

Phase	Activity	Aspect	Impact	Duration	Extent	Intensity	Probability	Nature	Consequence	Significance (Pre Mitigation)	Rating	Mitigation Measures	Duration	Extent	Intensity	Probability	Nature	Consequence	Significance (Pre Mitigation)	Rating
Construction Phase	Construction of ventilation shafts including vegetation clearing and sinking of ventilation shafts	Air Quality	Reduction in ambient air quality due to dust generation and soiling of surfaces	1	2	2	4	-1	5	-20	Negligible (negative) -	<ul style="list-style-type: none"> <li>Site clearing must be done in phases and use of suppressants and binders on exposed areas to reduce dust generation;</li> <li>The area of disturbance at all times must be kept to a minimum and no unnecessary clearing, digging or scraping must occur, especially on windy days (with wind speed ≥ 5.4 m/s);</li> <li>The drop heights when loading onto trucks and at tipping points should be minimised;</li> <li>Dust suppression must take place on exposed surfaces; and</li> <li>Set maximum speed limits on site and to have these limits enforced.</li> </ul>	1	1	1	4	-1	3	-12	Negligible (negative) -
Operational Phase	Mining Process: Tipping of ore at the Bunker and Stockpiling	Air Quality	Reduction in air quality as a result of the crushing activities as well as the tipping of the coal into the bunker.	5	2	2	3	-1	9	-27	Negligible (negative) -	<ul style="list-style-type: none"> <li>Enclosure of tipping points and crusher;</li> <li>Use of water spray to prevent coal dust dispersion;</li> <li>Use of Catalytic Converters is recommended if the levels of toxic gases are in excess of the regulatory standards; and</li> <li>Ensure bi-weekly inspections of dust suppression equipment on the bunker and transfer stations and replace faulty components.</li> </ul>	5	1	1	1	-1	7	-7	Negligible (negative) -
Operational Phase	Operation of the Ventilation Shaft	Air Quality	Release of TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>2</sub> , SO <sub>2</sub> and CO from the ventilation shafts will increase ambient levels of these pollutants.	5	2	2	3	-1	9	-27	Negligible (negative) -	<ul style="list-style-type: none"> <li>Mitigation measures such as: use of electrostatic precipitators to remove fine particles is recommended if ambient levels are exceeding regulatory standards;</li> <li>Use of Catalytic Converters is recommended if the levels of toxic gases are in excess of the regulatory standards; and</li> <li>Use of gas scrubbers to remove particulates and/or gases from emissions being released from the ventilation shafts if regulatory standards are exceeded.</li> </ul>	5	1	1	1	-1	7	-7	Negligible (negative) -
Decommissioning Phase	Sealing of shaft, decommissioning of mine infrastructure and rehabilitation	Air Quality	Sealing of ventilation shafts and rehabilitation results in dust emission	3	3	3	3	-1	9	-27	Negligible (negative) -	<ul style="list-style-type: none"> <li>Drop heights should be minimised when offloading materials;</li> <li>The dismantling area disturbed must be kept to a minimum;</li> <li>Limit rehabilitation activities to non-windy days, where possible;</li> <li>Rehabilitation must be undertaken in accordance with rehabilitation plan (Appendix O); and</li> <li>Dust suppression on exposed surfaces must be implemented including haul roads.</li> </ul>	3	2	1	2	-1	6	-12	Negligible (negative) -
Construction Phase	Site clearing, including the removal of topsoil and vegetation; Construction of ventilation shafts	Noise	Noise will emanate from the machinery and vehicles operating during the construction activities	2	2	1	3	-1	5	-15	Negligible (negative) -	<ul style="list-style-type: none"> <li>Restricting construction activities to daylight hours (06:00 – 18:00); and</li> <li>Switching off equipment when not in use.</li> </ul>	2	1	1	3	-1	4	-12	Negligible (negative) -
Operational Phase	Operation of ventilation shafts	Noise	Noise will emanate from the operation of the ventilation shafts	5	2	1	2	-1	8	-16	Negligible (negative) -	<ul style="list-style-type: none"> <li>The ventilation fan diffuser outlets should be installed horizontally and directed north.</li> </ul>	5	1	1	1	-1	7	-7	Negligible (negative) -
Operational Phase	Operation of the TCTS mine with associated infrastructure	Noise	Noise will emanate from the operation of the TCTS mine specifically the crushing facility as well as conveyor belt	5	4	5	5	-1	14	-70	Minor (negative) -	<ul style="list-style-type: none"> <li>Ensure regular inspections of the conveyor line are undertaken on a weekly basis and replace faulty rollers and other faulty components resulting in excessive noise. This should be undertaken not only from an environmental perspective but also from an operational perspective;</li> <li>Mining related machines and vehicles to be serviced to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers;</li> <li>Investigate all noise complaints promptly and advise the complainant of the outcome(s).</li> </ul>	5	2	3	3	-1	10	-30	Negligible (negative) -
Decommissioning Phase	Removal of infrastructure and surface rehabilitation	Noise	Noise will emanate from the machinery and vehicles operating during the decommissioning activities	2	2	1	2	-1	5	-10	Negligible (negative) -	<ul style="list-style-type: none"> <li>Restricting decommissioning activities to daylight hours (06:00 – 18:00);</li> <li>Switching off equipment when not in use</li> </ul>	2	1	1	2	-1	4	-8	Negligible (negative) -
Operational Phase	Sustained employment during operation	Social	Job creation during operation	5	4	4	4	1	13	52	Minor (positive) +	<ul style="list-style-type: none"> <li>Where feasible, promote the creation of employment opportunities for women and youth;</li> <li>Sasol Mining procurement and/or contracts department (or similar) to establish a monitoring system to ensure that the subcontractors honour the specified local employment policy. This can be stipulated in contractor agreements;</li> <li>If required, the local resident status of applicants should be verified in consultation with community representatives and local government;</li> <li>Ensure that existing employees have access to pertinent skills training and are able to improve their professional proficiencies throughout their employment with Sasol. This will assist with self-improvement and provide an opportunity for employees to achieve professional's goals; and</li> <li>In addition, it is recommended that local employment opportunities that may arise be maximised as far as possible, by intensifying efforts in the SLP, which are aimed at developing scarce skills.</li> </ul>	5	4	6	5	1	15	75	Moderate (positive) +
Operational Phase	Operation of the Mine	Social	Economic Growth will result in a positive contribution to GDP	5	4	2	4	1	11	44	Minor (positive) +	<ul style="list-style-type: none"> <li>Recruitment to be coordinated by Sasol Mining in accordance with recruitment policy;</li> <li>Promotion of female and youth employment; and</li> <li>Effective implementation of training and skills development initiatives.</li> </ul>	3	2	1	3	-1	6	-18	Negligible (negative) -
Operational Phase	Operation of the Mine	Social	Conflict / competition between newcomers and incumbent population	5	2	5	4	-1	12	-48	Minor (negative) -	<ul style="list-style-type: none"> <li>Recruitment to be coordinated by Sasol Mining in accordance with recruitment policy;</li> <li>Promotion of female and youth employment;</li> <li>Effective implementation of training and skills development initiatives; and</li> <li>Where possible, maximise the extent of short-term employment (over and above the full time employees and contractors) through piecemeal work and the like.</li> </ul>	5	2	1	3	-1	8	-24	Negligible (negative) -
Operational Phase	Operation of the Mine	Social	Potential Financial implication for town developers	6	2	6	5	-1	14	-70	Minor (negative) -	<ul style="list-style-type: none"> <li>Public awareness campaigns regarding subsidence; and</li> <li>Investment in development to secure housing options for employees, and thereby reassuring public.</li> </ul>	3	2	4	4	-1	9	-36	Minor (negative) -
Operational Phase	Operation of the Mine	Social	Community development induced by Local Economic Development (LED) and Corporate Social Investment (CSI)	5	3	1	4	1	9	36	Minor (positive) +	<ul style="list-style-type: none"> <li>The details of Sasol Mining's proposed LED programmes must be designed and implemented in consultation with both community representatives and municipal management to ensure that the actual needs of communities are met; and</li> <li>All LED projects must include a monitoring and evaluation plan, to ensure that the effectiveness of each project is tracked and aligned to its intended objectives. Identified areas for improvement should be incorporated into the following years planning</li> </ul>	6	3	5	6	1	14	84	Moderate (positive) +
Operational Phase	Operation of the Mine	Social	Potential subsidence related impacts	5	2	5	2	-1	12	-24	Negligible (negative) -	<ul style="list-style-type: none"> <li>Ensure regular communication with stakeholders; and</li> <li>Any unintended (factual) damage and/or losses that are incurred by impacted persons must be addressed on a case-by-case basis, in accordance with South African.</li> </ul>	5	2	5	2	-1	12	-24	Negligible (negative) -
Operational Phase	Theft during the operation of the mine	Social	Theft of cattle, farming equipment and other valuables within the project site associated with increased activity from the mine	6	3	6	5	-1	15	-75	Moderate (negative) -	<ul style="list-style-type: none"> <li>Ensure theft is prohibited at the mine and warn workers of the consequence of stealing;</li> <li>Transporting workers to and from site after their shifts;</li> <li>Advise workers not to buy anything from farm workers; and</li> <li>All communication with farmers will be undertaken through the Sasol Mineral Rights Department (SMRD).</li> </ul>	5	2	2	3	-1	9	-27	Negligible (negative) -

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Operational Phase	Operation of the Mine	Social	Operation-related health and safety impacts	5	2	5	6	-1	12	-72	Minor (negative) -	<ul style="list-style-type: none"> <li>The mine should be maintained during its lifetime so as to minimise the risk of mine personnel being injured as result of failed machinery etc.;</li> <li>Operational health and safety programmes should be implemented;</li> <li>All mine employees should be issued with the appropriate personal protective equipment (PPE) and educated regarding the risks involved in mining activities;</li> <li>Unauthorised access to the mine and future construction sites must be prevented through appropriate fencing and security to be erected/ established at the start of operation and maintained throughout the life of the proposed project; and</li> <li>Ensure that diversions are clearly marked and sign posted, especially for night time.</li> </ul>	5	2	1	3	-1	8	-24	Negligible (negative) -
Decommissioning Phase	Decommissioning of the Mine	Social	Dependency On Mine For Sustaining Local Economy	4	4	6	6	-1	14	-84	Moderate (negative) -	<ul style="list-style-type: none"> <li>Develop alternative and sustainable livelihoods for instance through LED programmes listed in the Mine's SLP;</li> <li>During the life of mine workers are given the opportunity to better and formalise their skills in order to aid their attempts to find alternative employment;</li> <li>The Mine's SLP should provide strategies and measures that reduce job loss through redeployment at other operations;</li> <li>Where feasible alternatives to save jobs/avoid downscaling should be investigated beforehand, including LED, potential redeployment at other operation;</li> <li>In addition to this it is vital that at all times but particularly towards the end of mine life that issues around retrenchment are dealt with in a transparent manner. All workers must know where they stand with regard to employment, what processes will be followed in the event of retrenchment and what services are available to them in this regard.</li> <li>Proactively assess and manage the social and economic impacts on individuals, regions and economies where; retrenchment and/or closure of the mine are certain. In particular through promoting economic diversification, portable skills development and local economic development where possible;</li> <li>Ensure open discussions with relevant government departments to ensure the closure process is correctly followed; and</li> <li>Rehabilitation must be undertaken in accordance with rehabilitation plan.</li> </ul>	3	4	3	4	-1	10	-40	Minor (negative) -
Construction Phase	Site clearing and topsoil removal for the construction of the ventilation shafts	Soil, Land Use and Land Capability	Loss of topsoil as a resource: During clearing of vegetation and removal of soil for establishment of ventilation shafts (3.5 ha), the soil chemical and physical properties are impacted on. The movement of vehicles on the soil surface causes compaction which reduces the vegetation's ability to grow and as a result erosion could occur.	5	3	4	5	-1	12	-60	Minor (negative) -	<ul style="list-style-type: none"> <li>If possible soil should be removed during dry months, as to reduce compaction;</li> <li>Only clear vegetation when and where necessary;</li> <li>Only the designated access routes are to be used;</li> <li>The soils stripped for the ventilation shafts should be stripped and conserved for rehabilitation;</li> <li>Topsoil stockpiles are to be kept to a maximum height of 3 m at a 2.5:1 slope;</li> <li>If erosion occurs on the site or on the stockpiles, corrective actions must be taken to minimise any further erosion from taking place;</li> <li>The handling of the stripped topsoil should be minimised to ensure the soil's structure does not deteriorate significantly;</li> <li>The stockpiles should be vegetated to reduce the risk of erosion, and to reinstitute the ecological processes within the soil;</li> <li>Compaction of the removed soil should be avoided by prohibiting traffic on stockpiles; and</li> <li>Ensure designed storm water management is in place.</li> </ul>	2	2	3	4	-1	7	-28	Negligible (negative) -
Operational Phase	Maintenance of roads and topsoil stockpiles	Soil, Land Use and Land Capability	Topsoil losses can occur during the operational phase as a result of rainwater runoff and wind erosion from roads and soil stockpiles where steep slopes are present. Compaction of soils during operational phase will occur.	5	3	5	7	-1	13	-91	Moderate (negative) -	<ul style="list-style-type: none"> <li>Topsoil stockpiles are to be kept to a maximum height of 3 m at a 2.5:1 slope angle and away from drainages lines and surface water;</li> <li>Only the designated access routes are to be used; and</li> <li>If erosion occurs, corrective actions must be taken to minimise any further erosion from taking place.</li> </ul>	4	2	3	3	-1	9	-27	Negligible (negative) -
Operational Phase	Potential impacts of operational phase on soils, land capability and land use (30 – 100 m below ground level)	Soil, Land Use and Land Capability	Collapsed underground mine roof could potentially cause significant surface subsidence. This may restrict post mining land capability and agricultural productivity. Surface cracking and subsidence will occur due to large areas that could be affected by high extraction.	7	5	7	7	-1	19	-133	Major (negative) -	<ul style="list-style-type: none"> <li>Rehabilitation of cracks once identified and areas where vegetation is affected by ponding, where practicable;</li> <li>Subsided areas can be backfilled and re-shaped to match the original topography to mitigate ponding and waterlogging conditions depending on the degree of the collapse and available soil material, where practicable;</li> <li>Planning for free drainage of ponded areas, where practicable;</li> <li>Monitoring of undermined areas to assess the effects of subsidence at surface. Annual surface surveys will be undertaken over mined out areas to establish the degree of subsidence; and</li> <li>Falling these mitigation measures, the only other alternative will be to compensate the farmers for loss of productive land.</li> </ul>	6	4	6	6	-1	16	-96	Moderate (negative) -
Operational Phase	Potential impacts of operational phase on soils, land capability and land use (>100 m below ground level)	Soil, Land Use and Land Capability	Collapsed underground mine roof could potentially cause significant surface subsidence. This may restrict post mining land capability and agricultural productivity. Surface cracking and subsidence will occur due to large areas that could be affected by the high extraction.	7	4	4	4	-1	15	-60	Minor (negative) -	<ul style="list-style-type: none"> <li>Rehabilitation of cracks once identified and areas where vegetation is affected by ponding;</li> <li>Subsided areas can be backfilled and re-shaped to match the original topography to mitigate ponding and waterlogging conditions depending on the degree of the collapse and available soil material;</li> <li>Planning for free drainage of ponded areas; and</li> <li>Monitoring of undermined areas to assess the effects of subsidence at surface</li> </ul>	5	3	3	3	-1	11	-33	Negligible (negative) -
Decommissioning Phase	Rehabilitation of infrastructure areas, roads and subsided areas	Soil, Land Use and Land Capability	Rehabilitation of roads, associated infrastructure and subsided areas could cause compaction and erosion if rehabilitation is not done correctly. This could be as a result of poor vegetation establishment which would result in exposed surfaces and increase the risk of erosion.	5	2	5	3	-1	12	-36	Minor (negative) -	<ul style="list-style-type: none"> <li>Rehabilitate according to the rehabilitation plan;</li> <li>Return the land conditions capable of supporting prior land use or uses equal than prior land use to the extent feasible or practical.</li> <li>Contour slopes to minimise erosion and run-off;</li> <li>Plant native vegetation to prevent erosion and encourage self-sustaining development of a productive ecosystem such as Cynodon dactylon, eragrostis tef, eragrostis chloromelas, chloris gayana, digitaria eriantha and panicum;</li> <li>Remove buildings to foundation level. All rubble to be relocated to a specified approved rubble dump or used as backfilling in shafts, etc</li> <li>Use waste rock for backfill and followed by topsoil of 0.3 m to the extent feasible</li> <li>Compacted areas are to be ripped to loosen the soil and vegetation cover re-instated;</li> <li>Inventory of hazardous waste materials stored on site should be compiled and arrange complete removal;</li> <li>Seal the shaft by placing concrete plugs;</li> <li>Ensure proper storm water management designs are in place to ensure no erosion or ponding occurs, where practicable;</li> <li>Conduct soil contamination assessment to assess if any remediation is require prior to future land use development;</li> <li>Only designated access routes are to be used to reduce any unnecessary compaction;</li> <li>The topsoil should be shaped taking the pre-mining landscape into consideration, where practicable;</li> <li>The rehabilitated areas must be assessed twice a year for compaction, erosion and fertility; and</li> <li>Monitoring for subsidence must be done annually.</li> </ul>	2	2	3	2	-1	7	-14	Negligible (negative) -
Construction Phase	Site Clearing for the construction of the Ventilation Shafts	Fauna & Flora	Site clearing resulting in alien plant invasion	3	2	4	6	-1	9	-54	Minor (negative) -	<ul style="list-style-type: none"> <li>The footprint area should be kept as small as possible;</li> <li>The site should be screened prior to construction, preferably between the months of November to March, for any plant Species of Special Concern (SSC);</li> <li>Existing access roads should be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; and</li> <li>An alien invader management plan should be implemented, whereby the disturbed site is monitored quarterly for at least two years to ensure that alien invasion does not take place.</li> </ul>	3	2	1	5	-1	6	-30	Negligible (negative) -

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Operational Phase	High Extraction Underground Mining	Fauna & Flora	No direct loss of fauna, flora or sensitive ecosystems will occur, except if subsidence occurs. However, undermining of sensitive areas/landscapes leading to changes that will negatively affect the functioning of the ecosystem; particularly related to groundwater impacts. Depth of mine varies from 30 to 215 m.	7	3	6	7	-1	16	-112	Major (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> A comprehensive geotechnical investigation should be undertaken for the following:</li> <li><input type="checkbox"/> Provide appropriate design parameters for pillar and overburden stability, in line with the actual geotechnical rockmass properties, and</li> <li><input type="checkbox"/> Indicate any areas (undermining of the natural ecosystems) that may fall outside of these design parameters.</li> <li><input type="checkbox"/> Following the geotechnical investigation, where required a provision must be made for the rehabilitation of these areas in the event of a possible risk of subsidence / intersection collapse.</li> <li><input type="checkbox"/> The edge of the wetlands and a 100 m buffer must be demarcated near where the areas of high risk or definite subsidence area located and the ventilation shafts to reduce the risk of being impacted on from subsidence;</li> <li><input type="checkbox"/> Sensitive landscape monitoring must be carried out to ensure no unnecessary impact to these areas is realised; and if so that a remedy is put in place as soon as possible;</li> <li><input type="checkbox"/> The safety factor prescribe by the Rock Engineer must be used;</li> <li><input type="checkbox"/> No high extraction mining to be done within 100 m from watercourses;</li> <li><input type="checkbox"/> Monitoring should take place for excessive inflow into the underground workings;</li> <li><input type="checkbox"/> If any plant SSC are recorded, these should be translocated with the involvement of a qualified botanist. The donor habitat should resemble the receiving habitat and the species/populations should be monitored monthly after translocation for up to one year; and</li> <li><input type="checkbox"/> If any important fauna species (SSC) are identified (as listed in the expected species lists) that have not been included in the site-specific species lists, this should be reported to the Environmental Control Officer on site and the provincial authority (MPTA) for their reference. Further to this, measures should be undertaken to ensure that negative impacts to the species in question are not imposed due to the development.</li> </ul>	7	3	5	7	-1	15	-105	Moderate (negative) -
Decommissioning Phase	Dismantling and removal of infrastructure	Fauna & Flora	Alien plant invasion may take place	3	2	4	4	-1	9	-36	Minor (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> An alien invasive plant management plan should be implemented.</li> <li><input type="checkbox"/> Riparian habitat and river biomonitoring must be carried out during rehabilitation to ensure these areas are not impacted upon; and if they are remedial action must be implemented. Transects should be set up through representative sites and monitored on an annual basis;</li> <li><input type="checkbox"/> Should there be decant, the water will need to be treated with active or passive treatment and a Rehabilitation Plan will need to be compiled to rectify any damages.</li> <li><input type="checkbox"/> Rehabilitation must be undertaken in accordance with rehabilitation plan;</li> </ul>	3	2	1	4	-1	6	-24	Negligible (negative) -
Operational Phase	Potential Impacts on Wetlands: Underground Mining (30-100 m below ground level)	Wetland	Undermining of wetlands leading to hydrological and geomorphic changes to the functioning of the ecosystem; particularly related to groundwater impacts. Depth of mining is between 30 – 100 m below ground level.	7	4	6	7	-1	17	-119	Major (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> No mitigation measures will reduce the impact of definite subsidence. In this case, a wetland offset strategy would need to be compiled.</li> </ul>	7	4	6	7	-1	17	-119	Major (negative) -
Operational Phase	Potential Impacts on Wetlands: Underground Mining (>100 m below ground level)	Wetland	Undermining of wetlands leading to hydrological and geomorphic changes to the functioning of the ecosystem; particularly related to groundwater impacts. Depth of mining is >100 m below ground level.	7	4	6	5	-1	17	-85	Moderate (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> The highest safety factor as prescribed by the Rock Engineers must be adhered to.</li> <li><input type="checkbox"/> A geotechnical study would need to be compiled to determine the exact risk of subsidence;</li> <li><input type="checkbox"/> Wetland monitoring must be carried out to ensure no unnecessary impact to wetlands is realised; and if so that a remedy is put in place as soon as possible.</li> <li><input type="checkbox"/> A wetland offset strategy may need to be compiled.</li> </ul>	7	4	6	4	-1	17	-68	Minor (negative) -
Decommissioning Phase	Mine closure and rehabilitation	Wetland	Post-mining decant of groundwater will have negative impacts on the wetlands as this water is likely to be of a poor water quality.	7	5	7	6	-1	19	-114	Major (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> Wetland monitoring must be carried out on wetlands that could possibly be impacted on by activities during rehabilitation to ensure no unnecessary impact to wetlands is realised; and if so that a remedy is put in place as soon as possible. Transects should be set up through representative sites and monitored on an annual basis;</li> <li><input type="checkbox"/> Groundwater and wetlands must be monitored post-mining for potential decant (3 years or until the system has stabilised).</li> <li><input type="checkbox"/> Decant should not be allowed to discharge into a wetland system. The decant can be collected and stored in PCD's as a short term mitigation measure;</li> <li><input type="checkbox"/> Investigation into long term solutions for decant management needs to be conducted, should this water not be to the correct standards;</li> <li><input type="checkbox"/> Wetland Rehabilitation Plan will need to be compiled to rectify any damages should decant impact on wetlands;</li> <li><input type="checkbox"/> Monitoring groundwater levels and decant (rate and quality) quarterly.</li> </ul>	7	3	2	3	-1	12	-36	Minor (negative) -
Construction Phase	Construction of ventilation shafts including vegetation clearing and sinking of ventilation shafts	Surface Water	Siltation of surface water resources leading to deteriorated water quality	3	3	4	7	-1	10	-70	Minor (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> Clearing of vegetation must be limited to the development footprint area, and the use of existing access roads must be prioritized so as to minimize construction of new access roads in these areas;</li> <li><input type="checkbox"/> If possible, construction activities must be prioritised to the dry months of the year to limit mobilisation of sediments, dust generation and hazardous substances (oil, diesel, etc.) from construction vehicles used during site clearing;</li> <li><input type="checkbox"/> Dust suppression with water on the haul roads and cleared areas must be undertaken to limit dust. During dry times, this could be undertaken on a daily basis where there is visible dust being generated;</li> </ul>	3	3	3	4	-1	9	-36	Minor (negative) -
Construction Phase	Construction of ventilation shafts including vegetation clearing and sinking of ventilation shafts	Surface Water	Alteration of surface water drainage patterns and river banks	7	2	5	4	-1	14	-56	Minor (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> Construction work closer to the streams should be suspended during heavy rains to avoid erosion and sedimentation of the streams and unnecessary vehicle movement should be avoided.</li> <li><input type="checkbox"/> Designs should avoid the causing of erosion or spillages of material during the construction phase.</li> </ul>	7	1	5	2	-1	13	-26	Negligible (negative) -
Construction Phase	Construction of ventilation shafts including vegetation clearing and sinking of ventilation shafts	Surface Water	Deterioration of water quality due to dirty water reporting into natural water resources	3	3	5	5	-1	11	-55	Minor (negative) -	<ul style="list-style-type: none"> <li><input type="checkbox"/> All fuel storage areas should be appropriately banded to ensure that leakages can be contained. Spill kits should be in place and construction workers should be trained in the use of spill kits, to contain and immediately clean up any potential leakages or spills;</li> <li><input type="checkbox"/> Vehicles should regularly be maintained as per the mine's developed maintenance program. This should also be inspected on a daily basis before use to ensure there are no leakages underneath</li> <li><input type="checkbox"/> Ablutions facility for construction workers and general waste bins should be provided. An accredited contractor should be appointed to properly dispose the waste; and</li> <li><input type="checkbox"/> No dirty water should be allowed off site and into a stream.</li> </ul>	3	3	5	3	-1	11	-33	Negligible (negative) -

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Operational Phase	Operation of the mine	Surface Water	Water contamination leading to deterioration of water quality	5	4	5	6	-1	14	-84	Moderate (negative) -	<ul style="list-style-type: none"> <li>□ As proposed in the project activities, ensure that all the dirty water emanating from the dirty water areas is contained for re-use within the mine, to prevent discharge into the environment;</li> <li>□ Use of storage compartments underground to store dirty water;</li> <li>□ All pollution control dams must be maintained and is required to operate with a 0.8 m freeboard and able to contain a 1:100 year flood event;</li> <li>□ All surface water pollution control structures will be inspected on a three monthly basis and maintenance work carried out as required. Furthermore, all structures (e.g. dams) registered in terms of the National Water Act will be maintained in accordance with the Act.</li> <li>□ The mines water balances and management of the water balance must be regularly updated and monitored. This should be updated as specified in the IWUL or if on an annual basis;</li> <li>□ The wash bays and workshops are equipped with oil skimming facilities to remove oil and grease from the wash down water;</li> <li>□ Clean run-off must be directed around these facilities, and directed back to the clean water catchment;</li> <li>□ The emergency coal stockpile area at Thubelisha must ensure that dirty water from the stockpile area is contained and the seepage is minimised (No dirty water is permitted to be discharged to the clean water environment);</li> <li>□ No discharge of polluted water should be planned for or allowed;</li> <li>□ Where subsidence will occur during operation, measures to rehabilitate the surface area should be implemented as soon as possible to avoid impoundment of surface water; and</li> <li>□ Water quality monitoring should continue on the existing and newly proposed monitoring points to ensure detection of impacts.</li> </ul>	5	4	5	3	-1	14	-42	Minor (negative) -
Operational Phase	High Extraction Underground Mining	Surface Water	Reduction in catchment yield	5	3	2	7	-1	10	-70	Minor (negative) -	<ul style="list-style-type: none"> <li>□ There is no mitigation for the loss of catchment yield. However, the area to be stooped is assumed to be approximately 30 km2 and makes up 8% of the total quaternary catchment of 371 km2.</li> <li>□ The mine will limit the extent of pillar extraction to target only areas with low potential water ingress. This implies excluding <ul style="list-style-type: none"> <li>□ All floodplain areas and areas within 100 m of a watercourse or 1:100 year floodline whichever is greatest</li> <li>□ All areas with a thin soil cover that have a significant catchment draining to them.</li> </ul> </li> <li>□ As far as is practical, the mine will avoid rocky outcrops, although the areas currently designated for pillar extraction do contain some percentage of thin cover and rocky outcrop.</li> <li>□ Clean water from upstream should be diverted around these areas and report to the natural streams.</li> <li>□ The surface of stooped areas will be inspected to ensure they remain free draining. This will involve the use of surface teams undertaking civil works such as cutting drains where required to ensure areas of settlement can drain. Sasol Mining has developed a range of strategies for stooped areas based on their experiences elsewhere</li> <li>□ The percentage decrease in MAR amounts to 8 % for B11C quaternary catchment (where the proposed new mining areas are located). Therefore, the loss in MAR for the quaternary catchment is considered to be of moderately low significant.</li> </ul>	5	3	2	7	-1	10	-70	Minor (negative) -
Decommissioning Phase	Dismantling and removal of infrastructure	Surface Water	Siltation of surface water resources leading to deteriorated water quality	3	3	4	7	-1	10	-70	Minor (negative) -	<ul style="list-style-type: none"> <li>□ Use of accredited contractors for removal or demolition of infrastructures; this will reduce the risk of waste generation and accidental spillages;</li> <li>□ Rehabilitated and backfilled areas (where subsidence has occurred) must be seeded as soon as possible to avoid siltation due to erosion;</li> <li>□ Surface inspection on the fully rehabilitated areas must be undertaken to ensure a surface profile that allows good drainage. This will ensure improvement or increased catchment yield to the surrounding streams.</li> <li>□ Rehabilitation must be undertaken in accordance with rehabilitation plan (Appendix O);</li> </ul>	3	3	3	4	-1	9	-36	Minor (negative) -
Decommissioning Phase	Underground mine closure and rehabilitation	Surface Water	Decant of mine water leading to deterioration of water quality in the nearby streams	6	4	5	6	-1	15	-90	Moderate (negative) -	<ul style="list-style-type: none"> <li>□ Should decant occur, decant should be collect and stored at a PCD as a short term solution;</li> <li>□ Long term management solutions for decant should be investigated;</li> <li>□ Water quality monitoring must continue to enable the detection of decant when it occurs so immediate mitigation measures can be implemented. Monitoring should continue for as long as decant is taking place.</li> </ul>	6	4	1	3	-1	11	-33	Negligible (negative) -
Construction Phase	Site clearance and construction of ventilation shafts within associated wetland habitats and river catchment	Aquatic	Increased runoff and erosion within the rivers nearby to the ventilation shafts	4	2	3	2	-1	9	-18	Negligible (negative) -	<ul style="list-style-type: none"> <li>□ Minimise and keep the footprint as small as possible;</li> <li>□ Buffer zones (100 m wetlands and 100 m riparian);</li> <li>□ Revegetation of the construction footprint as soon as possible;</li> <li>□ Storm water should be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow;</li> <li>□ Construction should take place during the dry season to minimise runoff; and</li> <li>□ Sequential removal of the vegetation (not all vegetation immediately).</li> </ul>	4	2	1	2	-1	7	-14	Negligible (negative) -
Construction Phase	Waste generation/disposal and the use of hazardous products	Aquatic	Water and habitat quality deterioration	4	2	5	3	-1	11	-33	Negligible (negative) -	<ul style="list-style-type: none"> <li>□ Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow;</li> <li>□ Approved barrier systems to minimise contaminated seepage and runoff from entering the local aquatic systems;</li> <li>□ Ensure correct waste management; and</li> <li>□ Ensure correct storage systems are used for the storage of hazardous products when constructing.</li> </ul>	3	2	3	2	-1	8	-16	Negligible (negative) -
Operational Phase	Underground mining high to definite risk subsidence areas	Aquatic	Subsidence of land within the river catchment and subsidence of land underneath river channels resulting in poor ecosystem functioning and connectivity	7	4	6	7	-1	17	-119	Major (negative) -	<ul style="list-style-type: none"> <li>□ No mitigation measures will be able to prevent subsidence where the depth of mining is shallower than 100 m.</li> </ul>	7	4	6	7	-1	17	-119	Major (negative) -
Operational Phase	Underground mining low risk subsidence areas	Aquatic	Subsidence of land within the river catchment and subsidence of land underneath river channels resulting in poor ecosystem functioning	7	4	6	6	-1	17	-102	Moderate (negative) -	<ul style="list-style-type: none"> <li>□ Complete a geotechnical study to identify high risk subsidence areas and avoid or mitigate to support them;</li> <li>□ Ensure sufficient pillar support and safety factors to prevent subsidence of undermined wetland/aquatic areas;</li> <li>□ The highest safety factor possible (at least 2) must be used for areas of shallow mining (confirm with geotechnical study);</li> <li>□ Underground mining should avoid aquifers especially due to the proposed high extraction near aquatic and wetland systems. Punctured aquifers could lead to the dewatering of aquatic/wetland systems;</li> <li>□ Mining should not occur above 100 m below aquatic/wetland areas or within the 100 m wetland buffer zones (confirm with geotechnical study if areas can be mined shallower than 100 m without the risk of subsidence); and</li> <li>□ Monitoring should take place for excessive inflow into the underground workings.</li> </ul>	7	4	6	4	-1	17	-68	Minor (negative) -

Phase	Activity	Aspect	Impact	Duration	Extent	Intensity	Probability	Nature	Consequence	Significance (Pre Mitigation)	Rating	Mitigation Measures	Duration	Extent	Intensity	Probability	Nature	Consequence	Significance (Pre Mitigation)	Rating
Operational Phase	Emergency coal stockpiling	Aquatic	Runoff from the emergency coal stockpile into local aquatic systems will result in the degradation of the water and habitat quality of the polluted system	5	3	5	5	-1	13	-65	Minor (negative) -	<ul style="list-style-type: none"> <li>Clean and dirty water storm water management: Clean water should be managed in a manner according to the Department of Water and Sanitation Best Practice Guidelines;</li> <li>Barrier systems, including synthetic, clay and geological/natural or other approved mitigation methods to minimise contaminated seepage and runoff from entering the local aquatic systems;</li> <li>Storm water management plan must be implemented to ensure clean storm water is diverted away from the surface operations and dirty water stored in the existing Pollution Control Dam (PCD);</li> <li>The emergency stockpile should be managed to minimise infiltration of contaminants to the groundwater. Mitigation methods that should be considered include: <ul style="list-style-type: none"> <li>Management of the stockpile shape to control the ease with which water can run off from the facility.</li> <li>The vegetation of the soil/overburden stockpile and covering them with soil to minimise rainfall infiltration and mobilisation of dissolved metals.</li> <li>Implementation of a lime cover on overburden stockpiles to neutralise acidity.</li> </ul> </li> </ul>	5	3	3	3	-1	11	-33	Negligible (negative) -
Operational Phase	Storage/disposal of generated waste and the working with hazardous products	Aquatic	Runoff from operational site containing contaminants will degrade habitat and water quality of polluted aquatic systems	5	3	5	4	-1	13	-52	Minor (negative) -	<ul style="list-style-type: none"> <li>Clean storm water must be diverted from operational sites and managed in such a manner to disperse runoff to prevent an accumulation of storm water flow that may carry contaminants from the site to aquatic systems;</li> <li>Ensure correct waste management; and</li> <li>Ensure correct storage systems are used for the storage of hazardous products throughout the project life.</li> </ul>	5	3	5	2	-1	13	-26	Negligible (negative) -
Decommissioning Phase	Mine closure and rehabilitation	Aquatic	Decant of severely contaminated water into local aquatic ecosystems	7	4	6	6	-1	17	-102	Moderate (negative) -	<ul style="list-style-type: none"> <li>Decant should not be allowed to discharge into the associated aquatic systems. The decant can be collected and stored in PCD's as a short term mitigation measure; and</li> <li>Investigation into long term solutions for decant management needs to be conducted.</li> </ul>	7	4	5	4	-1	16	-64	Minor (negative) -
Decommissioning Phase	Removal of infrastructure and surface rehabilitation.	Aquatic	Increased runoff and erosion	3	3	5	3	-1	11	-33	Negligible (negative) -	<ul style="list-style-type: none"> <li>Avoid rehabilitation or unimpacted areas;</li> <li>Stay within already impacted areas and avoid activity within the 100 m buffer zones of the rivers; and</li> <li>Commence the phase during the dry season to limit runoff.</li> </ul>	3	3	5	2	-1	11	-22	Negligible (negative) -
Operational Phase	Underground mining	Geology	With high-extraction mining/ stooping the impact on the geology includes both the excavation of the coal seams as well as the impact on the overlying aquifer above the high-extraction mining/ stooped areas with potential resultant surface subsidence.	7	3	5	7	-1	15	-105	Moderate (negative) -	<ul style="list-style-type: none"> <li>Once geology has been impacted no mitigation measures can be proposed. However measures can be proposed in an attempt to prevent subsidence in areas where only bord and pillar mining has taken place.</li> <li>The application of stone dust on coal pillars and maintenance of pillar safety factors above 1:1 million chance of failure under watercourses. Exclude areas with surface infrastructure from pillar extraction.</li> </ul>	7	3	5	7	-1	15	-105	Moderate (negative) -
Construction Phase	Site clearing for the development of surface infrastructure through the removal of the top soil and weathered rocks	Groundwater	Lowering of the water table	2	2	2	3	-1	6	-18	Negligible (negative) -	<ul style="list-style-type: none"> <li>Site clearance and construction activities should take place above the water table, at the unsaturated zone, (if possible); no impact on the groundwater level will then be expected.</li> <li>Site clearance should be kept to a minimum area and short duration.</li> <li>If trenches are going to be excavated below the water level, dewatering of the aquifer to lower the water table locally should be considered to ensure that the construction takes place above the groundwater level. Since the groundwater is not expected to be polluted at this stage, the utilisation of the water for activities such as dust suppression or irrigation will not cause negative environmental impacts.</li> <li>Install monitoring boreholes as recommended in Section 8.1.7.</li> </ul>	2	2	1	3	-1	5	-15	Negligible (negative) -
Operational Phase	Subsidence as a result of high extraction	Groundwater	Groundwater quality deterioration	7	3	5	5	-1	15	-75	Moderate (negative) -	<ul style="list-style-type: none"> <li>In order to prevent subsidence during the bord-and-pillar mining in the operational phase, it is required that a safety factor that provides sufficient pillar stability is applied.</li> <li>The mine should be monitored on an annually basis for subsidence and areas of subsidence should be rehabilitated by backfilling with waste rock and topsoil thereafter revegetating of the disturbed area.</li> <li>High extraction areas should be delineated as a high risk (depending on the local geology and dolerite sill) for subsidence and for groundwater impact.</li> <li>If possible, concurrent backfilling of the mine voids with fly ash should be conducted to minimise the risk of subsidence and neutralise any acid that might be generated. This should be done to assist with reducing the risk of subsidence and is a means of waste management. Should this occur a separate environmental authorisation will need to be applied for.</li> <li>Groundwater level and quality monitoring should be conducted on quarterly basis during operation, with special attention given to the subsidence areas. The monitoring frequency can be reduced post-closure depending on the trend of the monitoring results.</li> </ul>	5	3	3	4	-1	11	-44	Minor (negative) -
Operational Phase	Removing water from the mine for the safety of people and operations and possible creation of cone of dewatering	Groundwater	Possibility of lowering of the water table and affecting the yield of boreholes	6	2	4	6	-1	12	-72	Minor (negative) -	<ul style="list-style-type: none"> <li>To minimise the impact associated with the lowering of the water table, dewatering should be conducted by abstracting groundwater ingress into mine voids during operation;</li> <li>Contaminated mine water should be stored in compartment and/or pollution control dams and reused for machine cooling or dust suppression underground;</li> <li>Groundwater monitoring should be conducted quarterly to assess the time series water level, water quality impacts and trends. Thereafter sampling frequency could be adjusted following the trend analysis; and</li> <li>Numerical model should be updated every two years in the first four years and thereafter every five years based on groundwater monitoring results.</li> <li>Impact to receptors such as private boreholes and surface water bodies (if proven through monitoring) should be compensated.</li> </ul>	6	2	1	3	-1	9	-27	Negligible (negative) -
Operational Phase	Groundwater contamination as a result of underground mining	Groundwater	Groundwater contamination	6	3	5	4	-1	14	-56	Minor (negative) -	<ul style="list-style-type: none"> <li>If subsidence occurs during operation, it should be rehabilitated as soon as possible to minimise water and oxygen inflow from the atmosphere.</li> <li>Nitrate-based explosives can contaminate water thus no underground water should be discharged unless it meets standards to minimise ground and surface water contamination.</li> <li>Quarterly groundwater monitoring should be conducted to assess the time series water level, water quality impacts and trends.; and</li> <li>Numerical model should be updated every two years in the first four years and thereafter every five years based on groundwater monitoring results.</li> </ul>	6	2	1	3	-1	9	-27	Negligible (negative) -
Decommissioning Phase	Subsidence as a result of high extraction	Groundwater	Lowering of the water table	7	3	6	5	-1	16	-80	Moderate (negative) -	<ul style="list-style-type: none"> <li>In order to prevent subsidence during the bord-and-pillar mining in the operational phase, it is required that a safety factor that provides sufficient pillar stability is applied.</li> <li>The mine should be monitored on an annually basis for subsidence and areas of subsidence should be rehabilitated by backfilling with waste rock and topsoil thereafter revegetating of the disturbed area.</li> <li>If possible, concurrent backfilling of the mine voids with fly ash should be conducted to minimise the risk of subsidence and neutralise any acid that might be generated. This should be done to assist with reducing the risk of subsidence and is a means of waste management. Should this occur a separate environmental authorisation will need to be applied for.</li> <li>Groundwater level and quality monitoring should be conducted on quarterly basis during operation, with special attention given to the subsidence areas. The monitoring frequency can be reduced post-closure depending on the trend of the monitoring results.</li> </ul>	5	3	3	4	-1	11	-44	Minor (negative) -

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Decommissioning Phase	Groundwater contamination as a result of underground mining	Groundwater	Groundwater contamination	6	3	6	4	-1	15	-60	Minor (negative) -	<input type="checkbox"/> Impact to receptors such as private boreholes and surface water bodies (if proven through monitoring) should be compensated. <input type="checkbox"/> Update numerical model every 5 years post closure to calibrate with monitoring results.	6	2	2	3	-1	10	-30	Negligible (negative) -
Decommissioning Phase	Mine decanting and contamination of surface water bodies	Groundwater	Decanting of the closed mine	7	4	5	6	-1	16	-96	Moderate (negative) -	<input type="checkbox"/> Decant should be collect and stored at a PCD as a short term solution; <input type="checkbox"/> Long term management solutions for decant should be investigated; and <input type="checkbox"/> Monitoring groundwater levels and decant (rate and quality) quarterly.	7	2	1	3	-1	10	-30	Negligible (negative) -