FINAL AMENDED ENVIRONMENTAL IMPACT ASSESSMENT REPORT (PART A)

AND

FINAL AMENDED ENVIRONMENTAL MANAGEMENT PROGRAMME

REPORT (PART B)

FOR THE DEVELOPMENT OF AN OPENCAST AND UNDERGROUND COAL MINE NEAR BETHAL, MPUMALANGA (WITFONTEIN PROJECT)

PART B

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002.

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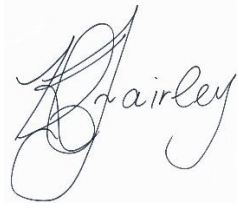
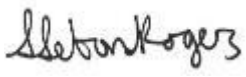
Kerry Fairley	EAP Director Pr.Sci.Nat		2017/11/24
Shelley Seton-Rogers	Senior Environmental Scientist		2017/11/24

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WITFONTEIN PROJECT

FINAL AMENDED ENVIRONMENTAL IMPACT ASSESSMENT

AND

FINAL AMENDED ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

PART B

AMENDED FOLLOWING COMMENTS FROM THE DMRE AND ALIGNED TO THE INTEGRATED WATER USE LICENCE (IWUL)

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THE EIA AND EMPR HAVE BEEN UPDATED, IN RESPONSE TO COMMENTS RECEIVED FROM THE DMRE. THE REPORT WAS UPDATE TO INCLUDE THE CONDITIONS OF THE APPROVED WATER USE LICENSE ISUED TO LITTLESNIPE ON 16 APRIL 2021THE CHANGES ARE IN TURQOISE AND BOLD FONT. STRIKETHROUGH HAS BEEN USED TO INDICATE WHERE WORDING HAS BEEN REMOVED.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

TABLE 1-1: DETAILS OF THE EAP

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1.2 EXPERTISE OF THE EAP

1.2.1 QUALIFICATIONS OF THE EAP

Kerry Fairley

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1.2.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

Kerry Fairley has over 17 years of experience in environmental impact assessment and management in the mining industry. Kerry has been involved in the compilation of numerous environmental impact assessment reports for both green fields mining projects as well as for extensions and amendments to existing mining operations in South Africa and as well as other African countries (Namibia, Malawi).

See Part A: Appendix A for proof of registration.

2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The requirement to describe the aspects of the activity that are covered by the draft environmental management programme are already included in PART A, Section 3, as required.

This description of the mining to be undertaken at Witfontein is in accordance with the final site layout 3 of the mine as presented in the EIA Part A. The detailed description of the project can be found in the EIA Part A; the project is summarised here.

The proposed Witfontein Project will be constructed on land currently used for agriculture. The project involves 6 farm portions and a total area of approximately 480ha (prospecting right area/proposed mining right area). Littlesnipe holds two prospecting rights (MP 11535 & 11532 PR) over these farms portions and the mining right application includes both prospecting rights. The area of the underground workings is approx. 480ha and the surface area of disturbance is approx. 68 ha (Figures 3.1 and 3.2).

The project has a measured coal resource of 18.86 million tonnes and will involve the extraction by means of both opencast and underground mining methods. The mine will have a planned life of approximately 10 years. Mining will initially involve conventional truck and shovel operations from one opencast pit, namely Holfontein (South Pit), followed by bord and pillar underground mining by creating an adit through the high wall at the opencast pit, and another adit on the farm Witrand. The opencast section will be developed to approximately 30 m below natural ground level, where an access adit from the high wall will be created to mine the coal that is located underground. An overland conveyor will be built between the northern (Witrand) and southern (Holfontein) adits. The conveyor will transport ROM coal from the northern adit to the plant, and will cross the Piekespruit. The conveyor will be completely enclosed and regularly maintained to ensure that no coal can spill from the conveyor.

The underground mining will commence subsequent to opencast mining and will form the majority of the coal extraction for the mine, with approximately 12 million tonnes run-of-mine (ROM) coal to be produced. Underground mining will take place over most of the mining right area, with the exception of the wetland areas, and no undermining of the discard dump will take place. The mine will have a planned LOM of approximately 10 years and is planning to mine 100 000 tonnes of coal per month during the operational phase.

The coal will be processed at the mine plant complex. From the Run of Mine (ROM) coal stockpile, the raw coal is crushed in a primary and secondary crusher. The various sizes of

crushed coal then enter the Dense Medium Separation (DMS) Plant. The coal is processed further and separated into various particle sizes. The various particle sizes of coal form various products which are stockpiled in the product stockpiles. Coarse discard from processing is placed on the discard dump. Slurry produced from the thickener is disposed of in the slurry dams and dried residue material is disposed of on the discard dump. It is possible that the applicant may also use a filter press for the slurry which removes water from the slurry to produce a solid filter cake. This filter cake would likely be disposed of on the discard dump. The water extracted from the filter press would be recycled in the process.

Other mine infrastructure includes offices and workshops, haul roads, mine access road, security gates and fencing, berms, a weighbridge and diesel storage areas. Stormwater and pollution control measures will also be in place. This will include stormwater canals and pollution control dams.

Water for coal processing and domestic use will likely be sourced from boreholes on site, as well as groundwater from dewatering the pit. There is also a possibility that the mine may use water from existing farm dams on site. Sewage will be managed via the operation of a package treatment plant. All water uses will need to be licensed from the Department of Water and Sanitation (DWS) before mining commences.

The coal products will be transported via the D450 road to a proposed new railway siding for local and export sales. The new proposed railway siding near Bethal is located on a portion of portion 41 of the Farm Rustfontein 109 IS, adjacent to the D450 road, adjacent to the existing railway line (refer to Figure 3.3). The siding is located approximately 12.4 km from the Witfontein Mine. The siding will have a stockpile and loading area of approximately 600 meters in length which will cover approximately 3.15 hectares. The siding will be able to accommodate up to 50 rail wagons.

2.1 CONSTRUCTION PHASE ACTIVITIES

The construction phase is considered to end once the boxcut has been established. Carbonaceous material, in the form of the coal seam, is exposed within the boxcut. The construction of the boxcut thus includes the removal of coal. This first coal will be stockpiled until the processing plant has been constructed.

The hard rock removed from the initial boxcut will be placed in overburden stockpile areas adjacent to the opencast pit or adit. This material will remain in the stockpiles for the duration of mining. Thereafter the material in the overburden stockpile will be placed back into the pit void

and used to backfill the adit.

The following activities are expected to take place during construction of the mine and railway siding:

- Temporary construction facilities will be established on site to support the construction phase. These facilities could include: contractor's laydown areas, workshops/ maintenance area for servicing and maintaining equipment and vehicles; and temporary waste collection and storage area;
- Clearing of vegetation in construction areas;
- Stripping and stockpiling of soil;
- Establishment of storm water management facilities such as drains, berms and pollution control dams;
- Establishment of services: including powerlines, pipelines, refuelling and sewerage;
- Construction of surface water storage dams if required;
- Construction of access roads to the plant from the main gravel road (D450 district road), including a bridge upgrade;
- Construction of maintenance roads, security roads, haul roads from the pit/ underground to the processing plant;
- Construction of an explosives magazine;
- Construction of a processing plant, workshops, warehousing, washbays and offices;
- Construction of an overland conveyor from the opencast pit and adit to the plant;
- Store for the storing and handling of fuel, lubricants, solvents, paint etc.;
- Parking areas;
- Weighbridge;
- Change houses;
- Security and access control;
- Development of areas for stockpiles and dumps (overburden and topsoil);
- Construction of railway siding;
    - Construction of coal stockpile area at railway siding;
    - Construction of access roads to the railway siding;
    - Establishment of storm water management facilities such as drains, berms and pollution control dams at the new proposed siding.

2.2 OPERATIONAL PHASE ACTIVITIES

The Witfontein Mining project is planning to mine 100 000 tonnes of coal per month during a life of 10 years. The Mine will initially involve a conventional truck and shovel operation from one opencast pit and one adit. The opencast section will be developed to approximately 30 meters

below natural ground level where an access from the high wall (adit) can be created to mine the coal that is located underground.

The coal will be mined from the opencast pit and adit for a period of 1 year. Two underground sections (Witrand and Holfontein) will be mined using bord and pillar mining methods. Underground mining will commence subsequent to **the** opencast **pit and adit being mined** ~~mining~~ and will form the majority of the coal extraction for the mine with approximately 12 million tonnes run-of-mine (ROM) coal to be produced.

ROM Coal will be processed at a new coal washing plant within the mine processing plant area, to be constructed on the Farm Holfontein 111 IS R/E. The plant will likely use a filter press which will produce a dry discard that will be placed on a dry discard dump.

Other operational phase activities include:

- Discard dumps from excavation of the pit, underground mining and coal processing;
- Conveyors;
- ROM stockpiles;
- Product stockpiles
- Crushing and Screening;
- Dense Medium Separation (DMS) Plant;
- Pollution Control Dams (PCDs or Polcon) to capture dirty stormwater;
- Slurry Dams;
- Stormwater Management Systems;
- Dewatering of underground workings.

Coal will be transported by truck to a planned new railway siding near Bethal (Figure 5.6), from where it will be sent to customers via rail (either exported or consumed locally). The operation of the new rail siding will involve the off-loading of coal product delivered by side-tipper trucks and stockpiling along the loading tracks. Loading occurs by means of Front End Loaders onto the rail wagons. The siding will have storm water infrastructure in place in the form of lined trenches and a pollution control dam.

2.3 EMPLOYMENT

The mine will create employment opportunities during construction and operation. The employment opportunities at Witfontein Mine are likely to total approximately 130 temporary workers during the 2 year construction phase and 150 long-term employees during the 10 year operation. The employees will likely be sourced from nearby areas.

2.4 WATER USE

Please note that the Witfontein Project will require water use licences (WUL) for all water uses. The process of obtaining the WUL was also be subjected to a public participation process.

Approximately 15 m³/day of potable water will be required for mine employees. Potable water will likely be sourced from boreholes on site, or from the existing farm dams on site. Water will be pumped from boreholes via pipelines to a potable water tank which will feed into the reticulation scheme. Raw water will be required for dust suppression, the processing plant, fire suppression, ventilation and for use at the wash bay.

The amounts of water use and losses for the Witfontein Mine have been summarised in the table below.

TABLE 2-1: WITFONTEIN MINE WATER USE AND LOSSES

Water use/loss description	Value
Water loss in coal mining	28 m³/day per CM
Ventilation Losses	133 m³/day per CM
Service water	307 m³/day per CM
Loss of water due to CM usage	5% of service water
Plant demand	371 m³/day
Potable supply	15 m³/day
Dust suppression	400 m³/day

Water will mainly be sourced from capturing surface water runoff (rainfall) and from the dewatering of underground and opencast mining areas. Under average rainfall conditions, over the LOM, the mine will operate with a water deficit, additional water for the process will need to be sourced from external sources such as the potable water supply (from a borehole on site, or the existing farm dam). Although in summer the mine will operate with a surplus of water, which will need to either be stored on surface or in the underground workings, this surplus will be depleted in winter with additional make-up, for processing, required for the winter months. The average water deficit, over the LOM average rainfall conditions, is estimated at 470 m³/day. The water deficit is expected to decrease over time as mining progresses and the amount of water obtained from underground mining increases.

The average amount of water obtained from underground mining over the LOM is expected to increase to 810 m³/day towards the end of the LOM in 2025 for average rainfall conditions.

- The average amount of water obtained from underground mining over the LOM is estimated at 630 m³/day for both the underground and opencast sections.
- The required size of the Discard Dump PCD is 20 000 m³. At this capacity, the dam will be able to accommodate both surface runoff and seepage from the Plant Processing Discard Dump, with surplus water being pumped to the Plant PCD, ensuring that the risk of spill is less than 2% in any one year (i.e. not more than one spill in 50 years).
- The required size of the Plant PCD is dependent on the available storage capacity in the underground workings. Surplus water can be stored underground and the Plant PCD will need to be sized at a capacity of 145 000 m³ in order to accommodate both surface runoff reporting to the dam as well as pit and underground water, ensuring that the risk of spill is less than 2% in any one year (i.e. not more than one spill in 50 years)
- During the decommissioning phase, the pit and adits will be backfilled without a final void, rehabilitated and made free-draining. The water level in the workings will be actively managed to ensure it remains below the decant elevation.

The areas contributing to evaporation, runoff and dust control are indicated in the Table below.

TABLE 2-2: AREAS OF WATER INFRASTRUCTURE

Description	Area (ha)
Dirty water runoff area:	
PCD 1	25.4
PCD 2	23.4
PCD 3	2.3
Pollution control dam surface areas:	
PCD 1	0.7
PCD 2	0.6
PCD 3	0.1
Dust control on haul roads and between overburden dumps	7.0
Mine working area (open box cuts)	1.5
Disturbed area around opencast pit	1.9
Opencast total reserve area	5.0
Under ground reserve area -Witrand	170.0
Under ground reserve area -Holfontein	192.0

Two water use options have been considered to determine water availability to meet the needs of the mine. These are Option 1 – to use a filter press at the plant, or Option 2 – to not use a filter press. These 2 options are discussed below.

2.4.1.1 Option 1

This option considers the fact that a filter press will be used. From the WRSM 2000 water balance it is observed that there will be a shortage in water to meet the plant demands in years 1 and 2 of the mine. Sufficient water will be present from year 3 to 10 to meet all the plant demands due to groundwater infiltration.

No water will also be available for dust control during the dry months (year 1 and 2) where there is no water for the plant, meaning additional water of about 2000 m³ per month will need to be sourced elsewhere or alternative methods such as using chemicals on the road will have to be applied.

Due to the high groundwater infiltration that is expected, surplus water will be present during January to March in year 1 and 2, as well as all the 'wet months' November to April from year 3 to 10. Due to the limited space available the PCD cannot be constructed large enough to minimise the spills to less than once in 100 years. Mechanical evaporators are therefore required to evaporate the surplus water.

A 45kW evaporator operates at a pump rate of 83m³/h. On average 60% of this pump rate can be evaporated.

2.4.1.2 Option 2

If no filter press is used, there will be a shortage in water to meet the plant demands in years 1 and 2 of the mine. The shortage is higher than if a filter press is used. Sufficient water will be present from year 3 to 10 to meet all the plant demands due to groundwater infiltration.

If no filter press is used, the slurry dams will need to be larger to accommodate higher levels of wastewater from the processing plant. A larger proportion of water will not be able to be recycled. However, smaller amounts of water will need to be removed by forced evaporation, as not using a filter press will result in less excess water on site.

2.5 STORM WATER MANAGEMENT

Clean and dirty storm water will be kept separate on site. Clean storm water will be allowed to flow naturally back into the environment, while dirty storm water will be contained and reused in the mine processes. Storm water on site will be separated into clean water and dirty water catchment areas. Clean storm water will include all storm water that has not come into contact with materials that have the potential to reduce the water quality. The clean water catchment areas are likely to include the topsoil stockpile, overburden stockpiles, and mine management

and administration areas. The runoff from the clean storm water areas will be diverted by means of open drains and released into the surrounding environment.

Dirty water from the mine will include any water that comes into contact with areas where potential pollutants are handled. Water from the discard dump, product stockpiles, weighbridge, ROM stockpiles, plant area, workshop, fuel storage, wash bays, etc. will be directed to dirty water pollution control dams **(PCDs). All dirty water channels will enter the PCDs via concrete silt traps. A minimum of two silt straps will be required per PCD for maintenance purposes. PCDs will also be spilt into two compartments each for maintenance purposes**.

The open pit and adits will be provided with berms and diversion canals around the perimeter to prevent clean storm water from entering them. Storm water accumulating in the pit will be pumped out together with ingress groundwater to be used in mine operations.

All clean water and dirty water channels are sized to meet the 1:100 year floods and will have 1:1 side slopes. All dirty water channels will be concrete lined and the clean water channels grass lined. The grass channels are designed with velocities to minimise siltation due to low flows, although flows are kept below 1.5m/s to prevent erosion.

Storm water drainage canals will be in place and will be concrete lined with varying depths, depending on the amount of water they are likely to carry. **Three** ~~Two~~ pollution control dams will be required to service the dirty water management areas. The dams will be lined with HDPE geomembrane to prevent groundwater pollution.
The Stormwater Management Plan has been approved in terms of the IWUL.

2.6 WASTE RECOVERY AND REDUCTION

The recyclable portion of general waste (e.g. scrap metal, wood, used tyres) will be separated at source and will be removed from site to appropriate recycling facilities. A portion of hazardous waste, (e.g. used oils and batteries), will be returned to the suppliers for recycling.

2.6.1 CONSTRUCTION

During the construction phase, general waste such as building rubble and domestic waste will be generated. General domestic waste will also be generated during the operation phase. Recyclable waste such as steel, tyres and construction wood will be identified and separated from other wastes and arrangements will be made for the removal of this material from site to a recycling facility.

Domestic and other general waste produced which cannot be recycled will be stored at the points of generation by the various contractors involved in construction. The responsible construction contractors will be required to move the waste to a central waste collection point where waste skips will be provided. The waste will be collected at least once a week and taken to a licenced landfill site for disposal.

Hazardous waste will be stored in separate receptacles on impervious surfaces at each working area. The handling of hazardous waste from points of generation to the central waste collection point will be similar to the general waste handling. Hazardous waste which may be generated includes used oils, rags contaminated with hydrocarbons, batteries, containers of hydrocarbons and solvents. The hazardous waste area will have an impervious concrete base and a concrete bund. Solid hazardous waste will be stored separately to liquid hazardous waste. Waste will be removed by a suitable contractor every three months for disposal at a licensed hazardous waste site. Used oils will be taken to the service provider for recycling.

Options for the disposal of building rubble will depend on the quantities produced and the opportunities for the re-use of this material in construction activities. A central temporary waste storage area will be identified for waste storage during the construction phase.

2.6.2 OPERATION

During the operational phase, the waste will be handled in a similar manner to the construction phase. Recyclable waste will be separated at source. The remaining general waste will be stored at a temporary waste storage area where it will be collected once a week. A contractor will be appointed by the mine to manage the transport of waste from the mine to the nearest licensed landfill site. Each area where waste is generated will be provided with waste receptacles that will be emptied on a daily basis for bulk storage at the maintenance area.

Hazardous waste will be collected from the source points and stored within a bunded temporary hazardous waste storage area. The hazardous waste will be collected by a specialist waste contractor at least every three months, for disposal at a licensed hazardous waste disposal site. No permanent general or hazardous waste disposal sites will be developed at the Witfontein Project site. All waste storage will be temporary, except for the mine discard dump which will remain on site. The mine discard dump will need to be lined with a liner that meets Class C performance requirements (refer to Appendix 15). The liner will likely consist of compacted in-situ material (300 mm) mixed with bentonite (3%) and sealed with a 1.5mm bitumen layer.

2.7 SEWAGE TREATMENT

2.7.1 CONSTRUCTION

During the construction phase, sewage will be managed by means of septic tanks or portable chemical toilets. Sewage will be collected from septic tanks by means of a honey sucker truck which will transport it to the municipal sewage treatment plant. Or if portable chemical toilets are used, these will also be emptied on a regular basis.

2.7.2 OPERATION

During the operational phase, an aboveground, containerised sewage treatment plant will be installed. The sewage plant will service the maintenance, administration and plant areas. The treated effluent will likely be recycled by the mine. Dried sewage sludge will likely be disposed of on the discard dump or a waste disposal site that is licenced to accept such waste.

2.8 ROAD TRANSPORT

2.8.1 PUBLIC ROADS

The D450 district road will be used for the transportation of mining equipment during construction and coal during the operational phase. Once the mining development is operational, around a 100 000t/month will be hauled along the D450 to the rail siding. Road legal 30t side tippers or similar vehicles will be used for coal haulage. Over a 16-hour period a day, around 208 truck trips can be expected. A further 12 bus trips and 122 light vehicle trips per day can be expected for the approximate 80 staff required for the operation. The D450 is gravel road and the use of this road will necessitate upgrading of the current road structure (see Part A Appendix 17).

2.8.2 INTERNAL ROADS

Internal roads will be required for the transportation of material and staff around the mine. The internal roads at the mine include gravel haul roads, and internal gravel service roads. The service roads will be used by private vehicles, buses, minibus taxis and some heavy vehicles.

3 COMPOSITE MAP

A map which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities showing how areas are to be avoided is provided as Figure 3.1 and Figure 3.2.

The Witfontein project is located on the farm Holfontein 111 IS (remaining extent) and the farm Witrand 103 (portions 11, 12, 15, 19, 20). The new proposed railway siding near Bethal is located on a portion of portion 41 of the Farm Rustfontein 109 IS.

The Witfontein project area lies on either side of the D450 road which is accessed from the N17. The Piekespruit and some other small tributaries of the Olifants River flow through the proposed mine site. The proposed railway siding is also located adjacent to the D450 road. It is proposed that the D450 road will be used to transport coal from the mine to the railway siding (Figure 3.3).

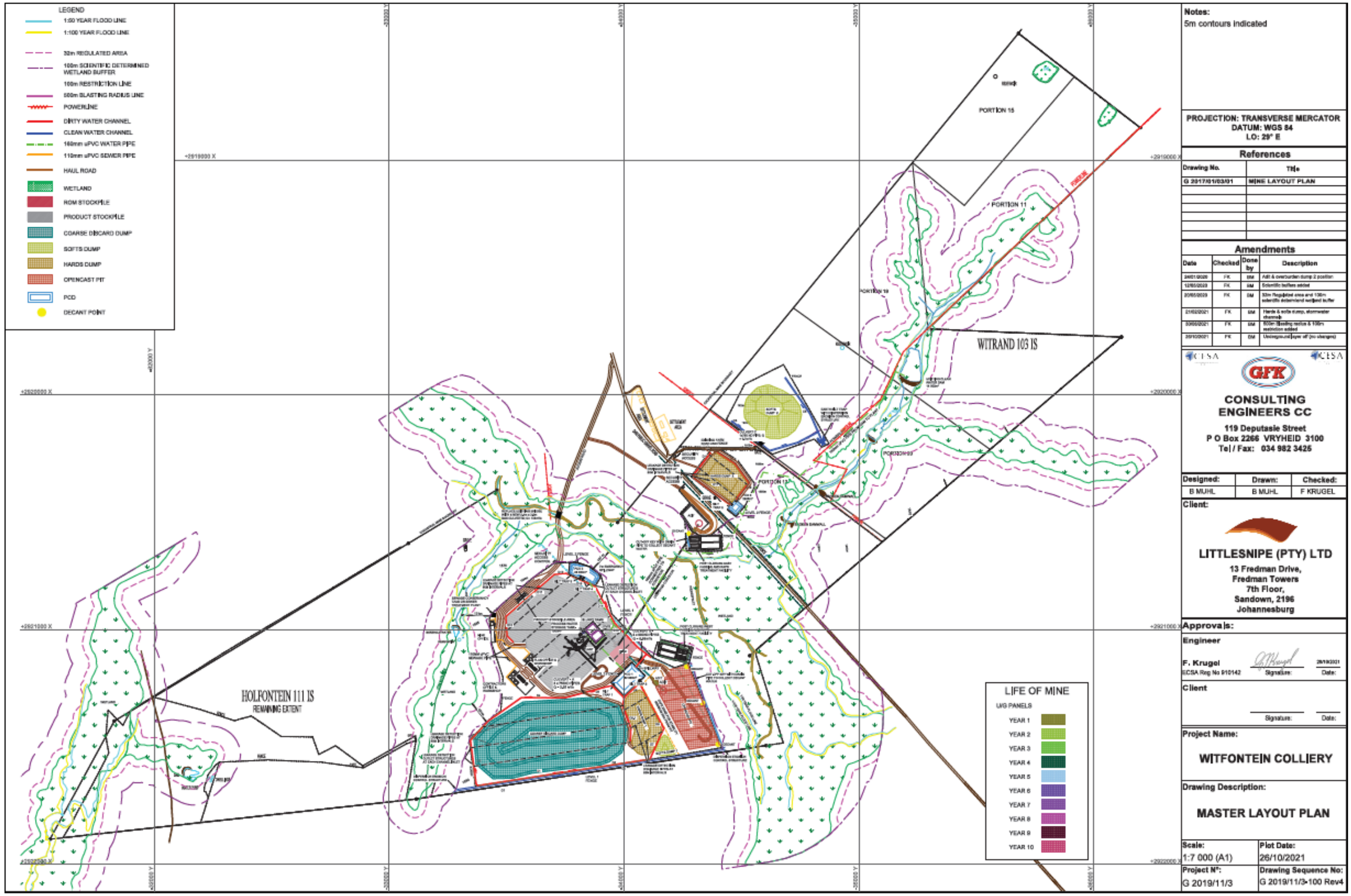

FIGURE 3-1: MAP OF ~~ENTIRE~~ WITFONTEIN MINE SHOWING PROPOSED LISTED ACTIVITIES AND INFRASTRUCTURE FINAL MITIGATED LAYOUT 3 (~~REVISED LAYOUT 2 AFTER MITIGATION~~)

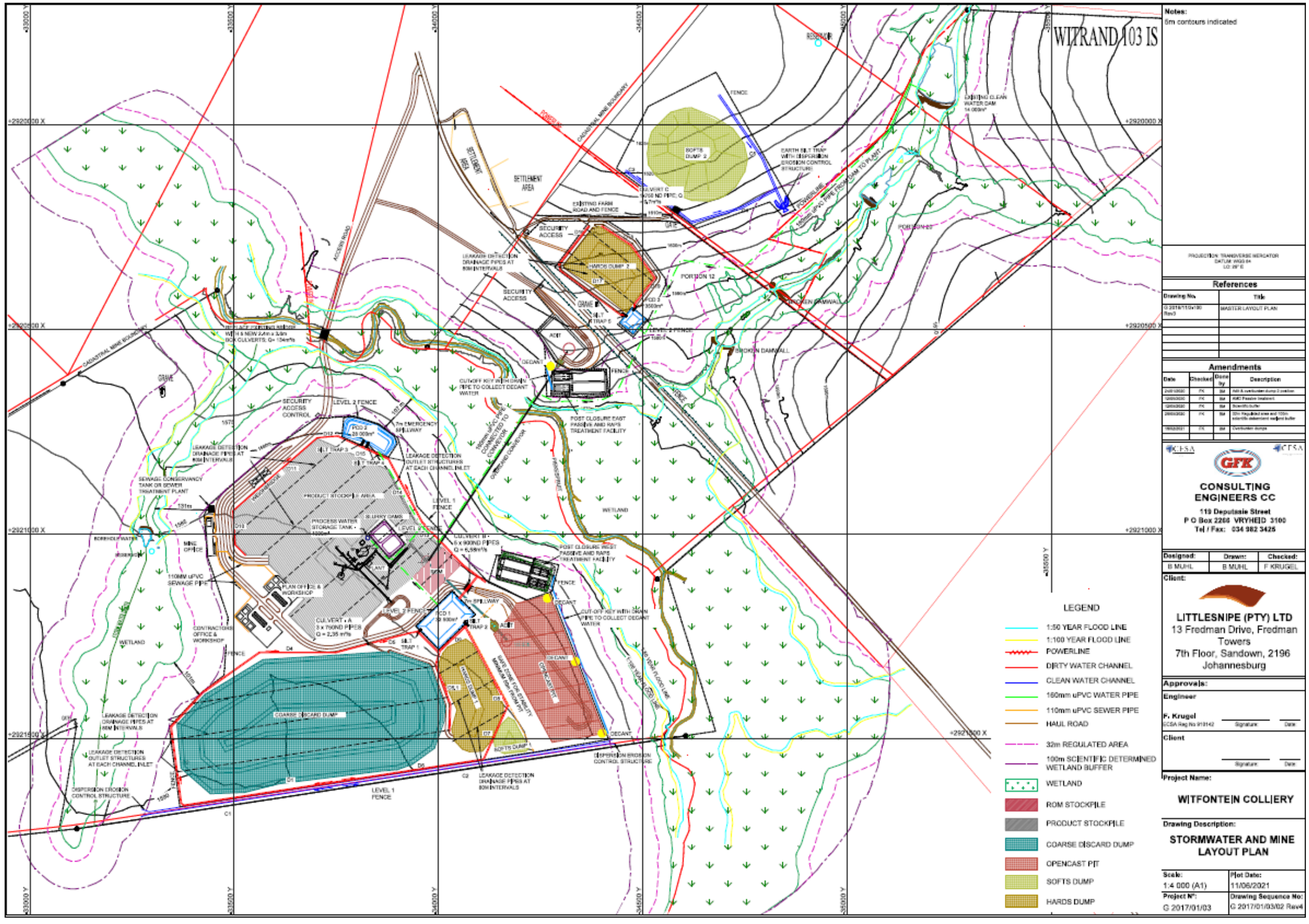

FIGURE 3-2 : MAP OF PLANT AND PITS AT WITFONTEIN MINE FINAL MITIGATED LAYOUT 3 ~~(REVISED LAYOUT 2 AFTER MITIGATION~~)

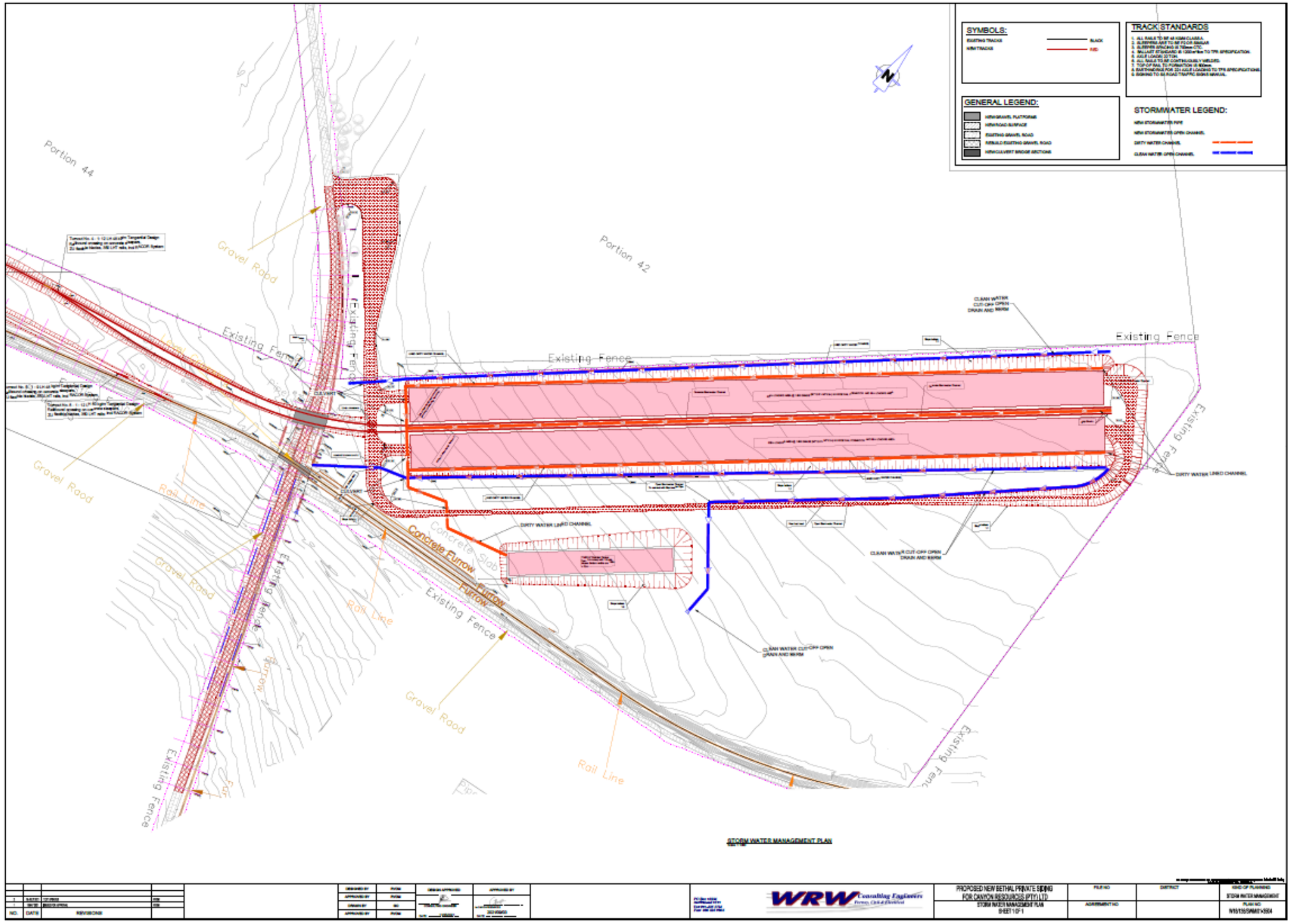

FIGURE 3.3: LAYOUT MAP OF RAILWAY SIDING INFRASTRUCTURE

4 IMPACT MANAGEMENT OBJECTIVES

4.1 CLOSURE OBJECTIVES

The Witfontein Mine will plan for sustainable closure by ensuring that every reasonable effort has been made to achieve rehabilitation closure objectives that will give effect to the following principles:

- Safety and health of people and animals are safeguarded from hazards resulting from the suspended mining operations.
- Environmental damage or residual environmental impacts are minimised to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of the land can be achieved.
- The physical and chemical stability of the remaining structures should be such that risk to the environment through naturally occurring forces is eliminated.
- Mine closure is achieved efficiently, cost effectively, and in compliance with the law.
- The social impacts resulting from mine closure are managed in such a way that establishment of a socially stable community in line with the principles of sustainable development is facilitated.

The rehabilitation objectives for closure are discussed further in the Closure and Rehabilitation Report (EXM, 2017) (Part A - Appendix 20). The overall rehabilitation goal for Witfontein Mine is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amenable to the local habitat types that is suitable for the sustaining of cattle farming as the next land use over the mine site, post closure.

The overall closure goal for Witfontein Project is to progressively re-instate the natural landscape areas that are safe, stable and non-polluting, mimicking some of the current land use, and taking into account the unavoidable remaining mining residue and/or disturbances towards leaving behind a positive post-mining legacy.

The above closure goal is underpinned by the specific objectives listed below. These objectives are stated qualitatively and become more specific as the actual rehabilitation and closure measures are devised. The objectives apply to the mine site in its final closed state and not whilst it is transformed towards this state.

4.1.1 PHYSICAL STABILITY

To facilitate the mine's planned final land use, all unavoidable mining residue, opencast areas,

adits and surface infrastructure needs to be removed and/or stabilised. This would need to be done as follows:

- The discard dump outer slopes and upper surfaces needs to be stabilised. The final void (if applicable) can possibly be utilised to divert all surface water runoff from the discard dump. A suitable cover to the discards dump must be constructed to limit water infiltration and erosion.
- All infrastructure, that does not have a beneficiation potential, must be removed, dismantled and disposed of; and
- The natural vegetation should be re-established by ripping, shaping, and seeding of all remaining footprint areas. Only roads which have a post closure beneficial use should be retained.

4.1.2 ENVIRONMENTAL QUALITY

The closure vision is to ensure that the surrounding environmental quality is not adversely affected by the potential chemical contamination and physical effects as a result of the mining operations. This can be achieved by:

- To ensure the protection of the surrounding environment; including human and animal life, contaminated land and hazardous waste needs to be effectively removed and managed. An appropriate procedure should therefore be developed.
- Regulatory standards should be used for contaminated sites to ensure mitigation against regulatory control;
- Post closure environmental risk should be contained during decommissioning to ensure secondary contamination does not take place;
- Dust generation during decommissioning of site infrastructure should be limited. This will ensure no health effects or nuisance related impacts affect surrounding communities and landowners;
- A contaminated land assessment must be undertaken to identify contaminated site material which needs to be removed to ensure protection of receiving downstream environment;
- Local groundwater quality needs to be protected through implementing measures to limit source contamination from operational areas;
- The area should also be reshaped to be free draining, without any future erosion risks.

4.1.3 HEALTH AND SAFETY

Rehabilitated sites need to be secured to ensure no adverse risk to human, animals health and safety, by:

- The perimeter of the remaining open voids needs to be bunded to limit access to area;

- The discards dump outer slopes and upper surfaces needs to be stabilised;
- Through environmental monitoring of the impacts over time, clearly demonstrate that the environmental impact on humans and animals is acceptable over the rehabilitated site;
- To ensure the protection of the surrounding environment; including human and animal life, contaminated land and hazardous waste needs to be effectively removed and managed
- Monitoring data should show that with the planned final land use and rehabilitation undertaken, no contamination of surface and groundwater resources has the potential to affect health and safety.

4.1.4 LAND CAPABILITY/LAND-USE

The planned final land use, being grazing, ensures the affected area is re-instated to desired land capabilities, by:

- Obtaining stakeholder consensus of desired final land use.
- To ensure the desired land use is re-instated soil types needs to be stockpiled separately.
- Ensuring long-term stability of rehabilitated sites;
- Contaminated soils should be cleaned up and rehabilitated; and
- Rehabilitation areas should be pre-determined by committing available topsoil.

4.1.5 AESTHETIC QUALITY

The overall aesthetic appearance must be re-instated to acceptable levels to mirror prior landscape. Discard dumps should be reshaped to successfully blend with surrounding landscape. Rehabilitated areas should re-establish to ensure area is aesthetically pleasing.

4.1.6 SOCIO-ECONOMIC ASPECTS

The mine must implement commitments contained in their Social and Labour Plan (SLP)

4.2 PROCESS FOR MANAGING ENVIRONMENTAL DAMAGE, POLLUTION, PUMPING AND TREATMENT OF EXTRANEOUS WATER OR ECOLOGICAL DEGRADATION

The Witfontein Rehabilitation Plan is provided in Part A - Appendix 20 (EXM, 2017). This includes the detailed rehabilitation and management methodologies for:

- Mining areas
    - Discard and overburden dumps
    - Slurry dams
    - Pollution Control Dams
    - Open Pits and adits

    - Disturbed Land to be rehabilitated once infrastructure is removed
- Non-mining areas including
    - Alien vegetation control
    - Sensitive and protected species
    - Wetlands
- Site wide water management
    - Catchment yield and integrity
    - Wetland catchment protection

4.3 POTENTIAL RISK OF ACID MINE DRAINAGE

4.3.1 STEPS TAKEN TO INVESTIGATE, ASSESS, AND EVALUATE THE IMPACT OF ACID MINE DRAINAGE

Acid Mine Drainage (AMD) is drainage from disturbed geological material at mines with a high degree of pyrite oxidation and inadequate neutralisation by other (especially carbonate) minerals in rocks. Drainage pH is below pH 5.5 - 6.5 and often has a high saline and metal load. The impact on drainage at a mine depends on the interaction between the 1) solid, 2) water and 3) air phases. The drainage quality will be a function of the dissolution and reactivity of the minerals, the degree of acidification or neutralisation, as well as the interaction of the minerals with oxygen and water.

Disturbed geological material with a high pyrite content (that is also in contact with oxygen) will typically generate a high sulfate load. Whether the drainage will become acidic or saline will depend on whether enough neutralisation minerals are present. However, if the mine is sealed off from the atmosphere (e.g. a flooded underground mine) before acidification occurs, then no oxygen ingress is possible with no resultant oxidation of sulfides - the mine will then produce saline or neutral mine drainage. At Witfontein it is possible that where insufficient neutralisation is present acid mine drainage will be present.

In terms of Acid Mine Drainage (AMD) Potential, the shallow hanging wall composite sample (WF-HW1) was assessed as a Type I rock, which indicates that it is potentially acid generating. As for the deep hanging wall composite sample (WF-HW1) and the carbonaceous coaly composite sample (WF-COAL), they were both assessed as a Type II rocks, which may or may not generate acid. It is, however, unlikely that the material making up these samples will generate AMD as their pH values are slightly alkaline.

There is a moderate risk of acid mine drainage originating from waste streams and coal stockpiles at Witfontein Mine (see Part A – Appendix 15).

4.3.2 ENGINEERING/MINE DESIGN SOLUTIONS TO BE IMPLEMENTED TO AVOID OR REMEDY ACID MINE DRAINAGE

The waste assessment conducted resulted in the hanging wall and carbonaceous coaly material each being assessed as Type 3 wastes. Barrier systems for the discard dump (hanging wall material) and coal stockpiles should therefore comply with the performance of a Class C barrier system. It is noted that some of the residue material has the potential to generate Acid Mine Drainage, therefore, this aspect needs to be taken into account when designing barrier systems. The DWS has recently circulated a memorandum stating that use can be made of source – pathway – receptor modelling to motivate for an alternative (less stringent barrier system) than the Class C default system based on the waste assessment results (DWS, 2016). For the above ground discard disposal facilities this approach can therefore be used to potentially motivate for a less stringent barrier system. It is understood that some of the residue disposal facilities may be located on backfilled material, therefore source pathway- receptor modelling must anyway be conducted for the backfilled material and therefore disposal scenarios for the above ground residue stockpiles can be included for various barrier systems.

~~The Witfontein Groundwater report (Part A – Appendix 6) modelled the groundwater impacts using a liner system of: compacted in-situ material (300 mm) mixed with bentonite (3%) & sealed with 1.5mm bitumen. In previous modelled groundwater studies, this type of liner has been found to be as effective as a Class C liner.~~

An updated Groundwater Flow Model was undertaken (EXM, 2020) to determine the decant positions and expected decant volumes. The assessment found that the estimated location of potential decant points are at the adit and opencast pit. The decant points around the open pit are based on the existing digital elevation model, pit geometry and groundwater levels obtained from Jones and Wagener (2017).

Decant is likely to take place along the eastern side of the pit . The decant point for the underground mine in the eastern side of the study area occur at the adit. The assessment also calculated the estimated time until decant, where the Western mine (Holfontein) will take on average 48 years to decant, while the Eastern mine (Witrand) will take on average 57 years to decant. The average decant volume for the Western mine is 139 m^3/d, while decant volume for the Eastern Mine is 156m^3/d.

During operation, acid mine drainage (AMD) will be managed by employing various strategies. These include:

- **Strict surface water management using grass lined clean water channels and berms to divert clean stormwater.**
- **Concrete/soilcrete lined dirty water channels and silt traps will be used to collect and divert all dirty water from the product and ROM stockpile pads, coarse discard dump and overburden dumps to three pollution control dams (PCD's).**
- **The PCD's have sized in accordance with Regulation No. GN 704 of the National Water Act (1998) which states that a PCD is not allowed to spill more than once in 50 years.**
- **The waste storage facilities will be constructed with a Class C liner (1.5mm HDPE with 2x 150mm clay layers) suited for Type 3 classified wastes. These include the product and ROM stockpile pads and coarse discard dump.**
- **The slurry dams will be concrete lined.**
- **Liners are designed according to the geochemical waste classifications and relevant regulations and will be continuously monitored.**
- **There will be surplus water during the operational phase. This will be managed through forced evaporation, using 45kW mechanical evaporators.**

The post closure long term management of AMD will primarily consist of managing the expected decant water. A passive treatment system will be well suited as the decant flows are between 1.82 l/s and 2.04 l/s (EXM, Mar 2020). The passive treatment system will consist of a Reducing and Alkalinity Producing System (RAPS) Wetland together with a settling pond to treat post closure decant water and manage the AMD. The RAPS wetlands have been positioned within the 100m wetland buffer, but outside the 32m wetland zone of regulation. This would allow the system to function under gravity, thus limiting the maintenance and on-site operation.

A cut off key consisting of a 160ND perforated drainpipe, wrapped in 19mm stone and a geotextile, as well as a concrete channel and berm will be constructed along the eastern boundary of the opencast pit. This will ensure all decant water at various points along this boundary is channelled to the treatment facility. The Eastern mine has one estimated location where the decant will occur. The decant water from this point will also be channelled to the RAPS passive system using the same method.

~~It has been calculated that the underground workings will decant into the backfilled opencast pits after approximately 37.4 years where after the opencast pits will decant into the environment at an average volume of 21.6 m³/d for the northern workings and 62.3 m³/d for the~~

~~southern workings. Mitigation measures will include the following (from the Witfontein Closure and Rehabilitation Report, Part A, Appendix 20):~~

- ~~After underground mining has ceased the adit will be plugged and the opencast pits will be backfilled without a final void, rehabilitated and made free draining.~~
- ~~Monitoring of water levels in the mine and the associated water quality is committed to. This will allow both calibration of the post mining water quality and water volumes.~~
- ~~The water level in the workings will be actively managed to ensure it remains below the decant elevation.~~
- ~~The post closure mine water make will be pumped from the mine workings to the Plant PCD and from there to the selected treatment facility or end use activity.~~

~~It is deemed essential that a redundant systems and excess capacity is ensured to ensure that at all times decant can be managed. At no time should decant water be allowed to be discharged untreated or not treated to the required standard to the receiving environment. Management of decant water will be required to ensure that poor quality mine water is not discharged into the environment. Treatment solutions will consider the volume and quality of water make to be managed. The following treatment solutions will be considered:~~

- ~~A stand-alone active treatment plant at Witfontein.~~
- ~~A passive or semi-passive treatment solution at Witfontein.~~
- ~~Pumping to a regional treatment plant.~~

Treatment technologies are continually developing and improving and it is therefore not possible to commit to a particular treatment solution at this stage. An appropriate technology solution will be selected prior to decant, based on the best available technologies at the time.

4.3.3 MEASURES THAT WILL BE PUT IN PLACE TO REMEDY ANY RESIDUAL OR CUMULATIVE IMPACT THAT MAY RESULT FROM ACID MINE DRAINAGE

As detailed Section 4.3.2 above, potential AMD will be managed during operations by strict separation of clean and dirty stormwater systems, lining of waste storage facilities with a class C liner, containment of dirty water in PCDs, use of this water in the plant and evaporation of any excess water.

A passive treatment system, known as a Reducing and Alkalinity Producing System (RAPS) Wetland together with a settling pond will be constructed to treat post closure decant water and manage the AMD.

~~Recommended mitigation measures (from the Witfontein Closure and Rehabilitation Report, Part A, Appendix 20):~~

- ~~In order to minimise the rate at which groundwater quality will deteriorate in the long-term excess seepage must be removed to a suitable facility on surface or in the underground workings during the operational phase to limit the reaction of pyrite with oxygen and water.~~
- ~~During the decommissioning phase, designated underground water storage areas must be identified. In these areas, the coal seam containing pyrite bearing minerals will be flooded, thus reducing the risk of acidification and deterioration in underground water quality.~~
- ~~Where the underground workings intersect water-bearing fractures and faults, these structures must be sealed off to prevent seepage into the underground workings, acidification and deterioration in underground quality;~~
- ~~Use the results of the monitoring programme to confirm/validate the predicted impacts on groundwater availability and quality after closure;~~
- ~~Manage groundwater levels below decant level.~~

The costs of water treatment during and after mine closure have been included in the financial provision for the mine closure and post-closure.

4.4 VOLUMES AND RATE OF WATER USE REQUIRED FOR MINING

The Witfontein Mine was issued a Water Use Licence for several water uses listed under Section 21of the National Water Act (No. 36 of 1998). The WUL was issued on 16 April 2021. The volumes of water required are detailed in section 2.4 above.

4.5 WATER USE LICENCE APPLICATION

All water uses have been approved as part of the Integrated Water Use Licence (IWUL) in terms of the National Water Act (No. 36 of 1998) issued by the Department of Water and Sanitation (DWS) (Ref: 06/B11C/ABCGIJ/10186).

~~An application for a Water Use Licence will be made~~. **The application was undertaken for the following water uses:** ~~will be made in terms of the following sections of the National Water Act (No. 36 of 1998).~~

- Section 21(a) – taking water from a resource
- Section 21(b) – storing of water
- Section 21(c) – impeding or diverting the flow of water in a water resource
- Section 21(g) – disposal of waste in a manner which may impact on a water resource
- Section 21(i) – altering the beds, banks, course or characteristics of a watercourse

- Section 21(j) – removing, discharging or disposing of water found underground if it is necessary for the efficient continuation or for the safety of people.

5 ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMP presents the actions that need to be implemented to address the potential impacts resulting from the identified activities to be undertaken during the establishment, operation and rehabilitation of the Witfontein Mine. The management actions are stated in a manner that ensures that they can be audited during the performance assessment programme. Once approved by the relevant authorities, the provisions of the EMP are legally binding on the project applicant and all its contractors and suppliers. (Further discussions regarding the mitigation measures can be found in Part A, the EIA and the Appendices 5 to 20).

The Mine Manager will appoint an Environmental Manager, and the Mine Manager may then delegate certain responsibilities in the EMP to the Environmental Manager.

5.1 PLANNING AND DESIGN

Ref. No.	Objective	Action	Responsibility	Time period for implementation
PROTECTION OF FLORA				
1.1	To ensure the management of vegetation on site.	A fenced-off buffer zone of 32 m around the wetlands must be included in the mine design plan. No mine infrastructure should be planned for these areas (except for the mine access road).	Project Manager	During planning and design
1.2		An alien invasive plant management plan for construction shall be developed.	Project Manager and ECO	Prior to commencement of construction
AIR QUALITY AND NOISE				
1.3	To ensure the management of air quality on site.	Methods for the management of dust at material handling areas and on gravel roads (including the D450) must be included during the planning phase.	Project Manager	During planning and design
		Air quality and noise monitoring at the monitoring points in this EMP must commence at least 3 months before the start of construction to ensure the proper operation and also to collect a baseline.	Project Manager and ECO	Prior to commencement of construction
LANDUSE				
1.4	To ensure the achievement of rehabilitation on closure.	Financial provision for rehabilitation of the mine must be made.	Project Manager	During planning and design

Ref. No.	Objective	Action	Responsibility	Time period for implementation
1.5	To have information to measure a change in land value.	Valuations of neighbouring properties should be undertaken prior to the commencement of construction. This is to be used as a baseline against which a change in land value can be measured. Valuers must be objective and include potential loss of production, loss of future income, the value of buildings and houses, etc. If landowners cannot undertake their economic activities on their farms/ households due to impacts of the mining operation, then consultation must take place to address the impact through the complaints process.	Project Manager	During planning and design
TRAFFIC				
1.6	To ensure planning for safety on public roads.	Budgeting must include the regular maintenance of the D450 road.	Project Manager	During planning and design
1.7		Provision must be made for the improvements required for the D450 road.	Project Manager	During planning and design
1.8	To ensure planning for safety at the mine entrance.	Consider alternative access points (not opposite the farmworker community on the D450).	Project Manager	During planning and design
1.9	To plan for traffic safety	The mine must compile a detailed traffic management plan for the construction and operation phases. The plan must include measures to mitigate safety risks, noise mitigation, speed limits, truck parking areas, operation times, road maintenance, additional precautions required during heavy fog, complaints procedures, details regarding compensation if mine trucks cause damage, and the use of farm implements and other abnormal vehicles on the public road. This plan must be developed in consultation with IAPs.	Project Manager	Planning and design phase
SOCIO-ECONOMICS				
1.10	To ensure minimisation of the impact on the two farm worker communities due to additional people to the area.	The relocation of the two nearby communities of farm workers identified in the social impact assessment must be considered. Prior to the commencement of mining, negotiations must take place to determine the process for relocation, or other mitigation as agreed with the communities.	Littlesnipe	Planning and design phase
1.11	Local procurement and enterprise development. Local employment.	The mine's local recruitment and procurement policies must be in place. Collaboration with the municipality's unemployment forum. Contractors must be committed to employing locally.	Project Manager and contractors	During planning and design
FINAL MINE DESIGN				

Ref. No.	Objective	Action	Responsibility	Time period for implementation
1.12	Ensuring the final mine design minimises environmental impacts.	The location of ventilation shafts will be determined by the mine engineers in the final mine design. The vent shafts should be placed at the entrance of the adits. Should alternative areas be required the noise monitoring plan must be updated to assess if any noise is generated above limits in this report.	Project Manager and engineers	During planning and design

5.2 CONSTRUCTION

Ref. No.	Objective	Action	Responsibility	Time period for implementation
ROLES AND RESPONSBILITIES				
2.1	To define roles & responsibilities for the implementation of the EMP.	The ultimate responsibility for the implementation of the EMP lies with Littlesnipe.	Littlesnipe	Prior to construction
2.2		Littlesnipe is to delegate responsibility for adherence with the EMP to the Project Manager.	Littlesnipe	Prior to construction
2.3		The Project Manager must appoint an Environmental Control Officer (ECO) for the construction phase who will be responsible for monitoring compliance with the EMP on a monthly basis.	Project Manager	Prior to construction
2.4		Adherence to the EMP must be included as a contractual agreement for all contractors involved in the construction of the mine.	Project Manager	Prior to construction
2.5		Each contractor is responsible for adherence with the EMP in their area of construction.	Construction contractor	Prior to construction
2.6		Each contractor must designate an environmental representative for monitoring compliance with the EMP.	Construction contractor	Prior to construction
ENVIRONMENTAL AWARENESS AND TRAINING				
2.7	To ensure awareness of the conditions of the EMP to everyone working on site.	All workers on site must to undergo an environmental induction and must be made aware of the conditions of the EMP.	ECO	Prior to site establishment
2.8		A copy of the EMP and all environmental authorisations must be kept at the main site office.	Project Manager	From date of site establishment
2.9		A copy of the EMP must be given to each contractor on site.	Project Manager	On appointment
2.10		Each contractor must keep a copy of the EMP at their office and this copy must be made available to staff.	Construction contractor	From date of site establishment
COMPLIANCE MONITORING				
2.11	To ensure compliance with the EMP and	Each environmental representative appointed by their contractor must undertake daily monitoring to assess compliance with the EMP.	Contractor	Daily

Ref. No.	Objective	Action	Responsibility	Time period for implementation
2.12	environmental authorisations.	A record must be kept by each contractor recording any environmental incidents for the day. Environmental incidents must be rectified and reported to the ECO.	Environmental representative	Daily
2.13		The ECO will undertake weekly EMP compliance audits.	ECO	Weekly
ENVIRONMENTAL MONITORING				
2.14	To monitor key environmental imapcts.	Establish monitoring network for groundwater, surface water, air quality and noise in accordance with section 7 of this EMP.	Project Manager	During construction and operation
GROUNDWATER RESOURCES				
2.15	To ensure the management of groundwater resources.	Water abstraction must comply with water use licensing requirements.	Project Manager	Commencement of construction
2.16		No water will be abstracted from any private borehole without an agreement being entered into with the landowner.	Project Manager	Commencement of construction
2.17	To prevent pollution of groundwater resources.	Pollution control measures must be put in place where hazardous chemicals and hydrocarbons are handled. **The ROM stockpile, discard dump, coal stockpile and hards overburden dump barrier systems must comply with requirements of Class C landfill sites (National Norms & Standards for Disposal of Waste to Landfill, GNR636, 23 August 2013).** **The following liner will apply:** **A nonwoven geotextile (e.g. Rock Grid) will be placed directly on the 1.5mm HDPE geomembrane. This nonwoven geotextile will minimize any punctures to the HDPE by the material placed on top of it. Directly above that geotextile a 150mm layer of sandy material will be placed by method of end-tipping from one edge and moving towards the centre. The 600mm -1000mm discard (for ROM stockpile) or 600mm -1000mm softs material (for hards overburden dump) will immediately be placed on top of the 150mm layer sandy material using the same placing method to avoid damage** **The softs and hards material in the overburden dump will be stockpiled separately. The softs overburden will be stored on a Class D liner.**	Contractor	Commencement of construction

Ref. No.	Objective	Action	Responsibility	Time period for implementation
2.18	To manage the impact of drawdown on the water table	Monitoring plan to be established and include hydrocensus boreholes, drilled boreholes and the Piekespruit. Groundwater and surface water quality and levels be monitored on a quarterly basis and bi-annual basis.		
SURFACE WATER RESOURCES				
2.19	To ensure the protection of surface water resources.	Sediment originating from construction activities shall be prevented from contaminating stormwater. Stormwater management measures to be implemented as detailed in the Storm Water Management Plan (GFK Drawing Sequence No. G 2017/01/03/02 Rev 02)	Contractor	Commencement of construction
2.20		Dirty water run-off must be contained and not allowed to enter into the surrounding environment.	Contractor	Commencement of construction
2.21	To prevent the washing of sediments from the discard dumps into stormwater.	Berms and trenches must be put in place to prevent run-off from discard dumps entering wetlands.	Mine manager	Prior to operation
2.22	To prevent erosion of wetlands due to linear infrastructure.	Runoff must be attenuated using naturally rounded rocks and grass lined channels before discharging into wetlands.		
2.23	To protect the surrounding wetlands	No infrastructure, except for the passive treatment plant, is to be located within the scientifically calculated buffer, developed as part of the Hydropedological Assessment. All development footprint areas to remain as small as possible Strict control of edge effects must be undertaken via no-go areas and stormwater management measures. Roads and other linear developments within the wetland and hydropedologically important soils should be prepared with layerworks including a permeable pioneering layer to allow free lateral movement of water through the hydropedologically active soils. Water captured in the clean water systems should be returned to the wetlands in an attenuated and controlled manner. Contractor lay-down area to be located outside of the sicnetific buffer.		
SOIL AND LAND CAPABILITIES				

Ref. No.	Objective	Action	Responsibility	Time period for implementation
2.24	To ensure the protection of soils during soils stripping.	The upper 1000 mm of soils (topsoil and subsoil) must be removed and stored as topsoil.	Contractor	Commencement of soil stripping
2.25		No soil stockpile must be higher than 4m high.	Contractor	During soils stockpiling
2.26	To ensure the management of soils.	Footprint area of disturbance shall be minimised and no unnecessary disturbance to take place.	Contractor	During construction
2.27		No off-road driving allowed.	Contractor	During construction
2.28		All roads and compacted areas used during construction must be ripped and the establishment of vegetation shall be promoted.	Contractor	During construction
2.29	Strip and store topsoils correctly.	Topsoil and sub-soil should be stripped separately; Avoid dilution of soil nutrients due to mixing of different soil forms; Avoid compaction of soils due to unnecessary vehicular movement; Avoid contamination of soil as a result of oil and diesel spills; Avoid wind and water erosion of soils; Avoid soil loss as a result of improper haulage practices; Topsoil should only be handled three times – stripping; stockpiling and replacement. Areas in which an activity is to take place should be demarcated; Stripping procedures should be undertaken well ahead of mining activities to avoid contamination although caution must be taken in stripping of too large an area, which will make the exposed areas susceptible to wind and water erosion. Generally, soil stripping should be kept between 50 – 100m ahead of the active mining face of opencast pits; Vegetation should be cleared before soil stripping is undertaken; Topsoil should be stripped in sequential blocks to avoid compaction; Stripping of soil should only take place during dry conditions as far as possible to avoid compaction; Soil stripping should be supervised by a competent person; Records should be kept of areas stripped and approximate volumes recovered; Operators of machinery should be trained regarding soil characteristics and soil horizons as to avoid unnecessary soil deterioration; A soil stripping and stockpiling Standard Operating Procedures should be drafted and enforced.	Contractor	During construction
2.30	Management of soil stockpiles.	Designated areas should be identified for the sole purpose of soil stockpiling; Stockpile areas should be fenced off and access controlled; Feasibility of utilising topsoil for visual screen berms should be investigated; Unauthorised borrowing of stockpiles should be restricted; Stockpile sites should not present any risk to sensitive environments;	Contractor	During construction

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		Soil stockpiles may not be established within the 1:100 year flood line of any watercourse or dirty water channel; Stockpile sites must be free draining to minimise erosion and waterlogging; Erosion protection measures must be implemented to avoid loss of the soil resource; Soil stockpiles should be protected by an upslope berm and toe channel; The amount of water that can enter a stockpile area should be restricted as far as possible; Soils with significantly different structural characteristics must be stockpiled separately as far as possible; Upland soils, usually red and yellow soils can be stockpiled together; Wetland soils, in particular soils with a plinthite horizon, should be stockpiled separately; Topsoil and subsoil should be stockpiled separately; Stockpiles may not exceed 4 m in height to prevent compaction; Stockpiles should be stabilised as soon as possible to avoid erosion; Stockpile slopes may not exceed an embankment of 1:3 (18°); Revegetation of the slopes should be undertaken as soon as possible to avoid soil erosion due to water runoff; Soil stockpiles may only be left un-vegetated if the soil is allocated for re-use within three months of initial stockpiling – this will most likely be soils stripped during the establishment of the initial box-cuts; If subsoil stockpiles are nor re-vegetated other means of covering should be investigated to avoid erosion; Stockpile locations should be indicated in a map. This map should be updated regularly; Stockpiled soil material should be surveyed and accurate volumes should be calculated and recorded; Stockpile volumes should be reviewed and updated regularly; Stockpiling must be supervised by the ECO at all time to ensure that best practice is followed; Stockpiled soil should be allocated to predetermined areas for rehabilitation initiatives and allocation should be aligned with areas where the type of soil occurs naturally.		
BIODIVERSITY (FLORA)				
2.31	To ensure the protection of vegetation.	Unnecessary disturbance of vegetation not to be allowed- vegetation clearance must be restricted to footprint areas required for the development of the mine.	Contractor	Commencement of construction
2.32		The collection of plant material or the picking of plants on site or the surrounds is prohibited.	Contractor	Commencement of construction.

Ref. No.	Objective	Action	Responsibility	Time period for implementation
2.33		Source populations of alien plants must be removed during construction phase.	Contractor	During construction phase
2.34		An alien invasive plant management plan shall be implemented during the construction phase.	Contractor	During construction phase
2.35		A fence is to be constructed to demarcate the buffer zone of 32 m around the wetlands.	Contractor	During construction phase
BIODIVERSITY (FAUNA)				
2.36	To ensure the protection of fauna.	No hunting is permitted on site.	Contractor	During construction phase
2.37		Workforce on site is to be made aware of the presence of fauna and protected species on site.	Contractor	During construction phase
2.38	To ensure the protection of faunal habitats	Where possible avoid the removal of large trees.	Contractor	During construction phase
AIR QUALITY				
2.39	To minimise production of dust at the construction site.	Surface wetting or chemical dust suppression must be applied on main construction roads.	Contractor	During construction phase
2.40	To minimise production of dust on the D450.	Chemical dust suppression must be applied on the D450.	Project Manager	During construction phase
HERITAGE RESOURCES				
2.41	To ensure the protection of heritage resources.	If heritage sites, graves or fossils are unearthed, construction activities must cease until given approval to proceed by a specialist approved by SAHRA. The sites identified in the EIA must be left untouched.	Contractor	During construction
TRAFFIC				
2.42	To minimise the impacts of traffic on nearby residents	• The drainage structure (private) at the mine access is unsafe and should be replaced. • Some culverts on the D450 are a safety hazard and should be replaced or extended. • The cover over culverts on the D450 are insufficient for structural protection and must be increased. • The D450 road width should be increased to 10m due to safety considerations. • The wearing course on the D450 should be replaced and a maintenance plan developed.	Project Manager	During construction phase

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		• Dust suppression on the D450 should be implemented. • Road signs along the D450 road are below standard and additional signs are recommended. • The road authority should be informed of the development and a wayleave should be obtained for the measures above that will be carried out by Littlesnipe. There are limitations imposed by the bridges on the D450 as to abnormally heavy or wide loads. The widening and strengthening of these should be considered.		
2.43		Mine trucks and other vehicles must park within the mine property. No mine vehicles are allowed to park next to the D450.	Project Manager	During construction
2.44		Suitable toilet and washing facilities must be in place for truck drivers at the truck parking areas.	Project Manager	During construction
PUBLIC SAFETY				
2.45	To assist the SAPS with maintaining public safety and reducing crime.	The mine must collaborate with the SAPS to develop and implement crime fighting initiatives, should crime levels in the Witfontein mine area increase. Issues relating to public safety must also be addressed through the mine forum meetings. The Mine must form part of the local policing forum and farmers union.	Project Manager	During construction
PUBLIC RELATIONS				
2.46	To manage noise for surrounding landowners.	Machinery and vehicles to be maintained to ensure the miinimisation of noise.	Contractor	During construction
2.47	To ensure safety on public roads (D450).	Dust control measures and surface maintenance must take place on the D450.	Project Manager	During construction
2.48	To afford the community an opportunity to raise their concerns.	A general public forum must be established for members of the community to raise their issues of concern. Monthly forum meetings with community must take place during construction and quarterly during operations. The DEA, DMR, ward councillor and DWS must be invited to the meetings.	Project Manager	During construction
2.49		A complaints register must be kept on site at the main office, and should also be available during the forum meetings for the community to communicate their complaints.	Project Manager	During construction
2.50	To ensure the employment of locals.	The employment policy must give preference to local labour force.	Contractor	During construction
2.51	To ensure the safety and security of surrounding landowners.	Employment and local procurement policies must be in place and clearly communicated to the public e.g. through community leaders.	Project Manager	During construction

Ref. No.	Objective	Action	Responsibility	Time period for implementation
2.52		Under no circumstances is recruitment to take place at the gate. A recruitment office may be established in Bethal should it improve the use of local labour as far as possible.	Contractor	During construction
2.53		Access control must be in place at the construction site.	Project Manager	During construction
2.54		No workers to be housed on site. All workers must be provided with uniforms and identification.	Project Manager	During construction
SPILL PREVENTION				
2.55	To contain and manage spillage of hazardous chemical substances	Hazardous chemical substances must be stored in bunded areas.	Contractor	On commencement of construction
2.56		Non flammable chemical liquids must be stored within bunded areas with the capacity to contain 100% of the largest container stored.	Contractor	On commencement of construction
2.57		Flammable or combustible liquids must be stored in a bunded area with sufficient capacity to contain 110% of total volume contained.	Contractor	On commencement of construction
2.58		MSD sheets for all chemicals must be displayed in close proximity to the area of storage.	Contractor	On commencement of construction
2.59		Chemical spills are to be regarded as an environmental incident and reported through the incident reporting system.	Contractor	On commencement of construction
2.60		Hazardous chemicals (such as those used for cleaning) must not be released into the environment or sewage treatment system. These materials must be contained and disposed of as hazardous waste.	Contractor	On commencement of construction
2.61		The refuelling point needs to be on an impermeable suraface and runoff must gravitate to a sump. The sump must be cleaned out regularly and disposed of as hazardous waste	Contractor	On commencement of construction
2.62		All fuel tanks used in construction must be aboveground and bunded in accordance with the requirements for flammable liquids.	Contractor	On commencement of construction
2.63		Fuel and other petrochemicals must be stored in receptacles that comply with SANS100-1:2003 (SABA089-1:2003).	Contractor	On commencement of construction
2.64	To prevent and contain spillages of fuels, oils and greases.	All vehicles must be checked for leaks before commencing work on site.	Contractor	On commencement of construction
2.65		Drip trays must be placed beneath parked vehicles which drip oil.	Contractor	On commencement of construction
2.66		All equipment that leaks fluid must be repaired immediately or removed from site	Contractor	On commencement

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		when necessary.		of construction
2.67		Servicing of vehicles must only take place within designated workshop areas.	Contractor	On commencement of construction
2.68		Workshop areas must be provided with impervious surfaces.	Contractor	On commencement of construction
2.69		Should it be necessary to carry out repair or maintenance of vehicles and machinery in the field, a temporary impervious surface must be put in place to prevent contamination of soils in the area where oil, grease or fuel can be spilled.	Contractor	On commencement of construction
2.70	To prevent and contain spillages of hydrocarbons.	Hydrocarbon handling areas must be supplied with stormwater diversion measures.	Contractor	On commencement of construction
2.71		The integrity of the bund for hydrocarbon storage is to be monitored regularly to ensure that no seepage escapes it.	Contractor	On commencement of construction (Regularly)
WASTE MANAGEMENT				
2.72	To ensure the proper management of waste.	Waste receptacles must be provided for hazardous and general waste.	Contractor	On commencement of construction
2.73		General waste must be disposed of at a permitted landfill site.	Contractor	On commencement of construction
2.74		All hazardous waste must handled within a bunded area. Hazardous waste stored in skips must ensure no water infiltration is possible.	Contractor	On commencement of construction
2.75		Liquid and solid hazardous waste must be separated.	Contractor	On commencement of construction
2.76		Hazardous waste must be disposed of at a permitted hazardous waste site.	Contractor	On commencement of construction
2.77		Oil separators must be in place to separate out oil coming from the washbays and plant areas.	Contractor	On commencement of construction
2.78	To ensure management of sewage.	Construction workers will make use of portable toilets serviced on a regular basis, until a package sewage treatment plant has been established on site. During the construction, a certified contractor will remove sewage from the portable toilets and dispose of this off-site.	Contractor	On commencement of construction
2.79	To ensure minimisation of the potential for groundwater pollution	The lining of the discard dump and coal stockpiles (mine and siding) should be constructed as follows: compacted in-situ material (300 mm) mixed with bentonite (3%) and sealed with a 1.5mm bitumen layer.	Contractor	On commencement of construction of the discard dump and coal stockpiles.

Ref. No.	Objective	Action	Responsibility	Time period for implementation
	from the discard dump and coal stockpiles.	All overburden stockpiles, coal stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff.		
VISUAL MANAGEMENT				
2.80	To manage visual impacts during construction.	Night glow during construction is to be minimised	Contractor	On commencement of construction
2.81		All lay-down areas must show good housekeeping, litter control and general site cleanliness.	Contractor	On commencement of construction
2.82		Dust management plan must be implemented.	Contractor	On commencement of construction
2.83		The possibility of using indigenous trees or shrubs as a visual barrier must be investigated. If suitable trees are available, these should be planted in suitable locations to assist in reducing the visual impact of the mine.	ECO	On commencement of construction
EROSION CONTROL				
2.84	**To ensure management of potential erosion.**	**All clean water channels will be grass lined to serve as erosion control.** **All dirty water channels must enter the PCD's via concrete silt traps.** **A minimum of two silt straps will be required per PCD for maintenance purposes.** **All dirty water channels are to be concrete lined.** **Disturbed areas or exposed soils must be rehabilitated to minimise canalisation, sedimentation and erosion.** **Ensure that all stockpiles are well managed and have measures such as berms and protection with hessian sheets implemented to prevent erosion and sedimentation**	**Contractor**	**On commencement of construction**
2.85				
NOISE				
2.86	**To minimise noise levels within the mining area and surrounds**	**All diesel-powered equipment and plant vehicles should be kept at a high level of maintenance.** **In managing noise specifically related to truck and vehicle traffic, efforts should be directed at:** • **Minimising individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program.** • **Maintain road surface regularly to avoid corrugations, potholes etc.** • **Avoid unnecessary idling times.**	**Contractor**	**On commencement of construction**

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		• **Minimising the need for trucks/equipment to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur.** • **Limiting traffic to hours to between 06:00 and 18:00.** • **Limiting activities at the rail siding, including train movement, rail car loading etc., to hours between 06:00 and 18:00.**		
CONSTRUCTION REHABILITATION				
2.87	To ensure rehabilitation after construction.	All infrastructure including foundations and concrete surfaces that will not be used during mine operations must be removed from site.	Project Manager	On completion of construction
2.88		All temporary access roads are to be ripped after construction where possible to assist with vegetation growth.	Project Manager	On completion of construction
2.89		Material that has been contaminated with fuels, oils, lubricants or any other hazardous materials must be disposed of as hazardous waste.	Project Manager	On completion of construction
2.90		General waste must be removed and disposed of at a permitted landfill site.	Project Manager	On completion of construction
2.91		Lay down, stockpile and other compacted areas outside of the permanent footprint area must be ripped to at least 150 mm and covered with topsoil or a growth medium to at least 300 mm or to such a depth to sustain vegetation growth.	ECO	On completion of construction
2.92		All soils that have become contaminated with oils, fuels and lubricants must be removed and managed as hazardous waste. Bioremediation of contaminated soils shall take place should such a facility be available on site.	ECO	On completion of construction
2.93		Vegetation growth on rehabilitated areas must be monitored until the following rainy season to ensure re-growth and sustainable growth.	ECO	On completion of construction

5.3 OPERATION

Ref. No.	Objective	Action	Responsibility	Time period for implementation
ENVIRONMENTAL AWARENESS				
3.1	To ensure awareness of the conditions of the EMP.	The operations team must be made aware of the conditions of the EMP.	Environmental Manager	Prior to commencement of operations
COMPLAINCE MONITORING				
3.2	To ensure compliance with the EMP.	The EMP must be complied with and records of reporting are to be kept on file.	Environmental Manager	Ongoing
3.3		Environmental compliance audits are to be undertaken by an independent environmental practitioner and reports must be submitted to the DMR in accordance with the environmental authorisation (EA). Audits must include underground activities and assessment of public complaints.	An independent environmental practitioner.	An stated in the EA.
3.4	To facilitate rehabilitation	Annual update of financial provision for rehabilitation to ensure sufficient funding.	Environmental Manager	Yearly
SURFACE WATER				
3.5	To prevent the pollution of surface water resources.	Mine infrastructure, will be constructed and operated so as to comply with the National Water Act (36 of 1998) and Regulation GN 704 (4 June 1999): o Clean water systems are separated from dirty water systems; o Clean run-off and rainfall water is diverted around dirty areas and back into its normal flow in the environment; o The size of dirty water areas are minimized and dirty water is contained in systems that allow the reuse and/or recycling of this dirty water; o Discharges of surface water may only occur in accordance with authorisations that are issued in terms of the relevant legislation specifications. All hazardous chemicals (new and used), mineralized waste and non-mineralised waste must be handled in a manner that they do not pollute surface water. This will be implemented by means of the following: Pollution prevention through basic infrastructure design; Pollution prevention through maintenance of equipment; Pollution prevention through education and training of workers (permanent and temporary); Pollution prevention through appropriate management of hazardous, materials and the containment and remediation of pollution incidents. o The designs of potentially polluting structures will take account of the requirements for long term surface water pollution prevention. ~~oIn the event that Littlesnipe considers discharging any water, this water quality needs to be tested. In the event that water is not suitable for discharge this~~	Environmental Manager	Ongoing and as required.

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		~~water needs to be treated to standards outlined in the water use license prior to discharge. The release point of water to the environment will be equipped with energy dissipaters and erosion protection measures.~~Littlesnipe will monitor the surface water quality as per the monitoring programme.		
3.6	**To protect surrounding wetlands**	**Strict control of edge effects and implementation of no-go areas to be undertaken** **Stormwater management measures to be implemented, as detailed in the Storm Water Management Plan (GFK Drawing Sequence No. G 2017/01/03/02 Rev 02)** **Water captured in the clean water systems should be returned to the wetlands in an attenuated and controlled manner.** **Regular maintenance must be undertaken on stormwater structures and erosion control measures to ensure optimal operation.**		
3.7	To prevent the pollution of surface water resources from the coal conveyor.	Conveyor design to include spill control over river and automatic cut out. Allowance on conveyor crossing also to be able to do regular maintenance.	Environmental Manager	Ongoing
3.8	To prevent the pollution from the diesel tanks.	Bunds should be established around the diesel tanks that have sufficient capacity ot contain 110% of the capacity of the tank.	Environmental Manager	Ongoing
3.9	To prevent surface water pollution from the railway siding.	Stormwater management measures must be in place at the railway siding and must be maintained. These must include lined stormwater channels and a lined pollution control dam to contain any dirty water	Environmental Manager	Ongoing
GROUNDWATER				
3.10	To monitor the impacts of pit dewatering on surrounding private boreholes **and the groundwater table.**	Establish baseline yields and levels of surrounding boreholes.	Environmental Manager	Prior to operation
3.11		Groundwater flow model must be verified and updated on a 5 year period, and must be updated with the final mine layout.	Environmental Manager	At the start of operation and every five years from start of operation
3.12		Quarterly monitoring must take place for mine boreholes (chemical sampling), monthly sampling of mine boreholes (water levels). Quarterly water level monitoring of surrounding farmers and community boreholes identified during the hydrocensus as well as quarterly chemical analysis of identified farmers' and community boreholes.	Environmental Manager	Monthly and/or Quarterly
3.13		The Mine must develop a definition of an impact on groundwater in consultation with neighbouring landowners. If the surrounding farmers	Littlesnipe	As required

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		experience negative groundwater impacts due to mining activities, Littlesnipe must take the necessary steps to mitigate the impacts identified through a memorandum of understanding that must be developed prior to the commencement of dewatering.		
3.14		**A complaints' register must be kept at the mine where issues and complaints can be recorded. These must be investigated within 72 hours and feedback given to the complainant.**	**Environmental Manager**	**Ongoing**
3.15	To ensure communication with surrounding landowners on groundwater issues.	An environmental forum must be established with local farmers.	Environmental Manager	Operation
3.16	To manage the contamination of groundwater by waste dumps and coal.	Clean water and dirty water management system including required pollution control dams for the containment of dirty water run-off must be established.	Mine Manager	Prior to operation
3.17		Chemical sampling of boreholes in proximity to potential pollution sources (discard dump, coal stockpiles and PCDs) must be undertaken on a quarterly basis and mitigation identified and implemented if required.	Environmental Manager	Quarterly
3.18		Management measures are to be applied when sampling reveals that groundwater contamination is occurring.	Environmental Manager	Operation phase
3.19		Containment of dirty water run-off on site by means of lined canals and lined pollution control dams.	Environmental Manager	Operational phase
SOILS				
3.20	To ensure the management of soils stockpiles.	Soils stockpiles must be benched and sloped to 1:3. No soil stockpile must be higher than 15 m high.	Mine Manager	Operation
3.21	To prevent contamination of soils.	Handling of hydrocarbons and other hazardous chemicals must take place on impervious areas. Bunded areas to be provided for the storage of hydrocarbons and other hazardous chemicals.	Mine Manager/ Environmental Manager	Operation
LAND CAPABILITIES				
3.22	To facilitate rehabilitation	Concurrent rehabilitation of disturbed land.	Environmental Manager	Operation
3.23		Minimise areas to be cleared to that needed for open pit areas.	Environmental Manager	Operation
3.24	To maintain agricultural production where possible.	Productive farming activities should continue on undisturbed areas of the mining right area.	Environmental Manager	Operation
BIODIVERSITY (FAUNA)				
3.25	To prevent the killing of fauna at the mine.	Staff must be educated on safe driving and protection of animals. Poaching is prohibited.	Environmental Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
BIODIVERSITY (FLORA)				
3.26	To minimise the loss of vegetation.	Unnecessary disturbance of vegetation not to be allowed - vegetation clearance must be restricted to footprint areas required for the development of the mine.	Environmental Manager	Operation
3.27	To manage habitats for protected plants.	Wetlands, including 32m buffer zones must be designated as no-go areas during operational phase. The wetlands in the southern shaft complex have a 100m no-go buffer zone around them.	Environmental Manager	Operation
3.28	To manage the spread of alien vegetation.	Seed mix used for ongoing rehabilitation is to include only species indigenous to the area. Removal of the alien and weed species encountered within the proposed project area must take place in order to comply with existing legislation (Conservation of Agricultural Resources Act, 1983 and NEMBA (Alien and Invasive Species Regulations 2014). Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. Footprint areas should be kept as small as possible when removing alien plant species. No vehicles should be allowed to drive through designated sensitive wetland, buffer or intact grassland areas during the eradication of alien and weed species.	Environmental Manager	Annually throughout the construction, operational, closure/ decommissioning and rehabilitation/ maintenance phases.
3.29	To minimise die-back of plants due to dust fallout.	Dust control measures must be implemented.	Environmental Manager	Operation
AIR QUALITY				
3.30	To ensure the management of dust produced by the mine.	Chemical suppressant or surface wetting to be applied to main haul roads.	Mine Manager	Operation
3.31		Dust supression of coal material at transfer and handling points must take place where visual dust is observed or monitoring indicate a concern. This includes coal at the railway siding especially during storage periods	Mine Manager	operation
3.32		Air quality monitoring must take place as required in this EMP. If air pollution levels exceed regulations, addition dust control measures must be implemented e.g. reducing mine vehicle speeds, improving coal crushing dust efficiency, etc. The regional air quality officer must also be consulted should exceedances be noted in excess of the National Dust Control Regulations.	Mine Manager	operation
3.33		Above ground blasting must be undertaken during the day.	Mine Manager	Operation
3.34		Revegetation of discard dumps must occur during rehabilitation to reduce wind erosion.	Mine Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
3.35	To minimise production of dust on the D450.	Chemical dust suppression must be applied on the D450. The dust suppressants used must comply with SANS standards and be environmentally-friendly products that do not pollute surface water.	Mine Manager	Operation
VISUAL				
3.36	To minimise visual impacts	Topsoil and overburden dumps to be vegetated within one season and placed in such a manner to reduce visual impact.	Mine Manager	Operation
NOISE				
3.37	To minimise noise levels for surrounding landowners.	Machinery and vehicles to be maintained to minimise noise levels.	Mine Manager	Operation
3.38		Where possible, overburden dumps should be positioned to act as noise berms to reduce noise impacts for nearby landowners.	Mine Manager	Operation
3.39		~~Low pitch reverse hooters in vehicles.~~ **In managing noise specifically related to truck and vehicle traffic, efforts should be directed at:** • **Minimising individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program.** • **Maintain road surface regularly to avoid corrugations, potholes etc.** • **Avoid unnecessary idling times.** • **Minimising the need for trucks/equipment to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur.** • **Low pitch reverse hooters in vehicles** • **Limiting traffic to hours to between 06:00 and 18:00.** • **Limiting activities at the rail siding, including train movement, rail car loading etc., to hours between 06:00 and 18:00.**	Mine Manager	Operation
3.40		If noise monitoring shows exceedances on a regular frequency a noise specialsit should be consulted to assess the site specific mitigations measures to further reduce noise generation	Mine Manager	Operation
VIBRATIONS AND AIR SHOCK				
3.41	To manage impacts of blasting to surrounding landowners.	Control of stemming to minimise air blast and fly rock.	Mine Manager	Operation
3.42		In accordance with the Blasting Report (Appendix 14, of Part A of the EIA), an audit of nearby landowners' property should be conducted before blasting commences. This will include photographic surveys.	Mine Manager	Operation, before blasting
3.43		If complaints related to blasting are received, the mine manager must arrange an inspection of the damage or the complaint. If the damage has been casued by blasting, the mine must repair the damage.	Mine Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
3.44		In accordance with legislation, residents within 500m of the blasting area must be evacuated prior to blasting unless exemption has been acquired. The D450 road will also fall within the 500m buffer and the Department of Roads should be made aware of any road closures.	Mine Manager	Operation, before blasting
TRAFFIC				
3.45	To ensure safety for other road users during the operation of the mine.	Warning signs must be erected on either side of access to the mine.	Mine Manager	Operation
3.46	To minimise the impacts of mine traffic on night-time noise.	Mine traffic on the D450 road must be limited to between 06:00 and 22:00.	Mine Manager	Operation
3.47		Mine trucks must park inside the mine premises at night. Should an alternative parking area be identified it must be communicated to persons along the route in order to identify acceptable driving styles, volumes of trucks and road conditions.	Mine Manager	Operation
3.48	To minimise the generation of dust on roads.	Chemical dust suppressant is to be used on the D450 road.	Mine Manager	Operation
3.49		Regular maintenance must be undertaken of roads including maintenance of wearing course and reapplication of chemical suppressants.	Mine Manager	Operation
3.50		The speed limit must be adhered to by all Littlesnipe vehicles. Regular speed testing must take place on the D450 road.	Mine Manager	Operation
3.51	To ensure safety of school children travelling to and from school during the operation of the mine.	School transport must be provided for children travelling to school along the D450 between the mine and Bethal.	Mine Manager	Operation
3.52		If the mine trucks are found to have caused damage to private vehicles, this would need to be investigated as an incident.	Mine Manager	Operation
3.53		Animal road kill must be monitored on a monthly basis by the environmental manager. Measures to reduce roadkill must be included in the traffic management plan.	Environmental Manager	Operation
PUBLIC RELATIONS				
3.54	To minimise the effects of night glow.	Lighting must be directed towards mining activities.	Mine Manager	Operation
3.55		Hoods to be provided on lights to direct light towards places of works.	Mine Manager	Operation
3.56		Alternatives to high lighting masts must be investigated and implemented if practical.	Mine Manager	Operation
3.57		Low intensity lights (low sodium bulbs).	Mine Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
3.58	To minimise visual intrusion due to waste dumps.	Ongoing rehabilitation of waste dumps to reduce visual intrusion.	Environmental Manager	Operation
3.59	To ensure communication with Interested and Affected Parties.	Forums must be in place for communication with IAPs. The forums must include presentations of the latest results of environmental monitoring undertaken. The possibility of providing weekly air quality data to IAPs must be investigated. If this is possible, the air quality monitoring data must be sent to IAPs who request it.	Environmental Manager	Operation
3.60		Grievance mechanism including procedure for dealing with complaints must be in place.	Environmental Manager	Operation
PUBLIC SAFETY				
3.61	To assist the SAPS with maintaining public safety and reducing crime.	The mine must collaborate with the SAPS to develop and implement crime fighting initiatives, should crime levels in the Witfontein mine area increase. Issues relating to public safety must also be addressed through the mine forum meetings. The Mine must form part of the local policing forum and farmers union.	Mine Manager	During operation
WASTE MANAGEMENT				
3.62	To ensure the management of waste on site.	General waste must be removed from site on a regular basis for disposal at a permitted general waste site.	Environmental Manager	Operation
3.63		Hazardous waste must be stored in a concrete bunded area to prevent contamination of soils.	Environmental Manager	Operation
3.64		Hazardous waste must not be kept on site for longer than 3 months.	Environmental Manager	Operation
3.65		Hazardous waste must be disposed at a permitted hazardous waste site.	Environmental Manager	Operation
3.66		The mine will keep an accurate and up to date record of the management of the waste they generate, which records must reflect: 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. 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. Will be stored in designated skips and removed by an approved contractor for disposal at a licensed facility.	Environmental Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		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. 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. 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. Waste will be disposed of at appropriate permitted waste disposal facilities. 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. 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. No wastes will be buried on site. Waste may only be burned in legally approved incinerators.		
3.67	Management of the sewage treatment plant	Sewage sludge will be stored on-site where after it will be removed on a regular basis by a certified contractor for disposal at appropriate licensed facilities.	Environmental Manager	Operation
EROSION CONTROL				
3.68	**To ensure management of potential erosion**	**All clean water channels will be grass lined to serve as erosion control.** **All dirty water channels must enter the PCD's via concrete silt traps.** **A minimum of two silt straps will be required per PCD for maintenance purposes.** **All dirty water channels are to be concrete lined.** **Disturbed areas or exposed soils must be rehabilitated to minimise canalisation, sedimentation and erosion.** **Ensure that all stockpiles are well managed and have measures such as berms and protection with hessian sheets implemented to prevent erosion and sedimentation**		
ACCOMMODATION OF STAFF				
3.69	To ensure provision of housing and services.	Littlesnipe is to negotiate with the municipality as to the provision of housing and services and to provide support to ensure the pressure on services can be alleviated.	Mine Manager	Operation
CULTURAL HERITAGE				
3.70	To ensure the protection of heritage resources.	Should heritage sites, graves, or plant fossils be unearthed, activities are to cease until given approval to proceed by a specialist approved by SAHRA.	Mine Manager	Operation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
MANAGEMENT OF FIRE HAZARD				
3.71	To reduce the risk of fire hazards	Fire fighting equipment must be maintained at the mine	Mine Manager	Operation
3.72	To minimise the risk of fires spreading to surrounding landowners	A firebreak must be maintained around the mine perimeter fence	Mine Manager	Operation
MANAGEMENT OF SUBSIDENCE RISK				
3.73	To minimise subsidence risks.	No stooping can be undertaken. Geotechnical risk assessment to be done prior to operations to mitigate subsistence risk.	Mine Manager	Operation

5.4 DECOMMISSIONING

Ref. No.	Objective	Action	Responsibility	Time period for implementation
NOISE				
4.1	To minimise the production of noise during the decommissioning phase.	Where possible, demolition activities are to be limited to day time to minimise night impacts.	Mine Manager	During demolition of infrastructure
AIR QUALITY				
4.2	To minimise the generation of dust during decommissioning.	Surface wetting or chemical suppression should be used on roads.	Mine Manager	During decommissioning
SOCIO-ECONOMIC				
4.3	To minimise the impacts of job loss.	Measures identified in the Social and Labour Plan for promoting portable skills for workers must be implemented.	Mine Manager	During the decommissioning
SOILS				
4.4	To ensure the protection of soils.	Handling of hydrocarbons and other contaminants must occur at designated areas on impervious surfaces.	Environmental Manager	During decommissioning
4.5		Soils should be replaced according to a rehabilitation schedule to avoid indiscriminate use of soil resources; Soil should not be handled when saturated to avoid compaction; Soils should be placed in a similar location in the catena to their natural location ie. red soils that were stripped in upland locations should be used to rehabilitate upland areas (the crest), yellow-brown soils should be replaced on side-slopes; sandy leached soils should be replaced near the base of the slopes; and dark, cracking wetland soils (melanic and vertic) should be used to rehabilitate lower lying areas. This is done to ensure that soils are replaced in areas that will suite the natural drainage characteristics of the soils. The	Mine Manager	During rehabilitation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		stripping and stockpiling records can be used to align soil placement with initial soil locations; Ripping of the soil receiving surface should be undertaken prior to soil application; Tracked machinery should be used for ripping and placement of soils; Soil fertility tests should be conducted to determine if soil amelioration is needed prior to placement; Subsoil should be applied first to a depth of between 500 – 900mm. The subsoil should then be spread and levelled; Subsoil is physically suitable for use as topsoil, although soil amelioration will be required, as subsoil does not have sufficient nutrients to sustain plant growth; Topsoil placement should follow and topsoil should be applied to a depth of between 200 – 300mm; Shaping of the rehabilitated area should be done to achieve a landscape that emulates the surrounding natural landscape; Rehabilitation design should achieve a landscape that is free-draining; Shaping should be done in such a way to ensure slope stability and minimise the risk of soil erosion; a slope of between 18° and 24° is recommended; Areas that pose an erosion risk should be identified and designs should be amended to negate such risks; Revegetation of the area must be done as soon as possible; Indigenous vegetations must be used; It is recommended that a rehabilitation biologist be included in the process of vegetation selection; A qualified and competent person must monitor and assess the area for signs of soil erosion, compaction and the establishment of alien and invasive plant species; Corrective action must be taken if soil erosion or compaction is observed.		
LAND CAPABILITIES				
4.6	To facilitate successful rehabilitation.	A representative sample of the soil must be taken for analysis. At minimum the following elements are to be tested: EC, ECE, pH, Ca, Mg, K, Na, P, Zn, clay % and organic carbon. Based on the analysis, soil fertiliser must be applied to facilitate vegetation growth. Rehabilitated areas must be seeded with indigenous seed mix.	Environmental Manager	During rehabilitation
4.7		Assessing rehabilitation success at other Canyon Coal operations to refine current plan to ensure practical and successful measures are implemented.	Environmental Manager	During rehabilitation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
4.8		Discard dumps are to be capped to reduce infiltration of water.	Mine Manager	During rehabilitation
4.9		Discard dumps are to be vegetated and soil amelioration must be applied if difficult to vegetate. Dumps must also be landscaped to a stable slope.	Mine Manager	During rehabilitation
4.10		All infrastructure (conveyors, electrical, pipelines etc.) will be decommissioned and removed from site.	Mine Manager	During rehabilitation
4.11		The closure of both adits and ventilation shafts will entail the backfilling of available overburden, which was stripped during mining progression. A material balancing calculation has not been completed and therefore its assumed that enough material is available.	Mine Manager	During decommissioning
4.12		Closure of underground workings as soon as possible to reduce chances of AMD generation.	Mine Manager	During decommissioning
4.13		Grade and Rip Footprint Area. The final surface must be reshaped to simulate the topography of the surrounding landscape. This must be done to ensure the footprint area is free draining.	Mine Manager	During rehabilitation
4.14		Placement of 300 mm of topsoil The growth medium cover should be placed once backfilling has been completed. Topsoil replacement should be done as outlined in section 5.3 above.	Environmental Officer	During rehabilitation
4.15		Vegetation needs to be re-established on the footprint areas. Fertilizer and organic matter would possibly be required to support vegetation growth. Seeding of the area must then be undertaken. During vegetation is being established it might be necessary to include sacrificial erosion protection measures.	Environmental Officer	During rehabilitation
4.16		Access to the site needs to be restricted, until vegetation is re-established. All alien and invasive plants need to be removed.	Environmental Officer	During rehabilitation
4.17	Rehabilitation of the Processing Plant and Related Areas	All movable plant related infrastructure will be removed from the site. Demolition of foundations will be done to a suitable depth below ground level. All plant related conveyors should also be removed from site. Rubble associated with the demolition can be buried on site if it can be proven that it will not have a negative influence on water quality.	Mine Manger	During rehabilitation
4.18	Rehabilitation of the ROM & Product Stockpile Area	Embankments created during construction of the area will be levelled.	Mine Manger	During rehabilitation
4.19		All residual coal stockpiled material should either be removed from site or disposed of within the discard dump, if capacity allows.	Mine Manger	During rehabilitation
4.20		Removal of contaminated material The residual coal layer associated with the areas should be removed and disposed of on the discard dump or at a hazardous waste facility. Depth should be determined after a contaminated land assessment has been undertaken.	Environmental Officer	During rehabilitation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
4.21	Rehabilitation of the Slurry Dam and Discard Dump	Any residual sludge will be excavated from the slurry dam and disposed of on the discard dump. Once all this material is removed the plastic liner should be removed and disposed of at a hazardous waste facility. The walls of the slurry dam must then be flattened.	Environmental Officer	During rehabilitation
4.22		The discard dump must be sloped to an angle off no greater than 1:4. Once the area has been reshaped a suitable capping material should be placed and compacted to limit water infiltration.	Environmental Officer	During rehabilitation
4.23	Rehabilitation of the Stormwater Management Infrastructure	Any residual material will be excavated from the PCDs and disposed of on the discard dump. Once all this material is removed the plastic liner should be removed and disposed of at a hazardous waste facility. The walls of the PCD must then be flattened. All infrastructure associated with the PCD's should be demolished and removed.	Environmental Officer	During rehabilitation
4.24		All contaminated material should be removed from the clean and dirty water trenches. Contaminated material should either be disposed of on the discards dump or at a hazardous waste facility. All concrete material should also be demolished and removed. Berms created should be used to backfill trenches as far as practical.	Environmental Officer	During rehabilitation
4.25	Rehabilitation of the supporting Infrastructure	All movable infrastructure will be removed from the site. Demolition of foundations will be done to a suitable depth below ground level. Rubble associated with the demolition can be buried onsite; if it can be proven that it will not have a negative influence on water quality.	Mine Manger	During rehabilitation
4.26		Demolition of fuel storage, sewage treatment plant, substation and explosive magazine. Removal all tanks and contaminated material from the site. Ensure hazardous materials are disposed of at appropriated Hazardous waste facilities. All infrastructure must be removed from site. Concrete foundations and bunds must be demolished and removed and disposed of at Hazardous waste facilities. Contaminated land assessment to confirm whether no residue contamination occurred at these facilities.	Environmental Officer	During rehabilitation
4.27	Rehabilitation of the Railway Siding Infrastructure	Demolition of rail infrastructure; which includes rails, concrete sleepers, overhead electrical lines and signage.		During rehabilitation
4.28		All movable infrastructure will be removed from the site. Demolition of foundations will be done to a suitable depth below ground level. Rubble associated with the demolition can be buried onsite; if it can be proven that it will not have a negative influence on water quality.	Mine Manger	During rehabilitation
4.29		Any residual material will be excavated from the PCD and disposed of on the discard dump or at a hazardous waste disposal site. Once all this material is removed the plastic liner should be removed and disposed of at a	Environmental Officer	During rehabilitation

Ref. No.	Objective	Action	Responsibility	Time period for implementation
		hazardous waste facility. The walls of the PCD must then be flattened. All infrastructure associated with the PCD should be demolished and removed.		
4.30		All contaminated material should be removed from the clean and dirty water trenches. Contaminated material should either be disposed of on the discards dump or at a hazardous waste facility. All concrete material should also be demolished and removed. Berms created should be used to backfill trenches as far as practical.	Environmental Officer	During rehabilitation
4.31		Embankments created will be levelled.	Mine Manger	During rehabilitation
4.32		Remaining coal stockpiled material should be removed from the site.	Mine Manger	During rehabilitation
4.33		The residual coal layer associated with the areas should be removed and disposed of on the discard dump or at a hazardous waste facility. Depth should be determined after a contaminated land assessment has been undertaken.	Environmental Officer	During rehabilitation

5.5 POST CLOSURE

Ref. No.	Objective	Action	Responsibility	Time period for implementation
SOCIO-ECONOMIC				
5.1	To minimise the impacts of job loss.	Measures identified in the Social and Labour Plan for promoting portable skills for workers must be implemented.	Mine Manager	During decommissioning
GROUNDWATER				
5.2	To monitor contamination of groundwater due to discard dumps.	Lining of the discard dump. Alternative remedial options should be considered during the decommissioning phase, based on monitoring results. Dirty surface run-off should be pumped to dirty water dams. Suitable capping material should be used prior to topsoil replacement. The groundwater monitoring programme must be continued for the period stipulated by the relevant authorities (current proposed monitoring period by groundwater specialist is quarterly sampling for two years after mining closes).	Littlesnipe Pty Ltd	As agreed with authorities or quarterly for two years after mine closure
5.3	To mitigate the risk of flooding and possible decanting of mine	Increasing groundwater levels and groundwater quality should be monitored. Water levels should be managed below decant level. If polluted water reaches decant level, it must be treated to an acceptable quality before being discharged. Dirty surface run-off should be pumped to dirty water dams.	Littlesnipe Pty Ltd	During the post-closure phase
SURFACE WATER				

Ref. No.	Objective	Action	Responsibility	Time period for implementation
5.4	To reduce the risk of mine polluting groundwater and surface water.	No mitigation is recommended other than the monitoring of groundwater and surface water levels and quality. Water quality of the wetlands should also be measured.	Littlesnipe Pty Ltd	During the post-closure phase
WETLANDS				
5.5	Ongoing seepage and potential for decant from open pits and the discard dump and the pollution control dams post-closure	Implement monitoring programme to detect and determine the formation and/or extent of any potential groundwater pollution plume as per the groundwater management plan In accordance with the EIA/EMP, and any recommendations made in geohydrological specialist study. It is deemed essential that a redundant systems and excess capacity is ensured to ensure that at all times decant can be managed. At no time should decant water be allowed to be discharged untreated or not treated to the required standard to the receiving environment.	Littlesnipe Pty Ltd	During the post-closure phase
VISUAL				
5.6	Residual Discard dumps	The residual dump needs to be sloped and vegetated as soon as possible. This would ensure the residual visual aesthetics of the area is re-established and therefore improve the scenic quality.	Littlesnipe Pty Ltd	During the post-closure phase
LAND CAPABILITIES				
5.7	To monitor success of rehabilitation.	Success of rehabilitation is to be monitored for at least 3 years after decommissioning. Should rehabilitation not prove successful, a rehabilitation specialist must be included in the rehabilitation process.	Littlesnipe Pty Ltd	After decommissioning for a minimum of three years
5.8	To mitigate erosion on previously rehabilitated areas	• Regular monitoring of rehabilitated areas for soil erosion must be undertaken. • Revegetation must be undertaken as soon as erosion traits are identified. • Rehabilitated areas experiencing erosion hazards can be protected by an upslope berm and toe channel to divert water run-off to prevent erosion and transportation of sediments. • Alien and Invasive Management plan must be implemented.	Littlesnipe Pty Ltd	During the post-closure phase

6 FINANCIAL PROVISION

6.1 CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED WITH THE BASELINE ENVIRONMENT

The overall rehabilitation goal for Witfontein Mine is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amendable to the local habitat types that is suitable for the sustaining of cattle farming as the next land use over the mine site, post closure. The strategy to achieve this is provided in the Closure and Rehabilitation Report in Part A- Appendix 20 (EXM, 2017).

6.2 CONFIRMATION OF CONSULTATION OF CLOSURE OBJECTIVES WITH LANDOWNERS

The Environmental Impact Assessment Report and the Environmental Management Programme has been subjected to a public participation process in accordance with Regulations 41 of the EIA Regulations (GN. 982 of 4 December 2014). The rehabilitation plan compiled in terms of Appendix 3 of the Financial Provision Regulations (GN. 1147 of 20 November 2015) will be updated annually thereafter. This report will be made available for public review and comment on an annual basis.

6.3 REHABILITATION PLAN

A Closure and Rehabilitation Report is included in Part A- Appendix 20 (EXM, 2017). Witfontein Mine will submit an annual rehabilitation plan compiled in terms of Appendix 3 of the Financial Provision Regulations (GN. 1147 of 20 November 2015). In accordance with the regulations the rehabilitation plan will be updated annually.

6.4 EXPLAIN HOW THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES

The overall rehabilitation goal for Witfontein Mine (as indicated by EXM, 2017 in Part A- Appendix 20) is to undertake concurrent rehabilitation in order to stabilise to a land capability that is amenable to the local habitat types that is suitable for the sustaining of cattle farming as the next land use over the mine site, post closure.

6.5 QUANTUM OF FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT

The derivation of the Quantum of the Financial Provision is given in Appendix 20 of Part A. EXM conducted a detailed closure estimate for the planned new Witfontein Mine. The Closure Costing Report is provided as Part A- Appendix 20. Based on the information provided at the time of the assessment, the estimated financial provision required for the rehabilitation and

closure of the Witfontein Colliery is **R 28 301 948.54 (LOM) excl. VAT**. A summary of the financial provision estimate associated with the LoM of operations is included in the table below. Detailed sheets are provided in Appendix 20 of Part A.

TABLE 6-1: SUMMARY OF THE WITFONTEIN COLLIERY FINANCIAL PROVISION

Item	Description	Cost
1	Mining	R 8 982 848.30
2	Processing Plant and Related Areas	R 11 119 721.72
3	Stormwater Management Infrastructure	R 3 395 174.42
4	Supporting Infrastructure	R 3 059 349.52
5	Siding	R 1 744 854.58
6	**Latent Liability - Aftercare and Maintenance**	**R 1 098 515.32**
7	**Latent Liability – Post Closure Water Treatment**	**R 5 398 750.00**
Total		~~**R 28 301 948.54**~~ **R 34 799 213. 86**

6.6 CONFIRM THE FINANCIAL PROVISION WILL BE PROVIDED

The quantum of the financial provision for premature closure is updated on an annual basis. Witfontein Mine undertakes to submit an annual update of the financial provision in accordance with the Financial Provision Regulations (GN. 1147 of 20 November 2015).

7 MECHANISIMS FOR MONITORING COMPLIANCE

Witfontein Mine is to conduct environmental monitoring in accordance with this Environmental Management Programme and in accordance with the Environmental Authorisation.

7.1 WATER RESOURCE MONITORING

7.1.1 SURFACE WATER MONITORING

The objective of the surface water monitoring system is to ensure that the water management systems perform according to specifications, to act as an early warning system for pollution, to check compliance with license requirements and for reporting purposes. The objectives of these systems will be achieved if there is no impact (attributable to the proposed Witfontein Mining Project) on the in-stream and downstream fitness for use criteria.

Water quantity monitoring (water balance monitoring)

For efficient management of water on the site, a good understanding of the site water balance will be required. To achieve this, the following monitoring will be needed:

- Rainfall – to be measured daily on the site.

- Evaporation – this is not essential but would be useful for calibration of the water balance model.
- Dam water levels – to be measured weekly.
- Flows – including the following, to be measured weekly:
  - o Make-up water drawn from all systems (raw water and potable water).
  - o Water pumped from the mine workings.
  - o Water pumped to storage in the mine workings.
  - o Inflows to the Pollution Control Dams.
  - o Water pumped from the Pollution Control Dams.
  - o Water treated.
  - o Service water pumped to the underground workings.
  - o Dust suppression water.
  - o Sewage volumes.

Data management and reporting

The monthly report is an internal report which is used to keep records of changing water qualities at the site. The report will include:

- Dam levels and flow rates on site.
- Highlight significant issues that require immediate corrective/ preventative action.

The quarterly report may be submitted to DWS and consists of the following components:

- Brief compliance assessment description.
- Brief description of monitoring actions performed.
- Dam water level status report.
- Highlight significant issues that require immediate corrective/ preventative action.
- Historical and present source chemistry report.
- Time dependent graphs for the relevant water quality variables.

The annual report consists of all the active environmental components, and for the chapter on surface water, the following components should be included:

- System audit:
  - o Statutory/ regulatory requirements.
  - o Monitoring infrastructure.
  - o Data captured.
  - o Information generation.
  - o Management of system liquids.
- Data audit:

o Verification of data.

o Compliance interpretation using SANS 241 Drinking Water Standard and management unit objectives or water use licence requirements.

o Setting of new objectives or recommendation of corrective measures.

o Historical and present source chemistry report.

o Dam level status report.

Environmental Compliance audit

Annual audits should be carried out to determine the effectiveness of the water management systems that are in place. These should include a GN R704 audit.

7.1.2 GROUNDWATER MONITORING

Monitoring points

It is recommended that a monitoring plan be established that includes all the hydrocensus boreholes and the newly drilled boreholes, as well as the Piekespruit in the study area. It is advised that the monitoring programme be reviewed prior to the operation phase as to assess the monitoring network as some boreholes may have been damaged or destroyed during the construction phase. It is recommended that with the start of the construction phase groundwater and surface water quality and levels be monitored on a quarterly basis and bi-annual basis. The current monitoring plan should include the points and parameters as listed in the table below.

TABLE 7-1: PROPOSED MONITORING POINTS

Borehole / Pan	Coordinates		Monitoring frequency	Parameters (refer to Appendix 6 of Part A)
Newly drilled boreholes				
WF16-BH01S	33309.2	-2921126.5	Quarterly	a, c + water levels
WF16-BH01D	33314.6	-2921127.1	Quarterly	a, c + water levels
WF16-BH02S	33634.2	-2920529.2	Quarterly	a, c + water levels
WF16-BH02D	33634.7	-2920534.8	Quarterly	a, c + water levels
WF16-BH03S	34363.6	-2920703.8	Quarterly	a, c + water levels
WF16-BH03D	34367.7	-2920702.9	Quarterly	a, c + water levels
WF17-BH03P	33634.5	-2920525.6	Quarterly	a, c + water levels
WF17-BH04P	34359.3	-2920702.9	Quarterly	a, c + water levels
Hydrocensus boreholes				
HB4	34943.38	-2918870	Bi-annual	b + water levels
HB5	33826.59	-2919257	Bi-annual	b + water levels
HB6	31777.2	-2920729	Bi-annual	b + water levels
HB7	32137.95	-2920554	Bi-annual	b + water levels
HB8	30184.75	-2921362	Bi-annual	b + water levels
HB9	29995.6	-2922845	Bi-annual	b + water levels
HB10	29926.45	-2922789	Bi-annual	b + water levels
HB11	29348.92	-2923274	Bi-annual	b + water levels
HB12	28622.74	-2923337	Bi-annual	b + water levels
HB13	35330.17	-2920861	Bi-annual	b + water levels
Borehole on D.van der Westhuizen's farm near Piekespruit	Coordinates to be confirmed		Bi-annual	b + water levels
Surface water (Piekespruit)				
HUP	33466	-2920333	Quarterly	a, c + water levels
HDWN	34631	-2921552	Quarterly	a, c + water levels

Monitoring objectives

The objectives of the management action can be defined as:

- Identify, quantify and monitor groundwater flow in the vicinity of the mine;
- Identify, quantify and monitor all point and diffuse pollution sources and associated plumes on the mine; and
- These objectives should adhere to the requirements of being specific, measurable and feasible.

Monitoring parameters

All boreholes should be purged prior to sampling and it is recommended that the following constituents be included in the monitoring protocol (Table 7.2)

TABLE 7-2: MONITORING PARAMETERS FOR WITFONTEIN

Standard set of parameters (a)	Screening parameters (b)	Trace elements (c)
pH	pH	Ba
EC	EC	As
Ca	Total Alk	Co
Mg	NO_3(N)	Cr
Na	SO_4	Ni
K		Pb
Total Alk		Se
F		Zn
Cl		Mn
NO_2(N)		Cu
NH_4 (N)		Hg
NO_3(N)		
PO_4		
SO_4		
Al		
Fe		
Mn		

7.2 AIR QUALITY MONITORING

7.2.1 DUSTFALL NETWORK

Based on the impacts from the proposed project it is recommended that a dust fallout sampling network be implemented prior to operations in order to understand the baseline conditions and then during operations to ensure management measures implemented are effective and ambient standards are met at sensitive receptors in the area. A recommended dust fallout network is provided in Table 7.3. The recommended performance assessment and reporting programme for ambient air sampling is given in Table 7.4.

TABLE 7-3: RECOMMENDED DUST FALLOUT AND PM10 SAMPLING FOR THE PROPOSED PROJECT

Sampler	WGS 84		Description
	X	Y	
Dust bucket 1	733503.6	7078797.4	At closest sensitive receptor to north of operations
Dust bucket 2	734691.7	7078033.6	At closest sensitive receptor to south of operations
Dust bucket 3	732923.7	7077722.5	Downwind of product storage pile and crushing activities
Dust bucket 4	732570.2	7077156.8	Downwind of waste storage pile
Dust bucket 5	736558.6	7075459.6	Along access road coincident with a receptor
Dust bucket 6	743139.1	7072651.5	Near rail siding coincident with one of the closest receptors
PM_{10} sampler	733503.6	7078797.4	At closest sensitive receptor to north of operations

TABLE 7-4: AMBIENT AIR MONITORING, PERFORMANCE ASSESSMENT AND REPORTING PROGRAMME

Monitoring Strategy Criteria	Dustfall Monitoring
Monitoring objectives	- Assessment of compliance with dustfall limits within the main impact zone of the operation. - Facilitate the measurement of progress against environmental targets within the main impact zone of the operation. - Temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation. - Tracking of progress due to pollution control measure implementation within the main impact zone of the operation. - Informing the public of the extent of localised dust nuisance impacts occurring in the vicinity of the mine operations.
Monitoring location(s)	It is recommended that a dust fallout network be implemented consisting of six dust buckets (Figure 5-1).
Sampling techniques	*Single Bucket Dust Fallout Monitors* Dust fallout sampling measures the fallout of windblown settle able dust. Single bucket fallout monitors to be deployed following the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical container exposed for one calendar month (30 days, ±2 days).
Accuracy of sampling technique	Margin of accuracy given as ±200 mg/m^2/day.
Sampling frequency and duration	On-going, continuous monitoring to be implemented facilitating data collection over 1-month averaging period.
Commitment to QA/QC protocol	Comprehensive QA/QC protocol implemented.
Interim environmental targets (i.e. receptor-based performance indicator)	Maximum total daily dustfall (calculated from total monthly dustfall) of not greater than 600 mg/m^2/day for residential areas. Maximum total daily dustfall to be less than 1 200 mg/m^2/day on-site (non-residential areas).
Frequency of reviewing environmental targets	Annually (or may be triggered by changes in air quality regulations).
Action to be taken if targets are not met	(i) Source contribution quantification. (ii) Review of current control measures for significant sources (implementation of contingency measures where applicable).
Procedure to be followed in reviewing environmental targets and other elements of the monitoring strategy (e.g. sampling technique, duration, procedure)	Procedure to be drafted in liaison with I&APs through the proposed community liaison forum. Points to be taken into account will include, for example: (i) trends in local and international ambient particulate guidelines and standards and/or compliance monitoring requirements, (ii) best practice with regard to monitoring methods, (iii) current trends in local air quality, i.e. is there an improvement or deterioration, (iv) future development plans within the airshed (etc.)
Progress reporting	At least annually to the necessary authorities and community forum.

FIGURE 7-1: PROPOSED DUST FALLOUT NETWORK FOR THE PROPOSED PROJECT

7.2.2 PM10 SAMPLING

It is recommended that PM10 sampling campaign of 12 months be undertaken (to obtain daily PM10 concentration averages) at the closest receptors to the north of mining operations and the south of the railway siding once proposed mitigated operations commence in order to ensure that NAAQS are being met. The PM10 sampling can be undertaken by inexpensive sampling equipment such as a MiniVol or EBam or more expensive equipment such as a TEOM.

7.3 NOISE MONITORING

An environmental noise monitoring campaign should be conducted once during construction and annually during the operational phase, at the following NSRs: NSR1, NSR3, NSR4, NSR10, NSR16 and NSR23 (Figure 7.2). Also, In the event that noise related complaints are received, short term (24-hour) ambient noise measurements should be conducted as part of investigating the complaints. The results of the measurements should be used to inform any follow up interventions. The following procedure should be adopted for all noise surveys:

- Any surveys should be designed and conducted by a trained specialist.
- Sampling should be carried out using a Type 1 SLM that meets all appropriate IEC standards and is subject to annual calibration by an accredited laboratory.
- The acoustic sensitivity of the SLM should be tested with a portable acoustic calibrator before and after each sampling session.
- Samples of at least 24 hours in duration and sufficient for statistical analysis should be taken with the use of portable SLM's capable of logging data continuously over the time period. Samples representative of the day- and night-time acoustic environment should be taken.
- The following acoustic indices should be recoded and reported: LAeq (T), LAleq (T), statistical noise level LA90, LAFmin and LAFmax, octave band or 3rd octave band frequency spectra.
- The SLM should be located approximately 1.5 m above the ground and no closer than 3 m to any reflecting surface.
- Efforts should be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g. wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet.
- A detailed log and record should be kept. Records should include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site.

The investigation of complaints, should include an investigation into equipment or machinery that likely result or resulted in noise levels annoying to the community. This could be achieved with source noise measurements.

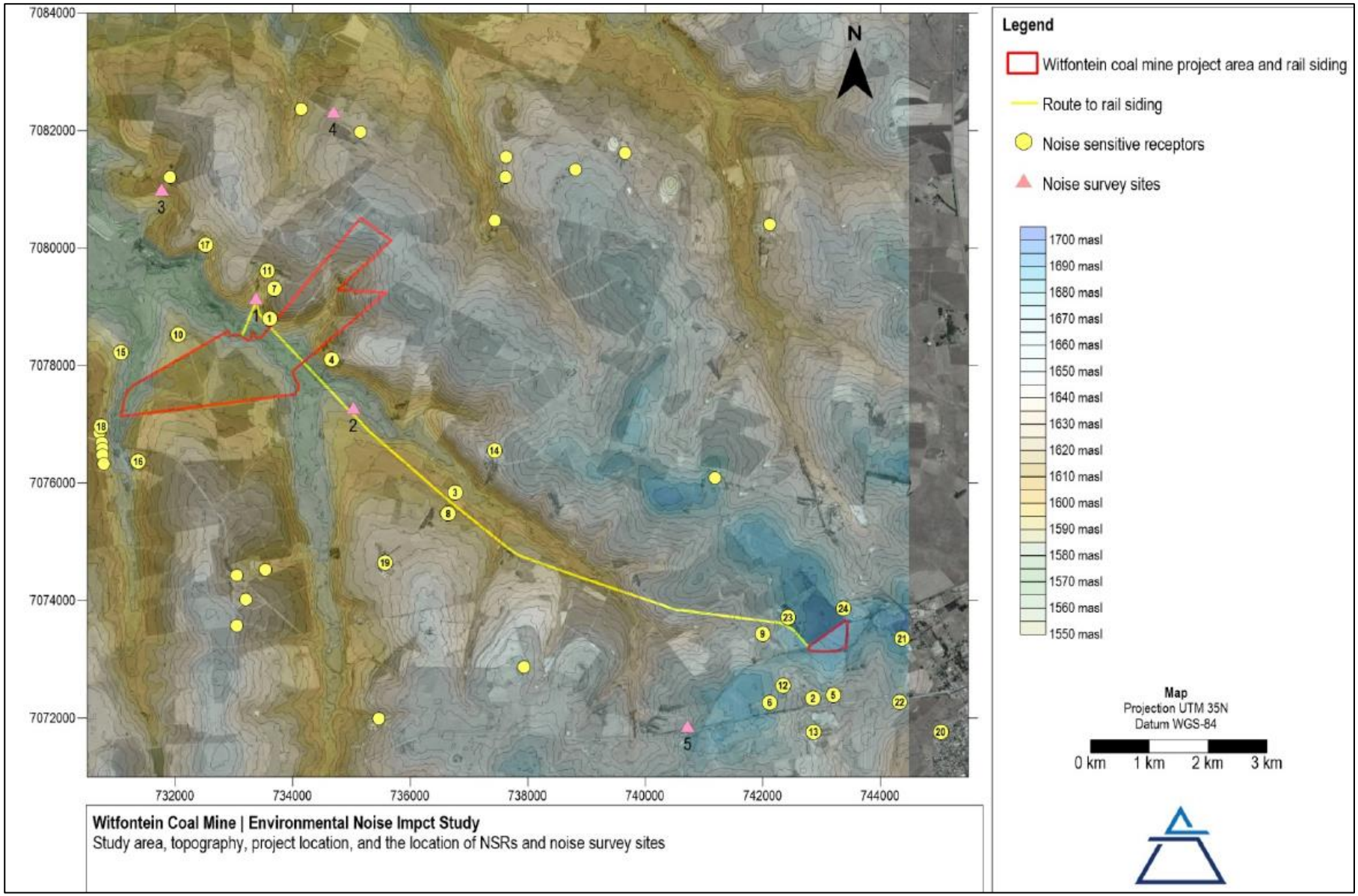

FIGURE 7-2: LOCATION OF NSRS AND NOISE SURVEY SITES

7.4 BIODIVERSITY MONITORING

7.4.1 FAUNAL MONITORING

It is recommended that a faunal monitoring plan should be designed and implemented throughout all phases of the mining development, should it be approved. The following points aim to guide the design of the monitoring plan, and it must be noted that the monitoring plan must be continually updated and refined for site-specific requirements:

- Permanent monitoring points must be established in areas surrounding the surface infrastructure. These points must be designed to accurately monitor the following parameters:
  - Species diversity (mammal, invertebrate, amphibian, reptile and avifaunal);
  - Species abundance; and
  - Faunal community structure including species composition and diversity, which should be compared to pre-development conditions.
- The following methods aim to guide the monitoring plan, although more detailed, site specific methods must be employed during the development and implementation of the monitoring plan:
  - Monitoring activities must take place on an annual basis as a minimum, but on a bi-annual basis for avifauna;
  - Annual walk down of all water sources within a radius of 1km of infrastructure areas must be done, as the water course will be used as migratory corridors by faunal species. All spoor, scat and signs of faunal species occurrence must be identified and recorded with a relevant GPS point taken; and Sherman traps must be installed to monitor small mammal diversity.
- The following criteria must be used with regards to the avifaunal monitoring:
  - Fixed and random points for bird counts to determine species composition and diversity trends. At these points, the observer must record all avifaunal species and total of species observed at the point. A Bird Lasser app that can be downloaded onto a smartphone can assist with record keeping, all necessary information can be captured; and
  - Proposed avifaunal fixed-point monitoring must be monitored bi-annually (July and February) in order to record summer as well as winter avifaunal species utilising the area.
- The results of the monitoring activities must be taken into account during all phases of the proposed mining development and action must be taken to mitigate impacts as soon as the negative effects from mining related activities become apparent; and
- The method of monitoring must be designed to be subjective and repeatable in order to ensure consistent results.

7.4.2 FLORAL MONITORING

It is recommended that a floral monitoring plan should be designed and implemented throughout all phases of the mining development, should it be approved. The following points aim to guide the design of the monitoring plan, and it must be noted that the monitoring plan must be continually updated and refined for site-specific requirements:

- Permanent monitoring plots must be established in areas surrounding the surface infrastructure and rehabilitated areas. These plots must be designed to accurately monitor the following parameters:
  - Measurements of crown and basal cover;
  - Species diversity;
  - Species abundance;
  - Impact of dust on flora;
  - Recruitment of indigenous species;
  - Alien vs. Indigenous plant ratio;
  - Recruitment of alien and invasive species;
  - Erosion levels and the efficacy of erosion control measures;
  - Vegetation community structure including species composition and diversity which should be compared to pre-development conditions; and
  - Presence, abundance and condition of floral SCC communities.
- Monitoring of rehabilitation trials in light of the above parameters must also take place throughout all phases of the proposed mining development and for a period of 5 years after decommissioning and closure;
- The rehabilitation plan must be continuously updated in accordance with the monitoring results in order to ensure that optimal rehabilitation measures are employed;
- Results of the monitoring activities must be taken into account during all phases of the proposed mining development and action must be taken to mitigate impacts as soon as negative effects from mining related activities become apparent; and
- The method of monitoring must be designed to be subjective and repeatable in order to ensure consistent results.

7.4.3 AQUATIC MONITORING

Close monitoring of water quality (surface water, groundwater and process water) must take place. Monitoring of water quality should take place at a minimum frequency of once a month (when surface water is present) during which time major salts and basic metals, are monitored along with basic parameters such as pH, Total Suspended Solids (TSS) and Total Dissolved Solids (TDS), dissolved oxygen and Electrical Conductivity (EC). Specific mention is made of the need

to monitor concentrations of fluoride in the groundwater resources. Should EC or pH values reach an undesirable level, suitable mitigation measures should be implemented.

An extensive monitoring programme will need to be implemented to track the cone of depression on an ongoing basis for the life of the mine, and suitable mitigation measures will be required to protect surface water recharge in the vicinity of the proposed development. Monitor all potentially affected riparian zones for changes in riparian vegetation structure.

Detailed monitoring must be implemented and maintained to ensure that all water usage is continuously optimised.

The monitoring of aquatic communities such as macro-invertebrates and fish within aquatic systems vary over season, and other factors such as weather play a vital role when field studies are conducted. It is thus crucial to implement a regular monitoring strategy, which will increase the data set and understanding of the aquatic community within the linked surrounding aquatic systems in the vicinity of the proposed mining area. It is recommended that ongoing aquatic ecological monitoring should take place on a bi-annual basis by an SA RHP Accredited assessor, in order to identify any emerging issues in the receiving environment.

A baseline toxicological assessment of the groundwater and surface water resources should take place before commencing with the proposed mining project. Toxicity testing of the proposed mining project's dirty water facilities, the groundwater and surface water resources present should take place quarterly and concurrently with the biomonitoring program, in order to monitor the toxicological risk of the process water system to the receiving environment and in particular the groundwater resources. These ongoing toxicological tests should be compared to baseline data to monitor and manage any emerging impacts over time. Tests should include the following test organisms as a minimum:

- *Vibrio fischeri;*
- *Daphnia pulex*; and
- Algal Growth Potential;

Regular monitoring of the groundwater resources is deemed critical, so as to promote early identification and mitigation of any arising issues and impacts.

A wetland monitoring programme should be implemented and maintained for the life of the proposed Witfontein mining project, with emphasis on the management of edge effects and loss of wetland habitat.

Monitoring of downgradient water resources should indicate whether contamination is escaping from site. In the case of contamination being detected, the mine must install interception boreholes to remove and clean contaminated water prior to release in the wetlands downgradient of the site.

Implement monitoring programme to detect and determine the formation and/or extent of any potential groundwater pollution plume as per the groundwater management plan in accordance with recommendations made in geohydrological specialist study. Drilling of groundwater monitoring boreholes into the underground workings to monitor water levels and quality as the groundwater rebounds.

8 SUBMISSION OF ENVIRONMENTAL COMPLIANCE AUDITS

Performance Assessments/Compliance Audits will be compiled and submitted in accordance with legislative requirements (as applicable at the time) including:

(1) Regulation 34 of the EIA Regulations (GN. 982 of 4 December 2014);
(2) Regulation 55 of the Minerals and Petroleum Resource Development Act.

9 ENVIRONMENTAL AWARENESS PLAN

9.1 ENVIRONMENTAL INDUCTION TRAINING

The purpose of the induction training is to promote a general awareness of the sensitivity of the environment, the legal commitments and the aspirations of Littlesnipe in terms of environmental management and the environmental consequences of individual actions. Induction is applicable to all employees, contractors and service providers that will be working within the mining area.

Environmental Induction for Employees and Service Providers

The induction training for employees, contractors and service providers is to take the form of a presentation including:

- A description of environmental sensitivities in the Witfontein Project environment.
- A description of environmental legal requirements and Littlesnipe's commitment to comply with these requirements;
- A description of broad-based objectives of environmental management at Witfontein Mine;
- A discussion of how individual actions can impact on the environment;

- A discussion of how individual actions can assist in the successful implementation of the environmental management programme (EMP);
- The Code of Conduct.

All employees are to sign that they have understood and will comply with the Code of Conduct. Employees are to be re-inducted on an annual basis (after returning from their annual leave).

Requirements

- Environmental induction material (posters, power point presentations etc.);
- Code of Conduct;
- Register of inducted employees, service providers and contractors.

9.2 GENERAL ENVIRONMENTAL AWARENESS PROGRAMME

The purpose of the general environmental awareness programme is to promote ongoing environmental awareness amongst the workforce. It will focus on addressing particular environmental issues which have been identified as problematic through the Performance Assessment Programme and EMP compliance monitoring. All members of Witfontein's workforce and contractors are to be incorporated into the general environmental awareness programme.

Monthly Environmental Topics

A monthly environmental awareness topic is to be chosen by management based on the outcomes of internal audits as well as topics of general environmental interest. The topic is to be communicated to the workforce through:

- Discussions at all SHE meetings (to be itemised on the agenda).
- Posters on notice boards.

Monthly environmental topics could include:

- What is the environment;
- The Witfontein environment;
- You and the environment;
- The Code of Conduct;
- Reporting environmental incidents;
- Environmental risks;
- Environmental emergency training;
- Preventing and cleaning up spills;
- Reduce, reuse and recycle;
- General versus hazardous waste;
- Alien vegetation control;
- Saving water;
- Saving energy;
- Historical sites.

Requirements

- Environmental topics to be included on the agenda of relevant meetings;
- Environmental awareness material to be produced and posted.

9.3 JOB SPECIFIC ENVIRONMENTAL AWARENESS TRAINING

The purpose of the job specific environmental awareness training is to ensure that employees within the specific management units are equipped to implement the actions committed to in the EMP. All members of Witfontein's workforce are to be subject to job specific environmental training. This training is to undertaken by the managers of each of the management units. Supervisors will be trained to assist with the implementation and training of the work force.

Environmental Risk Identification

The environmental risks associated with each management area are to be identified by the manager and supervisors together with the technical services manager. The risks are to be documented and actions to reduce these risks should be developed. The actions are to ensure overall compliance with the commitments of the EMP. The findings of the performance assessment audits and EMP compliance monitoring will assist in identifying risks.

Training

All members of the workforce (mining, plant workers, administration etc.) are to be subject to job specific training. This may include but not be limited to:

- Preventing pollution;
- Spill prevention and clean-up procedures;
- The location and purpose of material safety data sheets (MSDSs)
- Managing waste;
- No-go areas;
- Incident reporting.

The aspects to be covered however are dependent on the findings of the individual risk assessments. This is to be undertaken for each management area initially. Thereafter all new members of the workforce are to undergo environmental training as part of the training required to do their particular job.

Corrective Action

- Any actions undertaken by a worker that pose a risk to the environment are to be stopped immediately.
- The worker is to be instructed in how to correct the action.

- Non-compliance is to be incorporated into the standard disciplinary procedure applicable to Witfontein.

Requirements

- Risk assessment and action plan for each area at Witfontein.
- Training of the workforce within each management area.
- Training of new members of the workforce.
- Records of appropriate training conducted.

9.4 COMMUNITY COMMUNICATION AND AWARENESS

The purpose of the external communication and awareness programme is to:

- Inform neighbouring and nearby landowners and land users of the environmental risks associated with operations at Witfontein Mine.
- Inform and update interested and affected parties regarding environmental issues and monitoring undertaken.
- Provide a forum for communication of issues.

External communication is to include residents and land users on neighbouring and nearby farms, registered interested and affected parties, and interested authorities.

Notification of residents within 500m of the mine

Residents within 500m of the Witfontein Mine (owners and / or users of these areas) are to be notified if the mine is doing surface blasting or if the mine has an incident that may affect them. These landowners are to be informed telephonically before blasting takes place. A register will be kept of who has been notified of the risk.

Complaints Register

A complaints register is to be kept at the office within each section for the registration of internal complaints by employees and contractors. External persons will be able to officially register their complaints in a register kept at a readily accessible point (e.g. the main office at Witfontein). Complaints are to be followed up by the appropriate manager and the person is to be notified (preferably in writing) of how the complaint has been addressed. Complaints can also be received by facsimile, mail or e-mail and all registered interested and affected parties will be notified of the contact details.

Notification of Interested & Affected Parties

Registered interested and affected parties are to be provided with contact details for the mine and encouraged to direct their queries through this preferred channel of communication.

Participation in Local Environmental Forums

Witfontein personnel will participate in any relevant forums in the District or Local Municipality, with regard to issues at the mine or in the area.

Requirements

- Register of interested and affected parties.
- Internal complaints registers at each section.
- External complaints register at the main office.

10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

None applicable.

11 UNDERTAKING

I, **Kerry Colleen Fairley and Shelley Seton-Rogers**, acting as the independent environmental assessment practitioners hereby confirm:

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from specialist reports, where relevant; and
- The acceptability of the project in relation to the finding of the assessment and the level of mitigation proposed.

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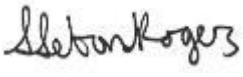
Kerry Colleen Fairley

Environmental Assessment Practitioner

Pr.Sci. Nat.

AND



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Shelley Seton-Rogers

Senior Environmental Scientist

BSc Hons (Zoology)