnel.
c) If needed, all mining activities in proximity to the incident must be ceased.
d) A suitably competent person must be appointed to take the necessary steps to ensure the safety of personnel.
e) The failed area must be repaired if needed.
f) If the area is declared safe, mining activities can continue.

7.10 Monitoring and Environmental Performance Assessments:

The following monitoring procedures will be implemented at the mine in order to ensure compliance with this document, as well as relevant legislation. The monitoring procedures are implemented to ensure that the mitigation measures implemented are successful.

7.10.1 Dust Level Monitoring:

The dust levels on site as well as at the potential dust impact sites must be monitored on an annual basis by means of dust fallout sampling or any other appropriate measure. This will ensure that current management strategies are sufficient, or need to be upgraded.

7.10.2 Noise Level Monitoring:

The monitoring of noise levels on-site as well as at the potential noise impact sites during the annual monitoring and auditing session is recommended.

7.10.3 Storm Water Monitoring:

The effectiveness of the storm water control measures over the whole mine will be audited annually. If any shortfalls are identified they will be rectified with the appropriate physical and management measures. At any time if it is identified that soil erosion is the result of storm water run-off, the mine will rectify the erosion and implement measures to ensure that erosion does not re-occur.

STORM WATER MANAGEMENT PLAN

- **Diversion beams must be secured around the quarry face to ensure that no storm water runs into the workings.**
- **Where any cut operation is practised or where soil is exposed for long periods, appropriate storm water control measures will be implemented.**
- **In the rehabilitation phase, topsoil should be replaced along the contours wherever possible. This will assist in storm water control by reducing water flow down slope and increasing water storage. Topsoil should be replaced and vegetated as soon as possible after construction has been completed.**
- **Plan for the worst case scenario, that is for heavy rainfall and runoff events, or high winds.**
- **Appropriate storm water control measures must be implemented around the access tracks and construction areas and a monitoring programme established to ensure that no erosion is taking place. At the first sign of erosion the necessary remedial action must be taken.**
- **Care must be taken to ensure that runoff is well dispersed so as to limit erosion caused by storm water.**
- **All disturbed sites should be re-vegetated and rehabilitated immediately after construction so as to limit the exposure of the disturbed areas to wind and water erosion.**

7.10.4 Water Quality Monitoring:

The surface water in the pit will be analysed twice a year to ensure that the groundwater quality does not deteriorate. Should deteriorating water quality levels be revealed, further appropriate mitigation measures will be implemented.

7.10.5 Vegetation Monitoring:

It is recommended that six monthly monitoring sessions be undertaken on disturbed areas where topsoil was restored and re-vegetated. This monitoring is to assess the success of the re-vegetation. During these monitoring sessions additional measures such as invader control, fertilisation and erosion control can be implemented if necessary.

7.10.6 Performance Assessment of EMPR:

An annual performance assessment will be conducted to determine the mine's compliance with the approved EMPR. Any management measures found to be inadequate will be re-evaluated and amended to ensure effective environmental management. The following aspects will specifically be assessed:

a) Compliance with current legislation.
b) Compliance wit mitigation measures as indicated in the approved EMPR.
c) Compliance with monitoring measures as indicated in the approved EMPR.
d) Review of the financial provision for rehabilitation.

e) The occurrence and spread of invader plant species will be assessed, mapped and an eradication programme will be proposed.

This Environmental Performance Assessment Report will be submitted to the DME.

7.11 General Mitigation and Management Measures:

The following general management measures will be put in place and communicated to all personnel.

- Visual inspection on the stability of all slopes must be done on a weekly basis.

PART 2
Chapter 8 – Financial Provision for Rehabilitation:

MPRDA Section 39 (4) (a) (ii)
MPRDA Section 41 (1)

8.1 Existing Financial Provision:

As this is a new application, there is no existing financial provision. An initial amount for financial provision of approximately R100, 000.00 is proposed for the first year as indicated in **Section 8.3** below.

8.2 Rehabilitation Plan:

The site will most probably be rehabilitated towards a cemetery. At the expected production rates and the estimated reserves, the expected life of the mine is more than 22 years. Therefore, a final rehabilitation plan for the rehabilitation of the mine will be submitted to the DME when the mine reaches its final mining phase. This is to ensure that the rehabilitation of the mine will be in line with the future needs of the surrounding area.

8.3 Quantum Calculation:

The following costs may be incurred to comply with the requirements of section 39.

An initial amount for Financial provision of approximately R100, 000.00 is proposed for the first year. The following table indicated the calculation of the amount required for financial provision, should closure be at the end of the life of mine, and no rehabilitation takes place. The following table indicated the quantum calculations for rehabilitation for immediate closure: