



ENVIRONMENTAL MANAGEMENT PLAN

for the
Proposed Construction of an Access Road
by
Limpopo Coal Company (Pty) Ltd
on the farms
Erfrust 123 MS and Bergen Op Zoom 124 MS.

Vhembe District
Limpopo Province

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Compiled by: Dubel Integrated Environmental Services

Compiled for: Limpopo Coal Company (Pty) Ltd

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This report contains the Environmental Management Plan for the proposed construction of a new access road by Limpopo Coal Company (Pty) Ltd on the farms Erfrust 123 MS and Bergen op Zoom 124 MS in the Vhembe District.

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This serves to confirm that Mr. Gawie Nel (director of Dubel CC) with the assistance of Lizanne Nel (employees of Dubel CC) has compiled this BA and EMP and has managed the Environmental Impact Assessment process acting as the Environmental Assessment Practitioners. Mr. Gawie Nel has a B.Sc. Honns. Wildlife Management (1988) obtained from the University of Pretoria, has been working as an ecologist the past 19 years, and is a member of The Southern African Institute of Ecologists and Environmental Scientists (SAIE&ES). Lizanne Nel has a B.Sc. Honns. Wildlife Management (1988) and an MBA (2006) - University of Pretoria and has been working as a Nature Conservation Scientists and Manager for 19 years.

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Activity for which an EMP is submitted		
Government Notice R386	1(m)	The construction of facilities or infrastructure, including associated structures or infrastructure, for any purpose in the one in ten year flood line of a river or stream, or within 32 meters from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including i) canals; ii) channels; iii) bridges; iv) dams; and v) weirs.
Government Notice R386	12	The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
Government Notice R386	15	The construction of a road that is wider than 4 meters or that has a reserve wider than 6 meters, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 meters long.

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1. Environmental Management Plan

1.1. Introduction

This Environmental Management Plan should be read with the Basic Assessment Report for the proposed access road construction for Vele Colliery as all relevant background information is contained in the Basic Assessment Report, including the following:

- Locality, layout and reference maps
- The Public Participation Process followed for the environmental assessment and inputs into the EMP
- Legal framework within which the environmental assessment was done and the EMP developed

The economically viable coal reserve to be mined by the planned Vele Colliery is estimated at more than 441 million tonnes. The ROM coal produced by the colliery will be beneficiated on site and transported off-site to be sold on both the local and export markets. Three conveying systems have been evaluated by Limpopo Coal Company (Pty) Ltd to transport the product to Musina, from where it will be distributed to inland and export clients via rail. These include road transport, conveyor system and a railway line.

However, further assessments need to be performed by Limpopo Coal Company (Pty) Ltd to determine the most viable long-term conveying option and for the interim (first 5 years of mining), road transport will be used to haul the product to Musina.

Travelling between the project site and Musina will take place when workers living in town travel to the mine and back to town on a daily basis. Any product and service deliveries to support domestic as well as industrial activities on the mine site will also require service providers to travel from town to the project site and back. In the short-term haul trucks will transport the coal by road from the proposed Vele Colliery to the nearest rail siding in Musina and return via the same road. Travelling from Musina to the proposed Vele Colliery, approximately 43 kilometres, and back to town will be via the existing R572 road. No proper access road however exists to travel from the R572 to the proposed mining area (plant area).

For these purposes, road infrastructure construction will be required and a newly build access road from the R572 to the proposed plant area is needed. Even if a different conveying system for the product is implemented, transportation of workers and product and service deliveries will continue in the long term and access to the mining area is necessary.

A new access road is therefore planned from the tar road (R572), between Musina and Pont Drift, on the farm Erfrust 123 MS to the proposed plant area of the proposed Vele Colliery on the farm Bergen Op Zoom 124 MS north of the farm Erfrust.

An Environmental Management Plan was developed specifically for the access road, giving consideration to organisational structures, responsibilities, operational measures and resources to implement environmental regulations and environmental policy and to monitor and control performance. It is flexible enough to account for the specific realities of a licensed coalmine. The EMP for the access road has also been aligned with the EMP (May 2009) that was developed for the mine license application submitted to the Department of Mineral Resources (DMR).

The environmental management recommendations provided here can be implemented through procedures and the EMS as stipulated in the EMP (May 2009) and described in section E6 of the BAR.

1.2. Methodology

Applicable information in the specialist's reports contained in the EMP that was developed for the mine license application submitted to the DMR (May 2009) served as basis for the information and impact assessments in the Basic Assessment process and report. The mentioned EMP itself was also used as reference document. Information was also obtained through other sources (mine planners etc.) and directly from managers.

1.3. Assumptions and Limitations

It is assumed that:

- A mining license will be issued for the proposed Vele Colliery as the access road is for the purpose of construction and operation of the mine only.
- The applicant has the inclination, sufficient resources and capacity to address all proposed environmental considerations throughout development and operation of the proposed facility.
- Professionals and material of high standard and integrity was used during baseline studies, assessments and environmental impact determinations for activities for the proposed Vele Colliery and would be used during construction and operation of the access road to ensure no defaults.
- Environmental considerations are included in all management decisions for the proposed access road and Vele Colliery and those measures, procedures and standards developed are communicated to all personnel with performance measurement systems in place to monitor compliance.
- That all other legal requirements as it may be relevant to this development will be complied with.
- The monitoring programme for the mine and reference to "mining", as included in the EMP (May 2009) for Vele Colliery and attached to this EMP, include both monitoring for the mine and related activities such as the access road.

Limitations:

- Although specialist studies and reports conducted for the Vele Colliery addressed many issues associate with the mining activities and thus the access road directly or indirectly, some specific aspects were not addressed in detail. For instance, foreseen employment, including local employment, for the mine is addressed but detailed information on employment specifically for the access road is not provided. This is also understandable because these studies were not specifically aimed at this activity, which is only one small activity in comparison to the larger more significant activities related to the Vele Colliery project.

1.4. Monitoring and reporting

A comprehensive monitoring system was developed for Vele Colliery, which includes a detailed environmental monitoring system and an implementation, auditing and reporting protocol (Table 2.8. in the EMP for Vele Colliery). This system is included in this EMP as table 5.

The objective of this environmental monitoring system is to:

- Prevent and/or minimize the environmental impact associated with the proposed mining operation
- Ensure that the environmental management system at Vele perform according to specifications
- Ensure conformance with the environmental objectives
- Ensure timeous implementation of the environmental strategies and implementation programme
- Act as a pollution early warning system
- Obtain the necessary data required to address knowledge gaps
- Check compliance with license requirements
- Ensure consistent auditing and reporting protocols

A proper data management system will be set up to facilitate trend analyses and preparation of reports. All the monitoring data will be collated and analysed on an annual basis and included in management reports.

It must be noted that the monitoring programme is a dynamic system changing over the different life cycle phases of the mine. The programme will be reviewed on an annual basis and revised if necessary.

In addition, EMP performance assessments, as required in terms of the Mineral and Petroleum Resources Development Act (MPRDA) will be performed on a biennial basis and submitted to the Department of Mineral Resources for distribution to other relevant authorities.

1.5. Planning and Design Phase

Table 1:1 Potential impacts of the proposed development during the planning and design phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures (Already implemented in planning and design phase are in bold)
Social Issues	Social and Socio-Economic	<p>Additional financial expenditure for the client.</p> <p>Poor alignment or integrated development planning with regard to related developments.</p> <p>Poor alignment with regional and international development frameworks.</p> <p>Poor consultation with interested and affected parties.</p> <p>Oversight of potentially important risks and impacts.</p> <p>Lack of local beneficiation.</p>	<ul style="list-style-type: none"> → Conduct planning phase parallel to the BA process and implement mitigation measures into planning and design. → Public participation and consultation with interested and affected parties and relevant authorities that were involved in related development of Vele Colliery. → Consider the most suitable road for construction as the option with the least potentially negative impacts on surrounding local communities and the environment while having cost savings. → Consideration of relevant regional planning instruments such as the Integrated Development Plan of the relevant municipalities, Transfrontier Conservation Plan and the Vhembe Biosphere Report, especially for decommissioning of the road. → Collaboration between the EAP, other specialist and mine managers / planners to align planning and designs with existing environmental features and specialist inputs. Consideration of relevant specialist reports and EMP (May 2009) for the proposed Vele Colliery. → Align all linear infrastructure developments as applicable and possible (such as power supply, water supply, and communication infrastructure) from the outside of the proposed mine development area to the planned mine, along the access road in a parallel servitude. → Construction workers will be housed offsite thereby addressing social and basic needs, security risks and alleviate environmental pressure. → Environmental awareness programmes should be conducted and be incorporated and aligned with the overall environmental awareness programmes of the planned Vele Colliery to make construction workers aware of the importance of environmental friendly practices and prohibited activities such as collection of wood etc. → Use of qualified professional in the required disciplines for planning and design. → Where possible, either temporary or permanent workers should be sourced from the immediate neighbouring communities that are legal residents in South Africa, through all phases of the development. → Where expertise and capacity is not available, empowerment models where local capacity is developed through partnerships should be considered. This principle should also apply where possible, to sourcing of supplies through all phases of development.
	Culture and Heritage	Cultural resources and heritage value may be damaged / reduced	→ Conducted a heritage impact assessment to identify heritage resources and to limit possible negative impacts.
Transport,	Traffic Flows and	Impact on local traffic flows	→ Design and construct an alternative access road to that being used by local landowners.

Traffic and Access	Access	Poor accessibility from the R572	<ul style="list-style-type: none"> → The access point to the R572 must be a full access point. → Provision should be made for safe egress and turnoff from and onto the R572 road. → No access of any adjacent landowner to their property or to the R572 will be blocked at any stage during the development.
	Safety	Increased road safety risk on the planned access road and the R572.	<ul style="list-style-type: none"> → An environmental emergency procedure should be developed to ensure that environmental incidents, such as for instance oils spills or fires resulting from traffic utilising these roads are addressed immediately and effectively. → Reflectors and road signs should be placed at strategic positions (e.g. before drainage line crossings) according to prescriptions from the relevant authority before any construction activity starts to alert road users and pedestrians of potentially dangerous situations. → Implement speed limits of 60 km/h on the access road and 80 km/h on the R572.
	Air quality & Noise	Increased noise and particle pollution risk resulting from mine traffic on the access road.	<ul style="list-style-type: none"> → Traffic on the access road should not be allowed to stop thereby decreasing noise impact, emissions, fuel consumption etc. → Loads should be covered to avoid loss of material in transport, especially if material is transported offsite. → The access road surface must be tarred.
Road Construction	Design and planning of road	<p>Poor planning and road design may impact negatively on the environment due to run-off causing erosion or damage to sensitive habitats and species.</p> <p>Poor road surface design may result in particle pollution and increased noise pollution.</p>	<ul style="list-style-type: none"> → Implement the environmental management recommendations provided in this EMP through procedures and the EMS as stipulated in the EMP (May 2009) and described in section E6 of the BAR. → The road should comply with the minimum safety and construction requirements for the anticipated traffic loads. → Road design is to match the functional requirements in order to be practical whilst minimising construction costs.
Water	Water resources	Limited water resources may be available for the development.	<ul style="list-style-type: none"> → An application must be lodged with the Department of Water Affairs (DWA) for the drainage line crossings. → Civil engineers must design the road and drainage line crossings to allow for sufficient stream flow and limit erosion potential, to satisfy requirements of DWA. → Debris accumulation should be monitored and cleared when needed. → A qualified civil engineer must design the road and storm water.
	Change in flow and drainage	<p>Stream flow and drainage patterns may be impacted on as a result of poor road design or siltation.</p> <p>Negative impacts on the integrity of the environment through increased siltation and the accumulation of debris.</p>	

Biodiversity and Environment	Habitat Loss and Degradation	<p>Habitat degradation as a result of the road traversing through sensitive area / species and potential siltation of rivers.</p> <p>Poor design may increase the risk for habitat destruction.</p> <p>Lack of planning for solid waste may pose a risk for water resources, soils and health.</p>	<p>→ An ecologist has conducted an assessment of potential impacts, including rare and threatened plant and animal species and the route with the least environmental impact was recommended and mitigation measures were identified to implement during all phases of the project.</p> <ul style="list-style-type: none"> - Realign road to bypass the large <i>A. digitata</i> (baobab) on a safe distance of 50m on alternative 1 on the farm Erfrust. - More threatened flora species and habitats occur on alternative 2 and are not regarded as the preferred alternative from a biodiversity point of view. <p>→ The contractor/s and crew should be sensitised about the threatened plant species as well as sensitive areas along the planned road and a suitable qualified person should point them out to them before construction commence.</p> <p>→ The road surface will be tarred to prevent air pollution through dust.</p> <p>→ Planning of relocation and relocation of threatened species, such as <i>A. digitata</i>, should be conducted before construction commences.</p>
	Species conservation	Rare and threatened species can be injured or disturbed.	
	Ecosystem functioning	Degradation/ modification of critical ecosystem functioning components.	

Table 1: 2 Potential cumulative impacts of the proposed development during the planning and design phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures (Already implemented in planning and design phase are in bold)
Social Issues	Social and Socio-Economic	<p>The planned access road will increase the overall footprint of Vele Colliery and the related impacts mentioned within this EMP along the linear line of the access road.</p> <p>Road users may develop negative perceptions towards the client if their concerns are not entertained throughout the projects life.</p>	<ul style="list-style-type: none"> → Public participation and consultation with interested and affected parties and relevant authorities that were involved in related development of Vele Colliery. → Collaboration between the EAP, other specialist and mine managers / planners to align planning and designs with existing environmental features, specialist reviews as reflected in specialist reports and the EMP for the proposed Vele Colliery. → A complaints register must be kept on site where the public can register all complaints. → Complaints must be addressed within 72 hours and steps taken indicated in the complaints register. → Management of complaints will be incorporated into the Environmental Management System (EMS) as well as through communication procedures as stipulated in the Vele Colliery EMP (May 2009) and outlined in section E6 of the BAR.
Transport, Traffic and Access	Traffic Flows and Access	<p>The increase in mine traffic on the access road will lead to increased traffic flows on the R572</p>	<ul style="list-style-type: none"> → No work must commence that affects public roads until all agreed traffic safety measures as required by relevant authorities, including Roads Agency Limpopo (RAL) has been implemented. → Strict safety measures, such as speed limits for heavy trucks, should be developed and agreed with RAL to reduce the safety risk of the increased traffic on the R572. → Alternative options for transport of coal on the R572 should be investigated and considered for implementation within 5 years.
	Safety	<p>Increased traffic on the R572 may increase the safety risk of all road users on the R572.</p> <p>The R572 was initially not build to carry the expected increase in heavy traffic loads and the condition of this road might deteriorate over time causing an increased safety risk and social impacts as prolonged travelling time.</p>	<ul style="list-style-type: none"> → An agreement between Roads Agency Limpopo and the applicant must be reached and recorded in writing with regard to the maintenance of the road surface and drainage structures on the R572 before development commence.

1.6. Construction Phase

Table 2:1 Potential direct impacts of the proposed development during the construction phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Social Issues	Social and Socio-Economic	New job opportunities will be created	<ul style="list-style-type: none"> → Where new jobs are created either temporary or permanent, legal residents from the immediate neighbouring communities should be the first choice when sourcing takes place through all phases of the development. → Where expertise and capacity is not available, empowerment models where local capacity is developed through partnerships should be considered. This principle should also apply where possible, to sourcing of supplies through all phases of development.
	Sense of Place	<p>The access road may negatively impact on the aesthetics of the area and its ambience.</p> <p>The continued activity of mine traffic may result in visual intrusion.</p> <p>Signage for and on the access road may cause visual intrusion for road users on the R572.</p>	<ul style="list-style-type: none"> → Although the access road falls entirely within the property of the client with some visibility from adjacent landowners, all efforts should be made to limit the impact on the aesthetics of the area. → No vegetation should be removed outside a 2 meter road reserve on either side of the road. → Within the 2 metre road reserve, shrubs and trees may be removed if necessary for safety purposes, but to prevent erosion, grasses should not be removed. → All signage on the R572 must comply with the guidelines as per the South African Manual for Outdoor Advertising Control and approval must be obtained from the relevant roads authority according to the South African Road Traffic Signs Manual before any signboards are erected. → Internal signs should be placed at localities and in a manner and colour scheme that will not cause visual intrusion for adjacent landowners.
	Culture and Heritage	Cultural resources and heritage of people may be damaged.	<ul style="list-style-type: none"> → If previously undetected subterranean heritage remains are discovered during the construction phase, it must be reported to the Limpopo Heritage Authority and/or the archaeologist, and may require further mitigation measures.

	Health and Safety	<p>Construction activities and structures may pose safety risks for people.</p> <p>Diversions and construction activities at the access point to the R572, may result in disruption of traffic flows and increased safety risks.</p>	<ul style="list-style-type: none"> → The necessary training and environmental awareness must be arranged for all employees and subcontractors relating to environmental health, safety and security. → All construction vehicles must be parked, when not operational, at areas demarcated for them in the construction camp at the plant area. → Signs must be put up to warn people about construction hazards. → All signs must be fixed safely and securely, must be visible and comprehensible by all and maintained. → Open trenches must be clearly marked. → Adherence to all aspects of the Mine Health and Safety Act (Act 181 of 1993). → Regulated traffic safety procedures must be implemented to ensure safety of people on site. → Strict precautions must be taken to prevent possibilities of fires along the construction area and no open fires must be allowed. → The environmental procedures to reduce the risk and impact for environmental incidents should be put up on site during construction.
Road Construction, Traffic, Access and Road Safety	Traffic Flows and Access	<p>Diversions and construction activities at the access point to the R572, may result in disruption of traffic flows of road users.</p>	<ul style="list-style-type: none"> → No work must commence that effects public roads until all agreed traffic safety measures essential for the works are accepted and agreed with relevant authorities, including Roads Agency Limpopo (RAL). → Existing access to properties of adjacent landowners shall be maintained at all times. → If road closures are required, it must be planned and communicated to the authorities and affected communities in advance and it must be properly sign-posted. → No temporary roads may be constructed additional to the existing road surface. → All damage to existing roads must be addressed within 72 hours. → Temporary diversions should be clearly sign posted, limited and rehabilitated.

	Increased construction activities and vehicles	Construction activities may lead to an increased risk of pollution, accidents and environmental incidents.	<ul style="list-style-type: none"> → Demarcated sites at the mine construction site must be used for parking and maintenance of construction vehicles. None close to sensitive areas or along the access road. → Run-off water from vehicle wash bays, workshops and diesel/fuel tank areas must be contained in a dirty water facility and not allowed to be discharged into the environment. → Used oils must be collected on a regular basis by the appointed registered waste contractor for safe disposal, → All construction vehicles must be serviced and in good working condition to ensure that all vehicles are safe, and to reduce risks of environmental incidents. → Any discharge of water containing polluted matter or visible suspended materials into the rivers and drainage lines should be prohibited. → All relevant aspects of the Mine Health and Safety Act must be complied with. → Speed limits for construction vehicles must be 60 km/h and must be enforced. → The access to the R572 must be cleaned from any mud or debris deposited by construction vehicles on the R572 that may impact on traffic. → All construction vehicles carrying potentially dusty or loose material likely to deposit this material on public roads during transit must have full sheeting covering. → The necessary road signage must be erected according to the relevant roads authority standards to inform all road users of construction activities and potential dangers during construction. → Clear signs, flagmen and signals must be set-up where necessary. Where temporary signs are required, the details and location of the signs must be discussed with the relevant authorities. → No work must commence that effects public roads until all agreed traffic safety measures are agreed with the relevant authorities, including Roads Agency Limpopo (RAL). → Regulated traffic safety procedures must be implemented to ensure safety of people on site. → All signs must be fixed safely and securely, must be visible and comprehensible by all and maintained. → Embankments must be protected against erosion both during and after construction. → All damage to existing roads must be repaired within 72 hours and the R572 must be maintained in the same or better condition than on the date that authorisation for development has been granted.
Water	Water resources	<p>Limited water resources will be used for construction activities.</p> <p>Pollution may occur as a result of lack of ablution facilities for the construction crew.</p>	<ul style="list-style-type: none"> → The workforce must be sensitised on aspects of water conservation. → There must be supervision over the workforce ensuring water is not wasted. → Temporary environmentally friendly ablution facilities (chemical toilets) must be available at the construction site and serviced according to manufacturer specifications.
	Storm water	Poor rain and storm water management may result in loss of property, erosion and pollution of water resources.	<ul style="list-style-type: none"> → Measures must be taken to ensure that no undue rain, or storm water damage and soil erosion, result from the construction activities. → An engineer must ensure that appropriate erosion protection measures are put in place to prohibit surface run-off water to concentrate and flow down cut or fill slopes or along spillway routes during construction / operation. → All topsoil stripped from physical development areas must be reinstated afterwards on areas requiring rehabilitation.

Solid Waste		Poorly managed and accumulating waste can cause water and soil pollution.	<ul style="list-style-type: none"> → Solid waste must be kept in bins to ensure that no solid waste comes into contact with the soil or drainage lines during rain. → No littering must take place and sufficient temporary waste bins must be provided along the construction area. → All waste bins must be cleaned weekly or when full (whichever comes first). → The waste may be temporarily stored at the contractor site of the mine area, in an area that is weatherproof and scavenger-proof, and which the Site Engineer has approved. → No waste bins shall be accumulated and/or stored in a waste yard for more than 30 days without being emptied. The waste contractor will ensure that the waste bins are disposed within the required time limit of not more than 30 days. → An approved registered waste contractor will be appointed specifically for management and safe disposal of all waste, including domestic waste. → No burying, dumping or burning of any waste materials, vegetation litter or refuse may occur on-site.
Pollution	Noise and air quality	Increased risk of noise and air pollution as a result of construction vehicles and activities.	<ul style="list-style-type: none"> → Speed limits for construction vehicles must not be more than 60 km/h. → All construction vehicles must be serviced and in good working condition to limit noise and emission levels. → Construction activities may not take place between 18:00 and 6:00 on weekdays. No construction should occur on Sundays and Saturday afternoons after 14h00.
	Water pollution	Pollution may occur as a result of lack of ablution facilities for the construction crew.	<ul style="list-style-type: none"> → Temporary environmentally friendly ablution facilities (chemical toilets) must be available at the construction site and serviced according to manufacturer specifications.

Biodiversity and Environment	Biodiversity Degradation	<p>Construction activities in environmentally sensitive areas such as drainage lines and threatened habitats, as well as through areas where threatened species occur, may result in significant negative impacts on biodiversity.</p> <p>Disturbance of large areas of natural vegetation and poor storm water management from the road may result in erosion and cause sediments to be eroded and washed into aquatic systems, causing the loss of aquatic habitat downstream.</p>	<ul style="list-style-type: none"> → The Contractor and crew should be sensitised about the threatened plant species as well as sensitive areas along the planned road and a suitable qualified person should point them out to the contractor and crew before construction commences. → Removal of vegetation will only be for purposes of clearing the 10.6 meters where the road surface will be constructed, except within the 2 metre road reserve on each side of the proposed access road, shrubs and trees may be removed if necessary for safety purposes, but grasses should not be removed. → No degradation to the vegetation may take place outside the 2 metre road reserve. → Relocation and removal of protected species must take place before construction is started and must be coordinated by a suitably qualified person. → No removal of vegetation for firewood may take place outside of the footprint area of the proposed access road. → No removal or catching of any animals may take place inside or outside of the footprint area of the proposed access road, except for relocation purposes and by suitable qualified person. → All sensitive areas (e.g. drainage line) adjacent to the development should be adequately protected against degradation and erosion, and rehabilitated when damaged incidentally. → Rehabilitation should be monitored and if not successful, redone. → A penalty clause for any contraventions should be included in the contractor's service agreement. → All declared exotic plants must be removed from the entire development area. → Contaminated topsoil e.g. with oil, must not be used in reclamation work. → Interference with natural drainage must be minimized and the requirements of the National Water Act must be met. → Pipes underneath drainage line crossings must be set at such a height, to ensure that there is no step on the downstream side. → After completion of the crossing, drainage line beds and stream-banks must be rehabilitated.
		Protected species can be destroyed and injured	
		Ecosystem functioning may be impaired	

Table 2:2 Potential indirect impacts of the proposed development during the construction phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Social Issues	Social and Socio- Economic	<p>The workforce may not adhere to safety, health and environmental regulations, requirements and measures.</p> <p>None or poor performance on environmental authorization requirements resulting in negative environmental impacts.</p> <p>Poor management may lead to environmental and safety incidents.</p>	<ul style="list-style-type: none"> → Information signs could be placed at strategic positions on the road to make the general public aware of the importance of the area, environmental practises and prohibited activities such as collection of wood. → The necessary training and environmental awareness must be arranged for all employees and subcontractors relating to environmental health, safety and security. → The workforce must be sensitised on aspects of energy and water conservation. → Safety, health and environmental responsibilities should be clearly allocated with accountability measures in place. → All construction workers should be sensitised about the conservation importance of the area. → An environmental officer with the necessary capacity must be appointed during construction to ensure that all environmental management measures are implemented as required by the environmental authorization, and mine EMP.
	Health and Safety	<p>Unknown people frequenting the development site may pose an increased security risk (albeit a perceived risk) to adjacent communities and landowners.</p> <p>Poor management may lead to environmental and safety incidents.</p> <p>Potential for increase in snaring, illegal activities, accidental fires and trespassing on properties of adjacent landowners.</p> <p>Construction workers may visit adjacent communities on neighbouring properties, which can be perceived as a security risk and having undesirable social impacts.</p> <p>No or poor provision for public transport services may lead to accessibility problems and safety risks.</p>	<ul style="list-style-type: none"> → The necessary training and environmental awareness must be arranged for all employees and subcontractors relating to environmental health, safety and security. → Adherence to all aspects of the Mine Health and Safety Act. → Construction labour will not be allowed to reside on site and only a few people, mainly for security purposes, will reside in the designated construction camp at the plant area. → Accommodation possibility should be investigated and could include Dongola Ranch and / or Musina. → Implement security measures (fencing, guards etc.) to safeguard the construction camp, equipment and workers. → Strict precautions must be taken to prevent possibilities of fires along the construction area and no open fires must be allowed. → Code of practise with safety regulations must be put up with emergency numbers for incidents.

Table 2:3 Potential cumulative impacts of the proposed development during the construction phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Pollution	Visual intrusion	Increased visual intrusions as a result of other infrastructure developments such as power lines, Telkom lines, etc. are erected to service Vele Colliery.	→ Align infrastructure along the access road and where possible putting the infrastructure underground, within the road reserve.
	Noise and air quality	<p>Heavy construction vehicles and equipment might significantly increase noise and air pollution during the construction period, albeit temporarily.</p> <p>Sensitive receptors, such as Dongola Ranch, Palm filling station and the farmhouse area on Erfrust, might experience temporary increases in noise and air pollution.</p> <p>The farmhouse area on Erfrust is further away from alternative 1 and less noise and air pollution impacts can be expected. Alternative 1 is located closer to Dongola Ranch and Palm filling station and more noise and air pollution impacts can be expected. This will however be temporary as construction activities move further away from Dongola Ranch and Palm filling station.</p>	<p>→ Speed limits for construction vehicles must not be more than 60 km/h.</p> <p>→ All construction vehicles must be serviced and in good working condition to limit noise and emission levels, to ensure that all vehicles are safe, and reduce risks of environmental incidents.</p> <p>→ No construction should occur at nighttime and construction hours should be limited to daylight hours.</p> <p>→ No construction should occur on Sundays and Saturday afternoons after 14h00.</p>
Severance		The road and other infrastructure such as electrical pylons, telecom lines, etc. will result in severance of animal paths or cause injury or death.	<p>→ Removal and relocation of small animals to safe areas.</p> <p>→ Erecting electrical pylons according to Escom guidelines to minimize impact on raptors and larger birds, or placing infrastructure underground.</p> <p>→ Sensitizing road users of the risk of animals crossing the road.</p> <p>→ Speed limits for construction vehicles must not be more than 60 km/h.</p> <p>→ Keep the grass along the road short to increase visibility of animals.</p> <p>→ Align infrastructure where possible long the proposed access road.</p>

1.7. Operational Phase

Table 3:1 Potential direct impacts of the proposed development during the operational phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Social Issues	Social	Negative perceptions by local communities as a result of job opportunities being allocated to people from other areas or products are sourced from other areas.	<ul style="list-style-type: none"> → Where possible, either temporary or permanent workers should be sourced from the immediate neighbouring communities that are legal residents in South Africa, through all phases of the development. → Where expertise and capacity is not available, empowerment models where local capacity is developed through partnerships should be considered. This principle should also apply where possible, to sourcing of supplies through all phases of development.
	Health and Safety	Poor maintenance and management may lead to environmental incidents, accidents and poor compliance	<ul style="list-style-type: none"> → Management should be responsible for environmental protection and performance for which all staff should be held accountable. → Management must ensure that: <ul style="list-style-type: none"> - An integrated environmental management system is developed within 5 year of environmental authorisation with proper checks and balances to ensure sustained sound environmental management and continuous improvement. - Ongoing environmental awareness and training of employees with regard to safety, health and environmental aspects. - All staff and customers comply with rules and procedures. - All required maintenance are done and recorded. - Adequate information, instruction and training to staff are provided. - Any accidents and incidents are recorded and addressed. - All complaints from the public are recorded and addressed. - Adherence to Mine Health and Safety Act.
Road maintenance, Traffic and Access	Roads, Traffic Flows and Access	<p>High levels of mine traffic impacting on traffic flows, and access to the R572.</p> <p>No or poor provision for public transport services may lead to accessibility problems and safety risks.</p>	<ul style="list-style-type: none"> → The R572 should be maintained as agreed with RAL together with the access road. → Clear traffic management signage that was authorized by the relevant authorities should be placed and maintained at strategic locations on the proposed road. → All signs should be fixed safely and securely, must be visible and comprehensible by all and maintained. → If road closures are required for maintenance, it must be planned and communicated to the authorities and affected communities in advance and must be properly sign-posted.

Water	Storm water and flood line	Poor rain and storm water management may result in loss of property, erosion and pollution of water resources.	<ul style="list-style-type: none"> → Any debris accumulating on the upstream side of the drainage line crossing structures must be removed regularly. → Maintenance of measures to mitigate the negative impact of rain and storm water from the access road.
Pollution	Air quality & noise	Increased noise levels as a result of increased vehicle activities on the proposed road.	→ All vehicles must be serviced and in good working condition to limit noise and emission levels, to ensure that all vehicles are safe, and to reduce risks of environmental incidents.
	Waste management	Waste can accumulate along the access road and impact on water resources, soils etc.	<ul style="list-style-type: none"> → The areas along the access road must be kept clean from litter. → Waste management for the area along the access road should be incorporated into the waste management system of Vele Colliery.
Biodiversity and Environment	Biodiversity degradation	<p>Habitat degradation when people do off-road driving or collect/catch illegal plants, firewood and animals along the road.</p> <p>Protected species can be destroyed and injured.</p> <p>Ecosystem functioning may be impaired.</p>	<ul style="list-style-type: none"> → All sensitive areas (e.g. drainage line) adjacent to the proposed access road should be adequately protected and rehabilitated when damaged incidentally. → All declared exotic plants and weeds must be removed in an environmentally friendly manner from the entire area. → A speed limit of no more than 60 km/h should be set for the access road to reduce the risk of accidents and injury to animals. → No off-road driving should be allowed. → Code of good practise with safety regulations and penalties/incentives for all employees and contractors must be put up with emergency numbers for incidents and whistle blowers.

Table 3:2 Potential cumulative impacts of the proposed development during the operational phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Road maintenance, Traffic and Access	Roads, Traffic Flows and Access	Increased levels of mine traffic impacting on traffic flows, and access to the R572 if alternative transport measures for the coal are not implemented.	→ Alternative options for transport of coal on the R572 should be investigated and considered for implementation.

Pollution	Air quality and noise	<p>Due to the large number of trucks and other vehicles that are required for the daily transport of coal, the impacts on the carbon dioxide budget would be greatly increased and so increasing climate change impacts.</p> <p>Noise levels would also increase due to the large number of trucks and other vehicles that are required for the daily transport of coal.</p>	→ Alternative options for transport of coal on the R572 should be investigated and considered for implementation.
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1.8. Decommissioning Phase

Table 4:1 Potential direct impacts of the proposed development during the decommissioning phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Social Issues	Social and Socio-Economic	Job opportunities will be lost.	<ul style="list-style-type: none"> → Empowerment and skills development programs should be implemented on an ongoing basis to ensure that people are sufficiently skilled to be absorbed in other areas with similar skills and experiential requirements. → A redeployment strategy should be developed with relevant labour unions to absorb labour where possible. → Financial provision should be made during the operational phase for future decommissioning.
Solid Waste		<p>A large amount of road rubble will have to be removed.</p> <p>Rubble and waste may wash into the drainage lines resulting in reduced water quality and degradation of habitat for aquatic species.</p>	<ul style="list-style-type: none"> → An approved registered waste contractor will be appointed specifically for management and safe disposal of all waste. → The waste may be temporarily stored at the contractor site of the mine area, in an area that is weatherproof and scavenger-proof, and which the Site Engineer has approved. → No burying, dumping or burning of any waste materials, vegetation litter or refuse may occur on-site → Water laden with waste e.g. cement or pollutants must be collected and must in no circumstances be allowed into drainage lines. → The area must be actively rehabilitated.
Pollution	Noise and air quality	Increased risk of noise and air pollution as a result of destruction activities and vehicles removing waste.	<ul style="list-style-type: none"> → Speed limits for construction vehicles must be no more than 60 km/h. → All construction vehicles must be serviced and in good working condition to limit noise and emission levels. → Noisy decommissioning (destruction) activities may not take place between 18:00 and 6:00 on weekdays. No construction should occur on Sundays and Saturday afternoons after 14h00.
	Water pollution	Pollution may occur as a result of lack of ablution facilities for the decommissioning crew.	→ Temporary environmentally friendly ablution facilities (chemical toilets) must be available at decommissioning site and serviced according to manufacturer specifications.

Biodiversity and Environment	Biodiversity Degradation	Poorly maintained decommissioning in environmentally sensitive areas such as drainage lines and threatened habitats, as well as through areas where threatened species occurred may result in significant negative impacts on biodiversity.	<ul style="list-style-type: none"> → Decommissioning in environmentally sensitive areas such as drainage lines and threatened habitats, as well as through areas where threatened species occurred should be rehabilitated under the guidance of an suitable qualified person. → No degradation to the vegetation may take place outside the 2 metre road reserve. → All sensitive areas (e.g. drainage line) adjacent to the development should be adequately protected against degradation and erosion, and rehabilitated when damaged incidentally. → Rehabilitation should be monitored and if not successful, redone. → Drainage line crossings must be removed and restored and actively rehabilitated.
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Table 4:2 Potential cumulative impacts of the proposed development during the decommissioning phase and mitigation measures.

Identified Issue		Possible Impacts	Mitigation Measures
Social Issues	Social and Socio-Economic	The existing road might be need after decommissioning to conduct monitoring.	<ul style="list-style-type: none"> → Investigate alternative usages of the access road. → Incorporate rehabilitation into the overall rehabilitation plan of the mine.

1.9. Environmental monitoring programme

Table 5: Environmental monitoring programme for Vele Colliery

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling method	Variables
Climate	Weather station	To obtain detail weather records for the LOM		Continuous	-	Wind speed & direction Temperature & rainfall Humidity & atmospheric pressure
Surface water	Surface water quality	Determine any deterioration in water quality as a result of the mining related activities	Limpopo River – u/s & d/s of site Two major site streams – u/s & d/s of proposed development	Monthly	Grab sampling	EC, pH, TDS, SS, Cl, SO ₄ , NO ₃ , Na, F, Fe, Al, Mn, Zn, Total Alkalinity, Ca, Mg, K, Total Hardness.
				Six monthly	Grab sampling	Analyses to 95% charge balance, including all metals and hydrocarbons.
	Potable water	Determine water quality of drinking water	Outflow of potable treatment facility	Weekly	Grab sampling	Turbidity and micro-biological constituents
	Sewage effluent	Determine water quality of sewage effluent	Outflow of sewage works	Weekly	Grab sampling	Turbidity and micro-biological constituents

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling method	Variables
	Clean water canals	Determine the sediment levels or any other contamination prior to discharge into the Limpopo River	Downstream points on clean water canals	Monthly	Grab sampling	EC, pH, TDS, SS, Cl, SO ₄ , NO ₃ , Na, F, Fe, Al, Mn, Zn, Total Alkalinity, Ca, Mg, K, Total Hardness, hydrocarbons.
	Water management infrastructure	Monitoring of condition, identifying areas that require maintenance	Along clean & dirty water canals, clean & dirty water dams	Quarterly After a big rain event.	Visual	Evidence of erosion, cracks, subsidence, overgrowth, etc.
	Dirty water systems	Determine the water quality and long-term chemical changes in the dirty water systems	Dirty water dams	Monthly	Grab sampling	EC, pH, TDS, SS, Cl, SO ₄ , NO ₃ , Na, F, Fe, Al, Mn, Zn, Total Alkalinity, Ca, Mg, K, Total Hardness.
	Haul road crossings	To identify and mitigate any spillages into the clean water system	All haul road crossings over clean water canals	Weekly	Visual inspection	Evidence of spillages
	Biomonitoring	Due to the ephemeral nature of the streams and even of the Limpopo River, biomonitoring will not be considered at this site.				
Groundwater	Groundwater quality	To determine any impact on the groundwater quality as a result of mining	Up & down gradient of mining area Along geological structures Alluvium & all other water bearing zones Neighbouring farms (Hydrocensus boreholes)	Quarterly	High integrity grab sampler (double valve), preferably made from PVC/Teflon	EC, pH, TDS, SS, Cl, SO ₄ , NO ₃ , Na, F, Fe, Al, Mn, Zn, Total Alkalinity, Ca, Mg, K, Total Hardness.
	Groundwater levels	To determine any impact on the groundwater levels as a result of mining	As above	Quarterly	As above	Water level
Mine water balance	Water levels in dams	To verify water balance and volume of water stored	Clean & dirty water dams	Monthly	Survey	Height (m)
	Dirty water recycled	To determine volume of dirty water abstracted & recycled for processing and dust suppression	Dewatering points in the open pits Underground mine water at the dewatering pumps	Monthly reading	Water meters	Volume (m ³)
	Clean water abstraction	To determine volume of clean water abstracted from the Limpopo River & primary aquifer	Surface water abstraction points at the Limpopo River Borehole abstraction points Neighbouring farms	Monthly reading	Water meters	Volume (m ³)
	Process flow	To determine accurate process water balance	Inflows & outflows Moisture content of the product & residue	Monthly	Water meters	Volume (m ³)
Land use management	Concurrent rehabilitation	To determine conformance with environmental objective for concurrent rehabilitation	Mining area	Monthly	Survey	Hectares disturbed Hectares levelled Hectares topsoiled Hectares revegetated

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling method	Variables
	Rehabilitation plan	To ensure conformance to final rehabilitation plan and free-draining standard	Rehabilitated areas	Monthly	Survey	Final level of rehabilitation
	Soil analysis	To determine any deficiencies in soil fertility prior to seeding	Topsoiled areas	Ongoing (prior to seeding)	Soil samples	As per specialist advise
	Vegetation audit	To determine effectiveness of land use management plan and long-term sustainability of vegetated areas	Vegetated areas	Annually	Field survey	As per specialist advise
	Riverine forest	To determine the impact on the riverine forest as a result of mining	Along Limpopo River	Bi-annually	Field survey	As per specialist advise
	Alien vegetation	To monitor conformance with alien vegetation programme	Total mining area, including rehabilitated areas	Monthly (during eradication programme)	Survey	Area (hectares)
Air quality	Dust outfall	To determine the levels of dust outfall as a result of the mining activities	As per specialist report	Continuous	Directional dust outfall buckets	Settleable particles (mg/m ² /day)
Environmental noise	Noise levels	To determine the noise levels within the communities and sensitive areas	Infrastructure areas Sensitive receptors within 35dBA noise isopleth	Monthly	To be determined	dBA
Blasting	Air blast and ground vibration	To determine the effectiveness of the blasting procedure	As per specialist report	Continuous	Vibration stations (seismograph)	Air blast Ground vibration
Waste	Waste generation & management	To determine volume of waste generated & disposed	Site	Monthly	Contractor report	Waste types
Heritage	Heritage/cultural resources	To capture all heritage/cultural resources exposed by mining	Site	Monthly	Archaeologist site visit	-
	Palaeontology	To capture all palaeontological artefacts exposed by mining	Site	Monthly	Palaeontologist site visit	