

Environmental Impact Significance Determination

OPERATIONAL PHASE

Activity, Phase and Impact					Impact Rating (before mitigation)							Impact Rating (after mitigation)								
Impacted Environment	Phase impact occurs (C, O, D, PC)	Activity No.	Activity	Summary of Impact	Reference in EIA	Nature of Impact (positive / Negative)	Extent (5)	Duration (5)	Severity (5)	Probability (5)	Consequence (15)	Significance (75)	Mitigation Measures	Nature of Impact (positive / Negative)	Extent	Duration	Severity	Probability	Consequence	Significance (75)
Biophysical Impacts																				
Geology	O	12	Coal removal	The coal will be removed, permanently altering the geology	7.3	N	1	5	3	5	9	45	No mitigation will be possible	N	1	5	3	5	9	45
Topography	O,D	10	Topsoil and overburden removal and stockpiling	The natural lie of the land will be altered. This alteration of the land will have further impacts on surface water flow dynamics as the natural drainage pattern is disrupted. Alteration of slope direction and slope percentages, thus creating the potential for erosion.	7.2/ 11.3.1	N	2	3	4	5	9	45	Mitigation is limited and is covered under soil and surface water	N	2	3	4	5	9	45
	O,D	16	Discard dump	Altering slope direction and percentages, thus creating the potential for erosion. Possibility of the siltation of drainage networks.		N	1	3	4	5	8	40	Engineering design to be adhered to to ensure slopes are stable and dump is rehabilitated effectively	N	1	3	3	5	7	35
	O,D	19	Concurrent replacement of overburden and topsoil and re-vegetation	Improvement of natural surface flow dynamics.		P	1	2	3	4	6	24	Replacement of overburden and topsoil but occur as soon as possible. Rehabilitated areas must be contoured .	P	1	2	3	5	6	30
Soil	O	10	Topsoil and overburden removal and stockpiling	Compaction of soil, erosion of exposed areas and decrease in available land for agricultural practices. Natural soil horizons are destroyed.	7.4/ 11.3.2	N	1	3	5	5	9	45	Compile accurate soil map showing classification, thickness, fertility status. Remove and stockpile 0.3 m- 0.35 m topsoil in berms or heaps less than 2 - 3 m high. Do not use as storm water control feature. Vegetate with diverse grass mix to control erosion. Wetland soils should only be stockpiled at heights of 1 - 2 m. Subsoil stockpiles can be bigger but must be protected against erosion similar to topsoil stockpiles. Ensure that a storm water management plan is implemented.	P	1	3	4	5	8	40
	O,D	13	Vehicular activity on haul roads	Compaction of soil, erosion of exposed areas and soil contamination.		N	1	3	4	5	8	40	All vehicles must be restricted to roads and designated areas. All coal haul trucks must be covered. Maintenance and refuelling must occur on hard park surfaces and if not drip trays must be placed under vehicles parked on exposed soil.	P	1	3	3	5	7	35
	O,D	19	Concurrent replacement of overburden and topsoil and re-vegetation	Improved integration between soil and vegetation. Possible erosion of rehabilitated areas in the event that revegetation does not occur. Soil properties have been altered.		P	1	3	4	4	8	32	Rehabilitation must ensure long-term stability and not compromise post-mining land use objectives. Ensure monitoring and remediate if necessary soil fertility, soil acidity and depths	P	1	3	4	5	8	40
	O	9	Storage of fuel , lubricant and explosives	Risk of contamination of surface water resources from improper storage, incorrect handling and spillages		N	1	3	3	3	7	21	A hydrocarbon and chemical management standard operating procedure	P	1	2	2	3	5	15

Surface Water	O	10	Topsoil and overburden removal and stockpiling	Long term stockpiling of overburden resulting in prolonged exposure may result in the the potential of Acid Mine Drainage concurring . As rehabilitation is undertaken it will alter the flow dynamics of the area and exposed soil will be come susceptible to soil erosion which could result in siltation of surface water bodies	7.5/ 11.3.3	N	3	4	5	4	12	48	All water from overburden stockpiles must be collected and treated as dirty water . Soil stockpiles must be vegetated as son as possible. During rehabilitation exposed areas must be vegetated.	P	2	3	4	3	9	27
	O	14	Water use around site	water use from a stressed water source will impact on the availability of water for existing users		N	2	3	4	4	9	36	Water recycling must be maximised.	P	2	3	3	3	8	24
	O	15	Screening and washing	Runoff from the plant area could result in in the contamination of surface water.		N	2	3	4	4	9	36	The plant must be constructed on an impermeable surface and all waste water resulting from the process must be collected and reused. All runoff from the plant area must be collected and treated as dirty water	P	2	3	2	3	7	21
	O,D,PC	16	Discard dump	Potential contamination of surface water from seepage and runoff from the discard dump		N	3	5	5	4	13	52	The discard dump must be designed correctly in order to prevent seepage and containment of run off	P	2	3	4	4	9	36
	O, D, PC	17	Pollution control dams	Possible contamination of surface water due to leakages or spillages from pollution control dams		N	3	4	4	4	11	44	Pollution control should be lined and maintained. They must be constructed in terms of DWAF BPG to ensure sufficient freeboard.	P	2	4	3	3	9	27
	O,D	18	Waste and sewage generation and disposal	Possible contamination of surface water incorrect disposal and handling of waste and sewage disposal		N	2	3	3	3	8	24	Waste disposal facilities must be correctly managed and maintained. Sewage disposal facilities must be monitored to ensure correct operation.	P	2	2	2	2	6	12
Groundwater	C,O& D	9	Storage of fuel, lubricant and explosives	Possible contamination of groundwater through incorrect storage of, fuel and lubricants as well as through potential spillages	7.6/11. 3.4	N	2	3	3	5	8	40	All hydrocarbons, lubricants and explosives should be adequately stored and banded off to prevent any contamination to the groundwater during an accidental spill.	N	1	3	2	4	6	24
	O & D	10	Topsoil and overburden removal and stockpiling	Infiltration runoff from stockpiles, resulting in groundwater contamination		N	1	2	3	5	6	30	The stockpile footprint should be compacted to prevent infiltration of contaminated water into the sub-surface. Runoff from stockpiles must be contained and managed.	N	1	2	2	5	5	25
	O	12	Coal removal	Impact on groundwater quality		N	2	5	5	5	12	60	No mitigation will be possible	N	2	5	5	5	12	60
	C, O & D	14	Water use around site	Reduction of the recharge of aquifers and the lowering of the water table affecting water quantity		N	1	3	1	5	5	25	Grey water should be collected into a dirty water system and recycled.	N	1	3	1	5	5	25
	O	15	Screening and washing	Groundwater contamination		N	1	3	2	5	6	30	Dirty water should be collected and pump to pollution control dams.	N	1	3	1	5	5	25
	O & D	16	Discard dumps	Contaminated water from infiltrating to aquifers		N	2	4	5	5	11	55	The discard dump footprint should be compacted and lined to prevent infiltration of contaminated water into the sub-surface. Water collected from penstock should be pump back to pollution control dams. Runoff from discard dump must be contained and managed. Monitoring boreholes must be drilled and sampled to detect any contamination	N	1	5	3	4	9	36

	O & D	17	Pollution control dams	Contaminated water from infiltrating to aquifers		N	2	3	3	3	8	24	Pollution control dams should be lined to prevent infiltration to aquifers. Water level in pollution control dam should always have a 0.8m freeboard available during a 1:50 year flood event.	N	2	1	2	3	5	15
	C, O & D	18	Waste and sewage generation and disposal	Grounwater contamination through spillages and inadequate waste handling		N	2	3	3	5	8	40	All waste storage areas should be adequately stored and banded off to prevent any contamination to the groundwater during an accidental spill or leaks. Sewage should be collected by an authorized contractor and disposed of at a licensed waste disposal site	N	1	3	2	4	6	24
	O & D	19	Concurrent replacement of overburden and topsoil and revegetation	AMD formation		P	1	3	2	5	6	30	Material with acid generating potential should be backfilled in areas were flooding is possible to reduce the risk of AMD polluting the underlying dolomites. It is strongly recommended that high acid generating potential material should not be backfilled and rather kept on the discard dump were management options are easier.	P	1	3	2	5	6	30
Air Quality	O,D,PC	10, 11 & 19	Topsoil and overburden removal and stockpiling, drilling and blasting and discard dump	The movement and placing of soil will contribute to dust levels. Exposed soil will also contribute to dust levels. Blasting activities will contribute to dust levels. The coal discard dump will result in windblown coal dust	7.7/ 11.3.5	N	2	4	3	5	9	45	Stockpiles must be vegetated if they are to remain for a long period of time. Once soils have been replaced they should be watered to reduce the loss of soil from wind and increase in dust. Vegetation must be encouraged on all exposed soil surfaces. Dust monitoring to continue throughout operations. The discard dump should be rehabilitate as soon as possible	N	2	4	2	3	8	24
	O,D	13	Vehicular activity on haul roads	Continual vehicular movement on haul roads will contribute to dust levels. Wind blow coal dust can occur during transportation of coal.		N	2	3	4	4	9	36	Haul roads need to be sprayed with water twice daily to reduce dust, or must be treated during the dry season. Coal haul trucks must be covered while transporting coal.	P	2	3	3	3	8	24
Noise	O,D	10, 12, 13& 19	Topsoil and overburden removal and stockpiling, coal removal, vehicular activity on haul roads, concurrent replacement of overburden and topsoil and revegetation	The excavators and haul trucks and other construction machinery which will be a source of continuous noise throughout the operational phase	7.8/ 11.3.6	N	2	3	2	4	7	28	Rehabilitation must ensure long-term stability and not compromise post-mining land use objectives. Ensure monitoring and remediate if necessary soil fertility, soil acidity and depths	P	2	3	1	4	6	24
	O	11	Drilling and blasting of hard overburden	The blasting activities are expected to impact on the ambient noise levels of the area. The blasting and drilling activities will be the highest noise producing source during the operational phase.		N	3	3	4	5	10	50	limited to daylight hours when ambient noise levels are highest. Reduction of the powder factor, that is, use of less explosive per cubic yard of overburden; Restriction of blasting to daylight hours are mitigation measures that should be followed .The use of millisecond delays between rows of blast holes in a given blasting pattern in order to reduce the amount of explosive charge detonated at any given instant is recommended.	P	3	3	2	5	8	40
	O	15	Screening and washing	Localized impact and is expected not to extend beyond the site boundarv		N	1	3	2	2	6	12	Optimum location of plant, away from nearest sensitive receptors. Noise barriers in the form of screens installed at various positions around the wash plant.		1	3	1	2	5	10

Air blasting and ground vibration	O	11	Drilling and blasting of hard overburden	Air blasting could result in fly rock. Blasting activities could be come problematic to near by chicken farms. Ground vibration can result in damage to infrastructure. Blasting activities also contribute to both noise and dust fallout levels.	7.9/ 11.3.7	N	3	3	5	4	11	44	Strict controls will need to be imposed as well on surface initiation of any explosive as this will immediately induce undesirable effects into the surroundings. Reduced charges and control on stemming will be assisting in reducing the possibilities of complaints from home owners. The greater the distance between receptors and the blast the less is the influence.	N	3	3	4	4	10	40
Flora & fauna	C,O	10	Topsoil and overburden removal and stockpiling	The removal of topsoil and overburden will result in stockpiling of the material which will increase the potential of the stockpiles becoming eroded as a result of winds and rain moving across the areas	7.10/ 11.3.8	N	1	2	3	4	6	24	Removal of vegetation during stripping will be minimised to reduce the erosion potential. Topsoil will only be removed off areas proposed for immediate mining as in accordance to the conceptual mine plan. Stockpiles will conform to best practice guidelines to reduce erosion risk	N	1	2	2	3	5	15
	O,D	13	Vehicular activity on haul roads	The vehicular activity will result in the creation of dust and coal dust which will increase the deposits these materials on plant leaves, blocking stomata and inhibiting evapotranspiration.		N	1	2	2	4	5	20	Coal haulage trucks must be covered. Dust suppression must be undertaken.		1	2	2	3	5	15
	O,D, PC	19	Concurrent replacement of overburden and topsoil and re-vegetation	The replacement of overburden and topsoil may result in the reduction of available space for alien invasive species, soil erosion and soil compaction. May also will create favourable habitat for indigenous plant species, and promote rehabilitation efforts.		P	1	2	3	4	6	24	Once overburden and topsoil has been place on the area seeding must be undertaken as soon as possible with grasses such as a standard seed-mix . Any alien invasive species that establish them selves in rehabilitated areas must be removed. If compaction of the areas occur they must be ripped to encourage plant growth. Rehabilitated areas must be monitored and maintaining to prevent soil erosion as stipulated in the rehabilitation plan that is compiled as part of the closure plan for the mine.	P	1	2	4	5	7	35
	O,D	9 & 18	Storage of fuel, lubricant and explosives and waste ad sewage generation and disposal	Incorrect, storage of these materials may result in the potential pollution of surface water and top soil resources due to spillages and leaks which may impact negatively on plants and subsequently animals.		N	1	3	3	3	7	21	Store waste in banded areas, regular removal of waste off site and reporting of any spillages. Adhere to emergency response plan in the case of a spill and rehabilitated contaminated soil and re-vegetate. Monitor for any problem areas.	N	1	3	2	2	6	12
	O,D	9 & 18	Storage of fuel, lubricant and explosives and waste ad sewage generation and disposal	Incorrect, inadequate or negligent storage of these materials may result in the potential pollution of surface water resources due to pollutant and toxicant spillages and leaks which may impact negatively the water quality and ecological functioning of the systems.		N	2	3	3	3	8	24	The storage of materials and substances will be housed in suitable facilities and managed. Emergency reponse plan to be put in place if spillages occur.	N	2	3	2	2	7	14
	O	10	Topsoil and overburden removal and stockpiling	Increase the potential load of sedimentation of the water resources . Erosion of exposed surfaces. The removal of the topsoil and vegetation reduces the potential for recharge of shallow aquifers that feed hillslope wetlands, which in turn reduces the flow in water resources.		N	2	3	5	5	10	50	Keep footprint area as minimal as possible. Vegetate all stockpiles and berms. Minimise vegetation removal.	N	2	3	4	4	9	36
	O	12	Coal removal	Both soil and coal dust being created will increase the potential of excessive siltation. This will impact on the quality of water available in the wetland units as well as inhibit the ability of the wetland units to provide key ecological services. There will be a reduction on surface water quantity due to reduction in catchments size.		N	2	3	5	5	10	50	Dust suppression measures must be implemented. Monitoring undertaken to pick up any problme areas.	N	2	2	3	3	10	30
	O,D	13	Vehicular activity on haul roads	The creation of soil as well as coal dust which will increase the potential of excessive siltation of the wetland areas. . This will impact on the quality of water available in the wetland units as well as inhibit the ability		N	2	3	1	4	6	24	Dust suppression measures must be implemented. Coal haul trucks must be covered.	N	2	3	1	2	6	12

	O	14	Water use around site	May result in underground aquifers and/or opencast areas being pumped to make water available for use. This may decrease the lateral seepage potential of the area resulting in a reduction of wetland size and potentially wetland loss. Additionally, the use of dirty water from opencast areas may impact on the quality of water within the wetland systems .	7.12/11.3.10	N	2	3	4	4	9	36	A water and waste water management plan must be implemented.	N	2	3	2	3	7	21
	O,D,PC	16	Discard dump	Seepage from the discard dump into the underground aquifers may impact on the quality of water of these aquifers which in turn provide seepage to wetland areas. In spite of this seepage process providing some water quality enhancement ability, the seepage of impacted water quality from the discard dump may impact on wetland functioning as the quality of the impacted water may not be completely restored by the seepage process.	7.12/11.3.10	N	2	4	4	4	10	40	Placement of perforated pipes and cut-off trenches to capture and drain dirty water.	P	2	4	3	4	9	36
	O,D	19	Concurrent replacement of overburden and topsoil and revegetation	This will also allow for the seepage areas to be restored to maintain sub-surface flow dynamics and restore ecological functioning. Sedimentation of the water resources due to erosion of the rehabilitated areas will be limited through the revegetation of the area.	7.12/11.3.10	P	2	3	3	3	8	24	The soil profile will be replaced to represent the original make-up and structure. Exposed areas will be revegetated which will help with the recharge of the aquifer.	P	2	3	5	4	10	40
Social Impacts																				
Visual	O, D, PC	10	Topsoil and overburden removal and stockpiling	Overburden stockpiles and discard dumps are expected to be approximately 30m in height, and will contribute the most severe visual disturbance to surrounding receptors	7.13/11.3.11	N	3	3	3	5	9	45	Where possible stockpiles and overburden dumps should be kept as low as possible, rather make the dumps longer than higher. Establish vegetation where possible	N	2	3	3	5	8	40
Traffic	O,D	13	Vehicular activity on haul roads	Increase of vehicular activity on site and the traffic to the site	7.13/11.3.11	N	2	3	4	5	9	45	All speed and safety controls must be adhered to. All vehicular must be maintained. Safety intersections must be constructed if needed.	N	2	3	4	3	9	27
Socio-economic	O	7	Employment	Mine continues to support the local economic sector through direct and indirect employment	7.15/11.3.13	P	2	3	3	4	12	48	Ensure skills training continues, increase employment where possible, employ local companies and contractors, liaise with the local community development officers	P	2	3	4	4	13	52
Cultural and Heritage Impacts																				
Findings of un-documented archaeological sites, artefacts	C,O	4, 6	Site clearing and establishment of initial box cut	Archaeological artefacts or sites may be located subsurface and can be destroyed during mining activities	7.11/11.3.9	N	1	3	2	2	6	12	In the event of the finding of archaeological artefacts subsurface or that have not been documented an archaeologist will need to be contacted immediately to identify, assess and document the discovery.	P	1	3	2	2	6	12

Significance		
High	57 - 75	
Medium-High	38 - 56	
Medium-Low	19 - 37	
Low	0 - 18	

C - Construction Phase
O - Operational Phase
D - Decommissioning Phase
PC - Post Closure Phase