

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MANAGEMENT & MITIGATION MEASURES	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P					LOSS RESOURCE	REVERSABILITY
CONSTRUCTION PHASE																	
All activities during the pre-construction and construction phases.	WETLAND AND DRAINAGE LINE	Direct	Water quality	Layout 1	Yes	Negative	Local	Medium-term	Medium-High	Definite	Medium	Medium	Stockpiling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration, sub-surface drains, velocity dissipation structures (such as reno mattresses);	Medium	Low-Medium	Partial	Medium Degree
				Layout 2			Local	Medium-term	Medium-High	Definite	Medium	Medium		Medium			
		Indirect	Silt	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Highly Likely	Low-Medium	High	Limited use of machinery in the wetland area. No servicing of vehicles and equipment on site.	Medium	Low	Minimal	High Degree
				Layout 2			Neighbouring	Medium-term	Medium	Highly Likely	Low-Medium	High					
		Direct	Surface water run-off	Layout 1	Yes	Negative	Local	Medium-term	Low-Medium	Highly Likely	Low-Medium	High	It is recommended that a WULA be submitted to the Department of Human Settlements, Water and Sanitation (DHSWS), as the proposed project will trigger sections of Section 21 of the National Water Act [NWA], 1998 (Act No. 36 of 1998) that will require such an application;	Medium	Low	Minimal	High Degree
				Layout 2			Local	Medium-term	Low-Medium	Highly Likely	Low-Medium	High					
		Indirect	Contamination of water from hazardous substances	Layout 1	Yes	Negative	Neighbouring	Incidental	Medium	Possible	Low	High	Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved;	High	Low	Minimal	High Degree
				Layout 2			Neighbouring	Incidental	Medium	Possible	Low	High					
		Direct	Disturbance of natural system	Layout 1	Yes	Negative	Local	Medium-term	Medium	Definite	Medium	High	Approved stormwater management plan must be implemented.	Medium	Low-Medium	Partial	Medium Degree
				Layout 2			Local	Medium-term	Medium	Definite	Medium	High					
		Direct	Disturbance/pollution of sub-surface flow	Layout 1	Yes	Negative	Local	Medium-term	Medium	Highly Likely	Medium	High	Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored.	High	Low-Medium	Minimal	High Degree
				Layout 2			Local	Medium-term	Medium	Highly Likely	Medium	High					
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Local	Medium-term	Medium	Highly Likely	Medium	High	Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements.	High	Low-Medium	Minimal	High Degree
				Layout 2			Local	Medium-term	Medium	Highly Likely	Medium	High					
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and water tanks and generation of power.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Local	Short-term	Medium	Likely	Low	High	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent must be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	High	Low	No Loss	Reversible
				Layout 2			Local	Short-term	Medium	Likely	Low	High					
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	Local	Medium-term	Medium	Definite	Medium	High	Control through mitigation measures including: All construction vehicles and machinery will be maintained such as to operate efficiently, idling times of vehicles and machinery to be minimised; In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; All vehicles used during the project should be properly maintained and in good working order; All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Low-Medium	Minimal	High Degree
				Layout 2			Local	Medium-term	Medium	Definite	Medium	High					
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Neighbouring	Incidental	Medium	Definite	Low-Medium	High	Control through noise control measures including: The provisions of SANS 10103.2008 will apply to all areas within an audible distance of residents or adjacent landowners; Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; Construction activities should be limited to daytime only; Noise monitoring should be undertaken as spot checks; When required noise mufflers should be utilised to reduced noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Medium	Low	No Loss	Reversible
				Layout 2			Neighbouring	Incidental	Medium	Definite	Low-Medium	High					
	SOIL	Direct	Soil alteration including compaction, contamination and pollution and erosion.	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium-High	Definite	Medium	High	Control and stop through mitigation measures including: Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. To reduce the loss of material by erosion, disturbance must be kept to a minimum. If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion. Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor. Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil	High	Low	Minimal	High Degree
				Layout 2			Neighbouring	Medium-term	Medium-High	Definite	Medium	High					
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Regional	Permanent	Medium	Highly Likely	Medium-High	High	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Medium	Low	Minimal	High Degree
				Layout 2			Regional	Permanent	Medium-High	Definite	High	High					
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Definite	Low-Medium	Medium	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts; No littering to be allowed; Good housekeeping practices to be followed.	Low	Low	No Loss	Reversible
				Layout 2			Neighbouring	Short-term	Medium	Definite	Low-Medium	Medium					

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		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P					LOSS RESOURCE	REVERSABILITY
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water (service water) and waste water pipelines and stormwater management infrastructure.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Local	Short-term	Medium	Highly Likely	Low-Medium	High	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent must be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	High	Low	No Loss	Reversible
				Layout 2			Local	Short-term	Medium	Highly Likely	Low-Medium	High		High	Low	No Loss	Reversible
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	Local	Medium-term	Medium	Definite	Medium	High	Control through mitigation measures including: All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; All vehicles used during the project should be properly maintained and in good working order; All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Low-Medium	Minimal	High Degree
				Layout 2			Local	Medium-term	Medium	Definite	Medium	High		Low	Low-Medium	Minimal	High Degree
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Neighbouring	Incidental	Medium	Definite	Low-Medium	High	Control through noise control measures including: The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; Construction activities should be limited to daytime only; Noise monitoring should be undertaken as spot checks; When required noise mufflers should be utilised to reduced noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Medium	Low	Minimal	High Degree
				Layout 2			Neighbouring	Incidental	Medium	Definite	Low-Medium	High		Medium	Low	Minimal	High Degree
	SOIL	Direct	Loss of topsoil and erosion	Layout 1	Yes	Negative	Neighbouring	Permanent	Medium-High	Likely	Low-Medium	High	Avoid through control measures including: During clearing of vegetation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case. Topsoil should be used in landscaping and rehabilitation where possible.	High	Low	Minimal	High Degree
				Layout 2			Neighbouring	Permanent	Medium-High	Likely	Low-Medium	High		High	Low	Minimal	High Degree
		Direct	Soil alteration including contamination and compaction	Layout 1	No	Negative	Neighbouring	Medium-term	Low	Definite	Low-Medium	High	Control and stop through mitigation measures including: -Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. -To reduce the loss of material by erosion, disturbance must be kept to a minimum. If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion. Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor. Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil. Hazardous materials (Hydrocarbon) storage areas to be installed and managed appropriately and spill procedures in place and implemented.	Low	Low	Minimal	High Degree
				Layout 2			Neighbouring	Medium-term	Low	Definite	Low-Medium	High		Low	Low	Minimal	High Degree
	LAND CAPABILITY	Direct	Loss of land capability	Layout 1	Yes	Negative	Site	Long-term	Low-Medium	Definite	Low-Medium	High	None	None	Low-Medium	Minimal	High Degree
				Layout 2			Site	Long-term	Low-Medium	Definite	Low-Medium	High		None	Low-Medium	Minimal	High Degree
	BIODIVERSITY	Direct	Destruction, further loss and fragmentation of the vegetation community	Layout 1	Yes	Negative	Local	Long-term	Medium-High	Definite	Medium-High	High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; All dumping and storage during the construction phase must be within the existing infrastructure footprint and the low sensitivity areas; All laydown, storage areas etc should be restricted to transformed areas during construction, close to the preferred option and existing roads should be used; The number (and size) of laydown, storage and staff facilities must be kept to a minimum; Building materials may not be stored for extended periods of time and must be removed from the site once the project has been concluded;	High	Low	Partial	Medium Degree
				Layout 2			Local	Permanent	High	Definite	High	High		Low	Medium-High	Irreplaceable	Irreversible
		Direct	Destruction of protected tree species	Layout 1	Yes	Negative	Local	Permanent	High	Likely	Medium	High	No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption. Environmental awareness training Fire management plan	High		No Loss	Reversible
				Layout 2			Local	Permanent	High	Highly Likely	Medium-High	High		Low	Medium	Partial	Medium Degree

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		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A+B+C) X P					LOSS RESOURCE	REVERSABILITY		
Generation and disposal of domestic waste, construction and hazardous waste		Direct	Displacement of faunal community (including threatened and protected species) due to habitat loss, direct mortalities and disturbance (noise, dust and vibration).	Layout 1	Yes	Negative	Regional	Long-term	Medium-High	Highly Likely	Medium-High	High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Construction activities should be limited during summer when the risk of disturbing sensitive life history stages (e.g. nesting) is lowest; Where possible, work should be restricted to one area at a time; If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project; Fauna species that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals; Waste management No killing of animals Speedbumps; Inspection of pipelines for leaks Transmission lines should be fitted with bird diverters. Lighting should be kept to a minimum; Implementation of a fire management plan; Environmental awareness training; Rehabilitation and re-vegetation.	Medium	Low	Minimal	High Degree		
				Layout 2			Regional	Long-term	High	Highly Likely	Medium-High			High	Low	Medium	Partial	Medium Degree	
		Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Highly Likely	Low-Medium	Medium		High	Avoid through control measures including: Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	High	Low	Minimal	High Degree
				Layout 2			Neighbouring	Medium-term	Medium	Highly Likely	Low-Medium	Medium		High	High	Low	Minimal	High Degree	
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Definite	Low-Medium	High	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts.	Medium	Low	No Loss	Reversible		
				Layout 2			Neighbouring	Short-term	Medium	Definite	Low-Medium	High		Medium	Low	No Loss	Reversible		
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Regional	Permanent	Medium	Highly Likely	Medium-High	High	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Medium	Low	Minimal	High Degree		
				Layout 2			Regional	Permanent	Medium-High	Definite	High	High		Low	Medium-High	Partial	Medium Degree		
	Generation and disposal of domestic waste, construction and hazardous waste	SERVICES	Direct	Additional burden on existing landfill.	Layout 1	Yes	Negative	Local	Short-term	Medium	Definite	Low-Medium	High	Waste minimisation strategies to be included in the EIA/EMPr and implemented.	Medium	Low	Minimal	High Degree	
					Layout 2			Local	Short-term	Medium	Definite	Low-Medium	High		Medium	Low	Minimal	High Degree	
SOIL, WATER		Direct	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Layout 1	No	Negative	Local	Incidental	Medium	Possible	Low	High	Control and stop through mitigation measures including: Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil.	High	Low	Minimal	High Degree		
				Layout 2			Local	Incidental	Medium	Possible	Low	High		High	Low	Minimal	High Degree		
VISUAL		Direct	Visual impact	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Likely	Low	Medium	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts; No littering to be allowed; Good housekeeping practices to be followed.	High	Low	No Loss	Reversible		
				Layout 2			Neighbouring	Short-term	Medium	Likely	Low	Medium		High	Low	No Loss	Reversible		
BIODIVERSITY		Direct	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Layout 1	No	Negative	Regional	Permanent	High	Likely	Medium	Medium	Control measures to reduce visual impact including: No littering to be allowed; Waste management strategies to be included in the EIA/EMPr and implemented; Good housekeeping practices to be followed.	High	Low	Minimal	High Degree		
				Layout 2			Regional	Permanent	High	Likely	Medium	Medium		High	Low	Minimal	High Degree		
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.		AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Local	Short-term	Medium	Highly Likely	Low-Medium	High	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent must be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	High	Low	No Loss	Reversible	
					Layout 2			Local	Short-term	Medium	Highly Likely	Low-Medium	High		High	Low	No Loss	Reversible	
	NOISE	Indirect	Noise generation by increased traffic on the roads and construction vehicles.	Layout 1	Yes	Negative	Local	Incidental	Medium	Definite	Low-Medium	Medium	Control through noise control measures including: Construction activities should be limited to daytime only; Noise monitoring should be undertaken as spot checks; Road users should adhere to speed limits; Construction vehicles to be serviced at appropriate intervals to reduce unnecessary noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	Low	No Loss	Reversible		
				Layout 2			Local	Incidental	Medium	Definite	Low-Medium	Medium		Low	Low	No Loss	Reversible		
	SOIL	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Definite	Low-Medium	High	Control and stop through mitigation measures including: Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; Construction vehicles to keep to the designated roads; Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials.	Medium	Low	Minimal	High Degree		
				Layout 2			Neighbouring	Medium-term	Medium	Definite	Low-Medium	High		Medium	Low	Minimal	High Degree		

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		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A+B+C) X P					LOSS RESOURCE	REVERSABILITY
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	Local	Permanent	High	Likely	Medium	Medium	Control through mitigation measures including: Enforce speed limits; Penalties or fines for reckless driving.	High	Low	Minimal	High Degree
				Layout 2			Local	Permanent	High	Likely	Medium			Medium	High	Low	Minimal
	NATURAL RESOURCES	Direct	Increased fuel consumption	Layout 1	Yes	Negative	National	Short-term	Medium	Likely	Low-Medium	High	Reduce unnecessary trips through efficient planning.	Low	Low	Minimal	High Degree
				Layout 2			National	Short-term	Medium	Likely	Low-Medium	High		Low	Low	Minimal	High Degree
Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. Stockpiling of construction and excavated materials	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Likely	Low	High	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent must be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	High	Low	No Loss	Reversible
				Layout 2			Neighbouring	Short-term	Medium	Likely	Low			High	High	Low	No Loss
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Definite	Low-Medium	High	Control through mitigation measures including: •All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; •In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; •All vehicles used during the project should be properly maintained and in good working order; •All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Low	Minimal	High Degree
				Layout 2			Neighbouring	Medium-term	Medium	Definite	Low-Medium	High		Low	Low	Minimal	High Degree
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Neighbouring	Incidental	Medium	Definite	Low-Medium	High	Control through noise control measures including: •The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; •Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; •Construction activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •When required noise mufflers should be utilised to reduced noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Medium	Low	No Loss	Reversible
				Layout 2			Neighbouring	Incidental	Medium	Definite	Low-Medium	High		Medium	Low	No Loss	Reversible
	TOPOGRAPHY	Direct	Temporary alteration of topography	Layout 1	Yes	Negative	Neighbouring	Short-term	Low-Medium	Definite	Low	High	None	Low	Low	No Loss	Reversible
				Layout 2			Neighbouring	Short-term	Low-Medium	Definite	Low	High		Low	Low	No Loss	Reversible
	SOIL	Direct	Stockpiling of materials may cause soil compaction.	Layout 1	Yes	Negative	Site	Short-term	Medium-High	Definite	Low-Medium	High	Control and stop through mitigation measures including: •Stockpiling only to be done on designated approved areas.	Low	Low	No Loss	Reversible
				Layout 2			Site	Short-term	Medium-High	Definite	Low-Medium	High		Low	Low	No Loss	Reversible
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Layout 1	No	Negative	Site	Permanent	High	Possible	Low-Medium	High	Prevent through: •Complying with legislation and best practice health and safety standards.	High	Low	Minimal	High Degree
				Layout 2			Site	Permanent	High	Possible	Low-Medium	High		High	Low	Minimal	High Degree
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Regional	Permanent	Medium	Highly Likely	Medium-High	High	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Medium	Low	Minimal	High Degree
				Layout 2			Regional	Permanent	Medium-High	Definite	High	High		Low	Medium-High	Partial	Medium Degree
VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Highly Likely	Low-Medium	High	Control measures to reduce visual impact including: •Suitable screening to be put in place during construction to minimise visual impacts; •No littering to be allowed; •Good housekeeping practices to be followed.	High	Low	No Loss	Reversible	
			Layout 2			Neighbouring	Short-term	Medium	Highly Likely	Low-Medium	High		High	Low	No Loss	Reversible	
TOPOGRAPHY	Direct	Temporary alteration of topography caused by drill rig.	Layout 1	Yes	Negative	Local	Short-term	Medium	Definite	Low-Medium	High	None	None	Low-Medium	No Loss	Reversible	
			Layout 2			Local	Short-term	Medium	Definite	Low-Medium	High		None	Low-Medium	No Loss	Reversible	
NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Local	Incidental	Medium	Definite	Low-Medium	High	Control through noise control measures including: •The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; •Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; •Where possible, drilling and mining activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •When required noise mufflers should be utilised to reduced noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	Low	No Loss	Reversible	
			Layout 2			Local	Incidental	Medium	Definite	Low-Medium	High		Low	Low	No Loss	Reversible	
HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	Site	Permanent	High	Possible	Low-Medium	High	Prevent through: •Complying with legislation and best practice health and safety standards.	High	Low	Minimal	High Degree	
			Layout 2			Site	Permanent	High	Possible	Low-Medium	High		High	Low	Minimal	High Degree	

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		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P					LOSS RESOURCE	REVERSIBILITY		
Sinking of shafts and vent raises and construction of SWD.	GROUNDWATER	Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Local	Medium-term	Low	Highly Likely	Low-Medium	High	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
				Layout 2			Local	Medium-term	Low	Highly Likely	Low-Medium	High		High	Reversible				
		Direct	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 1	Yes	Negative	Local	Long-term	Low-Medium	Definite	Medium	High	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
				Layout 2			Local	Long-term	Low-Medium	Definite	Medium	High		High	Reversible				
		Direct	Impacts on groundwater qualities due to construction of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
				Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible				
		Direct	Impacts on groundwater qualities due to construction of the unlined No 3A, 3B and 3C Shafts	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
				Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible				
		Direct	Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Proper construction and maintenance Regular inspection of the lining system Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
				Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible				
		Civil works including establishment of infrastructure on site including the stormwater dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water (service water) pipeline, potable water pipeline, mud pipeline, sewage pipeline, backfill pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablation/change house, waste storage area and stores, including cement mixing.	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Definite	Low-Medium	High	Control through mitigation measures including: •All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; •In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; •All vehicles used during the project should be properly maintained and in good working order. •All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Low	Minimal	High Degree
						Layout 2			Neighbouring	Medium-term	Medium	Definite	Low-Medium	High		Low	Low	Minimal	High Degree
NOISE	Direct		Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Neighbouring	Incidental	Medium	Definite	Low-Medium	High	Control through noise control measures including: •The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; •Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; •Construction activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •When required noise mufflers should be utilised to reduced noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Medium	Low	No Loss	Reversible		
				Layout 2			Neighbouring	Incidental	Medium	Definite	Low-Medium	High		Medium	Low	No Loss	Reversible		
SOIL AND WATER	Direct		Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Layout 1	No	Negative	Regional	Short-term	Medium	Possible	Low	High	Control and stop through mitigation measures including: •Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil. •Appropriate installation and maintenance of temporary and permanent ablation facilities sanitation infrastructure. •No cement mixing may occur on open ground. •Drip trays to be used under stationary vehicles.	High	Low	Minimal	High Degree		
				Layout 2			Regional	Short-term	Medium	Possible	Low	High		High	Low	Minimal	High Degree		
VISUAL	Direct		Visual impact	Layout 1	Yes	Negative	Neighbouring	Short-term	Medium	Definite	Low-Medium	High	Control measures to reduce visual impact including: •Suitable screening to be put in place during construction to minimise visual impacts; •No littering to be allowed; •Good housekeeping practices to be followed.	Medium	Low	No Loss	Reversible		
				Layout 2			Neighbouring	Short-term	Medium	Definite	Low-Medium	High		Medium	Low	No Loss	Reversible		
Energy, water, raw materials and fuel consumption	NATURAL RESOURCES		Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Layout 1	Yes	Negative	National	Long-term	Medium-High	Possible	Low-Medium	High	Control through minimisation strategies: •Reduce consumption of water by reusing water where possible; •Water and energy minimisation strategies to be included in the EIA/EMPr and implemented.	Medium	Low	Minimal	High Degree	
					Layout 2			National	Long-term	Medium-High	Possible	Low-Medium	High		Medium	Low	Minimal	High Degree	
Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp. Rehabilitation of construction camp and other construction areas, including along the raw water (service water) potable water, sewage, mud and backfill pipelines and access and haul roads.	SOILS		Direct	Soil erosion, compaction and contamination, as well as loss of topsoil.	Layout 1	Yes	Negative	Neighbouring	Medium-term	Medium	Likely	Low	High	Prevent and control through appropriate rehabilitation techniques recommended by biodiversity specialists.	High	Low	Minimal	High Degree	
					Layout 2			Neighbouring	Medium-term	Medium	Likely	Low	High		High	Low	Minimal	High Degree	
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Local	Medium-term	Medium	Likely	Low-Medium	High	Avoid through control measures including: •Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	High	Low	Minimal	High Degree		
				Layout 2			Local	Medium-term	Medium	Likely	Low-Medium	High		High	Low	Minimal	High Degree		
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavations to be backfilled.	Layout 1	No	Negative	Site	Permanent	High	Possible	Low-Medium	High	Prevent through: •Complying with legislation and best practice health and safety standards.	High	Low	Minimal	High Degree		
				Layout 2			Site	Permanent	High	Possible	Low-Medium	High		High	Low	Minimal	High Degree		
	SOILS AND WATER	Direct	Contamination of surface and ground water through spillages of hydrocarbons and waste water.	Layout 1	No	Negative	Regional	Incidental	Medium	Possible	Low	High	Prevent through control measures: •Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil; •Drip-trays to be used underneath stationary vehicles and machinery.	High	Low	Minimal	High Degree		
				Layout 2			Regional	Incidental	Medium	Possible	Low	High		High	Low	Minimal	High Degree		
	BIODIVERSITY	Direct	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Layout 1	Yes	Negative	Site	Medium-term	Medium-High	Highly Likely	Low-Medium	High	Prevent and control through appropriate rehabilitation techniques and monitoring recommended by biodiversity specialists.	High	Low	Minimal	High Degree		
				Layout 2			Site	Medium-term	Medium-High	Highly Likely	Low-Medium	High		High	Low	Minimal	High Degree		

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MANAGEMENT & MITIGATION MEASURES	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A+B+C) X P					LOSS RESOURCE	REVERSIBILITY
Creation of employment opportunities throughout the construction phase.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	Layout 1	Yes	Positive	Regional	Short-term	High	Definite	Medium-High	High	Use of local labour force. Implement approved Social and Labour Plan	Very High	High	No Loss	Reversible
				Layout 2			Regional	Short-term	High	Definite	Medium-High	High		Very High	High	No Loss	Reversible
OPERATIONAL PHASE																	
Operation of shaft complex and removal of ore.	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Local	Short-term	Medium	Highly Likely	Low-Medium	High	Control through: •The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; •Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; •Where possible, drilling and mining activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •When required noise mufflers should be utilised to reduced noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	Low	No Loss	Reversible
				Layout 2			Local	Short-term	Medium	Highly Likely	Low-Medium	High		Low	Low	No Loss	Reversible
	TOPOGRAPHY/VISUAL	Direct	Temporary alteration of topography caused by drill rig causing visual impact.	Layout 1	Yes	Negative	Local	Short-term	Medium	Definite	Low-Medium	High	None	None	Low-Medium	No Loss	Reversible
				Layout 2			Local	Short-term	Medium	Definite	Low-Medium	High		None	Low-Medium	No Loss	Reversible
	SOILS	Direct	Soil alteration through soil erosion and compaction on the surface, as well as contamination through spillages of hydrocarbons.	Layout 1	No	Negative	Site	Short-term	Medium	Possible	Low	High	Control and stop through mitigation measures including: •To reduce the loss of material by erosion, disturbance must be kept to a minimum. •Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil. •Spillages of hydrocarbons to be prevented.	High	Low	Minimal	High Degree
				Layout 2			Site	Short-term	Medium	Possible	Low	High		High	Low	Minimal	High Degree
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	Site	Permanent	High	Possible	Low-Medium	High	Prevent through: •Complying with legislation and best practice health and safety standards.	High	Low	Minimal	High Degree
				Layout 2			Site	Permanent	High	Possible	Low-Medium	High		High	Low	Minimal	High Degree
	BIODIVERSITY	Direct	Continued disturbance and degradation of the vegetation community and encroachment by alien invasive plant species.	Layout 1	No	Negative	Local	Permanent	High	Highly Likely	Medium-High	High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Dust-reducing mitigation measures; A spill management plan must be put in place; All rubble generated must be removed from the site; Keep storm water away from the working/mining areas; Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion. Implementation of a fire management plan; Environmental awareness training.	High	Low	Minimal	High Degree
				Layout 2			Local	Permanent	High	Highly Likely	Medium-High	High		Medium	Low-Medium	Minimal	High Degree
		Direct	Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, traffic and dust).	Layout 1	No	Negative	Local	Permanent	Medium-High	Highly Likely	Medium-High	High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; If any faunal are recorded during operation, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project; Waste management; Inspection of pipelines for leaks; Transmission lines should be fitted with bird diverters; Lighting should be kept to a minimum; Implementation of a fire management plan; Environmental awareness training.	High		No Loss	Reversible
				Layout 2			Local	Permanent	Medium-High	Highly Likely	Medium-High	High		Medium	Low-Medium	Minimal	High Degree
		Direct	Loss of faunal species (road mortalities and/or poaching)	Layout 1	No	Negative	Local	Permanent	Medium-High	Highly Likely	Medium-High	High	Implementation of a fire management plan; Environmental awareness training. No killing of animals; Speedbumps;	High	Low	Minimal	High Degree
				Layout 2			Local	Permanent	Medium-High	Highly Likely	Medium-High	High		High	Low	Minimal	High Degree
		Direct	Infringement by humans into the few remaining natural grassland and wetlands areas, with associated impacts such as poaching, litter as well as introduction of pests, diseases and feral species such as cats.	Layout 1	No	Negative	Local	Permanent	High	Highly Likely	Medium-High	High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Waste management; Inspection of pipelines for leaks; Transmission lines should be fitted with bird diverters; Lighting should be kept to a minimum; Implementation of a fire management plan; Environmental awareness training; No domesticated animals or feral species allowed at the site.	High		No Loss	Reversible
				Layout 2			Local	Permanent	High	Highly Likely	Medium-High	High		High		No Loss	Reversible
	WETLAND AND DRAINAGE LINE	Direct	Water quality	Layout 1	Yes	Positive	Neighbouring	Long-term	Medium	Highly Likely	Medium	High	Rehabilitation of construction impacted area, continuous monitoring.	Medium	Medium	No Loss	Reversible
				Layout 2			Neighbouring	Long-term	Medium	Highly Likely	Medium	High		Medium	Medium	No Loss	Reversible
		Indirect	Silt	Layout 1	Yes	Positive	Local	Long-term	Medium	Definite	Medium	High	Rehabilitation of construction impacted area, continuous monitoring and maintenance.	Medium	Medium	No Loss	Reversible
				Layout 2			Local	Long-term	Medium	Definite	Medium	High		Medium	Medium	No Loss	Reversible
Direct		Surface water run-off	Layout 1	Yes	Positive	Local	Long-term	Medium	Highly Likely	Medium	High	Rehabilitation of construction impacted area, continuous monitoring, storm water management, and silt management; Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved;	High	Medium	No Loss	Reversible	
			Layout 2			Local	Long-term	Medium	Highly Likely	Medium	High		High	Medium	No Loss	Reversible	
Indirect	Contamination of water from hazardous substances	Layout 1	Yes	Negative	Site	Incidental	Low-Medium	Possible	Low	High	Approved stormwater management plan must be implemented. Wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands	High	Low	Minimal	High Degree		
		Layout 2			Site	Incidental	Low-Medium	Possible	Low	High		High	Low	Minimal	High Degree		

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MANAGEMENT & MITIGATION MEASURES	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE		
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P					LOSS RESOURCE	REVERSABILITY	
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	DISTURBANCE OF NATURAL SYSTEMS	Direct	Disturbance of natural system	Layout 1	Yes	Negative	Neighbouring	Long-term	Low-Medium	Likely	Low	High	and their associated drivers; Wetland drivers should be protected as far as possible. Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored. Water quality preservation is key. Monitoring should take place during the operational phase as per the Water Use License (WUL) requirements. Enhance wetland integrity.	High	Low	Minimal	High Degree	
				Layout 2			Neighbouring	Long-term	Low-Medium	Likely	Low	High		High	High Degree			
		Direct	Disturbance/pollution of sub-surface flow	Layout 1	Yes	Negative	Neighbouring	Long-term	Low	Likely	Low	High		High	High Degree			
				Layout 2			Neighbouring	Long-term	Low	Likely	Low	High		High Degree				
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Neighbouring	Long-term	Low	Highly Likely	Low-Medium	High		High	High Degree			
				Layout 2			Neighbouring	Long-term	Low	Highly Likely	Low-Medium	High		High Degree				
	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Local	Long-term	Medium-High	Highly Likely	Medium	High	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent must be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	Medium	Low	Minimal	High Degree	
				Layout 2			Local	Long-term	Medium-High	Highly Likely	Medium	High		High Degree				
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	Local	Long-term	Medium	Definite	Medium	High	Control through mitigation measures including: •All vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; •In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; •All vehicles used during the project should be properly maintained and in good working order; •All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Low-Medium	Minimal	High Degree	
				Layout 2			Local	Long-term	Medium	Definite	Medium	High		High Degree				
		NOISE	Indirect	Noise generation by increased traffic on the surrounding roads.	Layout 1	Yes	Negative	Local	Long-term	Medium	Definite	Medium	High	Control through noise control measures including: •Where possible, mining activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •Road users should adhere to speed limits; •Mining vehicles to be serviced at appropriate intervals to reduce unnecessary noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	Low-Medium	No Loss	Reversible
					Layout 2			Local	Long-term	Medium	Definite	Medium	High		Reversible			
Direct			Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Neighbouring	Long-term	Medium	Definite	Medium	High	Medium		Low	No Loss	Reversible	
				Layout 2			Neighbouring	Long-term	Medium	Definite	Medium	High	Medium		Low	No Loss	Reversible	
SOILS	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Layout 1	No	Negative	Neighbouring	Long-term	Medium	Possible	Low	High	Control and stop through mitigation measures including: •Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; •Mining vehicles to keep to the designated roads; •Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials.	High	Low	Minimal	High Degree		
			Layout 2			Neighbouring	Long-term	Medium	Possible	Low	High		High Degree					
BIODIVERSITY	Direct	Increase in fauna mortalities on the roads.	Layout 1	No	Negative	Local	Permanent	High	Possible	Low-Medium	High	Control through mitigation measures including: •Enforce speed limits; •Penalties or fines for reckless driving.	Medium	Low	Minimal	High Degree		
			Layout 2			Local	Permanent	High	Possible	Low-Medium	High		High Degree					
HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	Local	Permanent	High	Possible	Low-Medium	High	Control through mitigation measures including: •Enforce speed limits; •Penalise or fines for reckless driving.	High	Low	Minimal	High Degree		
			Layout 2			Local	Permanent	High	Possible	Low-Medium	High		High Degree					
TRAFFIC	Direct	Increased traffic on adjacent roads and access issues.	Layout 1	Yes	Negative	Local	Long-term	Medium	Highly Likely	Medium	High	Reduce unnecessary trips through efficient planning.	Medium	Low	Minimal	High Degree		
Layout 2	Local	Long-term	Medium			Highly Likely	Medium	High	High Degree									
NATURAL RESOURCES	Direct	Increased fuel consumption.	Layout 1	Yes	Negative	National	Medium-term	Low	Definite	Medium	High	Reduce unnecessary vehicle trips through efficient planning.	Low	Low-Medium	Minimal	High Degree		
Layout 2	National	Medium-term	Low			Definite	Medium	High	High Degree									
GROUNDWATER	Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Local	Medium-term	Low	Highly Likely	Low-Medium	High	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
			Layout 2			Local	Medium-term	Low	Highly Likely	Low-Medium	High		High	Reversible				
	Direct	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 1	Yes	Negative	Local	Long-term	Low-Medium	Definite	Medium	High	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
			Layout 2			Local	Long-term	Low-Medium	Definite	Medium	High		High	Reversible				
	Direct	Impacts on groundwater qualities due to operation of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
			Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible				
	Direct	Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible		
			Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible				
Direct	Impacts on groundwater qualities due to seepage from the Reef and Waste Storage Silos	Layout 1	Yes	Negative	Local	Medium-term	Low	Likely	Low	High	Proper construction and maintenance Regular inspection of the lining system Installation of monitoring boreholes and monitoring	High	Low	No Loss	Reversible			
		Layout 2			Local	Medium-term	Low	Likely	Low	High		High	Reversible					
SERVICES	Direct	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Layout 1	Yes	Negative	Regional	Long-term	Medium-High	Possible	Low-Medium	High	Lining of shafts 3 and 4 Lining / sealing off of individual inflow areas of ventilation shafts Maintenance of lining	High	Low	Minimal	High Degree		
			Layout 2			Regional	Long-term	Medium-High	Possible	Low-Medium	High		High Degree					

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MANAGEMENT & MITIGATION MEASURES	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P					LOSS RESOURCE	REVERSABILITY
Operation of conveyor belts	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Neighbouring	Long-term	Medium	Possible	Low	Medium	Control through: •The provisions of SANS 10103:2008 will apply to all areas within an audible distance of residents or adjacent landowners; •Conveyor belts, if any, which will be used must comply with the manufacturer's specifications on acceptable noise levels; •Where possible, operation activities should be limited to daytime only; •Noise monitoring should be undertaken as spot checks; •When required noise mufflers should be utilised to reduced noise; •It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Medium	Low	No Loss	Reversible
				Layout 2			Neighbouring	Long-term	Medium	Possible	Low			Medium	Medium	Low	No Loss
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water (service water) pipelines, sewage, backfill and mud pipelines, access and haul roads.	SOILS	Direct	Soil erosion, compaction and contamination.	Layout 1	No	Negative	Site	Long-term	Medium	Highly Likely	Low-Medium	Medium	Control and stop through mitigation measures including: •Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; •Mining vehicles to keep to the designated roads; •Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials; •Spill procedures to be approved and implemented and included in the EIA/EMPr.	High	Low	Minimal	High Degree
				Layout 2			Site	Long-term	Medium	Highly Likely	Low-Medium			Medium	High	Low	Minimal
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Local	Long-term	Medium	Likely	Low-Medium	Medium	Avoid through control measures including: •Alien invasive species control methods to be included in the EIA/EMPr and implemented; •Recommendations by Biodiversity specialist to be included in the EIA/EMPr and implemented.	High	Low	Minimal	High Degree
				Layout 2			Local	Long-term	Medium	Likely	Low-Medium			Medium	High	Low	Minimal
Energy, fuel, water consumption and depletion of minerals	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Layout 1	Yes	Negative	National	Permanent	Medium-High	Possible	Low-Medium	Medium	Control through minimisation strategies: •Reduce consumption of water by reusing water where possible; •Water and energy minimisation strategies to be included in the EIA/EMPr and implemented.	Medium	Low	Minimal	High Degree
				Layout 2			National	Permanent	Medium-High	Possible	Low-Medium			Medium	Medium	Low	Minimal
Creation of new employment opportunities and sustaining existing employment at the mine.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Layout 1	Yes	Positive	Regional	Long-term	High	Definite	High	Medium	Use of local labour. Implementation of Social and Labour Plan	Very High	High	No Loss	Reversible
				Layout 2			Regional	Long-term	High	Definite	High			Medium	Very High	High	No Loss
Operation of the shaft complex	SOCIO-ECONOMIC	Indirect	Decline/increase in property value	Layout 1	Yes	Negative	Local	Long-term	Medium-High	Likely	Low-Medium	Medium	Implementation of all the mitigation measures in the EMPr.	Medium	Low	No Loss	Reversible
				Layout 2			Local	Long-term	Medium-High	Likely	Low-Medium			Medium	Medium	Low	No Loss
		Indirect	Loss of Sense of Place	Layout 1	Yes	Negative	Local	Long-term	Medium	Likely	Low-Medium	Medium	Implementation of all the mitigation measures in the EMPr.	Very Low	Low-Medium	Partial	Medium Degree
				Layout 2			Local	Long-term	Medium	Likely	Low-Medium			Medium	Very Low	Low-Medium	Partial