INTEGRATED MANAGEMENT ACTIONS

OVERALL, UPDATED EMP FOR BAKUBUNG MINING OPERATIONS

Table A: Description of Impact Management Actions

Activity	Potential impact	Mitigation type	Time period for implementation
Mining and mining related activities	Blasting impacts (fly rock, air blasts and ground vibrations)	• Explosive quantities during site preparation and sinking operations will be kept below quantities that could cause structures to be damaged. • The shaft and plant infrastructure was moved some 600 m further south east away from the nearest neighbour. • Blasting will be undertaken in accordance with relevant Mine Health and Safety legislation and international blasting standards. • Blasting noise will be monitored and recorded during blasting activities to ensure adherence to stipulated guidelines. • Blasting will take place within the required legal parameters. The area should be cleared of people and livestock in a radius of 500 m before blasting commences. • Ground vibrations to be kept below 10 mm/s (USBM guidelines) at the nearest structure. • Air blast levels will be kept below 135 dB. • A siren will signal the commencement of blasting in the area. • A program to inform the community on the impacts of blasting, seismics, air blast, etc. will be developed and communicated prior to the commencement of shaft sinking and surface preparation. • A schedule for all blasting work on surface and for the first 50 m of the shaft sinking should be provided to the local communities most likely to hear the noise of the blasts, especially schools and hospitals. A reminder or warning system, such as bulk SMSes, should be sent out to community • representatives who can inform their neighbours. • The mine will register and address all complaints concerning possible structural damage in the complaints system and an investigation will be undertaken. • Vibration and air blast levels monitoring as per the monitoring programme.	• Prior to construction • Prior to construction • Construction • Construction • Construction • Construction • Construction • Construction • Construction • Construction • On-going • Construction
Mining	Changes to geology	• The ore body will be mined and processed in such a way to ensure the most effective extraction of the non-renewable resource. • Mining will take place according to industry best practice and safety measures specific to the underground conditions on the mine and will be implemented to prevent possible collapse of underground workings.	• On-going • On-going
Site preparation Civil works Earthworks Mining and mining related	Negative visual impacts	• Mining infrastructure is generally designed according to functional engineering requirements. Efforts are to be made, where possible, to design structures with a more aesthetic appeal. • A noise attenuation structure and visual barrier will be constructed between the shaft bank and the receptive community areas. The structure will be designed to be as aesthetically pleasing as possible. The final design will be concluded prior to the commencement of the construction phase and will be signed off by a professional engineer. The design will include both visual and noise design criteria.	• Prior to construction • Prior to construction • Prior to construction • Prior to construction

Activity	Potential impact	Mitigation type	Time period for implementation
activities Waste rock management Mineral processing operations Tailings management Demolition Maintenance and aftercare of final land forms and rehabilitated areas		• Designs are to be optimised to try to decrease visual exposure of mining infrastructure. • Lighting infrastructure should be designed to minimise the impact on neighbouring communities. • The TSF, stockpiles and waste rock dump are to be shaped to reduce their visual intrusion. • The use of bright colours or highly reflective surfaces should be avoided. • Paint structures and buildings in colours (browns and greens) that reflect and compliment the natural landscape. • The unnecessary removal of vegetation during construction should be avoided. This is extremely important on the boundaries of the mine where vegetation can assist with screening. • Exclusive use of laydown areas will be enforced, and the uncontrolled dumping of waste or construction material will be prohibited. • Screening of various structures is to be achieved through landscaping and planting of vegetation. This will be undertaken where the visual impact on sensitive receptors is considered high. All vegetation that is planted as part of rehabilitation should reflect the natural vegetation of the area and be indigenous to the site. • The TSF will be screened with indigenous vegetation where the visual impact on sensitive receptors is considered high. • There must be concurrent rehabilitation on the TSF. The successful establishment of the vegetation must be demonstrated during the life of the mine so that there is little additional work to be done at closure. • Uncontrolled, open fires are prohibited on site. • Dust is to be controlled using appropriate dust suppression measures. • Implement the recommended air pollution control system to avoid plumes of dust that can reduce visibility. • The mine and plant will operate on a 24-hour basis. Lighting is thus required for safe operating conditions. As far as is possible, without compromising safety of mine personnel and operating processes, all light sources should be directed downwards and away from the public roads and surrounding communities. • Rehabilitated areas, especially on the TSF, will be maintained and monitored. • Rehabilitation is to take place according to the proposed annual Rehabilitation Plan. • Rehabilitated areas will be maintained and monitored and managed through an aftercare and maintenance programme to limit and/or enhance the long- term post closure visual impacts.	• Prior to construction • Construction • Construction • On-going • Construction • Construction • Construction • On-going • On-going • On-going • On-going • On-going • On-going • Closure • Closure • On-going
Site preparation Civil works Earth works Waste rock management	Hazardous excavations infrastructure and surface subsidence	• All mineralised waste facilities and water dams will be designed, constructed, operated, and closed in a manner to ensure stability and related safety risks to third parties and animals are addressed. It will furthermore be monitored according to a schedule that is deemed relevant to the type of facility by a professional engineer. As part of closure, BPM should ensure that provision is made to address long term safety risks in the decommissioning and rehabilitation planning. • Bakubung will survey its mining area and update its mine plan map on a routine basis to ensure that the position and extent of all potential hazardous excavations, hazardous infrastructure and subsidence is known as part of construction, operation, and decommissioning. It will furthermore ensure that appropriate management measures are taken to address the related safety risks to third	• On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
Mining and mining related activities Tailings management Demolition Rehabilitation Maintenance and aftercare		parties and animals • As part of construction and operation, the safety risks associated with identified hazardous excavations, subsidence and infrastructure will be addressed through one or more of the following: • Fencing, berms, barriers and/or security personnel to prevent unauthorized access • Warning signs in the appropriate language(s). Warning pictures can be used as an alternative • During decommissioning planning of any part of the mine, provision will be made to address long term safety risks in the decommissioning and rehabilitation phases. • At closure of any part of the mine, the hazardous infrastructure will either have been removed or decommissioned and rehabilitated in a manner that it does not present a long term safety and/or stability risk. • At closure the hazardous excavations and subsidence will have been dealt with as follows: • All excavated areas will have been backfilled and rehabilitated • Monitoring and maintenance will take place to observe whether the relevant long-term safety objective have been achieved and to identify the need for additional intervention where the objectives have not been met. • In case of injury or death due to hazardous excavations, the emergency response procedure in in Table D will be followed.	• Decommissioning • Closure • Closure • As required
Site preparation Civil works Earth works Waste rock management Mining and mining related activities Tailings management Demolition Rehabilitation Maintenance and aftercare	Alteration to topography and impact on infrastructure	• The sides of the TSF are to be designed with curves and rounded corners in order to allow the slopes to blend better into the surrounding topography. • Topographical management measures are to be included in the final TSF design document. • Any material removed from the footprint of the shaft complex, waste rock dump and TSF during bulk excavations and initial site clearing are to be temporarily stockpiled at the demarcated areas and vegetated if possible. • Upslope storm water diversion berms are to be constructed above the shaft/plant complex and TSF to prevent runoff across the cleared areas and away from stockpiles. • All storm water diversion berms will be vegetated and sloped to ensure stability and conservation of topsoil materials. • No unnecessary earthworks and clearing should be done outside of the stipulated footprint of the mining activities and TSF. • Minimise land clearing and ensure that clearing only takes place prior to the construction of each component. Avoid large-scale site clearing, as denuded areas are prone to water and wind erosion. • Upslope storm water diversion berms will be maintained to prevent runoff and erosion across the sites, especially around the sides of the TSF. • The development of the TSF will be in accordance with the final TSF design document and the mandatory TSF Code of Practice (COP). • Soil will be placed on the outer slopes of the TSF and vegetation will be established. • The soil and vegetation will be maintained until the vegetation is self-sustaining. • Rehabilitation and/or re-vegetation of structures selected, except the waste rock dump, that obtrude in the landscape should take place as soon as is possible and on a continuous basis. • Measures should be implemented to prevent erosion features developing on prominent structures, like the TSF.	• Planning and design • Planning and design • Construction • Construction • Construction • Construction • On-going • On-going • On-going • On-going • On-going • On-going • Closure • Closure • Closure • Closure

Activity	Potential impact	Mitigation type	Time period for implementation
		• Profiling of the landscape will take place to ensure the area is rehabilitated as close to its natural state as possible. • Close TSF in accordance with approved closure design • Additional composting material and soil will be brought in if required. • The landscape will be profiled to ensure that surface water runs off freely and does not pond anywhere. • Judicious planting of screening vegetation will be considered to ameliorate views of the taller structures from sensitive viewpoints. • Remove or demolish all temporary infrastructure, and dispose of waste at appropriate waste facilities	
Construction of project components Operation of the mine Decommissioning of project components Final land forms	Loss or changes to existing land use	• Do not disturb areas unnecessarily. • Identify, in conjunction with tribal council, specific rights of the affected parties eligible for compensation. • Establish an appropriate compensation method and the measures by which it will be implemented. • Rehabilitate disturbed areas according to the annual rehabilitation plan and according to recommendations from vegetation specialist included in this EMP. • Effective implementation of all mitigation measures as outlined in this EMP report to reduce the mine's overall impact on the environment and surrounding land-uses • Closure planning to incorporate measures to achieve future land use. • Should the impact on the surrounding land use and/or economic activity still prove unacceptable, BPM will compensate the relevant landowners accordingly. • Periodic communication (annual at a minimum) and feedback should be undertaken to the affected communities and stakeholders in respect of the activities that will generate nuisance factors. • Implement all mitigation measures as specified in the relevant specialist inputs, without compromising the safety of people, namely: • noise impact assessment; • air quality impact assessment; • traffic impact assessment; and • visual impact assessment in the EIA. • The existing grievance/complaints register should be maintained in which all community and IAP complaints are recorded and addressed. • **Construction staff, plant and equipment:** • All construction staff will agree to a Code of Conduct (CoC) that outlines protocols and standards for working on the affected land. The CoC should address the following: • respect for local residents; • respect for existing livelihood activities and the environment; • no hunting, snaring or unauthorised taking of any property belonging to someone else; • compliance with the Traffic Management Plan and all associated regulations; • unambiguous disciplinary measures for not adhering to the Code of Conduct. • Community members / affected land users will be able to lodge grievances with BPM using the existing grievance procedure. In the event that the • grievance is not addressed or closed out properly, there should be an avenue through which the matter is	• On-going • On-going • On-going • On-going and Closure • On-going • On-going • As required • On-going as per mitigation measure • On-going • On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
		escalated to a higher level of authority within • Bakubung Platinum Mine. • Bakubung Platinum Mine and the *Bakubung-Ba-Ratheo* Traditional Authority will discuss appropriate mitigation measures including methods and procedures to minimise the disruption to land use patterns and livelihood activities. This will include, fencing off the construction site to ensure that community members and livestock do not get injured due to construction activities and providing access points (both during construction and during operations and maintenance) across, over or under the pipeline to ensure unhindered movement for pedestrian and livestock as well as a clear and simple claim mechanism in the event of proven damage to property by the contractor. • Compliance with relevant mitigation measures as outlined in the noise, air quality, and heritage assessments. • **Pipeline crossings:** • Identify and confirm all affected land uses and land user groups with input from the *Bakubung-Ba-Ratheo* Traditional Authority. • Consider all possible measures to enable convenient and safe pedestrian and livestock crossing of the construction site and the pipeline, post construction. These may include providing overpasses and underpasses at regular intervals or in designated locations along the pipeline route. • Together with the *Bakubung-Ba-Ratheo* Traditional Authority and affected land user groups identify practical and cost-effective engineering solution to cross the construction site and the pipelines. • The pipelines should not be fenced during operations as this will completely prevent all pedestrian and livestock from crossing. • **If required:** • Hold discussions with the Traditional Authority to confirm that they are in agreement that all livelihoods activities can proceed unhindered. Should they raise concerns, these should be defined and investigated, suitable mitigation should be agreed. • Update BPM's "Grazing Compensation Assessment Procedure". Implement as and when required. • A practical and cost effective yet fair agreement should be reached between all parties. Possible mitigation measures may therefore include the construction of overpasses and underpasses at designated locations along the pipeline route or pursuing other options as detailed in the procedure. Should the pipeline prohibit livestock movement to the extent that livelihoods are compromised, BPM should enhance/ extend the Bakubung-Ba-Ratheo Farming Project to provide opportunities for the affected people. • Mitigation measures should be approached in accordance with the principles of the International Finance Corporation's Performance Standard 5 on Land Acquisition and Involuntary Resettlement (IFC PS5, 2012), namely to achieve fair compensation that will not leave affected parties worse off than their position pre-project intervention.	• Construction, Operation and Maintenance • On-going • Prior to construction • Prior to construction • Prior to construction • On-going • As required • As Required • As Required
Transport	Road	• Designs of the intersection layouts of the access roads with the main roads must address design	• Planning and design

Activity	Potential impact	Mitigation type	Time period for implementation
system	disturbance and traffic safety	standards and elements such as alignment, sign distances, cross-sections and provisions for other road users including pedestrians. • Put into place a system whereby overloading of mine vehicles, as well as contractors' vehicles (weigh bridge), can be prevented and impose adherence to these standards in the strictest possible way to minimise damage to tarred road surfaces that are travelled upon and to reduce the risk of accidents. • Inspect mine vehicles weekly for clean and operational tail lights, indicators, reflective signage and reverse hooters to ensure visibility of vehicles, especially at night. • Impose safety restrictions on drivers of mine fleet vehicles and include similar stipulations in contracts signed with contractors: • Encourage drivers of mine vehicles to not stop on the side of the R556 and R565 at any time, except in emergencies, to retain the integrity of the road shoulders. • All employees and contractors must adhere to the speed limits and other road safety procedures. • Trucks that are transporting concentrate will be sealed and covered. • As far as is possible, heavy vehicle deliveries and collections will be kept to off peak traffic periods. • The needs of pedestrians should be taken into consideration in the planning and design of the access to the proposed site, as well as the design of the road infrastructure. • A single-lane access road with stop-control at the access to the shaft plant on the R565 and R556. • A right-turn lane on the R565 and R556 to access the roads to the proposed site would also be an additional safety feature. • Provide large visible road signage indicating the presence of heavy vehicle traffic at least 500 m before, on either side of the mine site access road intersections with the R565 and R556. • Road safety issues must be included as part of the overall on-site safety training and at induction. • In case of a person or animal being injured by transport activities the emergency response procedure in Table D will be followed. • The mine will record and respond, appropriately and without delay, to any complaints about usage of roads by mine vehicles. • Bakubung needs to ensure that proper road markings, reflective road studs, road signs, overhead lighting and proper pedestrian crossings are provided and maintained at the entrance to the mine and TSF. This would need to be done in liaison with the roads department that has jurisdiction on the roads. • BPM is to share the recommendations for road infrastructure changes and upgrades provided in the 2016 traffic impact assessment report to the roads department.	phase • On-going • Weekly • On-going • On-going • On-going • On-going • Prior to construction • On-going • On-going • As required • On-going • On-going • Prior to construction
Site preparation Earthworks Waste rock management Transport systems Site/contract manageme	Loss of heritage, cultural and paleontological resources	• • A phase two heritage investigation is to be undertaken for sites to be destroyed or relocated. • Based on the heritage investigation the preservation or the destruction of the sites will take place prior to the commencement of the construction activities. • Should destruction of the sites be necessary, destruction permits must be in place prior to construction activities commencing at or near the relevant identified sites. • The grave site (MCH017) and stone cairn (MCH021) will be fenced off to afford them greater protection. • All relevant construction staff will receive training in basic archaeological identification and the communication routes to follow in the case of a discovery. • Additional heritage resources may be unearthed during construction. Should this occur, work in that	• Prior to construction • Prior to construction • Prior to construction • On-going • On-going • As required • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
nt Tailings management Demolition Rehabilitation		area should be halted until such time as an appropriately qualified person can make an expert decision on the mitigation measures required. The expert must notify SAHRA and carry out an emergency recovery (Emergency Response Procedure Table D). • Where graves have been identified, if they are not to be relocated, they will be monitored, and fences will be maintained during the life of mine. • Where stone cairns have been identified, if they are not to be destroyed or moved, they will be monitored, and fences will be maintained during the life of mine. • For graves to be relocated the following procedure is required: • A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation of the graves. • Bilingual site notices (in the most appropriate languages) indicating the intent of the relocation. • Bilingual newspaper notices indicating the intent of the relocation. • Permit applications to the legally required authorities, including (but certainly not restricted to) the South African Heritage Resources Agency. • An exhumation process that keeps the dignity of the remains and family intact. • An exhumation process that will safeguard the legal rights of the families as well as that of the development company. • The process must be done by a reputable company well versed in the mitigation of graves. • If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine (or whoever is applicable at the time) 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo (or whoever is applicable at the time) 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or paleontological significance, a Phase 2 rescue operation may be required. • SITE SPECIFIC MEASURES: Iron Age sites • For MCH003: • Shovel pit test to determine depth and integrity of archaeological deposit of site and for sites with ceramics to positively establish group identity. • Test pit excavations will be aimed at identifying structures.	• On-going • Prior to construction • As required • Prior to construction • Prior to construction
		• Based on the findings further assessment of the site might be required. • Before destruction of the site, a destruction permit must be applied for (for sites that require destruction permits) and received from the South African Heritage Resources Agency. • This work can only be undertaken by a suitably qualified and experienced archaeologist. • This work may only be undertaken after permits have been received from the South African	• Prior to construction • Prior to construction • During construction and prior to destruction

Activity	Potential impact	Mitigation type	Time period for implementation
		Heritage Resources Agency allowing such mitigation measures to be undertaken. • Permits for mitigation in terms of Section 35 of the NHRA must be applied for MHC003. Mitigation measure should include Shovel Test Pits and test pit excavations. These excavations must be documented by means of a Phase 2 Archaeological Investigation Report that must be submitted to SAHRA for further comment. An agreement with a recognised repository must be sought to house excavated artefacts for long term curation. • *For MHC005:* • If the site is impacted upon, an archaeologist must monitor the site during construction to mitigate accidental finds. • Before destruction of the site, a destruction permit must be applied for and received from the South African Heritage Resources Agency. • This work can only be undertaken by a suitably qualified and experienced archaeologist. • A Watching Brief must be conducted for sites MHC005. A Watching Brief Report must be compiled and submitted to SAHRA upon completion • **Early Stone Age:** • An Early Stone Age specialist must assess the study area in particular the pebble layers that contain artefacts. New dating techniques could be used here. • **MHC025, MHC026, MHC027A, C, D, E, F and G** • A social consultation process in terms of section 36 of the NHRA and Chapter XI of the NHRA Regulations must be completed for sites MHC025, MHC026, MHC027A, C, D, E, F and G, thereafter a permit for relocation may be applied for.	• During construction and prior to destruction • Prior to destruction • As required, during construction • Prior to destruction • Prior to destruction • As required, during construction • Prior to construction • Prior to destruction
Site preparation Earth works Civil works Waste rock manag ement Transport systems Demolition Rehabilitati on Waste rock	Noise Pollution	• The shaft and plant infrastructure was moved some 600 m further south east away from the nearest neighbour. • The prevailing wind directions is to be taken into consideration when planning the location of noise emitting installations/plant on surface • A noise attenuation structure and visual barrier will be constructed between the shaft bank and the receptive community areas. The structure will be designed to be as aesthetically pleasing as possible. The final design will be concluded prior to the commencement of the construction phase and will be signed off by a professional engineer. The design will include both noise and visual design criteria. • The designs of the shaft complex and concentrator plant should incorporate all necessary acoustic design aspects required in order to ensure that the overall generated noise level does not exceed a maximum equivalent continuous day/night rating level (LRdn) of 70 dBA inside the property boundary, as specified for industrial districts in SANS 10103. Notwithstanding this provision, the design is also to take into account the maximum allowable equivalent continuous day and night rating levels of the potentially impacted sites outside the mine property. Where the noise level at such an external site is presently lower than the maximum allowed, the maximum for that land use zoning shall not be	• Prior to construction • Prior to construction • Prior to construction • Prior to construction • On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
management Mineral processing operations Mining and mining related activities		exceeded. Where the noise level at the external site is presently at or exceeds the maximum, the existing level shall not be increased by more than indicated as acceptable in SANS 10103. Note that the induced ambient noise levels in the residential areas of Ledig Village should ideally not exceed 50dBA during the day and 40dBA at night. • Sound muffs will be used on the main ventilation fans. • Use most effective mufflers, enclosures and low-noise tool bits and blades • Noise will be periodically (construction) and continually (operations) monitored at relevant boundary points nearest the neighbouring communities according to national standards. • Regular inspection and maintenance of equipment • Reduce throttle settings and turn off equipment when not used • Select 'low noise' equipment, or methods of work • Use temporary noise barriers and use 'low noise' equipment (including alternative reversing alarms), where possible • Investigate use of alternatives to audible reversing alarms (such as broadband noise emitting models) or configure to maximise forward movements of mobile equipment • Avoid dropping from heights • Any complaints from any of the neighbours or other IAPs with regards to noise and vibration will be registered (A complaints system is to be established) • and dealt with by the mine management. • Construction site yards, concrete batching plants, asphalt batching plants and other potentially noisy fixed facilities are to be located as far away as is possible from noise sensitive areas adjacent to the development site. • The ventilation fan outlets have been positioned facing south east, away from the village and facing slightly upwards. • All construction vehicles, mine fleet vehicles and equipment are to be kept in good repair and fitted with appropriate sound suppression devices. • Avoid clustering of mobile fleet near receptors and enforce rest periods for unavoidable maximum noise events • Ensure periods of respite are provided in the case of unavoidable maximum noise level events • Activities, particularly the noisy ones, are to be restricted as far as possible to daylight hours. • The noise from mechanical implements and mining activities will be maintained within the requirements of the Mine Health and Safety Act (No 29 of • 1996). • Site generators to be equipped with suitable sound attenuation measures. • Blasting noise will be monitored and recorded during blasting activities to ensure adherence to stipulated guidelines. • A schedule for all blasting work on surface and for the first 50 m of the shaft sinking should be provided to the local communities most likely to hear the noise of the blasts, especially schools and hospitals. A reminder or warning system, such as bulk SMSes, should be sent out to community representatives who can inform their neighbours. • A siren will be sounded prior to a blast. • Train construction staff on noise control plan during health and safety briefings	• Construction • Construction • On-going • On-going • On-going • On-going • Construction • Construction • Construction • On-going • Decommissioning and Closure • As required • Prior to construction • Construction • Construction • As required

Activity	Potential impact	Mitigation type	Time period for implementation
		• Personal Protection Equipment (PPE) will always be worn as required by the appropriate workplace health and safety legislation. • Demolition and rehabilitation activities are to be restricted to daylight hours. • Local residents are to be notified of any potentially noisy field survey works or other works during the planning and design phase and these activities are to be undertaken at reasonable times of the day. These works should not take place at night or on weekends. • During the pre-construction phase, consideration must be given to the noise mitigation measures required during the construction phase that should be included in the tender document specifications and the design. • Construction site yards, concrete batching plants, asphalt batching plants, and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development site. • The temporary ventilation system for the shaft construction should incorporate all the applicable noise mitigation measures. • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, BPM should liaise with local residents on how best to minimise impact. • In general operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).	
		• Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment. • The latest technology incorporating maximum noise mitigation measures for the shaft complex and concentrator plant components should be designed into the system. • The design process is to consider, inter alia, the following aspects: • The position and orientation of buildings on the site. • The design of the buildings to minimise the transmission of noise from the inside to the outdoors. • The insulation of particularly noisy plants. • Specifically measures need to be taken for the two types of equipment, which are responsible for the highest noise levels from the shaft complex, namely the compressor house and the mine ventilation system (upcast vent fans): • The compressors should be fitted with effective silencers and the walls and roof of the compressor house should be constructed of a sufficiently dense material so as to achieve at least a 20dBA reduction (insertion loss) between the indoor noise and that transmitted to the outside of the building. Ventilation openings, if required, should be placed on the side of the building facing away from the noise sensitive areas. • The mine ventilation system should preferably use centrifugal fans rather than radial fans. The upcast vent fan outlets should be oriented slightly upwards and to the south-east away from Ledig Village, and if possible, the enclosure of the surface infrastructure in an insulated building should also be considered. • Irrespective of the aforementioned mitigation measures that need to be taken at the sources of the noise, earth berms (noise attenuation barriers) should also be constructed: • Along the eastern perimeter of Ledig Village. • North of mine along the southern perimeter of the planned Gabonewe Estate (mine housing). • The design of the pump stations at the planned tailings dam is to incorporate all the necessary acoustic design aspects required in order that the induced ambient noise levels in the residential	• On-going • Construction • On-going • On-going • On-going • On-going • On-going • Prior to construction • Prior to operations

Activity	Potential impact	Mitigation type	Time period for implementation
		areas of Phatsima Village and Reagile informal settlement shall not exceed 50dBA during the day and 40dBA at night. • The National Noise Control Regulations and SANS 10103 should be used as the main guidelines for addressing the potential noisee impact on this project. • The noise mitigation measures will need to be designed and/or checked by an acoustical engineer in order to optimise the design parameters and ensure that the cost/benefit of the measure is optimised. • At commissioning of the mine, the noise footprint of the new shaft complex, the concentrator plant and the tailings dam area should be established by measurement in accordance with the relevant standards, namely SANS ISO 8297:1994 and SANS 10103. The character of the noise (qualitative aspect) should also be checked to ascertain whether there is any nuisance factor associated with the operation.	
Site preparation Earthworks Waste rock management Transport systems Tailings management Demolition Rehabilitation Maintenance and aftercare	Loss of soil resources and land capability through physical disturbance	• Remove topsoil (approximately 300 mm) from all areas to be disturbed during construction activities and stockpile it for rehabilitation purposes • Remove subsoil (the layer beneath the topsoil) from all areas to be disturbed during construction activities and stockpile it for rehabilitation purposes. • Store topsoil and subsoil in separate stockpiles • Ensure that topsoil stockpiles are shaped convexly and are no more than 2 m high • Monitor topsoil and subsoil stockpiles regularly to identify any alien plants, and remove these to prevent contamination of the seed bank • Clearly mark soil stockpiles to identify the soil type • Earthworks and clearing will be limited to the stipulated footprints of the infrastructural areas. • Place infrastructure in already transformed areas or where transformation will occur as far as possible. • Avoid drainage lines and sensitive soils (particularly Sepane soil form). • Ameliorate altered physical and chemical properties of soil using appropriate methodologies and monitoring the progress thereof. • All staff and contractors handling topsoil and sub-soils are to receive the necessary training in terms of stripping guide, handling, and storage procedures. • Restore affected surface areas to their pre-disturbance potential. • The surface will be contoured to potentially replicate the pre-mining conditions. • All soils compacted because of activities falling outside of project footprint areas should be ripped and profiled. • To prevent the erosion of topsoils, management measures to minimise erosion should include installation of berms, silt traps, hessian curtains and other appropriate engineering materials/designs at erodible areas and storm water diversion away from areas susceptible to erosion. • All areas should be monitored for erosion and incision. • Take appropriate measures to protect topsoil and subsoil stockpiles from wind or water erosion, such as providing stormwater cut-off drains or using a breathable cover material or temporary vegetation cover. • Construct in the dry season	• Construction • Construction • On-going • Construction • Construction • Construction • Decommissioning • On-going • On-going • Decommissioning • Decommissioning • As required • Construction and ongoing management • On-going • Construction
Site preparation Earth works Waste rock	Loss of soil resources and land capability	• During the construction, operational and decommissioning phases, Bakubung will ensure that all hazardous chemicals (new and used), dirty water, mineralized • wastes and non-mineralised wastes are transported, handled and stored in a manner that they do not pollute soils. This will be implemented through a procedure(s) covering the following: • All contaminated soils should be rehabilitated or replaced with uncontaminated soils • All hydrocarbons will be stored in a bunded area during all the phases of the project.	• On-going

Activity	Potential impact	Mitigation type	Time period for implementation
management Transport systems Tailings management Process and storm water management Sewage sludge management Demolition Rehabilitation Maintenance and aftercare	through pollution	• Pollution prevention through appropriate management of hazardous materials and waste as outlined in Table B • Pollution prevention through basic infrastructure design and re-alignment of the tailings pipeline • Pollution prevention through maintenance of equipment • Maintenance of equipment should be done either on impermeable surfaces or drip trays should be used. • Use a drip-tray when refuelling vehicles or machinery. • Pollution prevention through education and training of workers (temporary and permanent) • A soil remediation plan developed by a soil chemist and hydrologist is to be implemented following a spill event. • The required steps to enable fast reaction to contain and remediate pollution incidents. In this regard the remediation options include ○ Store hazardous substances in appropriately bunded areas. ○ containment and in situ treatment or disposal of contaminated soils as hazardous waste. In situ treatment is generally considered to be the ○ preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are returned. Following spillages, the pollution plume should be determined by a soil chemist, geohydrologist or hydrologist. • Specifications for post rehabilitation audit to ascertain whether the remediation of any polluted soils and re-establishment of soil functionality has been successful and if not, to recommend and implement further measures. • In case of major spillage incidents the emergency response procedure in Table D will be followed. • If spillage occurs, the spill must be contained with swales and berms, after the leakage has been repaired the spilled material should be removed and pollution plume should be determined by a soil chemist and hydrologist and geohydrologist. • Clean up spills immediately, treat contaminated soil as hazardous waste and dispose accordingly	• As required • As required • On-going
Site preparation Civil works	Destruction to biodiversity	• The area to be disturbed during the construction of the mine and its associated infrastructure is to be kept as small as possible to limit disturbance to existing vegetation. • Limit transformation only to development footprints • Implement pollution control measures recommended in the soil, geotechnical and hydrological specialist reports for the project.	• Construction
Earthworks Tailings management Waste rock management		• Specimen trees on site will be identified and efforts will be made to conserve these. • Should this not be possible, then trees and large shrubs cleared during the site clearance phase should be made available to the local community as firewood. • Site clearing shall be carried out by mechanical means. Fire will not be used for bush clearing. • Indigenous vegetation will be planted for screening and landscaping purposes, especially around the TSF. • Pollution prevention measures will be established, maintained, and monitored, including spill prevention, dumping of domestic waste, or building rubble outside of designated waste transfer	• Prior to construction • Construction • Construction • Post construction • Ongoing

Activity	Potential impact	Mitigation type	Time period for implementation
Transport systems Process and storm water management Sewage sludge management Site/contract management Demolition Rehabilitation Maintenance and aftercare		stations. • Vehicles will be restricted to designated roads and laydown areas. • Areas of biological importance, such as the riparian zone of the Elands River, should not be disturbed by mining activities in order to preserve the existing floral and faunal habitats. • All activities are to remain within the designated infrastructure footprints • Implement the waste management procedures (Table B) • No unnecessary clearing of vegetation should take place during the operational phase. • On-going rehabilitation and monitoring of previously disturbed areas will take place, especially at the TSF. • Vegetation planted for screening and landscaping purposes should be monitored and maintained. • Mine infrastructure to be adequately rehabilitated after mining ceases. This includes stockpiles, tailings, rock dumps etc. • Implement the annual rehabilitation plan • Seeds from indigenous grasses common to the area will be harvested and added to the rehabilitation seed mix. • An alien and invader species management programme is to be developed and implemented in areas where BPM has control and will include a monitoring phase to evaluate successes achieved. This will be managed throughout the project life and for an additional three-year period after rehabilitation. • The annual vegetation survey will be continued to ascertain the progress and success of rehabilitation. This will include the TSF. • Additional surveys to be performed if expansion of infrastructure is planned in the future. • Conduct additional, brief floristic surveys, focused on searching for *Drimia sanguinea, Stentonstelma umbelluliferum*, *Boophone disticha* and *Hypoxis hemerocallidea* within the final development footprints prior to construction. Surveys should be conducted in late October to early November and in January. The brief floristic surveys should focus on searching those parts of the proposed infrastructure footprints containing potentially suitable habitat for *Drimia sanguinea*. These surveys will also contribute towards confirming the absence of other 'species of conservation concern' within the study area. • The mine will ensure that all staff members and contractors are familiar with the conservation policy of the company through training and induction. • No snaring, trapping, hunting, poisoning or disturbance of fauna will be allowed by any employee or contractor or their employees. • Perimeter fences are to be inspected monthly to determine if breached by poachers. • Speed restrictions will be enforced on all access roads. • Prevent any pollution of water, soil or vegetation which can cause harm to animal life. • Apply sound veld management principles to ensure maximum biodiversity. This would include sound fire management and grazing techniques to ensure optimal vegetation condition and biodiversity levels in areas of Marikana Thornveld and spatially restricted untransformed vegetation units not destroyed by the project. • No uncontrolled or camp fires are permitted on site • Develop and implement a water course rehabilitation plan near the end of the construction phase to	• Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • Ongoing • As required • End of construction • On-going • On-going • On-going as per management measure • On-going • On-going • On-going • On-going • On-going • Construction and Post Construction • On-going • Post construction • Construction • Prior to construction • On-going • Construction • On-going • Construction • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
		address remnant impacts. • All reseeding activities must be undertaken at the end of the dry season to ensure optimal conditions for germination and rapid vegetation establishment. • Any damage to the drainage lines necessary to complete the work must be limited in extent. • Avoid placement of any infrastructure footprints within the buffer zones for the biological corridors recommended in the vegetation impact assessment. • Botanical research and conservation institutions (e.g. SANBI and universities), should also be afforded an opportunity to search the footprint for species that are of research or horticultural interest, prior to commencement of development. • Alternatively, such species should be rescued and placed in a nursery or donated to a research institute (e.g. SANBI and universities), rather than simply being destroyed upon receipt of a permit. • Buffer zones need to be maintained during the operational phase of the project in order to be effective. This includes the maintenance of a well vegetated grass cover that is free of aliens and erosion features. Any aliens and/or erosion features observed within the buffer zone need to be • addressed in order to ensure buffer functioning. • Construction teams to be housed off-site to reduce human presence on site. • Delineated watercourses and buffers should be treated as sensitive no-go areas as far as possible. No unauthorized access is allowed in these features. • Dewatering that may be required during excavation activities should not be released directly into watercourses. • Ensure that geotechnical and geohydrological mitigation measures are in place around the proposed tailings storage facility to prevent seepage into nearby watercourses. • Water storage, waste and stockpile facilities are to construct and operated according to specifications to reduce the likelihood of structure failure • Fence off surrounding untransformed vegetation (applicable to all footprints except the pipeline); • Illegal medicinal plant harvesting should be discouraged through control of access to untransformed habitats and vegetation within the study area. • Implement and maintain sediment control structures upslope of watercourses, in between stockpiles and construction activities that may act as sources of sediment. • Develop a watercourse rehabilitation plan for impacts not successfully mitigated • The damaging or destruction of any plant species protected in terms of the National Forest Act or the Biodiversity Act should be avoided wherever possible, and the relevant permits for the destruction, removal or translocation of any such protected plant must be obtained prior to development from the provincial Directorate of Biodiversity Management • In the event of any 'Declining' plant species being recorded within approved development footprints in future, permission for their removal or destruction should be obtained from the provincial Directorate of Biodiversity Management. Where feasible, viable populations of such species should be translocated to degraded or untransformed areas within the study area which provide potentially suitable habitats, but such translocations will have to be carried out in a way that ensures no ecological degradation of the host habitat occurs, and will have to be evaluated by a botanist for each species and each potential translocation area. • In the event of any threatened (i.e. Critically Endangered, Endangered and Vulnerable) or Near	• On-going • On-going • On-going • On-going • Prior to construction • Prior to construction • On-going • On-going • Prior to construction • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
		Threatened plant species being recorded within the study area or proposed development footprints in future, appropriate in situ and/or ex situ conservation measures should be developed in consultation with the North-West Province Directorate of Biodiversity Management. • It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. • Limit damage and access to riparian vegetation during bridge construction. • Limit transformation only to development footprints. • Maintain the pipeline in a good working order with regular checks and inspections to help reduce the risk of spillage events. • Maintain untransformed vegetation in a natural state. • Maintain sediment control structures in a functional manner during the entire throughout the construction and operational phases.	
		• Modify infrastructure footprints so as to avoid overlap of watercourses, as well as the 32m and 100m buffers as far as possible. This pertains specifically to a portion of the tailings/return water pipelines. • Reporting of faunal species of conservation-concern and implementing a monitoring programme • Modify infrastructure footprints so as to reduce the area of spatially restricted vegetation units and Marikana Thornveld within the footprints wherever possible. Realigned footprints should be placed within the 'Secondary vegetation' unit in as far as possible. • Modify TSF footprint so as to maximise the surface area comprising Secondary vegetation and minimise the extent of Marikana Thornveld within the footprint. • Realign the Frischgewaagd section of the tailings and return water pipeline alignment along the recently constructed access road and reduce the width of the construction servitude in untransformed habitats. • Bridge designs need to be modified to prevent further habitat loss due to expected anthropogenic erosion damage. • Proposed bridge crossings should contain culverts across the length of the crossing and armouring on the downstream channel banks and bed to avoid further channel incision and channel bank scour during high flow events. Pipes are not recommended as they can become easily blocked with alluvial material, which can lead to further scour damage in the watercourse. • Tie-in points at riverbanks (i.e. where infrastructure is placed into the ground) must be suitably safeguarded with gabion cut-off walls to prevent erosion. • All final footprints should be searched for protected plant species prior to the commencement of construction. The surveys should focus on searching for *Drimia sanguinea, Stentonstelma umbelluliferum, Boophone disticha* and *Hypoxis hemerocallidea* within the final development footprints prior to construction and should be conducted in late October to early November and in January. • A restricted servitude width for pipeline river crossings should be used, and no construction activities should occur within the instream and riparian habitats. • The pipeline should be spanned across the watercourse with plinths, plinths can be located within the 32m buffer, but not within delineated riparian habitat. • No new access roads may be created through watercourses along the pipeline alignment. All new tracks and roads that intersect delineated watercourses and the 32m buffer will have to receive environmental approval before they can be constructed.	• On-going • • On-going • On-going • Prior to construction • Prior to construction • Prior to construction • Prior to construction • Prior to construction • Construction • Construction • Prior to construction • Construction • Construction • Construction • On-going • Construction • On-going • As required

Activity	Potential impact	Mitigation type	Time period for implementation
		• No refuelling of any vehicles, stockpiling of material or the positioning of portable toilets should be allowed within any of the watercourses or their associated buffer zones. • Permit only essential construction personnel within 32m of the riparian habitat, if absolutely necessary that they enter the buffer zone. • Regular monitoring of the tailings pipeline is recommended during the operational phase to prevent potential spills/leakages. • Rehabilitate all drainage line and riparian habitat areas if required, in order to ensure that the ecology of these areas is re-instated during all phases. Edge effects of activities including erosion and alien/weed control need to be strictly managed in these areas. • Repair erosion damage within watercourse through the use of either soft or hard rehabilitation interventions. Hard interventions, such as gabion drop inlets and other features, will require design by an engineer with rehabilitation experience. Soft rehabilitation interventions include rehabilitation interventions that do not consists of rock and concrete, examples include earth berms, revegetation with indigenous species and biojute fabrics. Note also that rehabilitation works in watercourses require a WUL. • Sheet runoff from access roads should be slowed down by the strategic placement of berms. • Stockpiles should be protected from erosion during the wet season to prevent sedimentation in watercourses. • Discharged storm water must be released in a controlled manner in a diffuse flow pattern across a buffered vegetation strip and be accompanied by energy dissipating interventions to prevent erosion damage. • Limit the amount of impervious material near watercourses as far as possible and demarcate setbacks from watercourses in the form of a buffer zone with a natural vegetation cover. • Structural control measures such as treatment techniques or naturally vegetated detention basins could be used to improve storm water quality. • Other structural control measures include grass swales, infiltration trenches and basins, wet ponds, and constructed wetlands to intercept and partially treat storm water before it is released. A combination of source controls and structural controls can result in an integrated solution, which is likely to provide the best benefits. • Since the downstream sites in both the Sandspruit and unnamed tributary of the Elands River displayed higher SASS scores this spatial trend should not show a deterioration in the future once the proposed development takes place and this trend should be considered a Key Performance Indicator for the project throughout the life of the infrastructure. • Environmental control officers should ensure that signage to identify watercourses and their buffers are kept in place and remain well visible during the construction process and that no unauthorised access occurs. Toolbox talks should address the importance and sensitivity of wetlands and other watercourses. • Disallow any infrastructure within the wetlands or within a 30 m buffer from any watercourse (including a wetland) • Demarcate the wetland areas during construction to ensure that no construction activities occur within these areas • If herbaceous protected plant species that are readily transplantable are found (e.g. many geophytes),	• On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • During construction • Construction • On-going • Design phase

Activity	Potential impact	Mitigation type	Time period for implementation
		viable populations of such species can also be translocated to transformed (including rehabilitation areas) or untransformed areas within the study area which provide potentially suitable habitats, but such translocations will have to be carried out in a manner that ensures that no ecological degradation of the host habitat occurs, and will have to be evaluated by a botanist for each species and each potential translocation area. • Develop and implement a rehabilitation plan for the tailings pipeline construction servitude. The principal objectives of the plan should be the optimal reintroduction of stripped topsoil and the establishment of indigenous seral plant communities through the natural process of secondary succession. • Modify the solar plant footprint so as reduce the extent of vegetation units with High biodiversity conservation value and sensitivity as far as possible and covering a greater extent of secondary vegetation.	
Site preparation Civil works Earthworks Tailings management Waste rock management Transport systems Process and storm water management Sewage sludge management Site/contract	General disturbance to biodiversity	• The use of light will be kept to a minimum, and where it is required, yellow lighting will be used where possible • Workers (permanent and temporary) will be trained on the value of biodiversity and the need to conserve the species and ecosystems, as well as fire control and prevention. This will be included in induction training as well as relevant follow-up training. • There will be zero tolerance with respect to the killing or collecting of any biodiversity by anybody working for or on behalf of Bakubung Platinum Mine within or adjacent to the mine area • Strict speed control measures will be implemented on access roads and vehicles will be restricted to travel on designated roads • Alien plant species proliferation, which may affect floral and faunal diversity, will be controlled in accordance with legislation and in a manner that no additional loss of indigenous plant species occurs • Develop and implement an alien plant control programme for the study area, with emphasis on areas surrounding infrastructure footprints. • Effective implementation of the following management plans (as described in the EMP): • Surface and groundwater management plans • Soil management plan • Dust management plan • Waste management plan	• On-going • On-going • On-going • On-going • On-going • On-going
management Demolition Rehabilitation Maintenance and aftercare		• Noise management plan • Blast management plan • Concurrent and final rehabilitation of the TSF. • Concurrent rehabilitation of areas no longer required for mining activities with a particular focus on establishing indigenous vegetation cover • As part of closure planning, the designs of any permanent and potentially polluting structures (TSF) will take consideration of the requirements for long- term ecosystem functionality, pollution prevention and confirmatory monitoring	• On-going • On-going • Closure

Activity	Potential impact	Mitigation type	Time period for implementation
Site preparation Civil works Earthworks Transport systems Waste rock management Tailings management Process and storm water management Demolition Rehabilitation Maintenance and aftercare	Alteration to natural drainage patterns and changes to water quantity	• Surface water, particularly storm water for all phases of the proposed mining operation, is to be managed in accordance with legislative requirements of • the NWA and Regulation 704 (4 June 1999). • Temporary storm water diversion berms will be constructed around all construction sites to divert clean water around and away from the sites. • Water consumption will be managed by setting key performance indicators to achieve water reduction based on the current water balance and the implementation of annual water audits. • All surface water management measures to be implemented in accordance with the Integrated Water and IWWMP and IWUL. • As the TSF develops, surface water control structures (contours and down drains) will be installed to prevent erosion and guide water into the return water dam. • An approved storm water management plan is to be implemented on site where clean and dirty water will be separated, and clean water will be diverted around dirty areas and allowed to return to its normal flow path. • Prevent stormwater outflows from entering directly into watercourses. Instead ensure that flows are attenuated before release. • Site rehabilitation will aim to restore surface drainage patterns as far as practically and economically feasible. • Infrastructure is to be re-aligned in accordance with the recommendations provided by the wetland specialist; this includes modifying infrastructure footprints so as to avoid overlap of watercourses, as well as the 32m and 100m buffers as far as possible including the tailings and return water pipelines. • A well designed and implemented storm water management system is required to attenuate flood peak events and consider buffer zones in order to prevent erosion impacts and the creation of channelised flows at discharge points. • Interventions and mechanisms in the storm water management system can include measures to facilitate a higher percentage of infiltration and reduce runoff volumes and velocities, without concentrating their outflows as far as practically possible. • Develop and implement an alien vegetation control plan to limit and manage the spread of alien vegetation within watercourses.	• On-going • Construction • On-going • On-going • On-going • Construction • Closure • Prior to construction • Prior to construction and on-going • Prior to construction and on-going
Site preparation Civil works Earthworks Transport systems Mining and mining related activities Waste rock	Contamination of surface water resources	• Surface water, particularly storm water for all phases of the proposed mining operation, is to be managed in accordance with legislative requirements of the NWA and Regulation 704 (4 June 1999). • The entire mine area (plant and TSF) subscribes to a zero-discharge policy for all dirty water. • Designate a re-fuelling area and disallow refuelling within close proximity to any watercourse. • All applicable water uses are to be licensed. • Temporary storm water diversion berms will be constructed around all construction sites to divert clean water around and away from the sites. • Pollution control dams will be constructed downslope of the shaft and plant site to capture all dirty water run-off. • The pollution control dams will be sized to accommodate all the dirty water from the area and not spill once in 50 years due to a storm event. The dams will have a minimum of 0.8m free board as required in Regulation GN R704.	• On-going • Construction • Prior to construction • Construction • Construction • Prior to construction • Construction • Construction • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
management Tailings management Process and storm water management General and hazardous waste management Sewage sludge management Site support services Demolition Rehabilitation Maintenance and aftercare		• The pollution control dams, TSF and return water dam are to include appropriate barrier systems in accordance with legislative requirements with designs approved by the DWS. • Silt traps will be constructed upslope of the pollution control dams and return water dam. • Ensure that all contractors and employees that are employed on site are aware of their responsibilities with regard to the prevention of pollution of water according to the requirements of the NWA. • The pollution control facilities (pollution control dams, silt traps and return water dam) will be placed on planned maintenance, routine inspections will be implemented, and they will be de-silted periodically to ensure effective performance. • Water in the pollution control dams will be used for dust suppression, industrial water, for construction, during underground mining activities, as make up water for the mine service water system and, should the quality be suitable, it will be used in the plant. as required • The contractors' laydown areas are to be surfaced and are to drain to a sump with silt traps and hydrocarbon collectors. • Portable chemical toilets will be provided during the construction phase. They are to be routinely cleaned and sewage disposed of at a licensed sewage treatment plant with the safe disposal certificate to be provided. • All chemicals, bulk fuels, oils and grease and any other hazardous substance, will be stored and handled as per all applicable legislation and national standards. • Temporary hazardous waste disposal facilities will be licensed prior to construction. Temporary waste disposal facilities are to be provided for the collection of waste, which will be removed regularly by a reputable contractor to the permitted waste disposal site. • All vehicle transfer of hazardous materials must be done within bunded areas to minimise potential effects of spills. • DWS are to be given details of the design of pollution control facilities before these are constructed.---------- • All surface water management measures to be implemented in accordance with the Integrated Water and IWWMP and IWUL. • A sewage plant will be provided, and the treated effluent water will be contained in the pollution control dams and will be recycled. • Water on the surface of the TSF will migrate toward the penstock, from where it will be channelled to the return water dam. • Seepage water captured by drains beneath the TSF will be channelled to the return water dam and into the pollution control dams for re-use in the plant. • A site wide water balance will be kept and updated annually. • Waste management procedures will be implemented including hazardous waste handling, storage, and disposal of all waste types. • Hazardous materials handling and storage procedure will be implemented, including the availability of Material Safety Data Sheets (MSDS). • Store hazardous materials in a hazardous material zone with a bunded area. • Hazardous materials spill procedures and an emergency response plan will be implemented. • Soil will be placed on the TSF as soon as deposition activities have moved high enough (one bench) to allow rehabilitation to begin. These re-soiled areas will be vegetated in the following growing season.	• On-going • Construction • Construction • On-going • On-going • On-going • Prior to construction • On-going • On-going • On-going • Prior to construction • On-going as per requirement • On-going • On-going • On-going • On-going • On-going • On-going • Prior to construction • On-going • On-going • Closure • On-going • Closure • Ongoing

Activity	Potential impact	Mitigation type	Time period for implementation
		• Tailings, chemical and hydrocarbon spillages from trucks, conveyors and pipelines will be cleaned up timeously in order to prevent contamination. • The return water dam and all pollution control dams will remain until such time that monitoring proves that surface water qualities are adequate thus allowing surface water to be released directly into the watercourses. • Bakubung Platinum Mine are to implement containment measures along the length of the tailings pipeline route, at locations where there is the potential for the pipe to leak or burst, to ensure spills or leaks from the pipeline do not enter watercourses, these can include berms, containment ponds or other • suitable measures. These designs are to be completed prior to construction. It must be ensured that measures implemented do not impede cattle access to watercourses. • Minimise potential leakages by routing any pipes above ground to detect and limit leaks. • Daily inspections of the tailings pipeline, joints, and casing to ensure integrity and to check for leaks.---------- • Monthly inspections to check thickness of the tailings pipeline. • Rehabilitation will be done according the annual rehabilitation plan to encourage clean surface flow off the rehabilitated surfaces • Surface water quality needs to be monitored until any impacts attributable to mining have been eliminated and are acceptable to the receiving water environment. • Results from the water monitoring program must be presented to DWS on an annual basis until acceptable limits are achieved.	
Site preparation Civil works Earthworks Transport systems Waste rock management Tailings management Process and storm water management Demolition Rehabilitation Maintenance and	Changes of groundwater levels and availability	• The shafts will be sealed during the construction phase to prevent the ingress of groundwater. • The shafts will be concrete lined and any water bearing fissures encountered during shaft sinking will be plugged to prevent further ingress of water. • Water pumped from underground during construction should be treated as dirty water and will be pumped to the settling ponds or pollution control dams. • The impact of shaft sinking on the surrounding aquifers will be monitored and reported on. Should there be a reduction as a direct result of the cone of dewatering from the shaft then an alternative source of water will be identified for the particular borehole user(s). • Groundwater inflow into the mine workings will be minimised by using appropriate measures. • Water encountered underground will be collected and re-circulated to surface. • All unwanted water accumulating in the excavations will be used or discharged into pollution control dams or settling ponds • Monitoring of groundwater levels should continue post closure. If a groundwater abstraction scheme is required around the TSF, this process must be scoped and discussed with all the authorities. The abstraction and disposal of polluted water must be licensed. • Groundwater levels should be continuously monitored for any type of impact;	• Construction • Construction • Construction • Construction • On-going • On-going • Construction • On-going and post closure • On-going as per monitoring programme

Activity	Potential impact	Mitigation type	Time period for implementation
aftercare			
Site preparation Civil works Earthworks Transport systems Mining and mining related activities Waste rock management Tailings management Process and storm water management General and hazardous waste management Sewage sludge management Site support services Demolition Rehabilitation Maintenance and aftercare	Contamination of ground water resources	• The TSF and return water dam will be constructed in accordance with the proposed TSF design document. • Suitable clay soils found on site at the TSF, waste rock dump and pollution control dams will be compacted to form an impermeable layer that will minimise the flow of leachate into the groundwater regime. • The return water dam will be lined with an appropriate barrier system approved by the DWS to prevent seepage. • Line the TSF and evaporation dams with a Class C liner. • All plant and surface infrastructure (including TSF, waste rock dump and pollution control dams) to be designed in accordance with national standards and applicable legislative requirements, to prevent ingress of surface water into the groundwater regime. • The in situ subsoil layer containing clay will be compacted beneath the waste rock dump, TSF and pollution control dams to act as an impermeable layer. • All plant and surface infrastructure (including TSF, waste rock dump and pollution control dams) to be constructed in accordance with national standards and applicable legislative requirements, to prevent ingress of surface water into the groundwater regime. • All chemicals, bulk fuels, oils, grease and any other hazardous substance, will be stored and handled as per all applicable legislation and national standards. • All dirty face water will be captured and stored in underground settling ponds. • All groundwater management measures to be implemented in accordance with the Integrated Water and IWWMP and IWUL. • Waste management procedures to be implemented including hazardous waste handling, storage and disposal of all waste types. • Hazardous materials handling and storage procedure to be implemented, including the availability of Material Safety Data Sheets (MSDS). • Hazardous materials spill procedures and emergency response plan to be implemented. • All chemicals, bulk fuels, oils, grease and any other hazardous substance, will be stored and handled as per all applicable legislation and national standards. • Clean and dirty water will be separated. • All tailings spills require immediate clean up to prevent contamination of water resources. • Put in place contamination interception measures if contamination is detected. This should consist of but not be limited to interception trenches (if the groundwater level is shallow enough) or interception boreholes. The water intercepted by these measures should be treated to the RQO of the Elands River before being released into the environment. • Groundwater quality and level monitoring will be conducted monthly as per the water management plan. Internal quarterly reporting will be undertaken, and an annual report will be submitted to DWS. • Seepage from under drains of TSF plus that from the penstock will be circulated back to the return water dam and the pollution control dams for use in the plant or for other mining purposes. • All hydrocarbon spills should be cleaned up as soon as possible to prevent ingress of pollutants into the ground water regime.	• Prior to construction • rigor to construction • Prior to construction • Prior to construction • Construction • Construction • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going as per measure • On-going • As required • On-going as per monitoring programme • On-going as per monitoring programme • On-going • Construction • On-going • On-going • On-going • On-going as per monitoring programme • As required

Activity	Potential impact	Mitigation type	Time period for implementation
		• Surface water quality needs to be monitored until any impacts attributable to mining have been eliminated and are acceptable to the receiving water environment. • Results from the water monitoring program must be presented to DWS on an annual basis until acceptable limits are achieved. • The TSF should be rehabilitated correctly to prevent the ingress of surface water after closure, thus reducing the potential for the generation of leachates. • Excess water that accumulates during the construction phase will be dealt with as part of the construction phase water balance. • Take care to minimize contamination during the construction of the TSF and its associated services. Bund fuel storage and service areas to minimize groundwater contamination. • Clean runoff will be diverted around the total TSF complex. • All excess water must be managed as part of operational phase water balance. Return water from the TSF must be used as much as possible. • All water coming to the TSF must be treated as polluted. Where water is not returned to the plant area, disposal must take place in the correct polluted water facility. • Groundwater quality should be continuously monitored for any type of impact. • If required, a groundwater abstraction scheme should be implemented around the TSF to capture polluted ground water, and to prevent the migration of polluted water away from the site. • Monitoring of groundwater qualities should continue post closure. If a groundwater abstraction scheme is required around the TSF, this process must be scoped and discussed with all the authorities. The abstraction and disposal of polluted water must be licensed. • Groundwater monitoring has to continue during all phases of the TSF operation to identify the impact on the groundwater resources over time, so effective measures can be taken at an early stage before serious damage to the environment occurs. • In total nine monitoring points are recommended for the proposed groundwater monitoring program four shallow (to monitor the water level and quality in the weathered aquifer), four deep (to monitor groundwater conditions in the fractured aquifer) and one by the Elands River). • Update the groundwater monitoring programme with additional points to monitor the groundwater quality at the TSF as well as the evaporation dams.	• On-going as per monitoring programme • On-going as per monitoring programme • On-going as per monitoring programme
Site preparation Civil works Earthworks Mining and mining related activities Waste rock management	Economic impact	• A policy regarding labour recruitment and employment will be compiled for use during the onset of the construction phase and early life of mine. The policy is to be reviewed at least once every two years. • Recruitment may not take place at any other point other than at the designated offices. • To compile a policy regarding labour training programs to guide contractor contracts as well as BPM. • Create a database of employable community members. This database will include identification documents, certificates of highest qualifications and proof of residence confirmed by the leader of the community. • A suitably qualified recruiting company will assist with the employment of individuals, both contractors and permanent, during both the construction and operational phases. This assistance will be in the form of interviews and a register held by the recruiting company.	• Planning and design • Planning and design • Planning and design • Planning and design • Planning and design

Activity	Potential impact	Mitigation type	Time period for implementation
Mineral processing operations Tailings management Power Supply and Use Water supply and use Process and storm water management Transport systems General and hazardous waste management Sewage sludge management Site support services Site/contract management Demolition Rehabilitation Maintenance and aftercare		• Development of a policy regarding procurement/contracting of local SMMEs and BEE and creation of business opportunities to be developed. • Local products and services will be used where possible. • A policy regarding the preferred use of local SMME's as service providers will be compiled for use throughout the life of mine. • Provide contractors with the policy regarding labour recruitment and employment for their implementation. • Ensure that this policy is clearly communicated to all employees and to the communities. • Fair and equitable recruitment opportunities will be afforded to all with equivalent qualifications. • Recruitment practices must be transparent and auditable. • Stipulate the preferential use of local labour in all contracts, from Phatsima and Ledig, from communities within 50 km of the mine site, and then those • areas from further afield, but without disregarding a person's constitutional rights. • Create a labour desk that can communicate any available positions to the community. • Any job vacancy that is advertised must clearly indicate the required and appropriate skills for that position. • BPM will comply with the requirements of the mining charter with respect to employment equity, women in mining and employment of disabled persons. Policies with respect to this have been drafted. • BPM will identify candidates from the local communities for apprenticeships and on the job training programs • Skills development plans must be focused on skills that the mine needs, and that are also transferable. Support must be given to people after the training to ensure that their newly acquired skills can be implemented. • BPM should liaise with local training institutions to determine whether there are any opportunities to offer internships and practical experience for their students. BPM must ensure that skills development requirements form part of their contracts with sub-consultants. The skills development requirements in their Social and Labour Plan (SLP) must be implemented. • Employees Training and skills development: • BPM has developed a policy and program for the training, development, mentorship, skilling, and career progression of its permanent employees as per the requirements of the SLP. Any BPM contractor will also be expected to meet the requirements of the SLP. All training will be carried out in accordance with the requisite SETA and NQA. • Communicate recruitment and appointment policy in transparent manner at local level. • Where retrenchments are unavoidable, they should be managed according to legislative requirements. • Provide contractors with the policy regarding the preferred use of local SMME's. • BPM should ensure at least 50% of secondary economic opportunities are given to local contractors. A percentage of goods as determined by BPM and the relevant stakeholders must also be procured locally. Services and goods must be procured locally as far as reasonably possible. Aspects of this positive impact will occur by default when the construction force lives locally, and they utilise local services and support local shops. • Preference should be given to local SMMEs as sub-contractors wherever possible. • Larger contractors will also be required, where possible, to sub-contract and mentor local SMMEs.	• Planning and design • Planning and design • Planning and design • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going • Decommissioning • On-going • On-going • On-going • On-going • Prior to closure • On-going • On-going as per mitigation stipulation • Annually • On-going • On-going • Prior to decommissioning • On-going and Closure

Activity	Potential impact	Mitigation type	Time period for implementation
		• Make use of locally available raw materials, goods, and services as far as possible, and where appropriate, during construction and operation. • Through the correct implementation of the SLP the mine is to put in place alternative forms of employment and generation of income prior to its closure, to hopefully ensure the sustainability of the neighbouring communities. • A grievance/ complaints register should be maintained in which all community and Interested and Affected Parties (IAP) complaints are recorded and addressed. • Periodic communication (annual at a minimum) and feedback should be undertaken to the community and IAPs in respect of the progress of the Project and the implementation of the EIA management plans • Review all commitments outlined in the SLP and EMP, update to ensure that there is an increased benefit directed towards Phatsima. This should include meaningful interventions that promote long-term investment and expenditure in the community. • All directly affected communities will be considered for corporate social investment initiatives. Bakubung Platinum Mine is to clearly define beneficiaries • (notably Ledig and Phatsima). Specific initiative should be defined for these communities. • BPM will continue to support the *Bakubung-Ba-Ratheo* Non-Mining Economic Development Trust and the *Bakubung-Ba-Ratheo* Economic Development • Unit (EDU) sustainable development initiatives and monitor their effectiveness. • All IAPs should be informed of the commencement of the decommissioning phase and the date of mine closure on a regular basis. • BPM must ensure that rehabilitation has taken place correctly, in accordance with the annual rehabilitation and closure plan, SLP and and according to legislation and the final end land users' requirements.	
Site preparation Civil works Earthworks Mining and mining related activities Waste rock management Mineral processing operations Tailings management Power Supply and	Inward migration and associated social ills	• Worker accommodation (construction and operation phases) must comply with the standards of international best practice, i.e. Workers Accommodation Processes and Standards: A Guidance Note by IFC and EBRD (2009). • Focus on employing local labour and the appointment of contractors. • Link with relevant forums/organisations on issues of community safety and provision of emergency response services. • Plan a medical facility for employee needs. • Through the CSI department, identify opportunities to improve the health of the community. • Communicate the fact that BPM will operate through contractors, and that recruitment is to be done at specified centres that will be regularly advertised to the local communities. • Ensure the inclusion of stipulations in the contractors' agreements which prohibit them from employing people from the street or on-site. • Negotiate the establishment of a recruitment facility at the Traditional Council's offices/ information centre in Ledig and at an equivalent facility in Phatsima. • Actively downplay (through clear, simple, and persistent communication) inflated expectations of unlimited employment opportunities. • Liaise regularly with the Community Policing Forums. • A zero-tolerance policy will be adopted for with respect to drugs and alcohols on site.	• On-going as per mitigation stipulation • Planning and design • Planning and design • Planning and design • Planning and design • On-going • On-going • As required • On-going • On-going • On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
Use Water supply and use Process and storm water management Transport systems General and hazardous waste management Sewage sludge management Site support services Site/contract management Demolition Rehabilitation Maintenance and aftercare		• Access to councillors will be made available to employees attend to conflict resolution, HIV/AIDS issues, and any other relevant social issues. • Join established forums in conjunction with BDM and the MKLM that deal collectively with emergency incidents, such as the Western Limb Local Producer's Forum or other relevant forums/organisations. Discover where effective contributions to these services can be made. • Through this establish linkages with the respective municipalities' Disaster Management Plans to determine if any contribution can be made to these plans. • Through the *Bakubung-Ba-Ratheo* Non-Mining Economic Development Trust and the *Bakubung-Ba-Ratheo* Economic Development Unit and BPM's corporate social investment program investigate opportunities to improve local health care. • Communicate with other mining houses and the local municipalities with regards to the support and implementation of emergency services as well as essential general services. • BPM will work closely with the *Bakubung-Ba-Ratheo* tribal authority on the management of informal settlements that entails that no newcomers to the area will be permitted to construct any form of informal housing structure on land held in trust for the Bakubung. • BPM will ensure that contractor accommodation is provided for contractors, of a standard, and is managed in an environmentally and socially acceptable manner. All necessary authorisations for the construction of the contractors' camp will be obtained prior to the commencement of construction. • The adherence to the EMP specifications for the construction and operational phases will be made a conditional precedent of the contract. • Actively support the endeavours of the *Bakubung-Ba-Ratheo* Traditional Council and the Moses Kotane and Rustenburg Local Municipalities to prevent squatting and to formalise settlement of newcomers in demarcated stands.	• On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going
Cont'd	Cont'd	• BPM must appoint a Community Liaison Officer (CLO) that is responsible for all the social aspects of their operations • BPM must ensure their grievance mechanism is community-friendly and can address and keep record of community grievances. BPM must have a grievance register. It is important to have documented evidence of community/mine interactions. This will assist the mine to track the issues, and the	

Activity	Potential impact	Mitigation type	Time period for implementation
		community to see what actions the mine has taken. • The mine must include planning and budgeting for external conflict situations (such as roadblocks or invasions) in their emergency response procedure. They must also compile a stakeholder engagement plan to guide their interaction with stakeholders	
Cont'd	Cont'd	• BPM will, in accordance with other mining practice, provide a housing allowance for their employees. However, this allowance will be paid in cash only • to those employees who can prove that they own their own local residences. • Those who do not own houses will be given the opportunity to purchase houses through a housing scheme that will be backed by a major financial institution in cooperation with BPM. • Those who neither currently own a local house and who do not wish to purchase locally will be provided with accommodation that will be paid for directly by the mine in order to discourage workers from taking up residence in informal settlements. • Compile a policy on HIV/AIDS. • Ensure that all applicable health legislation is strictly adhered to by both BPM and its contractors. • Actively inform employees and contractor employees about the HIV/AIDS pandemic and how they can help reduce the spread of the disease HIV/AIDS • amongst their families, relatives, and communities in which they live. • Educate employees and contractor employees about promoting good health practices, and inform them about other communicable diseases, and the prevention of the spread thereof. • Provide access to voluntary testing and counselling. • Provide free condoms at the workplace. • Facilitate appropriate information sessions with regard to HIV/AIDS for employees on all levels. • Toolbox talks should include talks about the impact of promiscuous behaviour. BPM should develop an in-house infectious diseases strategy to address health issues within the workforce and align the strategy with a community HIV strategy implemented by a non-profit organisation. Local schools and communities living in traditional areas close to the project must be included in the strategy. The strategy should include voluntary counselling and testing and training of peer educators. A workforce code of conduct should be developed to maximise positive employee behaviour in the local community and optimise integration. • Extend the workplace programme for HIV beyond the company's operations, and include all contractors, suppliers, transportation companies and local communities. Make it a contractual requirement. The spread of HIV along transportation routes (roads and railways) is well documented, so this component of the project (transportation of all goods and services to and from the project site) needs special attention. • Select suppliers who have in-house HIV programmes and policies in place. • Develop tailored behaviour change communication (BCC) materials such as mirror hanger messages and bumper stickers. • Include condoms in the road safety kit. • Work with truck company managers to ensure that their drivers receive adequate HIV training. • The facilitation of health training sessions.	• On-going • On-going • Planning and design • On-going • On-going • On-going • On-going • On-going • On-going • On-going
Site preparation Civil works Earthworks	Tourism	• Implement all mitigation measures as specified in the relevant specialist inputs, without compromising the safety of people. Namely: • noise impact assessment • air quality impact assessment	• On-going

Activity	Potential impact	Mitigation type	Time period for implementation
Mining and mining related activities Waste rock management Mineral processing operations Tailings management Power Supply and Use Water supply and use Process and storm water management Transport systems General and hazardous waste management Sewage sludge management Site support services Site/contract management Demolitio		• traffic impact assessment; and • visual impact assessment in the EIA. • A grievance/complaints register should be compiled and implemented in which all community and IAP complaints are recorded and addressed. • BPM is to undertake to act in all its activities in a sustainable and environmentally and socially acceptable manner. • BPM seeks to engage with established forums to discuss matters of mutual environmental concern. • Ensure that construction of the mining complex adheres to the provisions made in the EMP and environmental legislation. • Ensure that open communication is set-up between BPM, contractors, Pilanesberg National Park, Sun City and other tourism operators in the area, in order to pro-actively and "in-house" manage matters of mutual environmental concern. • Minimise light pollution as far as is practically possible. • Establish ties between BPM, the EDU, the Ipopeng Farmers' Association, and applicable local environmental NGOs, to consider appropriate sustainable • use development programs, driven through ventures creation in Ledig and Phatsima. • Establish a forum between BPM, BDM, MKLM and RLM, the Pilanesberg National Park, Sun City, the Traditional Council, and other tourism operators in the area to meet a minimum of annually to discuss matters of mutual environmental concern. • Ensure the correct implementation of the Rehabilitation Plan so the land will be returned to a grazing land use after decommissioning and the wilderness feel to the area will be promoted	• On-going • On-going as per mitigation stipulation • On-going • On-going • Construction • On-going • On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
n Rehabilitation Maintenance and aftercare			
Site preparation Civil works Earthworks Mining and mining related activities Waste rock management Mineral processing operations Tailings management Power Supply and Use Transport systems Demolition Rehabilitation Maintenance and aftercare	Air Pollution	• Maintain the weather station on site to provide required weather data. • Maintain the mine and plant designs that have been developed to reduce dust emissions on surface. • Reduction of fugitive PM emissions through the watering of roads, stockpiles and inactive open areas and the use of screens. • Ensure the position of the TSF, waste rock dump and mine have been positioned to reduce as far as is possible the impact on the neighbouring communities. • All vehicles and machines should be equipped such that gaseous emissions from engine exhausts are kept to a minimum. • A refrigeration plant (marine chiller) is to be installed to meet current legal practice and be aclosed system with zero emissions (non-ozone depleting substance technology). • Ventilation fans are to be placed in a manner to ensure directional ventilation along with prevailing winds and away from communities. • Paste technology, cyclone underflow, waste rock impoundment and spigotting are to be actively investigated from an environmental, technological, and economic perspective to determine the viability of these and/or other technologies. • The TSF design is to include erosion control design measures such as energy dissipaters and optimal slope angles and lengths. • A dust monitoring program will be implemented prior to the commencement of construction and will be on-going as part of the overall environmental monitoring program for the mining area. The dust monitoring program will continue through the decommissioning phase to assess dust levels generated by closure activities. • Alternative dust suppression methods, other than water, will be investigated, to reduce the consumption of water by the mine, particularly during the windier, winter months when water is scarce. • Roads on the mine and plant area will be surfaced or managed by water sprays or dust suppressants resulting in 75% control efficiency. • Vehicles will be maintained and inspected regularly to reduce emissions. • Disturbed sites will be re-vegetated as soon as possible. Regular inspection of vegetation cover will be undertaken to ensure dust does not emanate from soil surface. • Blasting will be undertaken in accordance with relevant Mine Health and Safety legislation and international blasting standards. • Vehicle speeds and routes on un-surfaced roads will be controlled to reduce dust entrainment by vehicles. • BPM are always to operate within the law and will undertake to assist in finding ways in which to reduce existing local emissions	• On-going • Planning and design • Planning and design • On-going • On-going • Planning and design • Planning and design • Planning and design • On-going • On-going • On-going • On-going • On-going • On-going • On-going • On-going

Activity	Potential impact	Mitigation type	Time period for implementation
		• A dust suppression sprinkler system will be implemented over the crest of the TSF wall and extending over the accessible dry portions of the beach. • All uncontrolled fires will be prohibited on site. • Mine vehicle fleets (diesel driven vehicles) will be serviced regularly and tested for compliance with exhaust emission regulations. • Servicing of mine vehicle fleets must only take place in a designated workshop • Reductions of vehicle exhaust emissions through the use of better-quality diesel; and inspection and maintenance programs. • Personal Protection Equipment (PPE) will be worn at all times as required by the appropriate workplace health and safety legislation. • Firefighting equipment will be placed around the site to enable rapid control of fires. • Unpaved surfaces and exposed areas to be regularly sprayed with water or periodically treated with chemical dust suppressants. • All conveyor tipping or transfer points will have dust suppression systems on them. • Application of relevant and applicable best practice vegetation establishment and erosion control as determined for the particular TSF design, according to the rehabilitation plan. • Earthen berms may also be placed between the prevailing winds and the TSF. • The installation and maintenance of permanent hydro-sprays are recommended on the traditionally, drier outer annulus of the TSF. • The side walls of the TSF will be progressively re-vegetated as the facility increases in height. • The TSF slope is to be designed to reduce the dusting effects of laminar wind flow over the slopes. • The TSF will be rehabilitated and closed properly to prevent the ingress of water. • Topsoil should be wetted as moist topsoil will reduce the potential for dust generation when tipped onto stockpiles. • Trees will be planted around the TSF to partially break laminar wind flow. • Upstream development of the TSF allowing simultaneous rehabilitation as close behind the active working area as possible. • Vegetation to be planted (and/or nets to be placed) on exposed side slopes of the TSF as and where applicable. • Minimising the area cleared and adequate revegetation or the addition of vegetation around the project. • Water sprays should be used for underground roads, material handling points and drilling points resulting in 75%, 50% and 70% Control Efficiency (CE) respectively. • $PM_{2.5}$ and PM_{10} ambient samplers must have no exceedances of the selected criteria. • SO_2 and NO_2 ambient samplers must have no exceedances of the selected criteria. • Ensure travel distance between clearing area and topsoil piles to be at a minimum. • For crushing and screening, a minimum mitigation measure of enclosure with fabric filters resulting in 83% CE is to be implemented. • Freshly graded areas to be kept to a minimum. • Haul routes should be shortened where possible • Keep active TSF and WRD surfaces to a minimum to decrease wind erosion. • During the life of the project monthly dustfall rates should not exceed 600 mg/m²/day at residential dustfall bucket locations and 1 200 mg/m²/day at non- residential dustfall bucket locations.	• On-going • Construction • On-going • On-going as per monitoring programme • Decommissioning • Decommissioning • On-going as per requirement • On-going in line with annual monitoring programme • As required

Activity	Potential impact	Mitigation type	Time period for implementation
		• During demolition ensure the site is restored to pre-mining conditions. • Demolition of infrastructure to have water sprays where a lot of vehicle activity is required. • Site inspections and progress reporting be undertaken at regular intervals (at least quarterly) during operations, with annual environmental audits being conducted. • Results from site inspections and off-site monitoring efforts should be combined to determine progress against source- and receptor-based performance indicators. Progress should be reported to all interested and affected parties, including authorities and persons affected by pollution. • Corrective action or the implementation of contingency measures must be proposed to the stakeholder forum in the event that progress towards targets is indicated by the quarterly/annual reviews to be unsatisfactory. • Stakeholder forums at specific intervals should be held for information dissemination and consultation. • The final design of the ventilation shafts will include measures to ensure $PM_{2.5}$ levels are within acceptable limits at third party residential receptors. These considerations can include position, height and orientation, or alternative appropriate means.	• Regularly as per mitigation requirement • Design phase prior to construction

Table B: Waste Management Procedure for General and Hazardous Waste

Items to be considered		Intentions
General	Specific	
Classification and record keeping	General	The waste management procedure for the mine will cover the storage, handling and transportation of waste to and from the mine. The mine will ensure that the contractor's responsible are made aware of these procedures.
	Waste opportunity analysis	In line with DWS/DEA's strategy to eliminate waste streams in the longer term, Bakubung Platinum Mine will assess each waste type to see whether there are alternative uses for the material. This will be done as a priority before the disposal option.
	Classification	Wastes (except those listed in Annexure 1 of the new Waste Regulations) will be classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation. Waste will be re-classified every five (5) years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors.
	Safety data sheets	The mine will maintain, where required in terms of the Regulations, the safety data sheets for hazardous waste (prepared in accordance with SANS 10234).
	Inventory of wastes produced	The mine will keep an accurate and up to date record of the management of the waste they generate, which records must reflect:

Items to be considered		Intentions
General	Specific	
		The classification of the wastes The quantity of each waste generated, expressed in tons or cubic metres per month The quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of By whom the waste was managed.
	Labelling and inventory of waste produced	Any container or storage impoundment holding waste must be labelled, or where labelling is not possible, records must be kept, reflecting: The date on which waste was first placed in the container The date on which waste was placed in the container for the last time when the container was filled, closed, sealed or covered The dates when, and quantities of, waste added and waste removed from containers or storage impoundments, if relevant The specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations, 2012 The classification of the waste in terms of Regulation 4 once it has been completed (if required).
	Disposal record	Written evidence of safe disposal of waste will be kept.
	Record keeping	Records will be retained for a period of at least 5 years and will be made available to the Department on request.
Waste management	Collection points	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity and that these are serviced frequently.
	Laydown/ salvage areas	During decommissioning and closure, lay down areas for re-usable non-hazardous materials will be established.
	General waste	Will be stored in designated skips and removed by an approved contractor for disposal at a licensed facility.
	Scrap metal and building rubble	Care will be taken to ensure that scrap metal and building rubble does not become polluted or mixed with any other waste. The scrap metal will be collected in a designated area for scrap metal. It will be sold to scrap dealers.
	Hazardous wastes	Medical waste will be temporarily stored in sealed containers in a bunded store before removal by an approved waste contractor and disposal in a licenced facility.
	Oil and grease	Oil and grease will be collected in suitable containers at designated collection points. The collection points will be bunded and underlain by impervious materials to ensure that any spills are contained.

Items to be considered		Intentions
General	Specific	
		Notices will be erected at each waste oil point giving instructions on the procedure for waste oil discharge and collection. An approved subcontractor will remove oil from site.
	Diesel tanks	Bunds should be established around the diesel tanks
	Any soil polluted by a spill	If remediation of the soil in situ is not possible, the soils will be classified as a waste in terms of the Waste Regulations and will be disposed of at an appropriate permitted waste facility.
	Mixing of wastes	Waste will not be mixed or treated where this would reduce the potential for re-use, recycling or recovery; or result in treatment that is not controlled and not permanent.
Disposal	Off-site waste disposal facilities	Waste will be disposed of at appropriate permitted waste disposal facilities.
		Unless collected by the municipality, the mine must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Waste Act prior to the disposal of the waste to landfill.
		Unless collected by the municipality, the mine must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Waste Act.
Waste transport	Contractor	A qualified waste management subcontractor will undertake the waste transport. The contractor will provide an inventory of each load collected and of proof of disposal at a licensed facility.
Banned practices	Long-term stockpiling of waste	Stockpiling of waste is a temporary measure. Waste stockpiling sites must have an impervious floor, be bunded and have a drainage system for collection and containment of water on the site.
	Burying of waste	No wastes will be buried on site.
	Burning of waste	Waste may only be burned in legally approved incinerators.

Table C: Soil Management Principles

Steps	Factors to consider	Detail
Delineation of areas to be stripped		Stripping will only occur where soils are to be disturbed by activities that are described in the EIA and EMP report, and where a clearly defined end rehabilitation use for the stripped soil has been identified. Plan and construct infrastructure in such a manner that minimises soil disturbance.

Steps	Factors to consider	Detail
Reference to biodiversity action plan		All requirements for moving and preserving fauna and flora according to the biodiversity management plan as per the EMP will be adhered to.
Stripping	Soil horizons are to be stripped and stockpiled separately and replaced in the correct order: C-horizon material to be backfilled first followed by B- and A-horizon material and a map of where the different soil types are placed will be kept. Topsoil should, if possible, be stripped during the dry winter months to protect the structural integrity of the soils. Stripped soil is to be back-filled as soon as possible.	
	Topsoil	Soils will be stripped to the competent rock. Where this is not possible, topsoil will be stripped to at least 300 mm where available and stockpiled for later use as a cover material. The stripped soils from the TSF area will be used for the ongoing rehabilitation of the TSF and for rehabilitation of disturbed areas on closure.
	Subsoil	Shaft & plant complex and housing: Subsoil will be stripped to at least 200 mm where available and stockpiled for later use as a cover material.
		TSF: The entire site is covered by either black sandy/silty clay colluvium (Soil Zone A) or reddish brown/red colluvium (Soil Zone B). Zone A: The stiff black colluvium will be used for the foundations of the starter walls. The foundations will be ripped to 300 mm below surface compacted to at least 98% of Proctor density to ensure the soil horizon has a low permeability. The stiff clayey soil has a very high potential for expansiveness therefore, moisture fluctuation should be monitored or controlled. Residual Norite will be used for construction of the starter wall and other embankments. The soft to very soft rock norite is considered suitable for foundations of heavy structures. Zone B: Reddish brown/red colluvium will be excavated to a depth of 500 mm and ripped an additional 300 mm. The base of the excavation will then be compacted to 98% Proctor maximum dry density. The reddish brown/red colluvium may be used as the inner core of the zoned embankment for the TSF. The black and reddish brown/red colluvium soils may be reused for the inner core of the zoned embankment walls. This material has very low permeability k-values.
Delineation of stockpiling areas	Location	Stockpiling areas are located close to the shaft and concentrator complexes which are in close proximity to the source of the soil to limit handling and to promote reuse of soils in the correct areas. Topsoil from the TSF will be located near the TSF.

Steps	Factors to consider	Detail
		All stockpiled material must be easily accessible without any environmental damage to adjacent undisturbed areas.
	Designation of the areas	Soil stockpiles will be clearly marked to identify the soil type.
Stockpile management	Vegetation establishment and erosion control	Rapid growth of vegetation on the topsoil stockpiles will be promoted (e.g. by means of watering or fertilisation). The purpose of this exercise will be to encourage vegetation growth on soil stockpiles and to combat erosion by water and wind. Monitor vegetation on soil stockpiles to prevent erosion and loss of topsoil. Disturbed or excavated areas should be backfilled with the soil material that was removed from it, shaped to free draining slopes and planted with sustainable grass species. Erosion control measures using sustainable methods and natural vegetation must be in place and must be monitored and maintained to minimise the loss of material from erosion.
	Storm water controls	Stockpiles will be established with storm water diversion berms to prevent run off erosion. Stockpiles are to be monitored for erosion.
	Height	Utilisable topsoil will be stockpiled in berms. Soils to be stored for longer than three years should preferably not be stockpiled in piles greater than 2 m in height. Slopes of the berm/stockpiles should be constructed to minimise the chances of erosion of the soils.
	Waste	No waste material will be placed on the soil stockpiles.
	Vehicles	Equipment movement on top of the soil stockpiles will be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank. The handling of soil will also be limited.
Rehabilitation of disturbed land: restoration of land capability	Placement of soil	A minimum layer of 300 mm of topsoil will be replaced. Soil horizons are to be replaced in the correct order: C-horizon material to be backfilled first followed by B- and A-horizon material.
	Fertilisation	A soil specialist will be consulted to sample the stockpiled soils at relevant depths in the topsoil stockpile berms to determine the nutrient status of the soil. As a minimum the following elements will be tested for: cation exchange capacity, pH and phosphate. These elements provide the basis for determining the fertility of soil. Based on the analysis, the soils specialist will advise if fertilisers must be applied.
	Vegetation	Refer to the rehabilitation plan which provides a guideline of the procedures for soil and vegetation to be followed for rehabilitation. Topsoil stockpiles should be vegetated as soon as possible and monitored to prevent loss of the resource by wind and water erosion and to retain its micro-biological functions.
	Erosion control	Erosion control measures will be implemented to ensure that the topsoil is not washed away and that erosion gulleys do not develop prior to vegetation establishment. If soil erosion has occurred, an erosion control plan entailing hard (i.e. gabion construction) and/or soft

Steps	Factors to consider	Detail
		(i.e. breaking surface water flow velocities) should be designed by a competent person.
Pollution of soils	In situ remediation	If soil (whether stockpiled or in its undisturbed natural state) is polluted, the first management priority is to treat the pollution by means of in situ bio-remediation alternatively by the removal and handling as per waste management plan. If the spill covers an extensive area the soil must be removed and rehabilitated elsewhere, then replaced.
	Off-site disposal	If in situ treatment is not possible or acceptable then the polluted soil must be classified according to the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (DWAF 1998) and disposed at an appropriate, permitted, off-site waste facility.

Updated Emergency Response Plan

ON-GOING MONITORING AND MANAGEMENT MEASURES

The monitoring programme as described in Chapter 8 will be undertaken to provide early warning systems necessary to avoid environmental emergencies.

PROCEDURES IN CASE OF ENVIRONMENTAL EMERGENCIES

Emergency procedures apply to incidents that are unexpected and that may be sudden, and which lead to serious danger to the public and/or potentially serious pollution of, or detriment to the environment (immediate and delayed). Procedures to be followed in case of environmental emergencies are described in the table below (Table D).

General emergency procedure

The general procedure that should be followed in the event of all emergency situations is as follows:

- Applicable incident controller defined in emergency plans must be notified of an incident upon discovery
- Area to be cordoned off to prevent unauthorised access and tampering with evidence
- Undertake actions defined in emergency plant to limit/contain the impact of the emergency
  If residue facilities/dams, storm water diversions, etc., are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Operations Engineer on shift must be notified
- Take photographs and samples as necessary to assist in investigation
- Report the incident immediately to the environmental department for emergencies involving environmental impacts or to the safely department in the case of injury

The Environment department must comply with Section 30 of the National Environmental Management Act (107 of 1998) such that:

- The Environment department must immediately notify the Director-General (DWS and DEA, DMR and Inspectorate of Mines as appropriate), the South African Police Services, the relevant fire prevention service, the provincial head of READ, the head of the local municipality, the head of the regional DWS office and any persons whose health may be affected of:
- The nature of the incident
- Any risks posed to public health, safety and property
- The toxicity of the substances or by-products released by the incident
- Any steps taken to avoid or minimise the effects of the incident on public health and the environment.

The Environment department must as soon as is practical after the incident:

- Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
- Undertake clean up procedures;
- Remedy the effects of the incident; and
- Assess the immediate and long term effects of the incident (environment and public health);
- Within 14 days the Environment department must report to the Director-General DWS and DEA, the provincial head of DMR, the regional manager of the DMR, the head of the local and district municipality, the head of the regional DWS office such information as is available to enable an initial evaluation of the incident, including:
- The nature of the incident
- The substances involved and an estimation of the quantity released
- The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects)
- Initial measures taken to minimise the impacts
- Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure
- Measures taken to avoid a recurrence of the incident.

Identification of Emergency Situations

The site wide emergency situations that have been identified together with specific emergency response procedures are outlined in Table D.

TECHNICAL, MANAGEMENT AND FINANCIAL OPTIONS

Technical, management and financial options that will be put into place to deal with the remediation of impacts in cases of environmental emergencies are described below:

- The applicant will appoint a competent management team with the appropriate skills to develop and manage a mine of this scale and nature.
  To prevent the occurrence of emergency situations, the mine will implement as a minimum the mine plan and mitigation measures as included in this EIA and EMP report.
- The mine has an environmental management system in place where all operation identify, report, investigate, address and close out environmental incidents.
- As part of its annual budget, the mine will allow a contingency for handling of any risks identified and/or emergency situations.

- Where required, the mine will seek input from appropriately qualified people.

Table D: Emergency Response Procedures

Item	Emergency Situation	Response in Addition to General Procedures
1	Spillage of chemicals, engineering substances and waste	Where there is a risk that contamination will contaminate the land (leading to a loss of resource), surface water and/or groundwater, Bakubung Platinum Mine will: 1. Notify residents/users downstream of the pollution incident. 2. Identify and provide alternative resources should contamination impact adversely on the existing environment. 3. Cut off the source if the spill is originating from a pump, pipeline or valve (e.g. TSF delivery pipeline, refuelling tanker) and the infrastructure 'made safe'. 4. Contain the spill (e.g. construct temporary earth bund around source such as road tanker). 5. Pump excess hazardous liquids on the surface to temporary containers (e.g. drums, mobile tanker, etc.) for appropriate disposal. 6. Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired.
2	Discharge of dirty water to the environment	1. Apply the principals listed for Item 1 above. 2. To stop spillage from the dirty water system the mine will: a. Redirect excess water to other dirty water facilities where possible b. Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; and c. Carry out an emergency discharge of clean water and redirect the spillage to the emptied facility. 3. Apply for emergency discharge as a last resort.
3	Pollution of surface water	1. Personnel discovering the incident must inform the SHEQ department of the location and contaminant source. 2. Apply the principals listed for Item 1 above. 3. Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants. 4. Contamination entering the surface water drainage system should be redirected into the dirty water system. 5. The SHEQ department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination.
4	Groundwater contamination	1. Use the groundwater monitoring boreholes as scavenger wells to pump out the polluted groundwater for re-use in the process water circuit (hence containing the contamination and preventing further migration). 2. Investigate the source of contamination and implement control/mitigation measures.
5	Burst water pipes (loss of resource and erosion)	1. Notify authority responsible for the pipeline (if not mine responsibility). 2. Shut off the water flowing through the damaged area and repair the damage (if Bakubung Platinum Mine pipeline). 3. Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit.
6	Flooding from failure of surface water control infrastructure	1. Evacuate the area downstream of the failure (e.g. PCDs, return water dam). 2. Using the emergency response team, rescue/recover and medically treat any injured personnel. 3. Temporarily reinstate/repair storm water diversions during the storm event (e.g. emergency supply of sandbags). 4. Close the roads affected by localised flooding or where a storm water surge has destroyed crossings/bridges.
7	Risk of drowning from falling into water dams	1. Attempt rescue of individuals from land by throwing lifeline/life saving ring. 2. Get assistance of emergency response team whilst attempting rescue or to carry out rescue of animals. 3. Ensure medical assistance is available to recovered individual.
8	Veld fire	1. Evacuate mine employees from areas at risk. 2. Notify down wind residents and industries of the danger. 3. Assist those in imminent danger/less able individuals to evacuate until danger has passed. 4. Provide emergency firefighting assistance with available trained mine personnel and equipment.
9	Overtopping or failure of the tailings dam	1. Sound the alarm to evacuate danger area. 2. Pump water from top of dam and follow redirection of water as indicated in Item 2 above. 3. Stop pumping tailings to the TSF. 4. Recover casualties resulting from dam failure using the emergency response team. 5. Make the remaining structure safe. 6. Apply the principles of Item 1 above.
10	Falling into hazardous excavations	1. Personnel discovering the fallen individual or animal must mobilise the emergency response team to the location of the incident and provide a general appraisal of the situation (e.g. human or animal, conscious or unconscious, etc.). 2. The injured party should be recovered by trained professionals such as the mine emergency response team. 3. A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport individual to hospital.
11	Road traffic accidents (on site)	1. The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. 2. Access to the area should be restricted and access roads cleared for the emergency response team. 3. Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). 4. Casualties will be moved to safety by trained professionals and provided with medical assistance. 5. Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.
12	Development of informal settlements	The mine will inform the local authorities (municipality and police) that people are illegally occupying the land and ensure that action is taken within 24hrs.
13	Uncovering of graves and sites	Personnel discovering the grave or site must inform the SHEQ department immediately. Prior to damaging or destroying any of the identified graves, permission for the exhumation and relocation of graves must be obtained from the relevant descendants (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local Police. The exhumation process must comply with the requirements of the relevant Ordinance on Exhumations, and the Human Tissues Act, 65 of 1983.