APPENDIX 5 – IMPACT ASSESSMENT

1. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

1.1 Impacts on Fauna and Flora

Loss of natural bush and/or Thornveld

Cause and Comment

Unnecessary vegetation clearing will lead to the permanent loss of natural bush and/or thornveld.

Mitigation and Management

- The prospecting footprint must be surveyed and demarcated prior to prospecting activities commencing to ensure that there is no unnecessary loss of natural vegetation outside the approved footprint.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken as soon as practically possible.
- The contractor/applicant must monitor vegetation clearing on site.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	Definite	**LOW(-)**

Loss of Species of Conservation Concern

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of habitats and the loss of identified and unidentified plant SCC.

Mitigation and Management

- The Applicant must ensure that the contractor and staff are made aware of potential floral SCC on site, as identified during the initial walkthrough.
- The prospecting footprint must avoid identified floral SCC as much as practically possible.
- Where this is not possible the contractor/applicant must ensure that the relevant permits are obtained prior to destruction.
- The contractor/applicant must monitor for the presence of floral SCC, and advise accordingly.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Localised	Long-Term	Moderate	Possible	**MODERATE (-)**
With Mitigation	Localised	Long-Term	Slight	May Occur	**LOW(-)**

Loss of Aquatic Habitat

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of aquatic habitats and features present of site.

Mitigation and Management

- Aquatic features identified on site must be avoided.
- The contractor and staff must be made aware of these “No-Go” areas.
- The contractor/applicant must monitor for encroachment within these areas.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Localised	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Localised	Short-Term	Slight	Unlikely	**LOW(-)**

Control of alien plant species

Cause and Comment

Lack of adequate planning for the control of alien invasive plant species will lead to large scale alien plant invasion.

Mitigation and Management

- The Alien Vegetation Rehabilitation and Management Plan must be implemented.
- The contractor/applicant must monitor for the establishment and spread of alien invasive species and advise accordingly.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Possible	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	May Occur	**LOW(-)**

Rehabilitation of disturbed areas

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of aquatic habitats and features present of site.

Mitigation and Management

- All temporarily impacted areas must be rehabilitated back to their original condition.
- Only topsoil from the immediate area must be used for rehabilitation.
- All temporarily impacted areas must be restored as per the Rehabilitation and Erosion Management Plan.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	Definite	**LOW(-)**

1.2 Air Quality

Cause and Comment

The pollutant of concern would be particulates that would result in elevated levels of dustfall. The likely emissions sources would be wind erosion of areas where vegetation cover is limited and vehicle entrainment of particulates from the unpaved district and farm roads.

Mitigation and Management

- Dust abatement by wetting down areas exposed as a result of the construction of the site camp.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Low	Probable	**LOW (-)**

1.3 Surface and Groundwater Pollution

Cause and Comment

Surface and groundwater may be polluted by a range of substances that, if not stored, handled and managed properly, may find their way into the wetlands, drainage lines, etc. The main contaminants during construction are hydrocarbons such as fuel, oil and other lubricants, paints and solvents, which must be stored, handled and managed to prevent spills and leakage, and measures put in place to rectify incidents immediately if they occur.

Mitigation and Management

- Oils and fuel must be stored in areas with an impermeable surface to avoid spillages.
- Vehicle repairs, servicing and washing must be done off-site.
- Where it is necessary to service or repair a vehicle or item of plant in the field drip trays / plastic tarps must be used to catch drips, spills and leaks.
- Spill kits must be available on-site, and spills must be cleaned up immediately in accordance with an established protocol appropriate to the material in question.
- An emergency plan for spillages must be in place.
- Stockpiles should not be higher than the 2 m height restriction.
- Keep equipment and vehicles within the limits of the already disturbed areas, where possible.
- Rehabilitation of the affected landscape must commence as soon as possible once the site camp is no longer required.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

1.4 Environmental Training

Cause and Comment

It is recommended that all staff undergo a basic level of environmental training.

Mitigation and Management

- All site personnel should have a basic level of environmental awareness training. Topics covered should include:

- What is meant by “Environment”
- Why the environment needs to be protected and conserved
- How construction activities can impact on the environment
- What can be done to mitigate against such impacts
- Awareness of emergency and spills response provisions
- Social responsibility during construction of the camp site e.g. being considerate to local residents
- The need for a “clean site” policy also needs to be explained to the workers.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Permanent – Long Term	Study Site	Slightly Beneficial	May Occur	**LOW (+)**
With Mitigation	Permanent – Long Term	Study Site	Moderately Beneficial	Definite	**MODERATE (+)**

1.5 Noise Pollution

Cause and Comment

Noise pollution would mainly emanate from vehicle movements on site.

Mitigation and Management

- All work should be limited to daylight hours, i.e. between 6am and 6pm, unless otherwise agreed upon with landowners.

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Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**
With Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**

1.6 Waste Pollution

Cause and Comment

The uncontrolled storage of solid waste, in particular food waste, can attract vermin and pests including rodents, birds and flies. These vermin / pests may pose a nuisance to adjacent farms and communities and may act as vectors for disease. The uncontrolled storage of solid waste can result in the release of unpleasant odours which may be regarded as a nuisance to adjacent land-users, particularly that down-wind of the material. Odorous compounds are also released from relatively well-managed solid waste disposal facilities. The presence of large quantities of litter around the site camp may constitute a visual impact to employees and local communities.

Mitigation and Management

- Scavenger proof bins must be made available to avoid windblown litter.
- Bins should be emptied on a regular basis.
- Domestic waste must be removed from site - no burying or burning of domestic waste must be allowed.
- Enviro-loo ablution facilities should be serviced regularly. ‘

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

1.7 Soil Pollution and Erosion

Cause and Comment

The construction of the site camp may require vegetation clearance which in turn may lead to erosion. In addition, soils may be polluted by a range of substances that, if not stored, handled and managed properly. The main contaminants during construction are hydrocarbons such as fuel, oil and other lubricants, paints and solvents, which must be stored, handled and managed to prevent spills and leakage, and measures put in place to rectify incidents immediately if they occur.

Mitigation and Management

- Oils and fuel must only be stored in areas with an impermeable surface to avoid spillages.
- Any spillages which may occur should be investigated and immediate action must be taken. In the event of significant spills (in excess of 35 litres) of any hazardous substance, this must be recorded and reported to the environmental personnel, Department of Water and Sanitation, DMR and any other relevant authorities. In such cases the contaminated soil must be excavated and disposed at a suitably licensed and registered landfill.
- Stormwater runoff in and around the camp site should be controlled.
- Equipment and vehicles should be kept within the limits of the already disturbed areas, where possible.
- Erosion control measures (i.e. silt fences) should be applied in areas that have high risk for erosion. ‘

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

1.8 Fire Prevention

Cause and Comment

The activities undertaken during the construction of the site camp may result in an increase in fire risk.

Mitigation and Management

- The Drilling Contractor must have fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.
- No fires must be permitted on site. Cooking must only be allowed on gas-stoves at designated areas.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Study Site	Slightly Beneficial	May Occur	**LOW (+)**
With Mitigation	Medium-Term	Study Site	Moderately Beneficial	Definite	**MODERATE (+)**

1.9 Erosion

Cause and Comment

The construction of the site camp may require vegetation clearance which in turn may lead to erosion of surrounding areas.

Mitigation and Management

- Wind screening and stormwater control should be undertaken to prevent soil loss from the site.
- All erosion control mechanisms should be regularly maintained.
- Re-vegetation of disturbed surfaces must occur immediately after the construction and prospecting activities have been completed.
- Rehabilitation should be undertaken progressively

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

1.10 Visual Impact

Cause and Comment

There are various activities which will take place during construction which will have impacts on sensitive visual receptors:

- Areas of vegetation will need to be cleared to make way for construction of the site camp.
- There will be an increase in the movement of vehicles in the area.
- Soil stockpiles and vegetation debris.
- Dust emissions from construction activity.

Mitigation and Management

- Visual impacts will be of a temporary nature and unfortunately cannot be mitigated.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**

1.11 Cultural and Heritage Artefacts

Cause and Comment

Prospecting may impact on heritage, archaeological and paleontological features identified within the boundaries of the study site

Mitigation and Management

- Local museums as well as the South African Heritage Resource Agency (SAHRA) and the PHRA must be informed if any artefacts are uncovered in the affected area and mitigation measures recommended by SAHRA must be followed.
- The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.
- Any discovered artefacts must not be removed under any circumstances. Any damage to or destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted.
- Whenever possible, all heritage sites identified during this study with a significance of Medium and Higher, must be preserved in situ by designing the development footprints in such a way that a buffer area of at least 50m is kept clear between any development footprints and construction activities and these heritage sites. In cases where the preservation of such sites and buffer areas are not possible, site-specific mitigation measures would be required (see below). Please note that all sites have been moved as per this recommendation (refer to Figure 6 in the BAR)
- Although some sites were identified away from the development footprints, the focus during the fieldwork was almost exclusively placed on these development footprints made up of proposed drill sites and trenches. Should the development footprints change or be altered in any way, these changes must be assessed in the field by a heritage specialist /

archaeologist before construction commences.

- This heritage impact assessment report is for proposed drill sites and trenches only. Should the project proceed into mining, a new heritage impact assessment will have to be undertaken.
- As far as palaeontological heritage is concerned, it is advised that a professional palaeontologist is called in once after the trenching process is completed and fresh bedrock is exposed in order to record potential stromatolitic occurrences if planned trenching is going to exceed widths and depths of >1m into unweathered/fresh bedrock where the latter starts below the superficial soil overburden.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Permanent	Regional	Moderate	May Occur	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**

1.12 Livestock

Cause and Comment

The proposed site is currently being utilised for grazing livestock. Livestock may therefore be disturbed by increase noise and vibrations mainly as a result of vehicular traffic.

Mitigation and Management

- Landowners and Land occupiers should be informed of the planned dates of construction activities.
- Site activities should be restricted to daylight hours between 6am and 6pm and as per the agreement with the landowner/s and/or land occupiers, unless otherwise agreed upon.
- The camp site must not be constructed within 100 m of livestock pens, or any wetlands and drainage lines and their regulatory buffers.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Study Site	Moderate	May Occur	**MODERATE (-)**
With Mitigation	Medium-Term	Study Site	Low	Unlikely	**LOW (-)**

2. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

2.1 Impacts on Fauna and Flora

Loss of natural bush and/or Thornveld

Cause and Comment

Unnecessary vegetation clearing will lead to the permanent loss of natural bush and/or thornveld.

Mitigation and Management

- The prospecting footprint must be surveyed and demarcated prior to prospecting activities commencing to ensure that there is no unnecessary loss of natural vegetation outside the approved footprint.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken as soon as practically possible.
- The contractor/applicant must monitor vegetation clearing on site.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	Definite	**LOW(-)**

Loss of Species of Conservation Concern

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of habitats and the loss of identified and unidentified plant SCC.

Mitigation and Management

- The Applicant must ensure that the contractor and staff are made aware of potential floral SCC on site, as identified during the initial walkthrough.
- The prospecting footprint must avoid identified floral SCC as much as practically possible.
- Where this is not possible the contractor/applicant must ensure that the relevant permits are obtained prior to destruction.
- The contractor/applicant must monitor for the presence of floral SCC, and advise accordingly.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Localised	Long-Term	Moderate	Possible	**MODERATE (-)**
With Mitigation	Localised	Long-Term	Slight	May Occur	**LOW(-)**

Loss of Aquatic Habitat

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of aquatic habitats and features present of site.

Mitigation and Management

- Aquatic features identified on site must be avoided.
- The contractor and staff must be made aware of these “No-Go” areas.
- The contractor/applicant must monitor for encroachment within these areas.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Localised	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Localised	Short-Term	Slight	Unlikely	**LOW(-)**

Control of alien plant species

Cause and Comment

Lack of adequate planning for the control of alien invasive plant species will lead to large scale alien plant invasion.

Mitigation and Management

- The Alien Vegetation Rehabilitation and Management Plan must be implemented.
- The contractor/applicant must monitor for the establishment and spread of alien invasive species and advise accordingly.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Possible	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	May Occur	**LOW(-)**

Rehabilitation of disturbed areas

Cause and Comment

Lack of adequate planning for the siting of proposed drill sites, trenches, soil surveying, access routes and site camp may lead to the destruction of aquatic habitats and features present of site.

Mitigation and Management

- All temporarily impacted areas must be rehabilitated back to their original condition.
- Only topsoil from the immediate area must be used for rehabilitation.
- All temporarily impacted areas must be restored as per the Rehabilitation and Erosion Management Plan.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Short-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	Definite	**LOW(-)**

2.2 Air Quality

Cause and Comment

The pollutant of concern would be particulates that would result in elevated levels of dustfall. The likely emissions sources would be wind erosion of areas where vegetation cover is limited and vehicle entrainment of particulates from the unpaved district and farm roads.

Mitigation and Management

- Dust abatement by wetting down exposed areas, at drill sites and trenches, when necessary.
- Vehicles should stay on the approved or available tracks as far as practically possible.
- Low speed limits must be set to avoid the creation of dust (≤ 40km/hr).
- All the equipment and vehicles should be equipped with the manufacturers' stock standard exhaust systems which will minimise the amount of emissions from their engines.
- No burning of waste must be allowed on site.
- Fire extinguishers and other fire safety equipment must be available on site.
- Drilling and trenching locations, as set out by the final layout plan and as discussed with the relevant landowners and/or land occupiers must be adhered to.

- Excavations and other clearing activities must only be done during agreed upon working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.
- Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Project Geologist and Drilling Contractor.
- All areas must be rehabilitated immediately upon completion of work conducted.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Low	Probable	**LOW (-)**

2.3 Surface and Groundwater Pollution

Cause and Comment

Surface and groundwater may be polluted by a range of substances that, if not stored, handled and managed properly, may find their way into the wetlands, drainage lines, etc. The main contaminants during the operational phase are hydrocarbons such as fuel, oil and other lubricants, which must be stored, handled and managed to prevent spills and leakage, and measures put in place to rectify incidents immediately if they occur.

Mitigation and Management

- Prospecting activities must not be conducted within 100 m of a drainage line or within 500 m of NFEPA (desktop) identified wetlands.
- Enviro-loo ablution facilities must not be placed within 100 m of any water body.
- All storage tanks (if any) containing hazardous materials must be placed in bunded containment areas with sealed surfaces.
- The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential high runoff stormwater events.
- Any hazardous substances must be stored at least 100 m from any of the water bodies on site.
- Contaminated wastewater should be managed by the Contractor to ensure existing water resources on the site are not contaminated.
- An emergency plan for spillages must be in place.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

2.4 Environmental Training

Cause and Comment

It is recommended that all staff undergo a basic level of environmental training.

Mitigation and Management

- All site personnel should have a basic level of environmental awareness training. Topics covered should include:
    - What is meant by “Environment”
    - Why the environment needs to be protected and conserved
    - How construction activities can impact on the environment
    - What can be done to mitigate against such impacts
    - Awareness of emergency and spills response provisions
    - Social responsibility during construction of the camp site e.g. being considerate to local residents
    - The need for a “clean site” policy also needs to be explained to the workers.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Permanent – Long Term	Study Site	Slightly Beneficial	May Occur	**LOW (+)**
With Mitigation	Permanent – Long Term	Study Site	Moderately Beneficial	Definite	**MODERATE (+)**

2.5 Noise Pollution

Cause and Comment

Noise pollution would mainly emanate from vehicle movements, drilling and trenching activities on site.

Mitigation and Management

- The activities must comply with the provisions of the Mine Health and Safety Act, 1996 (Act 29 of 1996) and its regulations as well as other applicable legislations and local by-laws regarding noise control.
- Employees should be supplied with ear plugs, when necessary. All prospecting vehicles should be maintained in a road worthy condition.
- All work must be limited to daylight hours, i.e. between 6 am and 6 pm, unless otherwise agreed upon with landowners. ‘

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**
With Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**

2.6 Waste Pollution

Cause and Comment

The uncontrolled storage of solid waste, in particular food waste, can attract vermin and pests including rodents, birds and flies. These vermin / pests may pose a nuisance to adjacent farms and communities and may act as vectors for disease. The uncontrolled storage of solid waste can result in the release of unpleasant odours which may be regarded as a nuisance to adjacent land-users, particularly that down-wind of the material. Odorous compounds are also released from relatively well-managed solid waste disposal facilities. The presence of large quantities of litter around the site camp may constitute a visual impact to employees and local communities.

Mitigation and Management

- Scavenger proof bins should be made available to avoid windblown litter.
- Bins should be emptied on a regular basis.
- Domestic waste must be removed from site - no burying or burning of domestic waste must be allowed.
- Enviro-loo ablution facilities should be regularly serviced.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

2.7 Soil Pollution and Erosion

Cause and Comment

Drilling and trenching may require vegetation clearance which in turn may lead to erosion. In addition, soils may be polluted by a range of substances if not stored, handled and managed properly. The main contaminants during the operational phase are hydrocarbons such as fuel, oil and other lubricants, which must be stored, handled and managed to prevent spills and leakage, and measures put in place to rectify incidents immediately if they occur.

Mitigation and Management

- Dust abatement by wetting down exposed areas, at drill sites and trenches, when necessary.
- Stockpiles must not be higher than the 2 m height restriction.
- Drip trays should be used under drilling and excavation equipment to ensure no spillage of oils and fuels onto the ground surface.
- Oils and fuel must be stored in areas with an impermeable surface to avoid spillages.
- Any spillages which may occur should be investigated and immediate action must be taken. In the event of significant spills (in excess of 35 litres) of any hazardous substance, these must be recorded and reported to the environmental personnel, Department of Water and Sanitation, DMR and any other relevant authorities. In such cases the contaminated soil must be excavated and disposed at a suitably licensed and registered

landfill.
- Stormwater runoff in and around drill holes and trenches should be controlled.
- Equipment and vehicles should be kept within the limits of the already disturbed areas, if at all possible.
- Erosion control measures (i.e. silt fences) should be applied in areas which have high risk for erosion.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

2.8 Fire Prevention

Cause and Comment

The activities undertaken during drilling and trenching may result in an increase in fire risk.

Mitigation and Management

- The Drilling Contractor must have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.
- No fires must be permitted on site. Cooking should only be allowed on gas-stoves at designated areas.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Study Site	Slightly Beneficial	May Occur	**LOW (+)**
With Mitigation	Medium-Term	Study Site	Moderately Beneficial	Definite	**MODERATE (+)**

2.9 Erosion

Cause and Comment

The drilling and trenching may require vegetation clearance which in turn may lead to erosion of surrounding areas.

Mitigation and Management

- Wind screening and stormwater control should be undertaken to prevent soil loss from the site.
- All erosion control mechanisms should be regularly maintained.
- Re-vegetation of disturbed surfaces must occur immediately after the prospecting activities are completed.

- Rehabilitation should be undertaken progressively.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

2.10 Visual Impact

Cause and Comment

There are various activities which will take place during the operational phase which will have impacts on sensitive visual receptors:

- Areas of vegetation will need to be cleared to make way for drilling and trenching.
- There will be an increase in the movement of vehicles in the area.
- Soil stockpiles and vegetation debris.
- Dust emissions from operational activity.

Mitigation and Management

- Visual impacts will be of a temporary nature and unfortunately cannot be mitigated.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Moderate	Definite	**MODERATE (-)**

2.11 Cultural and Heritage Artefacts

Cause and Comment

Prospecting may impact on heritage, archaeological and paleontological features identified within the boundaries of the study site

Mitigation and Management

- Local museums as well as the South African Heritage Resource Agency (SAHRA) and the PHRA must be informed if any artefacts are uncovered in the affected area and mitigation measures recommended by SAHRA must be followed.
- The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.
- Any discovered artefacts must not be removed under any circumstances. Any damage to or destruction of a site can only be allowed once a permit is obtained and the site has been

mapped and noted.

- Whenever possible, all heritage sites identified during this study with a significance of Medium and Higher, must be preserved in situ by designing the development footprints in such a way that a buffer area of at least 50m is kept clear between any development footprints and construction activities and these heritage sites. In cases where the preservation of such sites and buffer areas are not possible, site-specific mitigation measures would be required (see below). Please note that all sites have been moved as per this recommendation (refer to Figure 6 in the BAR)
- Although some sites were identified away from the development footprints, the focus during the fieldwork was almost exclusively placed on these development footprints made up of proposed drill sites and trenches. Should the development footprints change or be altered in any way, these changes must be assessed in the field by a heritage specialist / archaeologist before construction commences.
- This heritage impact assessment report is for proposed drill sites and trenches only. Should the project proceed into mining, a new heritage impact assessment will have to be undertaken.
- As far as palaeontological heritage is concerned, it is advised that a professional palaeontologist is called in once after the trenching process is completed and fresh bedrock is exposed in order to record potential stromatolitic occurrences if planned trenching is going to exceed widths and depths of >1m into unweathered/fresh bedrock where the latter starts below the superficial soil overburden.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Permanent	Regional	Moderate	May Occur	**MODERATE (-)**
With Mitigation	Short-Term	Study Site	Low	Definite	**LOW (-)**

2.12 Livestock

Cause and Comment

The proposed site is currently being utilised for grazing livestock. Livestock may therefore be disturbed by increase noise and vibrations mainly as a result of vehicular traffic, drilling and trenching.

Mitigation and Management

- Landowners and Land occupiers should be informed of the planned dates of construction activities.
- Site activities should be restricted to daylight hours between 6am and 6pm and as per the agreement with the landowner/s and/or land occupiers, unless otherwise agreed upon.
- The camp site must not be constructed within 100 m of livestock pens, or any wetlands and drainage lines and their regulatory buffers.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Study Site	Moderate	May Occur	**MODERATE (-)**
With Mitigation	Medium-Term	Study Site	Low	Unlikely	**LOW (-)**

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING PHASE

3.1 Impacts on Fauna and Flora

Control of alien plant species

Cause and Comment

Lack of adequate planning for the control of alien invasive plant species will lead to large scale alien plant invasion

Mitigation and Management

- The Alien Vegetation Rehabilitation and Management Plan must be implemented.
- The contractor/applicant must ensure adequate effort has been taken to reduce the spread of alien invasive species at closure.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Medium-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Medium-Term	Slight	Definite	**LOW (-)**

Rehabilitation of disturbed areas

Cause and Comment

Lack of adequate planning for rehabilitation of disturbed areas will lead to degradation and erosion of the surrounding natural environment.

Mitigation and Management

- All temporarily impacted areas must be rehabilitated back to their original condition.
- Only topsoil from the immediate area must be used for rehabilitation.
- All temporarily impacted areas must be restored as per the
- Rehabilitation and Erosion Management Plan.
- A suitably qualified individual/botanist should conduct a closure audit to ensure rehabilitation has been undertaken in a satisfactory manner.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Study Site	Medium-Term	Moderate	Definite	**MODERATE (-)**
With Mitigation	Study Site	Short-Term	Slight	Definite	**LOW (-)**

3.2 Land Degradation

Cause and Comment

Improper site clean-up may result in land degradation in the overall study area.

Mitigation and Management

- All waste bins and domestic waste must be removed from site once the activity is complete.
- Excess topsoil, not used in rehabilitation, must be levelled.
- All temporary and sampling equipment (i.e. waste bins, Enviro-loo ablution facilities, sample bags etc.) used during prospecting and rehabilitation must be removed from site.
- The site should be cleared of all litter.
- A final inspection must be undertaken, in order to ensure adherence to EMPr guidelines, with regards to the completion of localized / remaining areas of impact, monitoring of rehabilitation success, etc.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	May Occur	**LOW (-)**

4. SOCIO-ECONOMIC IMPACTS

4.1 Increase in Traffic

Cause and Comment

During prospecting 4x4 vehicles will be utilising the existing road network. This may result in damage to the existing roads and tracks.

Mitigation and Management

- Speed limits must not exceed 40km/h on farm roads and tracks.
- All drivers should be made aware of the procedures to be followed if an accident occurs.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Local	Low	Probable	**LOW (-)**
With Mitigation	Short-Term	Local	Low	May Occur	**LOW (-)**

4.2 Nuisance Impacts (Air and Noise)

Cause and Comment

Impacts on air quality will primarily result from increased dust levels associated with the required drilling and trenching activities and associated traffic on farm roads. It is anticipated that there will be an increase in noise levels during prospecting which will be associated with the operation of vehicles and sampling equipment.

Mitigation and Management

- The activities must comply with the provisions of the Mine Health and Safety Act, 1996 (Act 29 of 1996) and its regulations as well as other applicable noise regulations and local by-laws regarding noise control.
- All prospecting vehicles should be maintained in a road worthy condition.
- All work must be limited to daylight hours, i.e. between 6 am and 6 pm, unless otherwise agreed upon with landowners and/or land occupiers.
- Vehicles should stay on existing / approved tracks / roads, as far as practically possible.
- Low speed limits must be set on access roads to avoid the creation of dust (≤ 40km/hr).
- All the equipment and vehicles should be equipped with the manufacturers' stock standard exhaust systems which should minimise the amount of emissions from their engines.
- No burning of waste must be allowed on site.
- Any complaints or claims emanating from the lack of dust control should be attended to immediately by the Project Geologist, Site manager and or ESO/ECO.
- All areas must be rehabilitated immediately upon completion of work conducted.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Short-Term	Local	Moderate	Definite	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Probable	**LOW (-)**

4.3 Water Pollution

Cause and Comment

Surface and groundwater may be polluted by a range of substances that, if not stored, handled and managed properly, may find their way into the wetlands, drainage lines, etc. The main contaminants during the operational phase are hydrocarbons such as fuel, oil and other lubricants, which must be stored, handled and managed to prevent spills and leakage, and measures put in place to rectify incidents immediately if they occur.

Mitigation and Management

- Enviro-loo ablution facilities must not be placed within 100 m of any water body.
- Prospecting activities must not be conducted within 100 m of a drainage line or within 500 m of NFEPA (desktop) identified wetlands.
- Oils and fuel must be stored in areas with an impermeable surface to avoid spillages.
- Vehicle repairs, servicing and washing must be done off-site, as far as practically possible.
- Where it is necessary to service or repair a vehicle or item of plant in the field drip trays / plastic tarps must be used to catch drips, spills and leaks.
- Spill kits must be available on-site, and spills must be cleaned up immediately in accordance with an established protocol appropriate to the material in question.
- An emergency plan for spillages must be in place.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

4.4 Visual Impact

Cause and Comment

There are various activities which will take place during the operational phase which will have impacts on sensitive visual receptors:

- Areas of vegetation will need to be cleared to make way for drilling and trenching.
- There will be an increase in the movement of vehicles in the area.
- Soil stockpiles and vegetation debris.
- Dust emissions from construction and operational activity.

Mitigation and Management

- Enviro-loo ablution facilities must not be placed within 100 m of any water body.
- Prospecting activities must not be conducted within 100 m of a drainage line or within 500 m of NFEPA (desktop) identified wetlands.
- Oils and fuel must be stored in areas with an impermeable surface to avoid spillages.
- Vehicle repairs, servicing and washing must be done off-site, as far as practically possible.
- Where it is necessary to service or repair a vehicle or item of plant in the field drip trays / plastic tarps must be used to catch drips, spills and leaks.
- Spill kits must be available on-site, and spills must be cleaned up immediately in accordance with an established protocol appropriate to the material in question.
- An emergency plan for spillages must be in place.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Local	Moderate	Probable	**MODERATE (-)**
With Mitigation	Short-Term	Local	Low	Unlikely	**LOW (-)**

4.5 Economic Impact

Cause and Comment

According to the Integrated Development Plan (IDP) of the local municipality the unemployment rate is currently at 51%. Many 'poverty gaps' exist, with settlements in the nearby towns. Therefore, depending on the number of employment opportunities to be created, the project could have a positive impact in terms of employment.

Mitigation and Management

- Local labour and service companies should be used where possible.
- Prospecting Rights do not supersede property rights hence the applicant must comply with all reasonable requirements to minimize the impact of prospecting on landowners, land occupiers and agricultural activities.

Significance statement

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Medium-Term	Study Site	Slight Beneficial	May Occur	**LOW (+)**
With Mitigation	Medium-Term	Study Site	Moderately Beneficial	Definite	**MODERATE (+)**