mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT:	Wozimart (Pty) Ltd
TEL NO:	0833140309
FAX NO:	None
POSTAL ADDRESS:	PO BOX 67560, HIGHVELD TECHNO PARK, CENTURION, 0169 SOUTH AFRICA
PHYSICAL ADDRESS:	Same as postal address

FILE REFERENCE NUMBER SAMRAD: GP 30/5/1/1/2 (10553) PR

COMPILED BY: ENVIRO-INSIGHT CC

DATE: MARCH 2019

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998 as amended) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:

(i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

(ii) the degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;

(ii) identify suitable measures to manage, avoid or mitigate identified impacts; and

(iii) identify residual risks that need to be managed and monitored.

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PART A

SCOPE OF ASSSSMENT AND BASIC ASSESSMENT REPORT

1) Contact Person and correspondence address

a) Details of:

i) Details of the EAP

Name of The Practitioner:	**Corné Niemandt**
Tel No.:	**+27 (0) 12 807 0637**
Fax No. :	**None**
e-mail address:	corne@enviro-insight.co.za
Website:	www.enviro-insight.co.za

ii) Expertise of the EAP.

(1) The qualifications of the EAP

Mr. Niemandt holds a *M.Sc.* degree in Plant Science from the University of Pretoria (2015), and is registered as a professional scientist (Pr. Sci. Nat.) with the South African Council for Natural Scientific Professions (SACNASP). He is also a member of the International Association for Impact Assessment South Africa (IAIAsa) and a member of the South African Association of Botanists (SAAB).

Proof of qualifications included as Appendix 1.

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Mr. Niemandt has three years' experience as an environmental consultant, compiling and managing environmental authorisation reports, including Environmental Management Programmes (EMPr), rehabilitation plans and environmental auditing. He has recently completed an Environmental Impact Assessment Report and EMPr for the proposed Bloemendal Coal Mine project located in Gauteng. Projects completed included fieldwork, data collection, preparation of permits and licensing studies, compliance monitoring and community engagement, and project managing interdisciplinary teams and contractors. He has also compiled over 35 ecological specialist reports and assisted and managed Water Use Licence Applications.

b) Location of the overall Activity

Farm Name:	PORTIONS 5, 19, 20, 21, 22, 27, 32, 42, 43, 64, 65, 66, 67 AND 76 OF THE FARM HOLFONTEIN 71 IR AND PORTIONS 26 AND 32 OF THE FARM WELGEDACTH 74 IR
Application area (Ha)	771 ha
Magisterial district:	Ekurhuleni Metropolitan Municipality,
Distance and direction from nearest town	Approximately 17.4 km East of Benoni; Approximately 8.6 km North East of Springs
21 digit Surveyor General Code	
Portion 5 of the Farm Holfontein 71 IR	T0IR00000000007100005
Portion 19 of the Farm Holfontein 71 IR	T0IR00000000007100000
Portion 20 of the Farm Holfontein 71 IR	T0IR00000000007100020
Portion 21 of the Farm Holfontein 71 IR	T0IR00000000007100021
Portion 22 of the Farm Holfontein 71 IR	T0IR00000000007100022
Portion 27 of the Farm Holfontein 71 IR	T0IR00000000007100027
Portion 32 of the Farm Holfontein 71 IR	T0IR00000000007100032
Portion 42 of the Farm Holfontein 71 IR	T0IR00000000007100000
Portion 43 of the Farm Holfontein 71 IR	T0IR00000000007100043
Portion 64 of the Farm Holfontein 71 IR	T0IR00000000007100064
Portion 65 of the Farm Holfontein 71 IR	T0IR00000000007100065
Portion 66 of the Farm Holfontein 71 IR	T0IR00000000007100066

Portion 67 of the Farm Holfontein 71 IR	T0IR00000000007100067
Portion 76 of the Farm Holfontein 71 IR	T0IR00000000007100076
Portion 26 of the Farm Welgedacth 74 IR	T0IR00000000007400026
Portion 32 of the Farm Welgedacth 74 IR	T0IR00000000007400032

c) Locality map (See Appendix 2 for larger map)

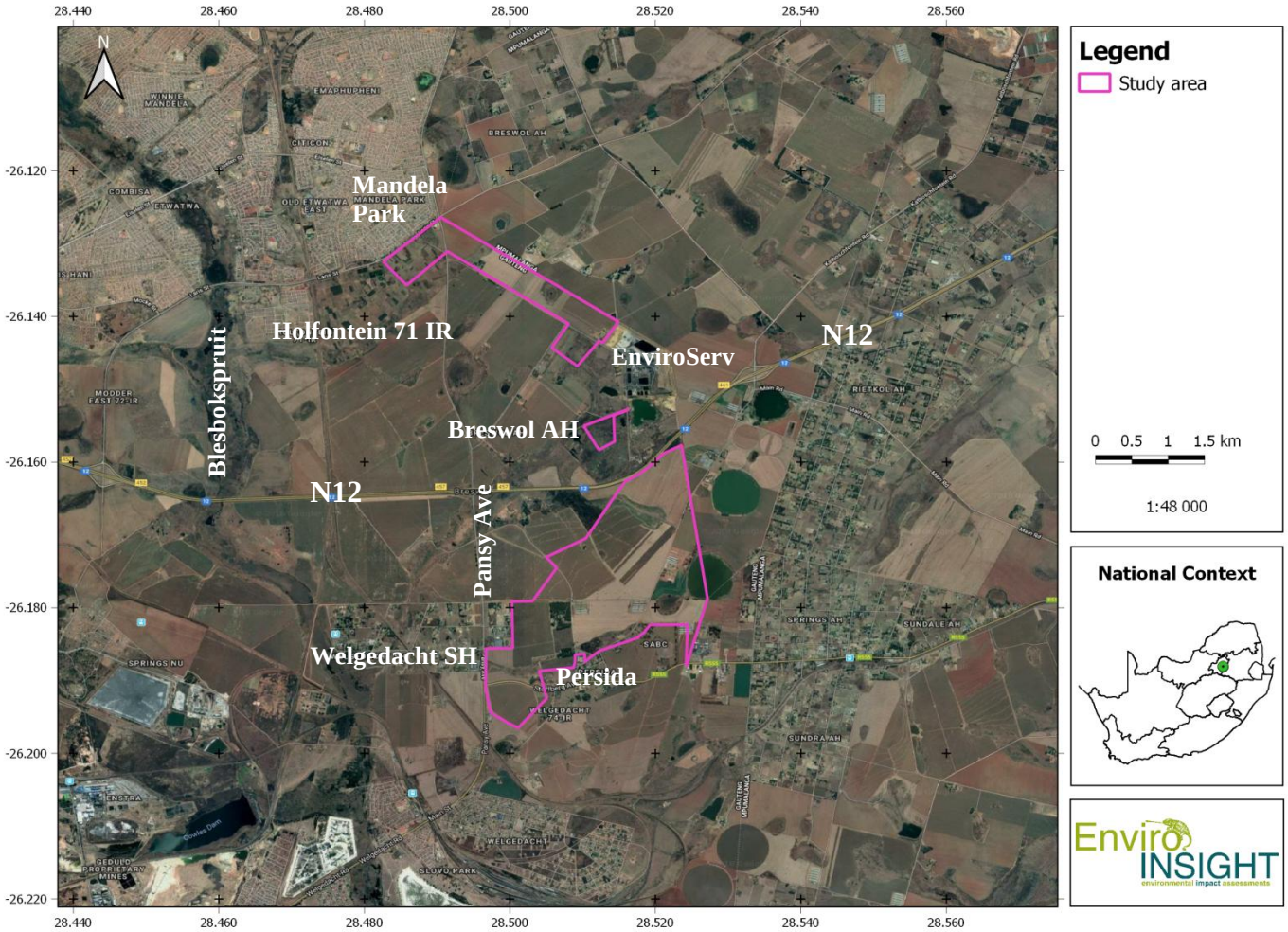


Figure 1-1: Locality map of the study area.

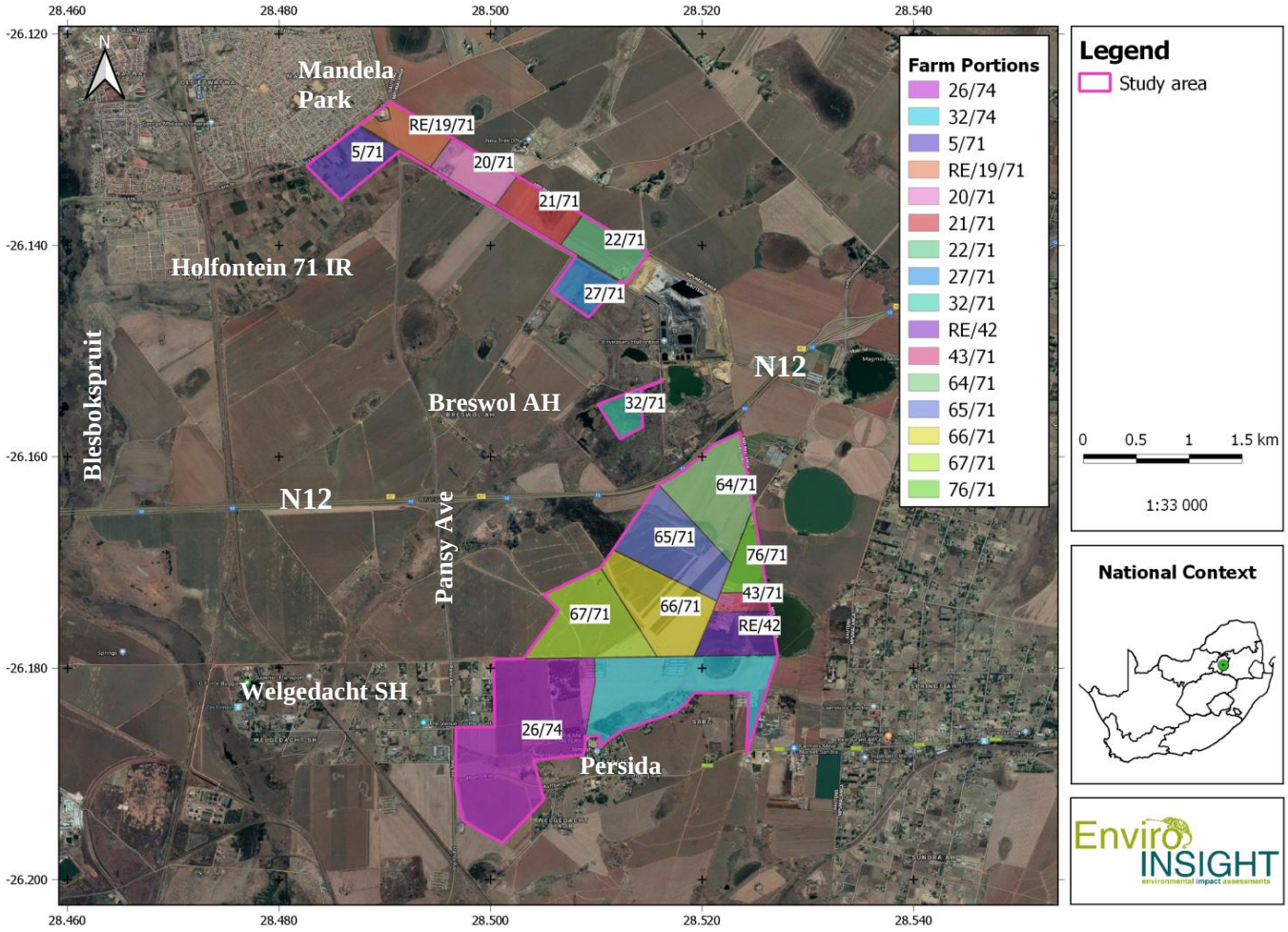


Figure 1-2: Locality map indicating farm portions affected by the proposed project.

d) Description of the scope of the proposed overall activity

Please take note: Prospecting tries to find out whether a mineral occur in an area, and if it does, how much of the mineral occur there; it is not mining. Prospecting means intentionally searching for any mineral by means of both non-invasive and invasive methods which disturbs the surface or subsurface of the earth. Prospecting starts with desktop studies that survey the land and gather information with no physical disturbance. The results from this study then allow the applicant to make an informed decision on where to drill, with minimal disruption to the existing landowner and the biophysical environment. All disturbances caused by the prospecting operations on the property will be rehabilitated on a concurrent basis. Please note that prospecting does not necessarily guarantee mining of the deposit in the future.

In Phase 1 (Desktop study) there will be no activity on site apart from a few site visits. However Phases 2 to 4 will require work on site. Phase 2 (Soil geochemistry, geophysics and trenching) will require access to the farm to be able to carry out a farm wide soil geochemistry and geophysical survey where existing farm access roads will need to be used. Phases 3 and 4 will be limited to specific delineated areas for drilling. When drilling is carried out it is possible that access roads will need to be created. This will be discussed with the respective landowners.

Since exploration is temporary in nature no permanent structures will be constructed, negotiations and agreements will be made with the farm owners to use any existing infrastructure like accommodation for the explorers, access roads and other infrastructure such as workshops and ablution facilities.

(i) Listed and specified activities

Table 1-1: Listed and Specified Activities

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc)	**AERIAL EXTENT OF THE ACTIVITY** Ha or m²	**LISTED ACTIVITY**	**APPLICABLE LISTING NOTICE (NEMA)**	**NATIONAL WATER ACT 36 OF 1998**	**NEMWA 59 OF 2008**
Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including, (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.	771 ha (but the actual drilling will be less)	Activity 20	GNR 327-Listing notice 1	No	No
Clearance of natural vegetation	To be confirmed	Activity 12 (b)	GNR 324-Listing notice 3	NA	NA

(ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/ mined and for a linear activity, a description of the route of the activity)

The commodity to be prospected is Coal Ore. The prospecting activities are anticipated to be undertaken for a period of 3 years. These prospecting activities will be conducted in phases, with the succeeding phase depending on the results and success of preceding phase. The intended phases in sequence are indicated below:

Phase 1 – Desktop Study: Analysis of Existing Data,
The exploration records of all previous work in the area will be re-examined, and the following studies will be carried out:

- Literature review
- Detailed aerial photograph and satellite image interpretation
- Regional airborne geophysics with main emphasis on magnetic and gravity
- Regional soil geochemistry interpretation
- Geological mapping will also be carried out

These records will need to be captured into a GIS format for geological modelling and exploration scheduling analysis. This work will form an initial desktop and surface fieldwork study to be continued during the period that the prospecting permit application is being assessed and, presumably, approved. A period of 7 months is estimated for this.

Phase 2 – Follow up Ground Geophysics, Soil Geochemistry and Trenching

Once targets have been generated in the first phase there will be a need to follow up on these targets. A detailed and denser soil geochemistry exercise will need to be carried out. Coupled with this will be ground geophysics to sharpen the identified potential areas. Gravity magnetic and time domain Electromagnetic Methods (EM) will need to be done.

After soil geochemical and geophysical targets are generated a trenching or pitting exercise will be done on the anomalies to determine the sidewall properties, profiles and average grades and to do drill-hole targeting. It is anticipated that this phase will take approximately 10 months to complete.

Phase 3 – Drilling and Resource Generation

In the event that the present application is approved and areas with possible targets for the minerals applied for, this identified prospective target will require further subsurface investigation. Drilling (coal ore) of the prospective areas will commence to establish presence of mineralization. Geological borehole logging, down the hole logging and sampling will also be carried out. Whole rock analysis of all the potential intersections will be carried out. For budgeting purposes, it is assumed that every meter of the initial holes will be analysed will be made. It is anticipated that initially approximately 15 drill-holes will be drilled. The average depth of these boreholes is

expected to vary between 130m and 170m, and will be sealed with a cement plug to one meter below surface upon completion to make it safe for people and animals and allow future access by the exploration team. Dependent on the results of these drilling further drill-holes may be required. The geological information generated will be used to model and estimate resource. The resources will at least be expected to be in the Indicated Category according to the appropriate reporting standard.

Phase 4 – Resources drilling and Pre-feasibility Study

The final phase of the prospecting programme would involve preparation of a prefeasibility study. This would include:

- Resource drilling
- Geological Modelling
- Initial conceptual Mine Planning.
- Planning the infrastructure requirements
- Environmental management planning
- Financial modelling
- Market analysis
- Analysis of transport logistics to markets
- Assessment of personal and training requirements
- Assessment of socio-economic factors

A feasibility study is multidisciplinary in nature, and requires the highest levels of expertise available. Such studies are both costly and time consuming

e) Policy and Legislative Context

Table 1-2 Policy and Legislation

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
The South African Constitution (Act 108 of 1996)	BAR but mostly through consultation process	Rights of all personnel who are directly or indirectly involved in the project has been respected and their concerns attended to during public consultation

Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA)	The prospecting activities requires the permit from the DMR	A Prospecting Right Application has been submitted to the DMR by the Applicant (GP 30/5/1/1/2 (10553) PR). The application was accepted by the DMR on the 10 October 2018.
The National Environmental Management Act (Act No. 107 of 1998) (NEMA) The National Environmental Management Act (Act 107 of 1998 as amended on the 8th of December 2014) (NEMA) and the Regulations and associated listed activities identified under Regulations 982, 983, 984 and 985 in accordance listing Notice Regulation 324-327 as amended in 2017. .	Basic Assessment Report (BAR)	This is the key national legislation underpinning environmental Authorisations in South Africa. In terms of NEMA an Environmental Authorisation Application has been submitted to the DMR by the Applicant and was acknowledged by the DMR. An extension period of 50 days was requested and granted on 11 December 2018. An impact assessment is included and the appropriate mitigation measures and recommendations are made.
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA)	Basic Assessment Report	The generation of potential waste will be minimised through ensuring employees of the drilling contractor are subjected to the appropriate Environmental awareness campaign before commencement of drilling. All waste generated during the drilling activities will be disposed of in a responsible legal manner. Proof of legal disposal will be maintained on site
The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No.10 of 2004)	The terrestrial ecological report (Appendix 4): • Threatened ecosystems • Alien invasive plants • Protected species	The appropriate buffer areas and sensitive areas to be excluded are applied. Species of conservation concern are protected or where required, a search and rescue operation will be carried out by a professional registered scientist. Alien invasive species management
The National Water Act (Act No. 36 of 1998) (NWA)	The proposed activities will use water; however it will not consume enough water to trigger water use license application.	No water use license is required for this Application
The National Heritage Resources Act (Act No. 25 of 1999) The National Heritage Resources Act requires	BAR and SAHRA compliance	A Phase 1 heritage Impact Assessment has being conducted for the purposes of this BAR (Refer to Appendix 5).

all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 ha in extent. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities.		
The National Environmental Management : Air Quality Act (Act 39 OF 2004) The National Environmental Management: Air Quality Act has a list of activities that would require an air emissions license. The objectives of this act are to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development	Dust pollution	Standards for particulates and dust used in Impact Assessment to regulate the concentration of a substance that can be tolerated without any environmental deterioration.
Spatial Planning and Land Use Management Act, No. 16 of 2013 (SPLUMA)	Ekurhuleni spatial development framework – no land use change required	No land use change application required. Prospecting activities does not change the current land use practices.
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	Basic Assessment Report (BAR) and Terrestrial ecology report	The project should promote the conservation of soil, water and vegetation

f) Need and desirability of the proposed activities

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Should prospecting prove successful and a resource is quantified, it would indicate a potential viable economic activity in the form of mining. Mining will contribute greatly to local economic growth through direct employment, future business opportunities, royalties and tax revenues.

The transformation from fossil fuels to renewable energy sources is slow in South Africa; accordingly there is still a high demand for coal in the country to meets its energy demands as well as internationally. This demand is evident considering coal shortage at ESKOM power stations across the country. South Africa is dependent on coal for electricity production as about 75% of South Africa's energy needs are met by coal fired power stations. The potential benefits of the proposed project are:

- Long-term, national benefits of reliable power supply and the resultant socio-economic benefits.
- Ensure the supply of a secure, long-term supply of coal to Eskom.
- Needed job creation and other local, provincial and national socio-economic benefits.
- Local growth in the economy in the surrounding areas, and for local businesses
- Economic benefits for contractors and other suppliers of goods and services.

The activity is desirable in terms of its proximity to Kusile Power station (approx. 60km from the site).

g) Motivation for the overall preferred site, activities and technology alternative

The proposed site was selected based on extensive research and also following on information from previous prospecting activities in the area. There are known coal reserves in the area and coal mining right applications has been applied for within 5km radius from the proposed project area. In terms of the technologies proposed, the proposed prospecting methods (i.e. diamond drilling) have been chosen based on the known success of prospecting using the above method. The prospecting activities proposed in the Prospecting Works Programme (PWP) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

h) Full description of the process followed to reach the proposed preferred alternatives within the site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

i. Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 3 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

a. The property on which the location or where it is proposed to undertake activity

No location alternative has been considered. The applicant's property or location is being guided by the presence of higher potential underlying coal thus not any location or property is suitable for the proposed activity.

b. The type of activity to be undertaken

Description of planned Non-invasive Activities

Desktop studies to be undertaken over the area would include studying of all available geological maps/plans, aerial photographs, topography maps and any other related geological information about this area.

Upon completion of the desktop study, field geological mapping of the area will be conducted, and if necessary, a ground magnetic geophysical survey to locate the occurrence of any dolerite sills/dykes that may be present in the area.

Description of planned Invasive Activities

This Prospecting Work Program is designed to establish the extent of the area of the coal deposit, and all available geological information will be utilized to calculate the in-situ Coal Resource and the economic viability of the Project.

Diamond Core Exploration Drilling is selected as the primary means of exploration as it provides accurate information on the depth and thickness of the coal seams, the quality and physical properties of the Resource, composition and thickness of the overburden and aid in interpreting possible fault blocks.

These holes will be drilled in strategic locations to fill the gaps and confirm existing borehole data and information derived from the ground magnetic field survey.

Based on the extent of the area, 84 TNW (75mm diameter) diamond core drill holes are planned to be drilled in order to increase the geological accuracy of the Resource modeling to inferred, of which some area may be measured (Samrec Code). Please note that practical and geological considerations may however reduce the number of planned boreholes and subsequent budget substantially.

The average depth of these boreholes is expected to vary between 130m and 170m, and will be sealed with a cement plug to one meter below surface upon completion to make it safe for people and animals and allow future access by the exploration team.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to drill. Water for the drilling process is provided by a truck fitted with a water tank.

The recovered core is geologically described and the coal sampled to be analyzed at an accredited laboratory to determine the quality of the coal based on proximate analysis, and where required, based on a wash analyses.

Should additional information be required, **Large Diameter Percussion Drilling** will be done where drill chips/rock fragments are blown out of the top of the hole and collected at 1m intervals and arranged to allow continuous detailed lithological descriptions of the stratigraphic horizons.

Subsequent **Downhole Geophysical Surveying** is done at every completed borehole to produce a number of profiles reflecting rock strength, coal qualities and structural features for the total length of the borehole.

A range of specialized geo-physical tools are lowered into the open borehole to record various physical and lithological characteristics of the rock mass and transmitted digitally via a cable to a computer on the surface.

A single truck is used which contains all equipment including a mobile generator.

c. The design or layout of the activity

Since exploration is temporary in nature limited permanent structures will be constructed. Negotiations and

agreements will be made with the farm owners to use any existing infrastructure like accommodation for the explorers, access roads and other things like workshops

Various designs and layouts for the mining operations have been considered and the layout has been altered to avoid potentially high impacted sensitivity areas due to inputs received from the specialists appointed on the project.

The infrastructure/ processing area is designed in existing disturbed areas to ensure that less agricultural land will be lost and outside sensitive areas.

d. The operational aspects of the activity

The alternative that has the least impact on the physical and social environment will be preferred. No operational aspects will take place within a watercourse (including wetlands) and its appropriate buffer area, within a built-up / residential area (including farm infrastructure; it will not interfere with farming operations) or within a 30m radius of heritage resources such as graveyards or historical buildings.

e. The option of not implementing the activity

The No-Go option would leave the valuable resource in the ground. The No-Go option would result in cascading effects as no economic benefit, no job creation and no supply of coal to Eskom or the export market in the future will occur. The No-Go option will however impact positively on the existing state of the area and on the availability of land for agricultural production. Furthermore, no natural areas will be impacted on.

ii. Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties.

The Public Participation Process (PPP) is developed to ensure compliance with environmental regulatory requirements and to provide I&APs with an opportunity to evaluate and comment on the proposed project. During this process stakeholders are able to provide inputs and to receive feedback from the environmental specialists, other stakeholders and the competent authority.

The objectives of PPP include:

- Provides Interested and Affected parties (I&APs) with an opportunity to voice their support, concerns and raise questions regarding the project, application or decision;
- Provides an opportunity for I&APs, Environmental Assessment Practitioners (EAPs) and the Competent Authority (CA) to obtain clear, accurate and understandable information about the environmental, social and economic impacts of the proposed activity or implications of a decision;
- Provides I&APs with the opportunity of suggesting ways of reducing or mitigating negative impacts of an activity and for enhancing positive impacts; and
- Enables the applicant to incorporate the needs, preferences and values of affected parties into the application.

The PPP must comply with the several important sets of legislation that require public participation as part of an application for authorisation or approval, namely:

- The Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 - MPRDA); and
- The National Environmental Management Act (Act No. 107 of 1998 - NEMA).

Adherence to the requirements of the above-mentioned Acts will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts.

During the process, the following methods are used to develop a stakeholder database which will be utilised to ensure a proper representation of stakeholders interested in or affected by the proposed Project. This included the following:

- Searchworks[1] and desktop searches are conducted in and around the project area to verify land ownership and obtain contact details;
- Responses received from newspaper advertisements, public notices and site notices;
- Responses received from distribution of the Background Information Document (BID) and notification letter;
- Identification and consultation with stakeholders including commenting authorities (local and district municipalities);
- Organs of state, other than the competent authority, such as the Department of Agriculture, Forestry and Fisheries (DAFF), Gauteng Department of Agriculture and Rural Development (GDARD) and South African National Roads Agency SOC Ltd (SANRAL), having jurisdiction in respect of any aspect of the proposed project and affected authorities; and
- Consultations with affected landowners.

The PPP commenced on 11 January 2019 with an initial notification to landowners and call to register. A registration period commenced on 16 January 2019 ending on the 23 of February 2019. The notification procedure included (Appendix 4):

- Newspaper advertisement: published in The Springs African Reporter on 25 January 2019;
- Site Notices: erected at prominent points on 16 January 2019;
- Public Notices: distributed to identified stakeholders, landowners and residents (where possible) on 16 January 2019;
- Consultation meetings with landowners – throughout January and February 2019 (refer to Appendix 4); and
- Public meeting on 13 February 2019 (only Mr Francois Neuhoff attended).

Registered letters and/or emails were composed and sent to the identified authorities, adjacent landowners, ward councillors and I&APs (Appendix 4). One landowner, Mr Jan Gerritsen (portion 21 of the farm Holfontein 71 IR) indicated that he does not want to participate in the process and therefore no consultation meeting took

[1] http://www.searchworks.co.za

place and no comments were received from him. Two landowners, Mr Peter John Barnes (portion 26 of the farm Welgedacht 74 IR) and EL GONDOR TRADING 162 PTY LTD (portion 27 of the farm Holfontein 71 IR) did not respond to requests for consultation meetings, they did not attend the public meeting and did not supply written comments on the draft basic assessment report. EnviroServ (portions 22 and 32 of the farm Holfontein 71 IR) is aware of the proposed project but no consultation meeting took place and no representative attended the public meeting.

All registered I&APs was notified of the availability of the draft Basic Assessment Report for public review for a period of 30 days from 1 February to 4 March 2019. All communication with registered I&APs including consultation sheets and a comments and issue register is included in the Final BAR (Appendix 4). A summary of issues raised by I&APs is addressed in the section below.

iii. Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses – Complete Issues and Comment register attached in Appendix 4)

Interested and Affected Parties List the names of persons consulted in this column,	**Date** **Comments** **Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**
AFFECTED PARTIES- COMMENTS RECEIVED DURING INITIAL PUBLIC PARTICIPATION			
Landowner/s and surrounding land owners			
Jannie Neuhoff	16 January 2019	• Not willing to sell only a portion of his land, the applicant needs to buy out everything • Wedding venue in proposed prospecting right area • Social impacts of mining on community	EAP will arrange consultation meeting with each landowner to discuss the proposed project and issues/concerns raised by landowners

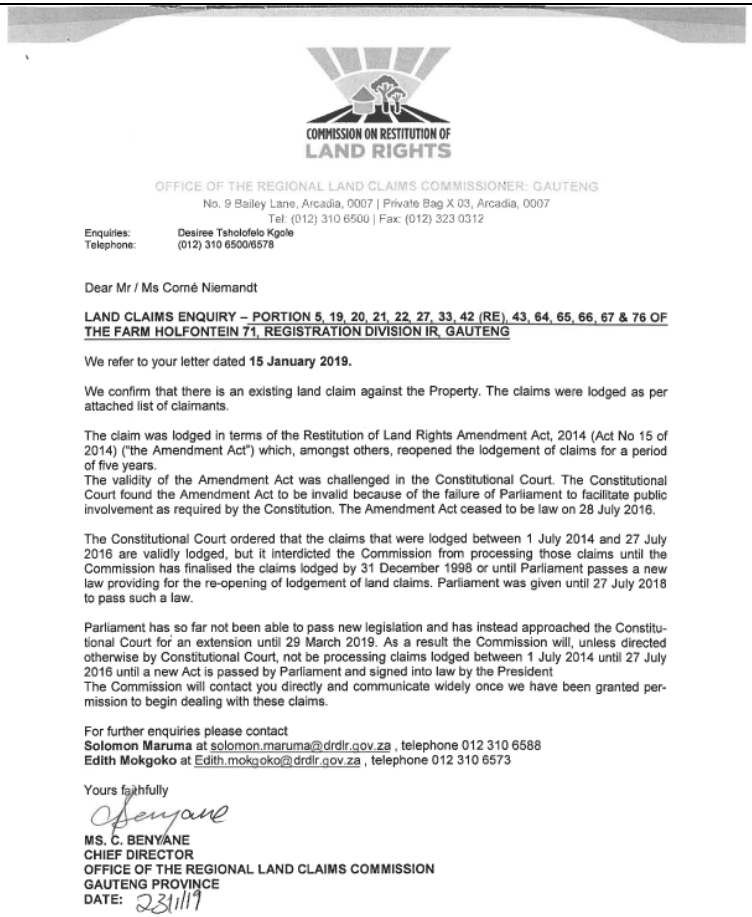
LT Berman	21 January 2019	Required more information of the project. Not willing to provide access to properties for specialists as it is unclear where activities will take place.	EAP responded via email on 21 January 2019 and provided background information of project, and explained that access to properties is required for specialists to conduct studies. The EAP explained that no drilling is currently taking place as permission has not been granted yet and that the activities are non-invasive by nature in order to obtain information as part of the BA process. EAP will arrange consultation meeting with each landowner to discuss the proposed project and issues/concerns raised by landowners
Dr Jacobus Greeff – Rowan Feed	January 2019	Required more information of the project.	EAP sent Background Information Document and will arrange consultation meeting with each landowner to discuss the proposed project and issues/concerns raised by landowners
Jannie Neuhoff Landowner: Portions 19 and 20 of the Farm Holfontein 71 IR	1 February 2019	Comments made during consultation meeting with Mr Neuhoff: Mr Neuhoff is a directly affected landowner and also an adjacent landowner regarding the proposed project. Mr Neuhoff is concerned with regards to the following: • Dust pollution • Groundwater pollution and quantities: Farmers and small holdings in area are dependent on groundwater (boreholes) – minimal supply from municipality • Visual pollution • Property value loss adjacent to a mine	The impacts regarding prospecting was included in the basic assessment report, and is specifically addressed in sections ***Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts page 84*** **and The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.** ***page 92*** Only impacts with regards to prospecting activities can be

		• Loss of high agricultural potential land Even though the impacts of prospecting is low compared to mining activities, we all know that eventually a prospecting right leads to a mining right application. Accordingly, the future impacts of mining within this area should be taken into account now. Currently busy with the development of residential units and a supermarket adjacent the proposed prospecting area and extends until 1km from the boundary. Possible future mining could have economic and social impacts on such developments. Mr Neuhoff provided Enviro-Insight a copy of: Coal, water and mining flowing badly (K Forrest & L Loate, June 2017). Mr Neuhoff would like to draw the attention to the DMR on the findings of this study, and the negative impacts coal mining has on the agricultural sector.	assessed and addressed for the current project. All mining related impacts need to be addressed if a mining right application is applied for. **Mr Neuhoff would like to draw the attention to the DMR on the findings of Coal, water and mining flowing badly (K Forrest & L Loate, June 2017), and the negative impacts coal mining has on the agricultural sector**

LT Berman	6 February 2019	Comments made during consultation meeting with Mr Berman and his daughter Tzipporah: Mr Berman is a directly affected landowner and also an adjacent landowner regarding the proposed project. Mr Berman wanted information on the project and was under the impression this was for another project (Welgedacht Mining Right Application which affects other properties of Mr Berman). After explaining that this project is for prospecting right on different properties, Mr Berman required background information on the project. Mr Berman has worked with the applicant before and was willing to provide access to his properties for specialists to conduct their fieldwork. The following concerns were raised: • compensation for damage to property, • will drilling take place during the planting season, • will the results of the drilling be communicated to him, • dust pollution, • drilling impact on groundwater	The EAP explained the current project to Mr Berman and indicated that this is separate from other mining or prospecting right applications or permits. The concerns addressed regarding this project involving prospecting activities has been included in the Basic Assessment report.
Alfred Gama Landowner: Portion 32 of the Farm Welgedacht 74 IR	4 March 2019	1) The farm depends on underground water (boreholes). I wonder whether my borehole supply will be adversely affected. 2) The structures are also on the farm. Will they not be damaged (cracks) with the mining 3) Pollution of the water by the drilling. Is there any negative impact on the water.	1) Underground water supply will not be affected as the drilling will occur away from surface water bodies (including boreholes). The drilling, if done appropriately, will not impact on the quantity of underground water. Drilling has occurred in the region before and no reduction in groundwater has been reported by any landowner. 2) No structures will be damaged by prospecting activities. Drilling will occur away from structures where impacts will be less. 3) As mentioned, drilling has occurred previously on some of the surrounding farms and has been monitored. No negative impacts from drilling are anticipated

			regarding groundwater pollution. This will be monitored throughout the project and will be addressed accordingly should an accident occur. Spill kits will be available on site for unforeseen events, but if the mitigation measures are followed and the contractor operates n a responsible manner no pollution of groundwater should occur.
Lawful occupier/s of the land			
None participated			
Landowners or lawful occupiers on adjacent properties			
Francois Neuhoff	13 February 2019	Refer to Appendix 4 for the minutes of the public meeting	Refer to Appendix 4 for the minutes of the public meeting
Municipality - Ekurhuleni Municipality			
Attention: Cecilia Rakgoale		Ekurhuleni received a copy of the draft BAR for review. No comments received.	Background Information Document provided and the draft BA report was delivered. No response from Ekurhuleni Municipality after phone calls and emails.
Municipal councillor: Cllr. Dean Desmond Stone - Ward 75		No comments received	Background Information Document provided and notification on availability of draft BA report. Emails were sent, no response received.
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)			
Department of Water Affairs		DWS received a copy of the draft BAR for review. No comments received.	No comments received.

Department of Agriculture, Forestry and Fisheries		DAFF received a copy of the draft BAR for review. No comments received.	No comments received.
Gauteng Department of Agriculture and Rural Development		GDARD received a copy of the draft BAR for review. No comments received.	No comments received.
Dept. Land Affairs (DRDLR)			
Amukelani Hulsky Shiburi	24 January 2019	DRDLR informed Enviro-Insight of land claims on the farm Holfontein 71 IR and Welgedacht 74 IR. Refer to Appendix 4 for more information.	Noted



COMMISSION ON RESTITUTION OF LAND RIGHTS

OFFICE OF THE REGIONAL LAND CLAIMS COMMISSIONER: GAUTENG
No. 9 Bailey Lane, Arcadia, 0007 | Private Bag X 03, Arcadia, 0007
Tel: (012) 310 6500 | Fax: (012) 323 0312

Enquiries: Desiree Tsholofelo Kgole
Telephone: (012) 310 6500/6578

Dear Mr / Ms Corné Niemandt

LAND CLAIMS ENQUIRY – PORTION 5, 19, 20, 21, 22, 27, 33, 42 (RE), 43, 64, 65, 66, 67 & 76 OF THE FARM HOLFONTEIN 71, REGISTRATION DIVISION IR, GAUTENG

We refer to your letter dated **15 January 2019.**

We confirm that there is an existing land claim against the Property. The claims were lodged as per attached list of claimants.

The claim was lodged in terms of the Restitution of Land Rights Amendment Act, 2014 (Act No 15 of 2014) ("the Amendment Act") which, amongst others, reopened the lodgement of claims for a period of five years.
The validity of the Amendment Act was challenged in the Constitutional Court. The Constitutional Court found the Amendment Act to be invalid because of the failure of Parliament to facilitate public involvement as required by the Constitution. The Amendment Act ceased to be law on 28 July 2016.

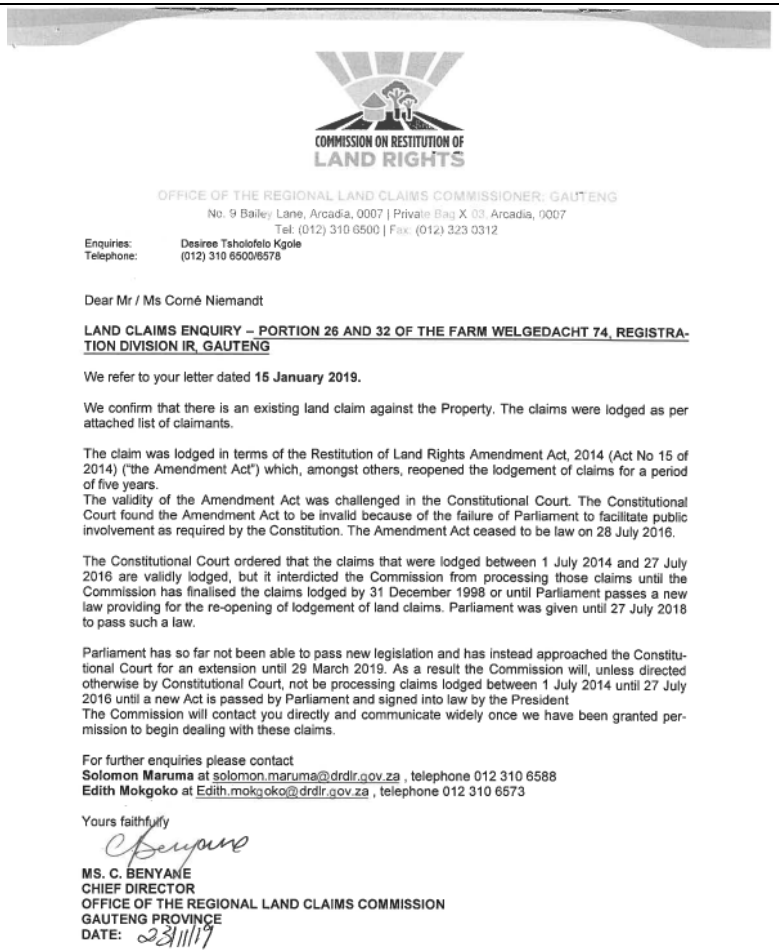
The Constitutional Court ordered that the claims that were lodged between 1 July 2014 and 27 July 2016 are validly lodged, but it interdicted the Commission from processing those claims until the Commission has finalised the claims lodged by 31 December 1998 or until Parliament passes a new law providing for the re-opening of lodgement of land claims. Parliament was given until 27 July 2018 to pass such a law.

Parliament has so far not been able to pass new legislation and has instead approached the Constitutional Court for an extension until 29 March 2019. As a result the Commission will, unless directed otherwise by Constitutional Court, not be processing claims lodged between 1 July 2014 until 27 July 2016 until a new Act is passed by Parliament and signed into law by the President
The Commission will contact you directly and communicate widely once we have been granted permission to begin dealing with these claims.

For further enquiries please contact
Solomon Maruma at solomon.maruma@drdlr.gov.za , telephone 012 310 6588
Edith Mokgoko at Edith.mokgoko@drdlr.gov.za , telephone 012 310 6573

Yours faithfully

MS. C. BENYANE
CHIEF DIRECTOR
OFFICE OF THE REGIONAL LAND CLAIMS COMMISSION
GAUTENG PROVINCE
DATE: 23/1/19



COMMISSION ON RESTITUTION OF LAND RIGHTS

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Tel: (012) 310 6500 | Fax: (012) 323 0312

Enquiries: Desiree Tsholofelo Kgole
Telephone: (012) 310 6500/6578

Dear Mr / Ms Corné Niemandt

LAND CLAIMS ENQUIRY – PORTION 26 AND 32 OF THE FARM WELGEDACHT 74, REGISTRATION DIVISION IR, GAUTENG

We refer to your letter dated **15 January 2019.**

We confirm that there is an existing land claim against the Property. The claims were lodged as per attached list of claimants.

The claim was lodged in terms of the Restitution of Land Rights Amendment Act, 2014 (Act No 15 of 2014) ("the Amendment Act") which, amongst others, reopened the lodgement of claims for a period of five years.
The validity of the Amendment Act was challenged in the Constitutional Court. The Constitutional Court found the Amendment Act to be invalid because of the failure of Parliament to facilitate public involvement as required by the Constitution. The Amendment Act ceased to be law on 28 July 2016.

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Yours faithfully

MS. C. BENYANE
CHIEF DIRECTOR
OFFICE OF THE REGIONAL LAND CLAIMS COMMISSION
GAUTENG PROVINCE
DATE: 23/11/19

Dept. Environmental Affairs

		DEA received a copy of the draft BAR for review. No comments received.	No comments received.
Other Interested and Affected Parties			
Jonathan Hericourt Gold One Group –Welgedacht 74 and Holfontein 71 MR	January 2019	We have future plans to mine the black reef and main reef in certain parts of our MR which may overlap with the possible exploration area. Future possible shaft to access gold resources could be on Holfontein 71 IR. The socio-economic conditions would dependent on what is finally proposed as far as mining of coal is concerned. Close liaison between Gold One and the Coal company to ensure we address any potential issues as early as possible.	Noted. The applicant takes note of this and will consult with Gold One where necessary.

*The full comment and response sheet can be found in Appendix 4

iv. The Environmental attributes associated with the alternatives.

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

1. Climate

1.1 Temperature

The temperatures are highest on average in January (>27 °C) with the lowest temperatures in the year occurring in July (<5°C) (Figure 1-4).

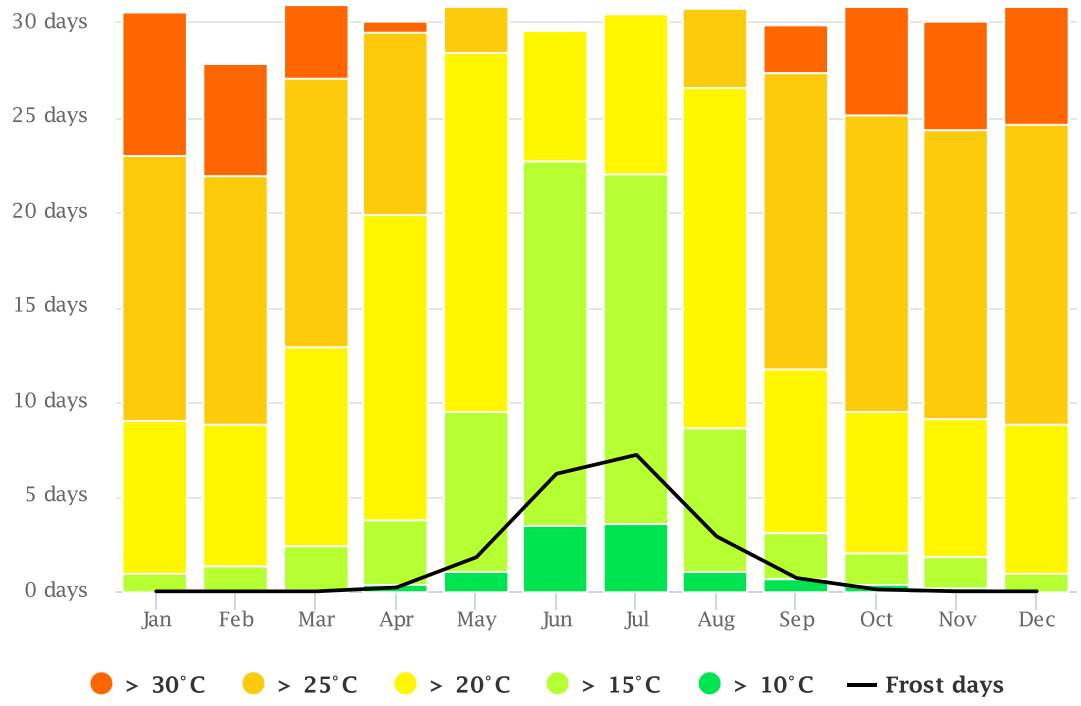


Figure 1-4: Monthly temperature of the study area.

1.2. Mean monthly precipitation

This area normally receives approximately 682mm of rain per year, with most rainfall occurring during the summer months (Oct - Feb). The least amount of rainfall occurs in July and the greatest amount of precipitation occurs in January, with an average of 115mm. The chart below (Figure 1-5) shows the average rainfall values for the study area per month.

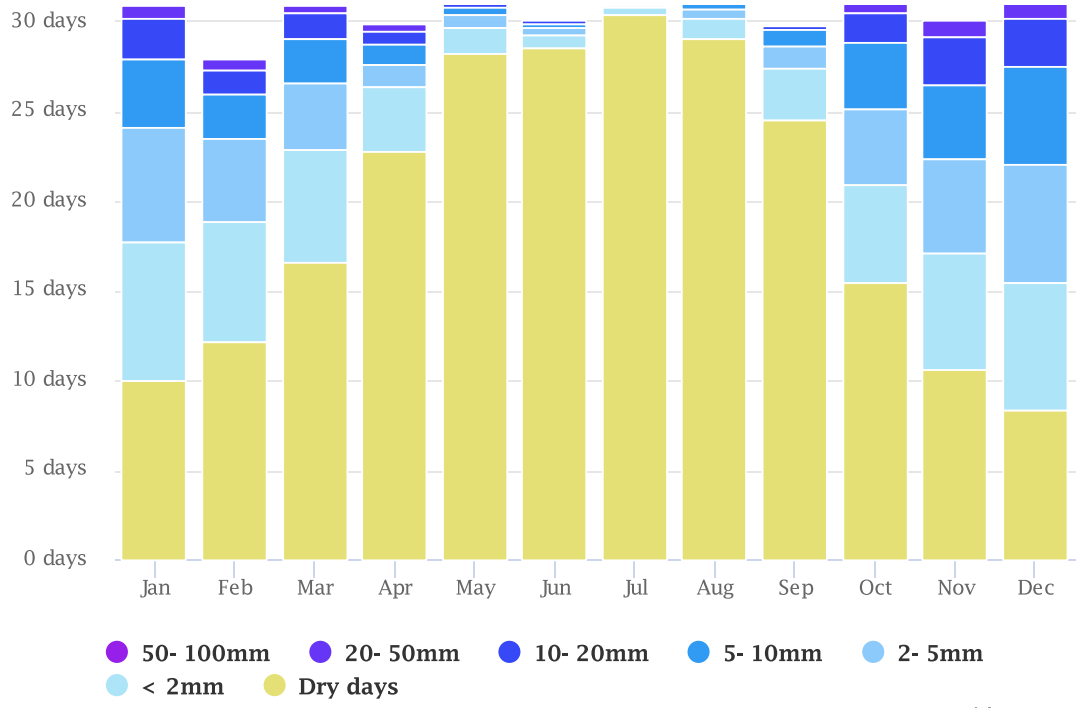


Figure 1-5: Monthly precipitation of the study area.

1.3. Wind speed

The average wind speed ranges from 5 km/h to >38 km/h throughout the year. Wind speed is high during the months of August, September and October, reaching speeds of more than >38 km/h on some days. From February to June, average wind speed is approximately 12 km/h per day (Figure 1-6).

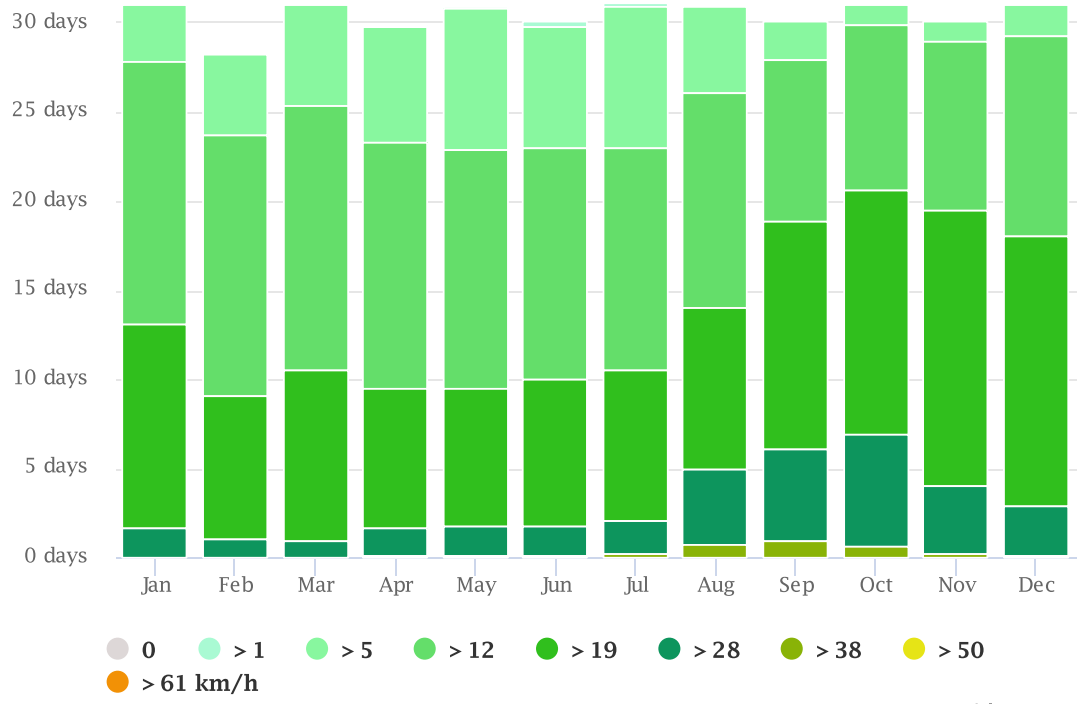


Figure 1-6: Wind speed data of the study area.

2. Topography

The general topography of the area can be characterised as relatively flat landscapes. The terrain is gently undulating with the main fall of the land to the west.

The highest point in the area located towards the south east of the study area is approximately 1642 metres above mean sea level (m.a.m.s.l), while the lowest point located on portion 32 of the farm Holfontein 71 IR is approximately 1595 m.a.m.s.l.

3. Geological Formation

The Ermelo Coalfield is situated in south east Mpumalanga Province between Carolina in the north and Dirkiesdorp in the south, Morgenzon in the west and Amsterdam in the east. The northern and eastern boundaries are defined by the sub-outcrop of the coal-bearing strata against pre-Karoo rocks. The western and southern boundaries are rather arbitrarily defined as straight lines forming the western boundary with the Highveld Coalfield and the southern boundary with the Coalfields of KwaZulu-Natal.

All of the coal Seams occur within the Vryheid Formation of the Ecca Group (Karoo Supergroup). The Karoo Supergroup comprises the following Groups (decreasing age): Dwyka; Ecca; Beaufort; Stormberg and Drakensberg. The Ecca Group comprises the following Formations (decreasing age): Pietermaritzburg; Vryheid and Volksrust.

Within the Ermelo Coalfield, only the Pietermaritzburg and Vryheid Formations are present with the Volksrust Formation having been eroded away. The Pietermaritzburg Formation, however, is only well developed in the southern parts of the Coalfield. There are five major coal Seams developed in the Ermelo Coalfield, named from the base up: the E Seam; the D Seam; the C Seam; the B Seam and the A Seam.

The B and C Seams have previously been described as coal zones since these Seams are often locally split by clastic partings resulting in several coal "Seams" separated by thin sand and siltstone partings. These Seams are then renamed as the B Upper and B Lower Seams, or C Upper and C Lower Seams. Basement topography and the present-day erosional surface control the distribution of the coal Seams and not all five Seams may be present at any one locality. The D and E Seams are thin to absent over much of the Coalfield and only the E Seam reaches mineable thicknesses in isolated patches in the northern parts of the Coalfield. The B and C Seams are most widely developed, and to mineable thicknesses, in the Coalfield. The A Seam has, over large areas of the northern and central areas of the Coalfield, been removed by erosion. Although to a lesser extent, the B and C Seams have also been removed by erosion.

Locally, fluvial channels cause erosion resulting in the non-deposition and thinning of coal Seams. The effects of channelling are evident in the central parts of the Coalfield where thick channel sandstones have been delineated which affect the C and C Lowers Seams. The coal Seams are generally flat-lying to gently undulating with a regional dip to the south-west. The Seams are relatively unaffected by folding although faulting and associated dolerite (igneous) intrusions are common throughout the Coalfield. Dolerite intrusions take the form of vertical to near vertical dykes, often intruding existing faults, and sills, which are parallel to bedding planes. Sills are also often transgressive resulting in the relative displacement of strata.

The number of sills increases to the south and up to eight major sills have been identified. An additional effect of dolerite intrusions is the burning or devolatilisation of coal in close proximity to the dolerites. Large areas of coal in the south have either been completely destroyed (burnt) or devolatilised by numerous dykes ranging in thickness from 3 – 5m. Dolerite intrusions not only sterilise available resources but also disrupt mining activities.

4. Roads

Important road networks in the area include the N12 freeway which runs between the properties of the study area, Pansy Avenue (which connects Springs and Etwatwa) located towards the west of the study area and transects the northern section of the study area, Laris Street located on the northern boundary of the study area, Stoffberg Avenue running through the southern section of the study area, Holfontein Road is the turn-off out of Stoffberg Avenue to gain access to the western section of the farm Welgedacht 74 IR, and Katboschfontein Road turnoff from Holfontein Road to gain access to the eastern section of the farm Welgedacht 74 IR and the southern portions of the farm Holfontein 71 IR (Figure 1-7).

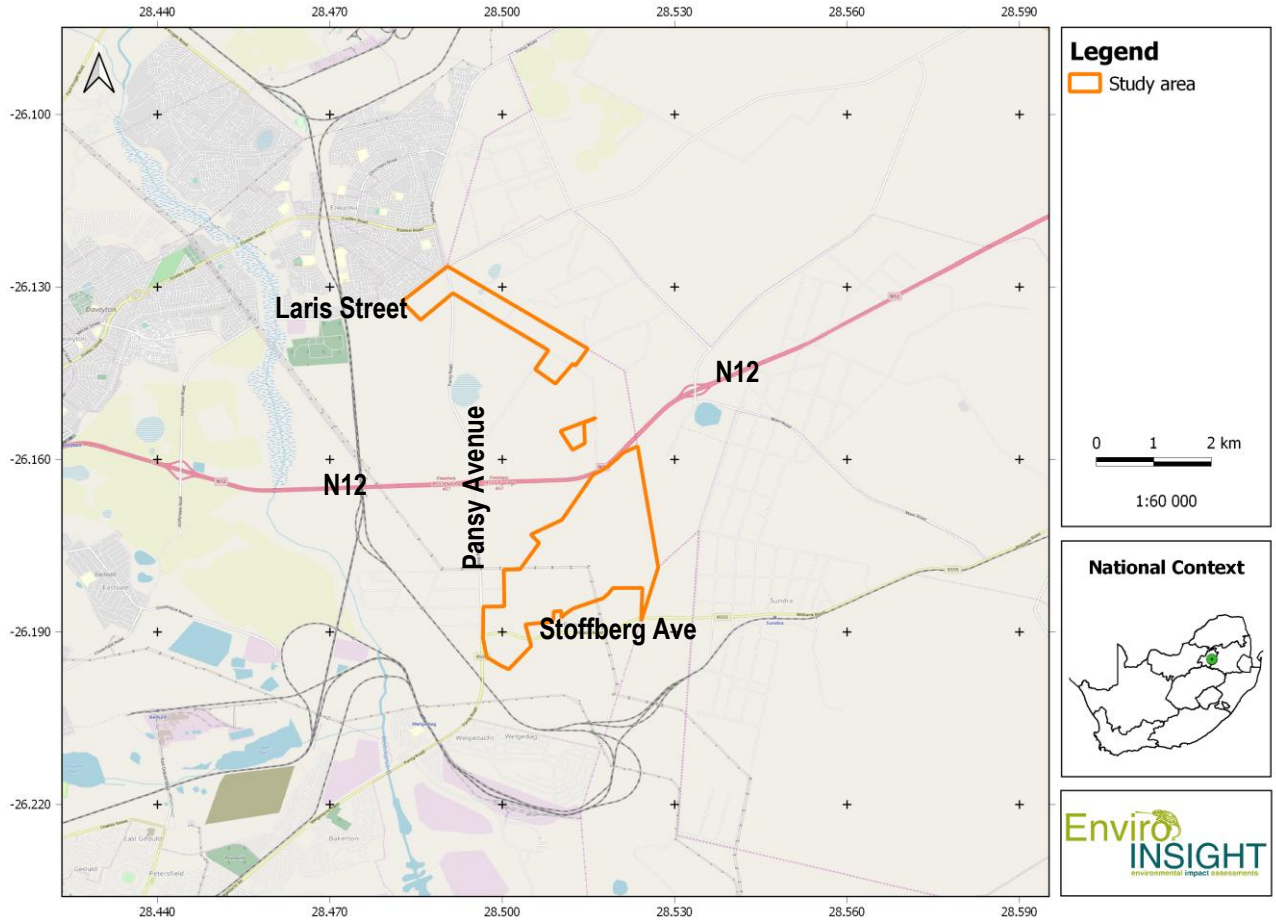


Figure 1-7: Map indicating the roads that transect and surround the study area.

5. Terrestrial Ecology

5.1. Regional Vegetation

The study area is located predominantly in the **Eastern Highveld Grassland (Gm 12)** vegetation type which is regarded as Endangered (Mucina & Rutherford, 2018) (Table 1-3). The Eastern Highveld Grassland occurs on plains in the Mpumalanga and Gauteng Provinces (Mucina & Rutherford, 2018). This vegetation type extends from Johannesburg in the west to Belfast in the east and Bethal and Ermelo in the south. The topography consists of slightly too moderately undulating plains with some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition such as species from the genera *Aristida, Digitaria, Eragrostis, Themeda* and *Tristachya*, with small, scattered rocky outcrops with wiry, sour grasses and some woody species such as *Senegalia caffra, Celtis africana, protea caffra* and *Searsia magalismontanum*.

This vegetation type is classified as Endangered with only a small fraction conserved in statutory (such as Nooitgedacht Dam) and in private reserves (Holkrans, Kransbank). The national target for conservation protection for this vegetation type is 24%. Some 44% of this vegetation type was classified as transformed

primarily by cultivation, plantations, mining, urbanisation of building of dams (Mucina & Rutherford, 2018), of which cultivation had a more extensive impact. *Acacia mearnsii* can become dominant in disturbed areas.

Table 1-3: Attributes of the Eastern Highveld Grassland vegetation type.

Name of vegetation type	Eastern Highveld Grassland
Code as used in the Book - contains space	Gm 12
Conservation Target (percent of area) from NSBA	24%
Protected (percent of area) from NSBA	0.3%
Remaining (percent of area) from NSBA	56%
Description of conservation status from NSBA	Endangered
Description of the Protection Status from NSBA	Hardly protected
Area (km^2) of the full extent of the Vegetation Type	12669.037
Name of the Biome	Grassland Biome

Table 1-4: Important Plant Taxa characteristic of the Eastern Highveld Grassland vegetation type.

Plant form	Species
Low shrubs	*Anthospermum rigidum subs. pumilum, Seriphium plumosum*
Succulent herbs	*Aloe ecklonis*
Geophytic bulbs	*Gladiolus crassifolius, Haemanthus humilis, Hypoxis rigidula, Ledebouria ovatifolia*
Graminoids (grasses and sedges)	*Aristida aequiglumis, A. congesta, Brachiaria serrata, Cynodon dactylon, Digitaria monodactyla, Elionurus muticus, Eragrostis chloromelas, E. curvula, E. plana, E. racemosa, Heteropogon contortus, Sporobolus africanus, Loudetia simplex, Microchloa caffra, Setaria sphacelata, Sporobolus africanus, Themeda triandra, Trachypogon spicatus and Tristachya leucothrix.*
Herbs	*Berkheya setifera, Haplocarpha scaposa, Justicia anagalloides, Pelargonium luridum, Acalypha angustata, Dicoma anomala, Euryops gilfillanii, Helichrysum aureonitens, H. caespititium, H. callicomum, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata.*

A small portion of the study area falls in the **Eastern Temperate Freshwater Wetlands** (**AZf 3)** located on Portions 42 and 43 of the farm Holfontein 71 IR towards the east of the study area. This vegetation unit is embedded within the Grassland Biome and can best be described as wetland vegetation surrounding bodies of water and periodically flooded areas. It occurs in the Northern Cape, Eastern Cape, Free State, North-West, Gauteng, Mpumalanga and KwaZulu-Natal Provinces as well as in neighbouring Lesotho and Swaziland around water bodies with stagnant water (lakes, pans, periodically flooded vleis, edges of calmly flowing rivers) with altitudes ranging from 750–2 000 m.

The wetlands vegetation primarily comprises grasses and sedges with very few trees and no shrubs present. Vegetation covers 85 % of the total land cover with bare soil comprising ~15% of the total cover. Soils are humus-rich black turf. The topography or slope is between 1~4° and drainage is good along the channelled and unchannelled valley bottoms (above the Dominant grass and sedge species are *Phragmites australis, Typha capensis, Schoenoplectus corymbosus, Cyperus margaritaceus, Leersia hexandra* and *Mariscus dregeanus*. Indigenous herbs include hydrophilic or moisture-loving species *Persicaria lapathifolia* and *Persicaria attenuata* together with the *Rumex lanceolatus*. Common alien species encountered in this type of wetland include: *Bidens bidentata*, *Cirsium vulgare*, *Conyza bonariensis*, *Oenothera rosea*, *Physalis viscosa*, *Plantago lanceolata*, *Rumex crispus*, *Sesbania punicea*, *Schkuhria pinnata*, *Stenotaphrum secundatum* (native on South African coast, alien on highveld), *Trifolium pratense*, *Verbena bonariensis*, *V. brasiliensis*, and *Xanthium strumarium.*

This vegetation type is classified as least threatened with a conservation target of 24% but only 4.6% is protected in the Blesbokspruit (Ramsar site), Marievale, Olifantsvlei, Seekoeivlei (a Ramsar site), Wakkerstroom Wetland and other areas. Some 15% has been transformed to cultivated land, urban areas or plantations. In places intensive grazing and use of lakes and freshwater pans as drinking pools for cattle or sheep cause major damage to the wetland vegetation (Mucina & Rutherford, 2018).

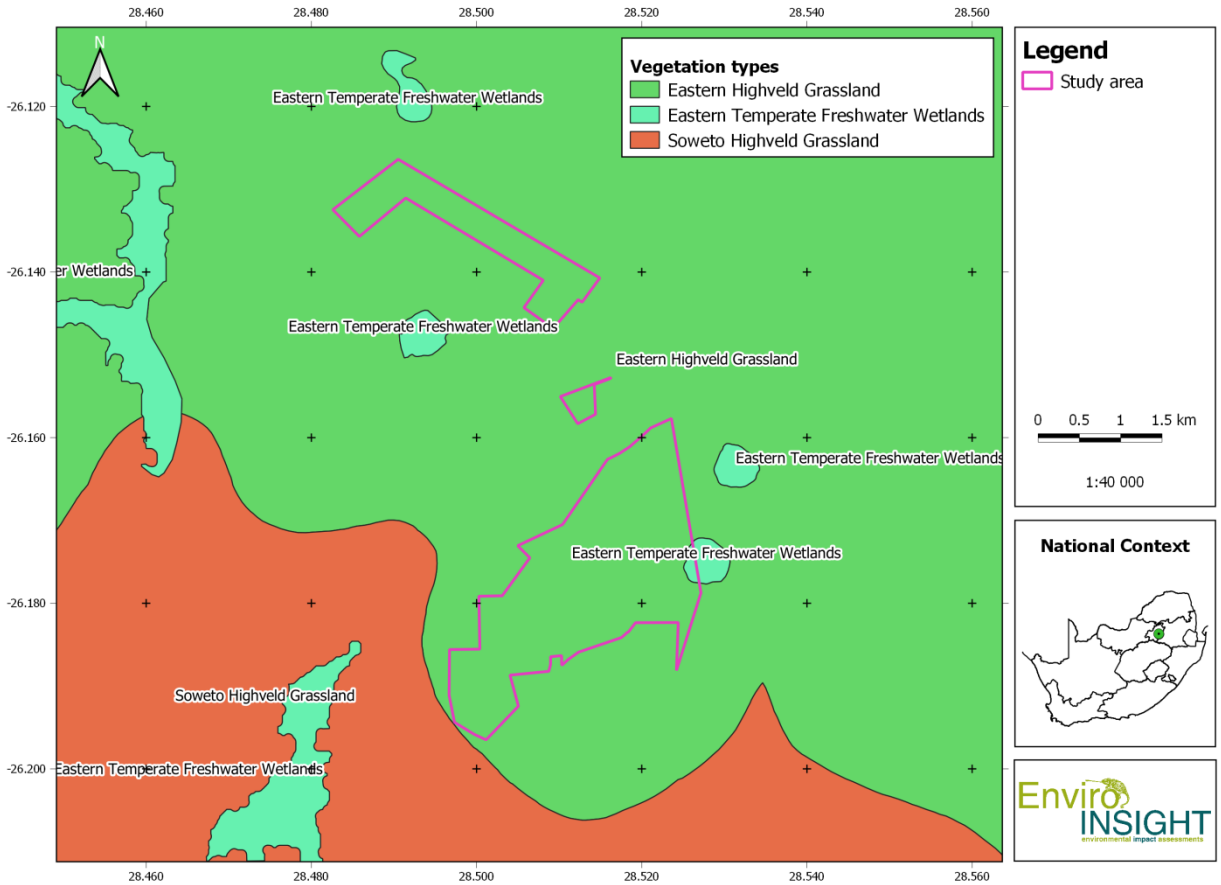


Figure 1-8: Regional vegetation types in relation to the study area (Mucina & Rutherford, 2018).

5.2. Threatened Ecosystems

The majority of the study area is located in the Critically Endangered (CR) Blesbokspruit Highveld Grassland and a small section in the Vulnerable Eastern Highveld Grassland towards the east of the study area (Figure 1-9).

The Blesbokspruit Highveld Grassland is geographically located on the East Rand of Gauteng including Endicott, Springs, and Benoni (QDGC's 2628BC, 2628AD, and 2628AB respectively). The ecosystem is delineated by the Blesbokspruit and its tributaries together with associated wetlands and pans. River, wetlands and pans in the ecosystem include the Blesbokspruit, Klein-Biesbokspruit, Verdrietlaagte, Karringmelkpan, Riet Pan, Spaarwater Pan, University Pan, Varkfontein Pan, and various other unnamed wetlands and pans. Currently only 1% is protected in the Marievale Bird Sanctuary of the remaining 85% of its original area. Species of conservation concern include 26 threatened or endemic plant and animal species. Key biodiversity features include Red or Orange Listed plants for example *Delosperma leendertziae* and *Khadia beswickii*; Red or Orange Listed mammals for example the Spotted necked Otter and Brown Hyena; Red or Orange Listed birds for example the African Grass-Owl, Greater Flamingo, Lesser Flamingo, African Marsh-Harrier, Secretarybird, Yellow-billed Stork, Caspian Tern, Melodious Lark, Lesser Kestrel, White-bellied Korhaan, and Corncrake; Red or Orange Listed amphibians including the Giant Bullfrog; Red or Orange Listed or priority invertebrates for example the Heidelberg Copper Butterfly, and the Golden Starburst Baboon Spider.

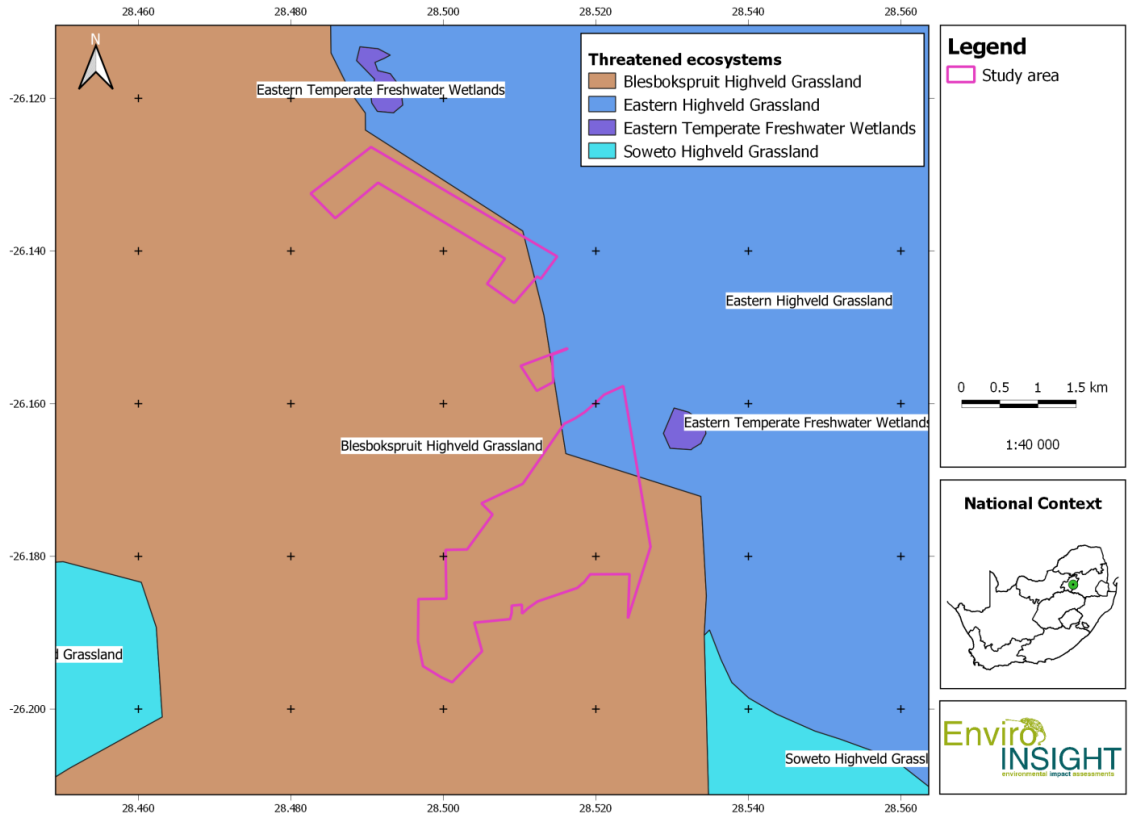


Figure 1-9: The study area in relation to threatened ecosystems.

5.3. Gauteng Conservation Plan Version 3.3

The main aims of Gauteng Conservation Plan Version 3.3 (GDARD, 2014[a] – Technical report) are to:

- Serve as the basis for biodiversity inputs into land use planning processes in the province.
- Serve as the basis for biodiversity inputs into bioregional plans for municipalities within the province.
- Serve as the primary informant for the biodiversity component of the Basic Assessment and Environmental Impact Assessment (EIA) processes.
- Guide protected area expansion and biodiversity stewardship programmes in the province.

The Gauteng C-Plan v3.3 (2011), commonly known as a Critical Biodiversity Areas Map, delineates biodiversity priority areas called Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA) and Protected Areas (PA). The map is designed to be used at approximately 1:50 000 scale. The Critical Biodiversity Areas are comprised of key areas that are required to meet national biodiversity pattern and process targets. Ecological Support Areas are areas required to prevent the degradation of Critical Biodiversity Areas and Protected Areas.

Input layers into Gauteng C-Plan v3.3 (2011) included a new land cover map, a new vegetation map, a range of revised threatened species data, data on important aquatic features including pans, unique aquatic biodiversity features and best-condition quaternary catchments, and priority areas for climate change adaptation. The Ecological Support Areas included comprised of dolomite areas, aquatic features which were not includes as CBAs (rivers, floodplains, and wetlands), as well as additional areas important for climate change adaptation such as ridges. The analysis process avoided areas of high conflict with other land uses, and favoured inclusion of areas best aligned with local planning instruments (e.g. identified Metropolitan Open Space Systems).

Protection of the priority areas identified in Gauteng C-Plan v3.3 would sufficiently contribute (on a proportional basis to ecosystem extent in Gauteng Province) to meeting national biodiversity targets for the South African vegetation types. Further, although nationally identified Freshwater Ecosystem Priority Areas (Nel *et al.*, 2011) are not included as features in the analysis, these areas are sufficiently represented in the CBA and ESA areas.

CBAs include both terrestrial and aquatic habitats, including threatened species and their habitat requirements, as well as important ecological process that ensure the persistence of biodiversity.

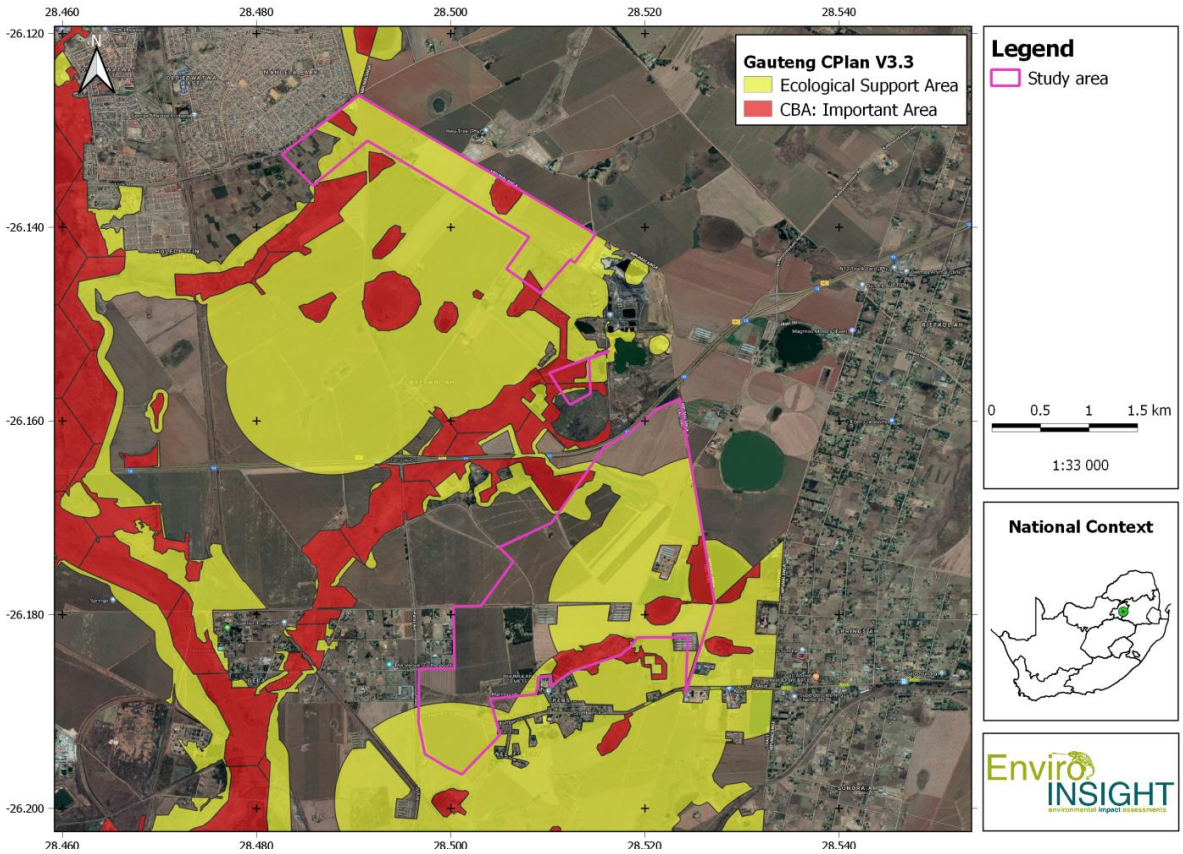


Figure 1-10: The study area in relation to the Gauteng Conservation Plan (2011).

The Biodiversity Classification categories in the study area are defined as follows:

- **CBA: Important** – best-design sites which represent an efficient configuration of sites to meet targets in an ecologically sustainable way that is least conflicting with other land uses and activities.
- **ESA**: Natural, near-natural, degraded or heavily modified areas required to be maintained in an ecologically functional state to support Critical Biodiversity Areas and/or Protected Areas.

According to the spatial dataset of the GDARD C-Plan (GDARD, 2011), the study area is located in CBA: Important and ESA (Figure 1-10).

Biodiversity features in terms of fauna and flora included for the CBA's in and surrounding the study area are (Figure 1-11):

- Primary vegetation; and
- Red Listed Bird Habitat.

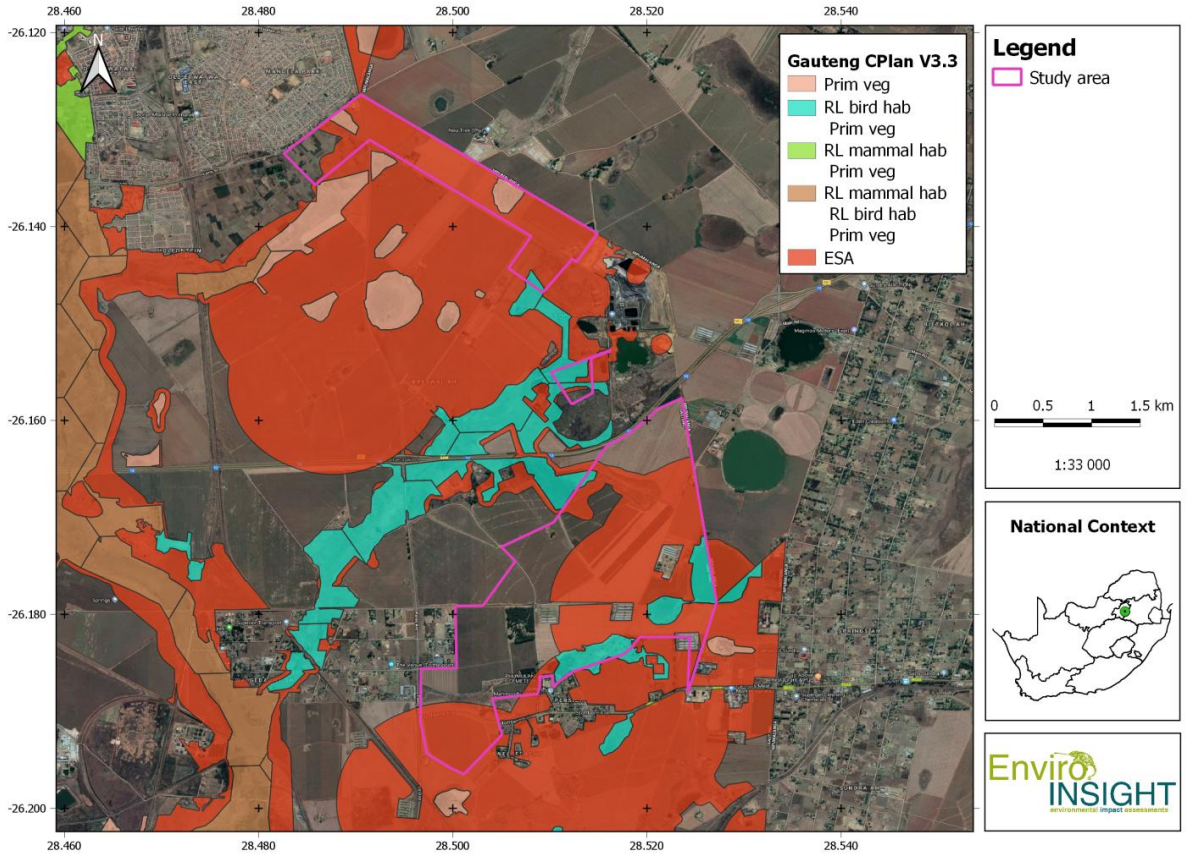


Figure 1-11: The study area in relation to the Gauteng Conservation Plan V3.3 (2011): Biodiversity features.

5.4. Important Bird Areas (IBA)

Located approximately 2.6 km south-west of the study area is the Blesbokspruit IBA and has also been proclaimed a RAMSAR site. The Blesbokspruit IBA is a large, highly modified, high-altitude wetland with a narrow fringe of degraded grassland. It extends along the Blesbokspruit, one of the Vaal River's larger tributaries, from the Grootvaly Wetland Reserve (R555) in the North to the Marievale Bird Sanctuary (R42) in the South. More than 220 species have been recorded for the IBA in SABAP2. The Blesbokspruit, which in the past regularly supported 20 000 waterbirds, was designated a Ramsar Wetland of International Importance for waterbirds in 1986.

The water is highly productive, providing ample food for Lesser Flamingo (*Phoeniconaias minor*) and Greater Flamingo (*Phoenicopterus roseus*) African Marsh Harrier (*Circus ranivorus*), which has been displaced from much of the surrounding veld as a result of intense industrialisation, urbanisation and habitat modification, is a breeding resident. African Grass Owl (*Tyto capensis*) is now rarely recorded along the Blesbokspruit, its local population decline being attributed to a reduction in its preferred rank grassland habitat adjacent to the wetland. Large volumes of water discharged upstream have increased the extent and permanence of flooded ground, while reed encroachment, unplanned fires, uncontrolled grazing by cattle and invasion by alien forbs contribute to the degradation of the remaining terrestrial habitat (Figure 1-12).

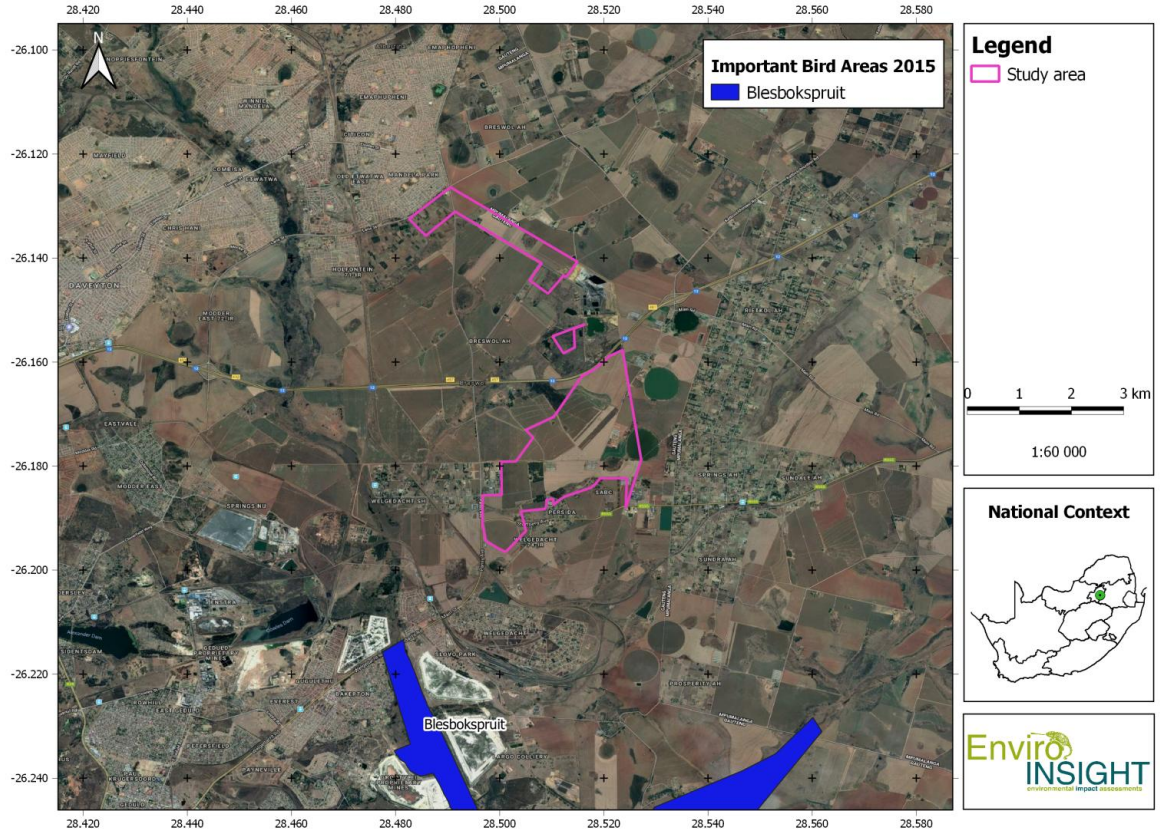


Figure 1-12: The study area in relation to Important Bird Areas.

5.5. Mining and Biodiversity

In 2012, South African Mining and Biodiversity Forum in partnership with the Department of Environmental Affairs and the Department of Mineral Resources, and with technical input and coordination of South African National Biodiversity Institute (SANBI) produced a guideline to highlight areas of high biodiversity in relation to mining risk for South Africa: Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (DEA *et al*., 2013; SANBI, 2012). This study was very comprehensive at the time of publication but could not benefit from key datasets that were developed thereafter e.g. the updated National landcover (2013/2014) dataset. The Mining and Biodiversity Guideline (SANBI, 2012) used "biodiversity priority areas" to develop their final dataset and defined these as follows:

- Protected areas;
- World heritage sites and their legally proclaimed buffers;
- Critically endangered and endangered ecosystems;
- Critical biodiversity areas;
- River and wetland freshwater ecosystem priority areas (FEPAs), and 1 km buffer of river and wetland FEPAs;
- RAMSAR sites;
- Protected area buffers;

- Transfrontier Conservation Areas (remaining areas outside of formally proclaimed PAs);
- High water yield areas;
- Coastal protection zone;
- Estuarine functional zones; and
- Ecological support areas.

The Mining and Biodiversity Guideline (SANBI, 2012) shows that large sections of the study area are located in category B (Highest Biodiversity Importance), and D (Moderate Biodiversity Importance), which indicate that there is a high to moderate risk from mining activities (Figure 1-13). The high risk category (B) is predominantly due to the critically endangered ecosystems, Critical Biodiversity Areas, the presence of NFEPA wetlands and primary vegetation. If biodiversity features are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. If an Environmental Authorisation is granted, limits may be set on allowed activities and impacts, and may specify biodiversity offsets that would be written into licence agreements and/or authorisations. For prospecting activities, these areas should be avoided and areas with moderate to low biodiversity sensitivity should be considered.

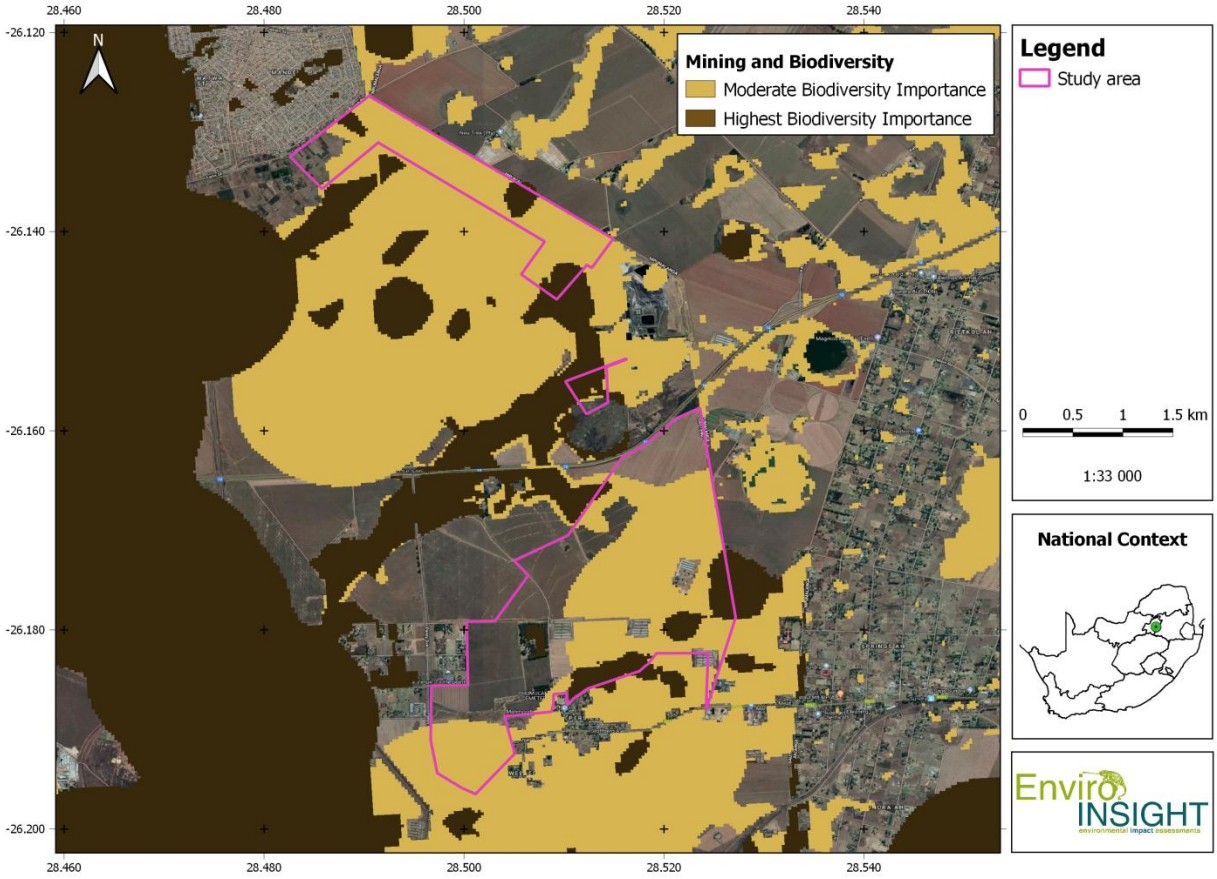


Figure 1-13: The study area in relation to Mining and Biodiversity Areas (SANBI, 2012).

5.6. Habitats

Four habitats were identified of which three are natural and all remaining areas including agricultural lands and infrastructure are grouped together (Figure 1-14).

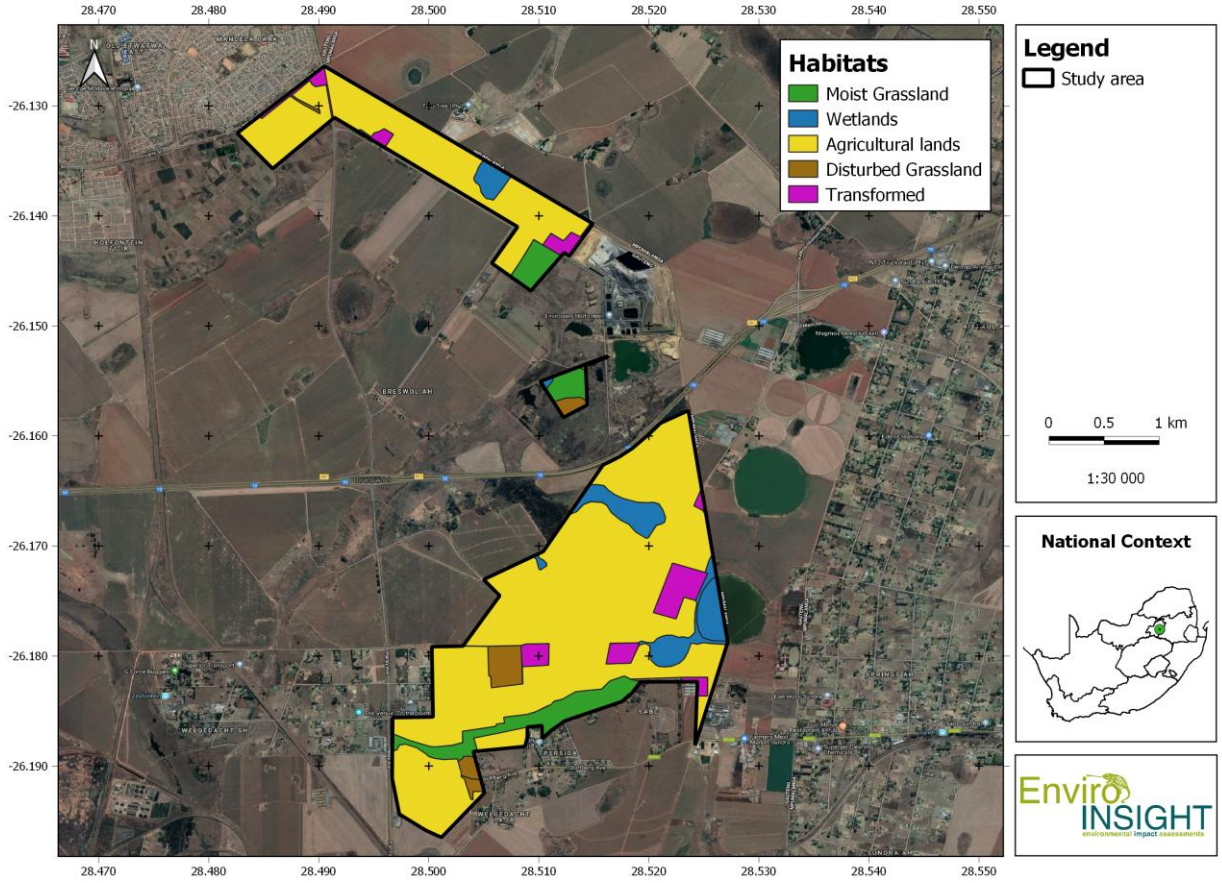


Figure 1-14: Habitats identified for the study area.

5.6.1. Moist Grassland

Moist Grassland patches are associated with wetland pans that occur in a mosaic of agricultural lands throughout the study area. The Moist Grassland has been negatively impacted on by agricultural practices, cattle grazing and alien invasive species (Figure 1-15). Despite limitations regarding site access and the current impacts, areas that were left intact showed a moderate diversity of grasses and forbs. About 50 individuals of the Orange List species *Hypoxis hemerocallidea* was recorded in this habitat.

Table 1-5: Plant species recorded in the Moist Grassland during the site visit.

Growth form	Species
Shrubs and dwarf shrubs	*Ziziphus zeyheriana**
Graminoids	*Cynodon dactylon, Cymbopogon caesius, Digitaria diagonalis var. diagonalis, Diheteropogon amplectens, Eragrostis curvula, Eragrostis chloromelas, Hyparrhenia hirta, Heteropogon contortus, Leersia hexandra, Setaria sphacelata, Sporobolus africanus, Themeda triandra, Urelytrum agropyroides*
Herbs and creepers	*Albuca sp., Arctotis arctotoides, Berkheya radula,* ***Campuloclinium macrocephalum****, Chlorophytum cooperi,* ***Cirsium vulgare****, Commelina africana, Cyanotis speciosa,* ***Cuscuta campestris****, Gerbera sp., Gladiolus crassifolius, Haplocarpha scaposa, Helichrysum nudifolium, Hermannia depressa, Hermannia grandistipula, Hermannia cf. transvaalensis, Hibiscus sp., Hibiscus microcarpus, Hypoxis hemerocallidea**, Hypoxis rigidula, Jamesbrittenia aurantiaca, Ledebouria ovatifolia, Ledebouria revoluta, Lobelia flaccida, Monsonia angustifolia, Nidorella anomala****, Nothoscordum gracile****, Oenothera rosea****, Ornithogalum tenuifolium, Pelargonium luridum, Senecio erubescens,* ***Tagetes minuta****, Trachyandra* sp., *Tulbaghia cf. acutiloba,* ***Verbena bonariensis, Verbena brasiliensis,*** *Wahlenbergia undulata*

*Medicinal plants; Species indicated in bold are alien invasive species.

Figure 1-15: Current impacts and features of the Moist Grassland.

5.6.2. Disturbed Grassland

The Disturbed Grassland is highly impacted on by agricultural activities and alien invasive species and experience high habitat loss and fragmentation (Figure 1-16). Illegal rubbish dumping is taking place along some dirt roads that are easily accessible, which destroys the grassland and promotes alien invasive species spread as some material are from gardens. In some areas, the presence of *Eucalyptus* spp., completely transformed the landscape. Historical excavations and stockpile dumping transformed some grassland areas and promoted the spread of alien species. A graveyard was also noted in this habitat. A list of species recorded in this habitat is indicated in Table 1-6.

Table 1-6: Plant species recorded in the Disturbed Grassland during the site visit.

Growth form	Species
Trees, shrubs and dwarf shrubs	***Eucalyptus camaldulensis, Solanum mauritianum***
Graminoids	*Cynodon dactylon, Digitaria diagonalis var. diagonalis, Eragrostis curvula, Eragrostis sp., Hyperthelia dissoluta, Melinis repens, Paspalum dilatatum,* ***Pennisetum clandestinum****, Setaria sphacelata, Themeda triandra, Urochloa panicoides*
Herbs and creepers	***Bidens bipinnata, Campuloclinium macrocephalum****,* ***Canna x generalis, Cirsium vulgare,*** *Commelina africana,* ***Conyza bonariensis****, Conyza podocephala,* ***Cosmos bipinnatus****, Helichrysum nudifolium, Helichrysum rugulosum, Hermannia sp., Lotononis sp.,* ***Mirabilis jalapa****, Nidorella anomala,* ***Tagetes minuta****,* ***Verbena bonariensis, Verbena brasiliensis***

*Medicinal plants; Species indicated in bold are alien invasive species.

Figure 1-16: Current impacts and features of the Disturbed Grassland habitat.

5.6.3. Wetlands

Several wetlands were identified within the study area, situated mainly between agricultural lands. These pans have been subjected to various edge effects from the surrounding environment, including agriculture activities, alien species and weed infestation as well physical disturbances such as cattle grazing and vehicles driving through them. Typical wetland species are indicated in (Table 1-7). The ecological integrity of most of these wetlands is in an acceptable condition and the vegetation create favourable habitat for birds, amphibians and small mammals (Figure 1-17); however, some have been impacted to such an extent that indigenous biodiversity is low and ecosystem functioning might have been altered.

Table 1-7: Plant species recorded in the Wetland habitat during the site visit.

Growth form	*Species*
Trees, shrubs and dwarf shrubs	***Salix babylonica, Solanum mauritianum***
Graminoids and Sedges	*Agrostis lachnantha,* ***Cortaderia selloana****, Cymbopogon caesius, Cynodon dactylon, Cyperus esculentus, Eragrostis chloromelas, Imperata cylindrica, Melinis repens,* ***Pennisetum clandestinum****, Phragmites australis, Sporobolus africanus, Sporobolus cf. festivus, Schoenoplectus cf. corymbosus, Setaria sphacelata, Themeda triandra, Urochloa panicoides*
Herbs	***Amaranthus hybridus****, Berkheya setifera,* ***Bidens pilosa****, Bulbostylis sp.,* ***Campuloclinium macrocephalum****,* ***Cirsium vulgare****, Commelina africana,* ***Cosmos bipinnatus****,* ***Conyza bonariensis****, Cyanotis speciosa, Dipcadi viride, Helichrysum nudifolium, Hibiscus microcarpus, Hypoxis hemerocallidea, Monopsis decipiens,* ***Oenothera rosea****, Persicaria attenuata, Persicaria* ***lapathifolia****, Polygala hottentotta,* ***Pseudognaphalium luteoalbum****, Schizocarphus nervosus, Selago densiflora, Senecio microglossus, Typha capensis,* ***Verbena bonariensis, Verbena brasiliensis,*** *Wahlenbergia undulata*

*Medicinal plants; Species indicated in bold are alien invasive species.

Figure 1-17: Current impacts and features of the Wetland habitat.

5.6.3. Agriculture lands and Transformed areas

Agricultural crop production is the main land use within the study area, and consists mostly of maize crops. Several alien species and weeds are present in this habitat type due to agricultural practices, which include *Tagetes minuta*, *Campuloclinium macrocephalum, Conyza* spp., *Pennisetum clandestinum* and *Verbena brasiliensis.* Transformed areas include infrastructure associated with agricultural practices and includes storerooms, farm houses, offices, feedlots etc. as well as a wedding venue (Figure 1-18). *Eucalyptus* spp., occur mostly in transformed areas with some smaller alien species. The ecological integrity of these areas is low and can even be homogenous.

Figure 1-18: Agricultural fields and transformed areas within the study area.

5.7 Observed and Expected Fauna

5.7.1 Mammals

The study area resides on the 2628BA and 2628AB quarter degree grid cells (QDGCs). These QDGCs along with adjacent cells were considered to represent similar habitats and therefore the predicted species list was derived from observation records from these QDGCs. Five species of conservation concern could be expected to occur within the study area.

Given the fact that the vast majority of the surface area of the study area is dominated by agricultural activity, the number of mammal species observed and expected is low. The system within the study area is not conducive to high mammal density and diversity, with the exception of the watercourse and wetland habitats combined with moist grasslands, where signs of a small rodent network (possibly that of *Otomys auratus*) were observed during the site visit in the moist grassland (Figure 1-19). All species of conservation concern discussed in detail subscribe to the Precautionary Principle where it is assumed that they are present on site, with appropriate mitigation measures suggested.

Figure 1-19: Signs of a small rodent network in the moist grassland.

5.7.2 Herpetofauna

The study area resides on the 2628BA and 2628AB QDGCs. These QDGCs along with the adjacent cells were considered to represent similar habitats and therefore the predicted species list was derived from observation records from these QDGCs. Expected species lists derived in this manner may therefore represent an overestimation of the diversity expected as very specific habitat types may be required by a species which may be present in a QDGC but not necessarily on the study site within the QDGC. Conversely, many large areas in South Africa are poorly sampled for herpetofauna and expected species lists derived from a single QDGC may therefore underestimate the species diversity. Drawing expected species from surrounding QDGCs therefore increases the likelihood of obtaining a species list that suffers less from poor sampling in the area but it also artificially inflates the expected number of species because many different habitats in the surrounding QDGCs may not be present on the study site. To counteract this, all possible attempts were made to refine the expected species list based on species-specific habitat requirements and a good understanding of the habitat types and quality of the study site. Species that are unlikely to occur on the study site but that do occur in the surrounding QDGCs were kept in the expected species list (precautionary principle) and species with a high probability of occurrence on the study site were added to the list even if ReptileMAP and FrogMAP did not have a record for the selected QDGCs.

A total of 47 reptile and 16 amphibian species is expected to occur within the study area, representing relatively low herpetofauna diversity, characteristic of the Highveld grassland habitats. Three species of conservation concern could be expected to occur within the study area namely the Striped Harlequin Snake (*Homoroselaps dorsalis*; Near-Threatened), Coppery Grass Lizard (*Chamaesaura aenea*; Near-Threatened) and Giant Bull Frog

(*Pyxicephalus adspersus*; Near-Threatened).

5.7.3 Avifauna

The study area is located in the 2605_2825, 2605_2830, 2610_2830 and 2610_2825 pentads (Figure 1-20). Common species recorded during the site visit include: *Hirundo albigularis* (White-throated Swallow), *Bubulcus ibis* (Cattle Egret), *Euplectes orix* (Southern Red Bishop), *Anas platyrhynchos* (Mallard Duck), *Vanellus armatus* (Blacksmith Lapwing) and *Ploceus capensis* (Cape Weaver).

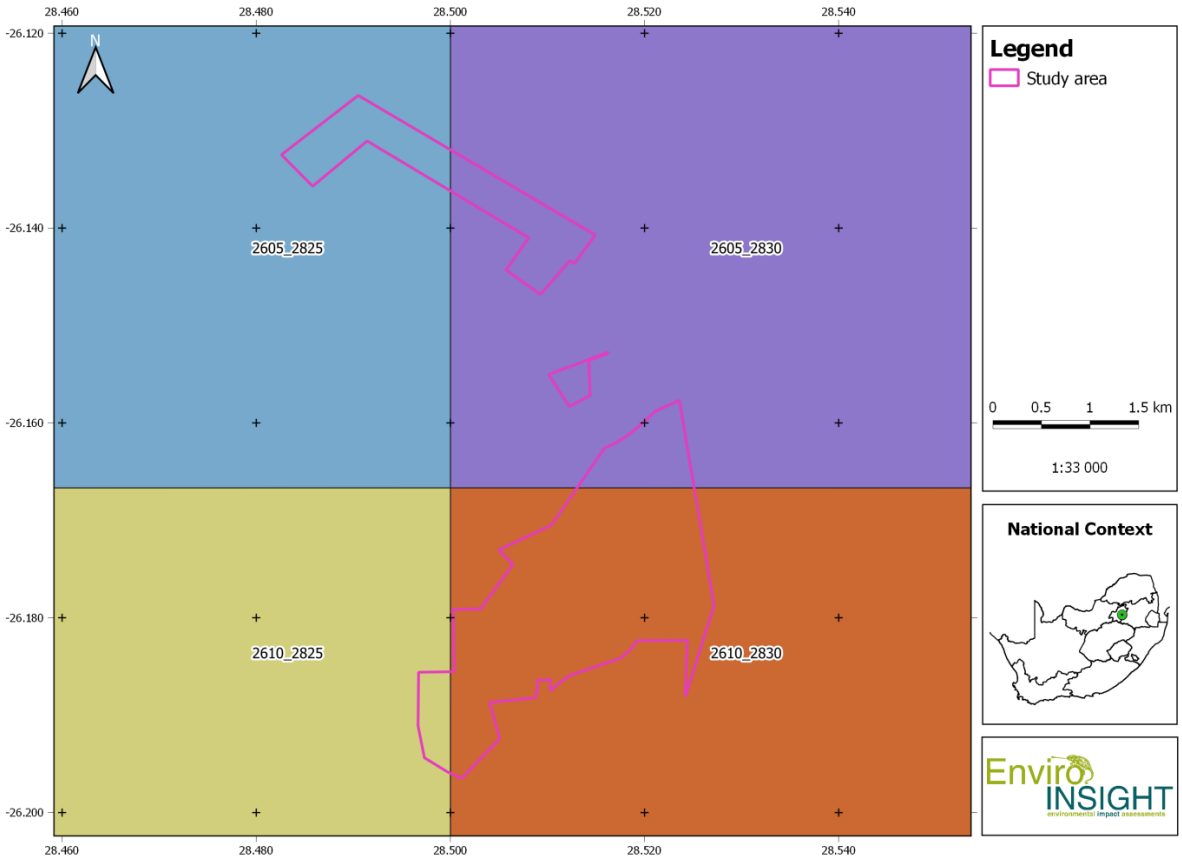


Figure 1-20: The study area in relation to the SABAP2 pentads.

5.8 Floral Species of Conservation Concern

Hypoxis hemerocallidea was observed during the site visit. About 50 individuals of this species occur within the temporary zone of the watercourse. *H. hemerocallidea* is a medicinal plant which makes it popular in the muthi shops/markets across the country as the corm is consistently heavily harvested. Land transformation and habitat loss in Gauteng is also a threat to the species. The species population trend is decreasing across the country, especially in Gauteng were it has been indicated as Declining.

The Gauteng C-Plan (v3.3) regards large portions of the study area to be suitable habitat for Red and Orange Listed plant species, specifically *Kniphofia typhoides* (Bulrush poker), *Khadia beswickii (*Khadiwortel*),* and *Nerine gracillis* (Nerine).

Kniphofia typhoides was recorded within 14.67 km south of the study area. The species occurs in low lying wetlands and seasonally wet areas in climax *Themeda triandra* grasslands on heavy black clay soils, and tends to disappear from degraded grasslands. The dense, brown inflorescence appears in late summer (February-March). Individual flowers are quite small and faintly aromatic. The leaves are broad and fan-shaped. It is one of three species of *Kniphofia* that occur in Gauteng and is listed as Near-Threatened. A survey of the range of this species by C. Craib reported extensive declines in the population in the last 30 years as a result of habitat loss to coal mining, overgrazing by cattle, urban expansion (especially in Gauteng), crop cultivation in the eastern North West Province and alien plant invasion in western Mpumalanga and North West Province. The full extent of the decline is unknown, but is suspected to be over 25%. If the wetland areas are excluded from development, this species will not be impacted on.

5.9 Faunal Species of Conservation Concern

5.9.1 Mammals

White-tailed Rat (*Mystromys albicaudatus*) Endangered

This species is a low density colonising, nocturnal, burrowing rodent that favours mesic grassland habitats present within the study area. The study area represents its core area of distribution where undisturbed grassland occurs and the species is unlikely to occur in regions where current impacts such as heavy disturbances from human activities or indeed high densities of feral predators persist. In light of this and by employing the Precautionary Principle (assuming that white-tailed rat is present in the area), it is concluded that trapping assessments such as Sherman trapping and scat analysis (jawbones of predators such as owls, dogs and jackals) are not warranted due to the rarity and temporary colonisation habits of the species. Instead, simple mitigation measures could be employed by ensuring that primary grassland habitat is buffered as much as possible, thereby avoiding all direct impact and maintaining the existing integrity of the rodent's habitat. However, as the species does exhibit migratory colonising behaviour, it is not likely to suffer catastrophic population declines due to the proposed prospecting activities.

South African Hedgehog (*Atelerix frontalis*) Near Threatened

Hedgehogs are listed as Near Threatened and although the species is common in urban environments and is affected by development, it is also found on grasslands of varying degrees of quality, especially in the absence of dogs and other feral predators. With a loss of grassland habitat, it is likely that local hedgehog populations will be displaced or eradicated. The best course of action will be to mitigate against roadkills, to which this species is very susceptible as well as to allow for worker induction, which will report hedgehog presence and allow individuals to be safely relocated to more undisturbed areas.

Serval (*Leptailurus serval*) Near Threatened

This meso-predator cat species has frequently been recorded in the area and it is anticipated that a significant resident population persists within the study area, given the predicated high density of rodents and the suitable habitat. The species is a relatively common wetland associate in grassland areas and although the Near Threatened status warrants due consideration, the species is not considered to be a fatal flaw given adequate avoidance and mitigation (especially of wetland environments).

Cape fox (*Vulpes chama*) TOPS Protected

Although this species is TOPS protected, its presence within the study is not considered to be of great concern due to the penchant for the species to colonise areas in association with humans.

Grassland Vlei Rat (*Otomys auratus*) Near Threatened

This species was until recently included in *Otomys irroratus* and the two cannot be distinguished on morphological grounds; however, *O. auratus* is closely associated with the Grassland Biome in South Africa, whilst *O. irroratus* is closely associated with the Fynbos and Thicket biomes of the Western Cape and Eastern Cape provinces of South Africa (Monadjem *et al*. 2015). The species is widely distributed throughout the Highveld grasslands and associated with mesic grasslands and wetlands within alpine, montane and sub-montane regions (Monadjem *et al*. 2015), typically occurring in dense vegetation in close proximity to water. This near-endemic grassland species is becoming increasingly threatened by grassland contraction and wetland loss, with niche modelling showing that it will undergo a 47–61% reduction in suitable habitat between 1975 and 2050 from climate change. Grassland and wetland habitat loss from agricultural expansion, human settlement sprawl and mining are currently the greatest threats to this species' habitat (Taylor *et al*. 2016). It is a relatively common wetland associate in grassland areas and although the Near Threatened status warrants due consideration, the species is not considered to be a fatal flaw given adequate avoidance and mitigation (especially of wetland environments).

Highveld Golden Mole (*Amblysomus septentrionalis*) Near Threatened

The "turned" earth of much of the study area is ideal for burrowing by this species. Its Near-Threatened status does not warrant a fatal flaw and mitigation of agricultural areas is considered to be impossible.

5.9.2 Herpetofauna

Giant Bullfrog (*Pyxicephalus adspersus*) – Least Concern/ Near Threatened

The Giant Bullfrog is listed by Minter *et al*. (2004) as Near Threatened. However, the IUCN (2019) considers this species to be of Least Concern across its global distribution but Du Preez & Carruthers (2017) mention that this species is still of conservation concern in Gauteng, despite GDARD having removed this species from their list of trigger species. This species will likely undergo an escalation in conservation status soon and must pre-emptively be considered to be of conservation importance. This species has been recorded in the 2628AB QDGC on which the study area resides (FrogMAP, 2019) and is very likely to breed within the study area in the

wetland pans habitats. Mitigation of potential impacts will need to occur and will include appropriate education of staff for the detection and relocation of encountered specimens, prevention of roadkills and avoidance of breeding habitats.

Coppery Grass Lizard (*Chamaesaura aenea*) – Near Threatened

This species favours grassland associated with mountain tops, escarpments and the Highveld (Branch, 1998; Bates *et al.,* 2014). It is considered a species of conservation concern due to the loss of habitat experienced across its range, mostly due to the transformation of its habitat for crop farming and plantations, overgrazing by livestock, infrastructural development, frequent anthropogenic fires and the use of pesticides (Bates *et al.,* 2014). This species has been recorded from both of the QDGCs on which the study area resides.

Striped Harlequin Snake (*Homoroselaps dorsalis*) – Near Threatened

This small, shy and secretive snake species is rarely seen but most often found in disused termitaria where it preys on thread snakes of the genus *Leptotyphlops* (Branch, 1998; Marais, 2004). This snake species has not been recorded from the QDGCs on which the study area resides but has been observed in adjacent QDGCs (ReptileMAP, 2019) and the author considers it possible that they may occur within the study area, albeit at a low probability.

5.9.3 Avifauna

A list of avifauna species of conservation concern previously recorded in the study area pentads is provided in Table 1-8. A total of eleven species of conservation concern could occur on site, of which six species are listed as regionally Near-Threatened, four species are listed as regionally Vulnerable, and one species is listed as regionally Endangered. Specific species are discussed in detail below.

Table 1-8: Avifauna species of conservation concern previously recorded in the study area pentads

Species	Common Name	Global Conservation Status*	National Conservation Status**	Average SABAP2 Reporting rate	Preferred Habitat	Potential Likelihood of Occurrence on study area
Alcedo semitorquata	(Half-collared Kingfisher)	Near threatened	Near threatened	0	Prefers fast-flowing and well-vegetated streams	Low given limited suitable habitat
Ciconia abdimii	(Abdim's Stork)	Least Concern	Near threatened	0	Open stunted grassland, fallow land and agricultural fields.	An uncommon summer visitor.
Circus ranivorus	(African Marsh Harrier)	Least Concern	Endangered	0	Restricted to permanent wetlands with extensive reed beds.	Likely to be present in wetland habitat

Falco biarmicus	(Lanner Falcon)	Least Concern	Vulnerable	41.06%	Varied, but prefers to breed in mountainous areas.	A highly irregular foraging visitor.
Falco vespertinus	(Red-footed Falcon)	Near-threatened	Near-threatened	0	Open arid savanna and grassland.	A very rare summer visitor. Probably absent.
Mycteria ibis	(Yellow-billed Stork)	Endangered	Endangered		Reasonably common in wetlands, open shallow water generally free of vegetation	Likely to be present in wetland habitat
Oxyura maccoa	(Maccoa Duck)	Near threatened	Near threatened	0	Large saline pans and shallow impoundments.	Likely to be present in wetland habitat
Phoenicopterus minor	(Lesser Flamingo)	Near threatened	Near threatened	0	Open, eutrophic, shallow saline and alkaline wetlands, such as salt pans	Low probability within shallow wetlands
Phoenicopterus ruber	(Greater Flamingo)	Least Concern	Near threatened	0	Restricted to large saline pans and other inland water bodies.	Low probability to occur
Sagittarius serpentarius	(Secretarybird)	Vulnerable	Vulnerable	0	Prefers open grassland or lightly wooded habitat.	Regular to uncommon foraging visitor.
Tyto capensis	(African Grass-owl)	Least Concern	Vulnerable	0	Prefers rank moist grassland that borders drainage lines or wetlands.	Unlikely – limited suitable habitat

African Marsh Harrier (*Circus ranivorus*) Endangered

Due to its Endangered conservation status, the African Marsh Harrier requires discussion. The species is expected to forage on the permanent wetlands within the study area which, along with reed beds (breeding requirements) represents the species' core habitat. According to Barnes (2000), all smaller wetlands will be utilised for foraging and possibly breeding. The population is highly fragmented and declining due to loss of breeding habitat, which is optimal at more than 100 hectares of reed beds over permanent to semi-permanent water. Within the study area, these criteria are not met although multiple smaller foraging habitats are present.

Secretarybird (*Sagittarius serpentarius*) Vulnerable

This species is often observed in open areas, including cultivated and old agricultural lands. It is not an irregular foraging resident as two breeding pairs have been recorded within the vicinity of the study area. The prospecting

activities should avoid nesting sites (if found on site) and should not disturb the species while foraging or breeding within the vicinity of the proposed development.

Great Painted-snipe (*Rostratula benghalensis*) Vulnerable

The species is expected to breed on the permanent wetlands within the study area which along with moist grassland represents the species' core habitat. The population is highly fragmented and declining due to loss of breeding habitat and has not been previously recorded (SABAP2) for the pentads within the study area. Within the study area, all breeding and foraging criteria are met.

Maccoa Duck (*Oxyura maccoa*) Near-threatened

The species may be a permanent resident within the suitable dams within the study area, albeit in very small numbers. The species is in decline due to water pollution and loss of habitat, which is axiomatic to Highveld grasslands influenced by agriculture and mining. The species has been observed in the surrounding area and thus mitigations and buffering are required as pans and wetlands are considered to be optimal breeding habitat.

5.10 Habitat Sensitivity

Based on the fauna and flora observations during the fieldwork as well as the current impacts described above, ecological sensitivity of each habitat type was identified. This sensitivity is rated as either low, medium or high, where low sensitivity is considered ideal for prospecting activities and high sensitivity areas are to be avoided (Figure 1-21**Error! Reference source not found.**). A 30 m buffer around all sensitive wetland pans that is likely to have suitable habitat for *Tyto capensis* and serve as breeding habitat for *Pyxicephalus adspersus* are included and should be avoided by the proposed prospecting activities.

5.11. Conclusions and Recommendations

The study area is located in the Eastern Highveld Grassland which is regarded as Endangered, and within the Critically Endangered Blesbokspruit Highveld Grassland threatened ecosystem. According to the GDARD C-Plan (GDARD, 2011), the study area is located in CBA: Important and ESA, as well as Primary vegetation and Red Listed Bird Habitat. ESA areas consist mostly of agricultural fields with wetland pans and associated moist grassland (CBA: Important areas) interspersed between these fields. Accordingly, no drilling must take place within natural areas identified as CBA: Important areas (wetlands) and a suitable buffer area of at least 30 m from these areas should be implemented in order to account for edge, indirect and cumulative effects. Post-prospecting operations should rehabilitate the land to its original state as far as possible with no net loss of wetland areas.
According to the Mining and Biodiversity Guideline (SANBI, 2012), large sections of the study area are located in category B (High Biodiversity Risk), and D (moderate Biodiversity Risk) The high risk category B is predominantly due to the presence of wetlands on site and should be avoided at all cost. Correlation is evident between the high biodiversity important areas and those demarcated as CBA: Important according to GDARD C-Plan.

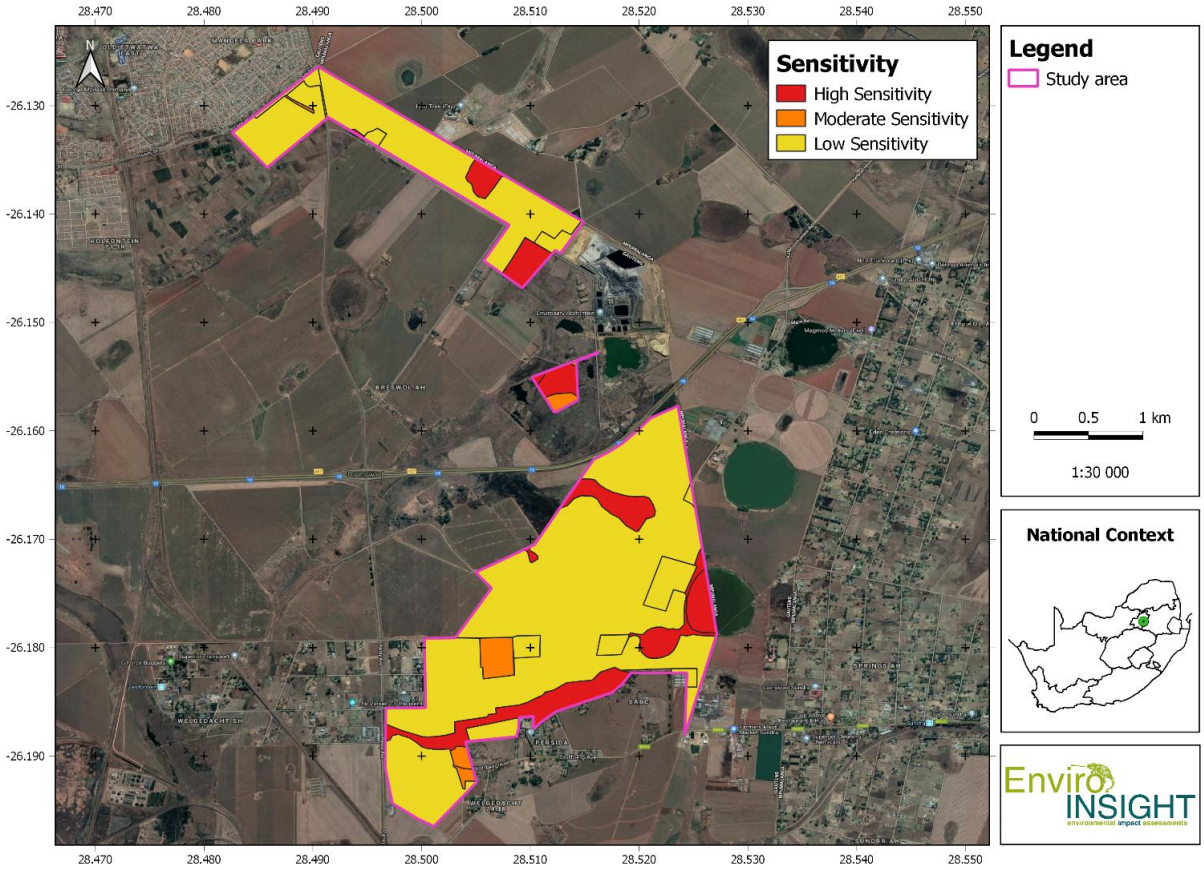


Figure 1-21: Habitat sensitivity of the study area.

No SCC have been observed within the study area, although the presence of SCC is likely in wetland and primary vegetation areas. These natural areas (highly sensitive) are to be avoided by all prospecting activities. The Orange List Plant *Hypoxis hemerocallidea* has been recorded within the wetland buffer area and should be protected *in situ* from prospecting activities. A Search and Rescue Plan should be drafted by a fauna and flora specialist in order for the relocation of medicinal plant species and Species of Conservation Concern. Most flora and fauna impacts are medium pre-mitigation in sensitive areas. After mitigation measures have been applied (mostly avoidance of natural vegetation and wetland areas), most impacts are reduced to medium/low or low. All expected impacts from prospecting activities can be mitigated.

The proposed prospecting impacts on fauna and flora, are considered to be of medium to low significance, and can be mitigated to acceptable levels. It should be noted that this is not based on a layout and location of the drilling sites. It is therefore required by the drilling pan to avoid sensitive area such as primary vegetation and wetlands, and to strictly adhere to the proposed mitigation measures. Should environmental authorisation be granted, an Environmental Management Programme (EMPr) should be compiled to highlight pre-prospecting and post-prospecting impacts (including rehabilitation), incorporating all mitigation measures and recommendations as outlined in the specialist investigations conducted to date for the study area.

In conclusion, it is unlikely with strict implementation of the proposed mitigation measures that the proposed prospecting operations could have severe, lasting negative effects on the ecology of the sensitive habitats.

Rehabilitation of drilling holes as well as any impacts on the natural environment must take place immediately after prospecting operations, and should strive to return the land back to its original natural condition.

6. Aquatic Ecology and Wetlands

6.1 Background Information

The area of interest falls entirely within quaternary catchment C21D in the Vaal Water Management Area (Figure 1-22). Several wetlands fall within the prospecting right and form the focus of this assessment (Figure 1-23). These include:

- Depressions and a section of a hillside seep that fall within Block 1;
- Sections of a channelled valley bottom wetland and hillside seep that fall within Block 2; and
- Depressions and wetland flats that fall within Block 3.

A non-perennial stream associated with the channelled valley bottom wetland flows through the western most section of Block 2. This stream eventually joins the Blesbokspruit wetland which has been declared as a Ramsar wetland.

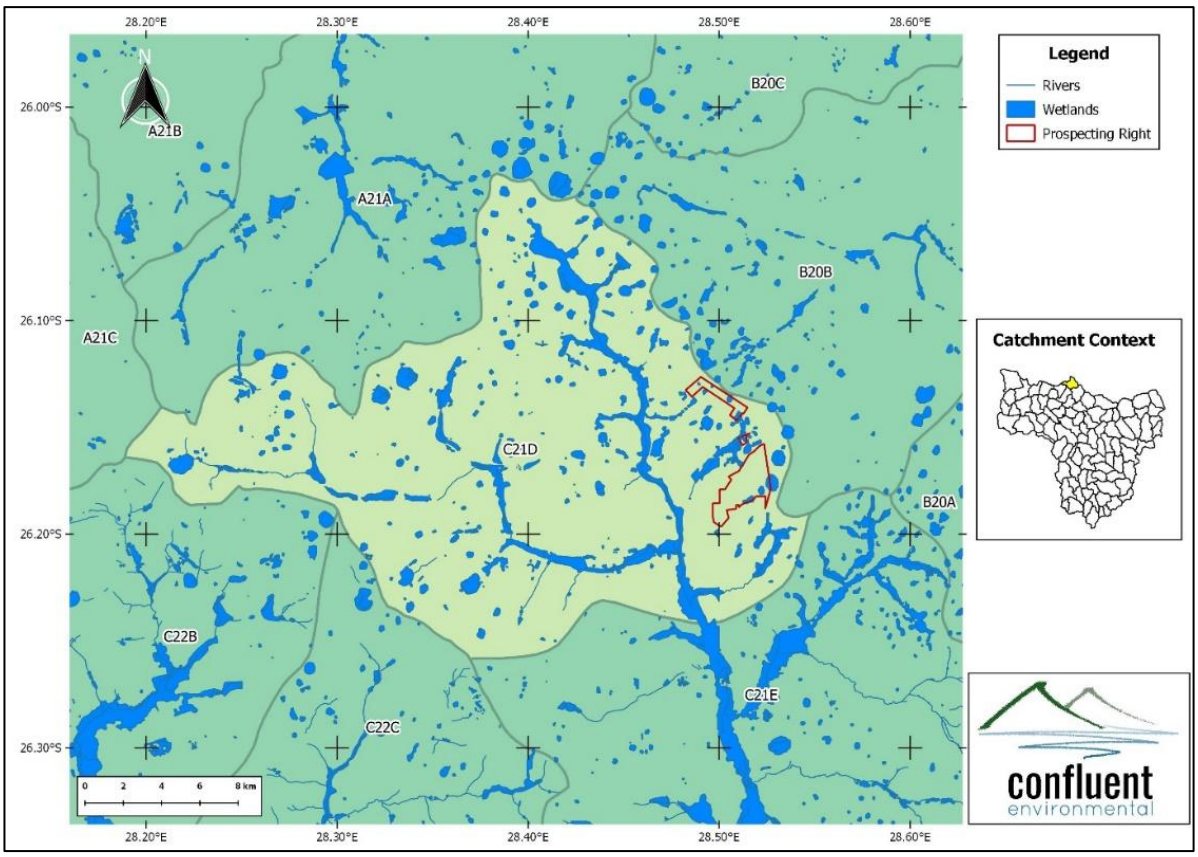


Figure 1-22: Location of prospecting right within catchment C21D of the Upper Vaal WMA.

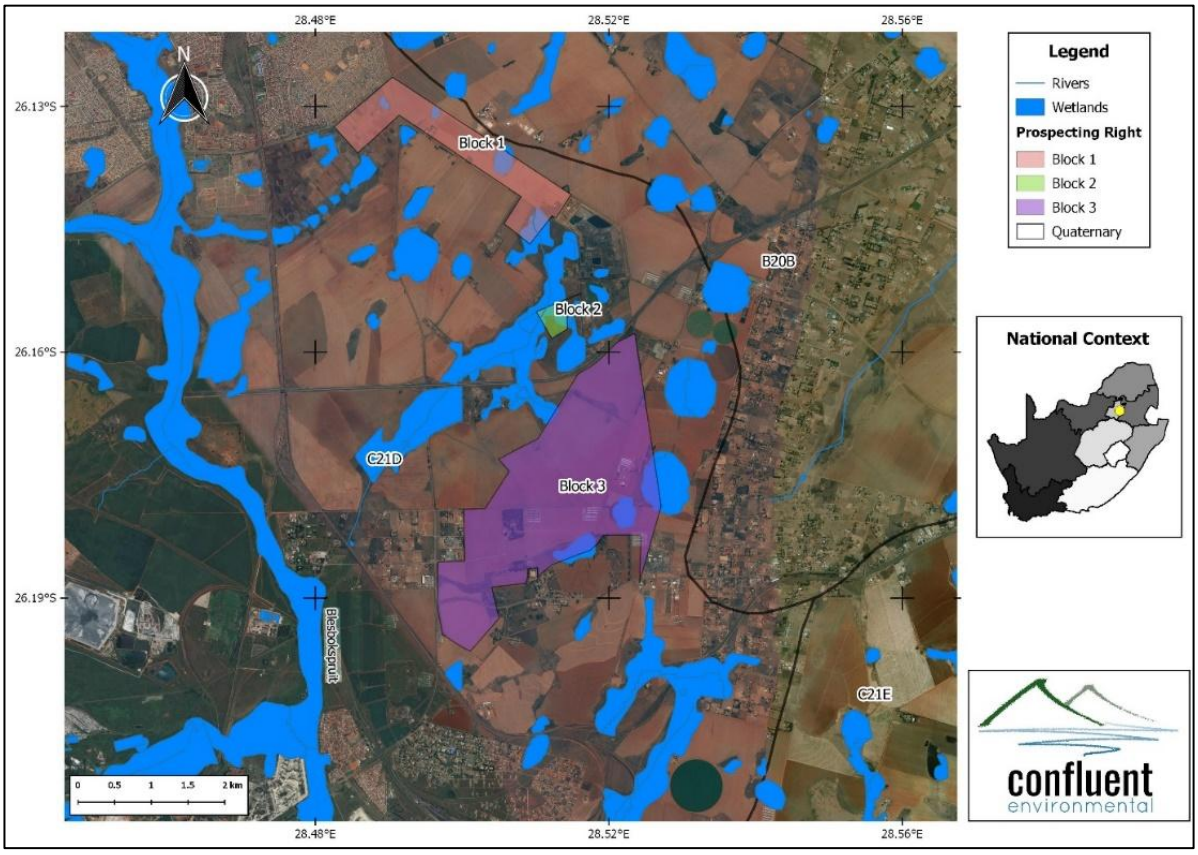


Figure 1-23: Map illustrating the location of wetlands within the three blocks that make up the prospecting right.

6.2. Methods: Wetland Assessment

6.2.1. Desktop Analysis

The wetland assessment involved a preliminary desktop analysis to identify the possible location of wetlands and important land use activities that may be potentially impacting the wetlands. The desktop analysis was undertaken using 2014 aerial photography for the area (Chief Directorate: National Geo-spatial Information) and was supplemented by recent and historical Google Earth imagery. In addition, historical orthophotos were also interrogated to assess changes to identified wetlands over time.

6.2.2. Site Visit

A site visit was conducted to verify the locations of identified wetlands and describe existing onsite impacts, which were mapped using a hand-held GPS device. All wetlands occurring within the project area were categorised into discrete hydrogeomorphic units (HGMs) based on their geomorphic characteristics, source of water and pattern of water flow through the wetland unit. HGMs were classified according to Ollis et al. (2013).

The outer edge of wetlands occurring within and adjacent to the footprint of the proposed mine were delineated according to the following four indicators (DWAF, 2008):

- The presence of wetland (hydromorphic) soils that display characteristics resulting from prolonged saturation such as grey horizons, mottling streaks, hard pans, organic matter depositions, iron and manganese concretion resulting from prolonged saturation (soil indicator);
- The presence of water loving plants (hydrophytes) (vegetation indicator);
- A high-water table that results in saturation at or near the surface, leading to anaerobic conditions developing in the top 50cm of the soil; and
- Topographical location of the wetland in relation to the surrounding landscape (terrain indicator).

The desktop analysis, in combination with vegetation and terrain indicators were primarily used to delineate wetlands in the project area and were verified through inspection of soil cores obtained through use of a hand-held soil auger.

6.3. Present Ecological State

6.3.1. Channelled Valley Bottom and Hillside Seep Wetlands

Desktop and field data were captured in GIS software and used to populate the Level 1 WET-Health tool (Macfarlane et al., 2008) which was used to derive the PES of the wetland HGM units. The magnitude of observed impacts on the hydrological, geomorphological and vegetation components of the wetland were calculated and combined as per the tool to provide a measure of the overall condition of the wetland on a scale from 1-10. Resultant scores were then used to assign the wetland into one of six PES categories as shown in Table 1-9 below.

Table 1-9: Wetland Present Ecological State categories and impact descriptions.

Ecological Category	Description	Impact Score
A	Unmodified, natural.	0 – 0.9
B	Largely natural with few modifications / in good health. A small change in natural habitats and biota may have taken place but the ecosystem functions are still predominantly unchanged.	1 – 1.9
C	Moderately modified / fair condition. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	2 – 3.9
D	Largely modified / poor condition. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	4 – 5.9
E	Seriously modified / very poor condition. The loss of natural habitat, biota and basic ecosystem functions is extensive.	6 – 7.9

F	Critically modified / totally transformed. Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota.	8 – 10

6.3.2. Endorheic Pans & Wetland Flats

The WET-Health method was not designed for use on depression wetlands such as endorheic pans and wetland flats. Therefore, based on the recommendations of Ollis et al. (2014), the RDM 1999 scoresheet for assessing the Habitat Integrity of Palustrine Wetlands was used to determine the PES for the endorheic pans. This method involves scoring various hydrological, geomorphological, water quality and biotic criteria with a score ranging from 0 (critically modified) to 5 (natural or unmodified). The average score is used to define the overall PES of the pan according to Table 1-10.

Table 1-10: Wetland Present Ecological State categories and impact descriptions.

Ecological Category	Description	Impact Score
A	Unmodified, natural.	4 – 5
B	Largely natural with few modifications / in good health. A small change in natural habitats and biota may have taken place but the ecosystem functions are still predominantly unchanged.	3 – 4
C	Moderately modified / fair condition. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	2 – 3
D	Largely modified / poor condition. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	1 – 2
E	Seriously modified / very poor condition. The loss of natural habitat, biota and basic ecosystem functions is extensive.	0 – 1
F	Critically modified / totally transformed. Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota.	0

6.3.3. Ecological Importance and Sensitivity

The ecological importance of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales (Duthie, 1999). Ecological sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred (Duthie, 1999). The Ecological Importance and Sensitivity (EIS) provide a guideline for determination of the Ecological Management Class (EMC).

According to Rountree et al. (2013) the EIS for wetlands should be based on a combination of three suites of importance criteria, namely:

1. Ecological Importance and Sensitivity (EIS), incorporating the traditionally examined criteria used in EIS assessments of other water resources by DWS (Kleynhans, 1999) and thus enabling consistent assessment approaches across water resource types;
2. Hydro-functional importance, which considers water quality, flood attenuation and sediment trapping ecosystem services that the wetland may provide (Kotze et al., 2008); and
3. Importance in terms of basic human benefits – this suite of criteria considers the subsistence uses and cultural benefits of the wetland system (Kotze et al., 2008).

In summary, several determinants representative of each of the three importance criteria (Table 1-11) are assigned a score ranging from 0 (low importance or sensitivity) to 4 (high importance or sensitivity). The average score for each of the three criteria is calculated, with the highest average score being used to determine the overall EIS category of the wetland system according to (Table 1-12).

Table 1-11: Determinants for three different importance criteria that are scored (from 0 to 4) in order to determine the overall EIS category for a wetland system.

Ecological Importance & Sensitivity	Hydro-Functional Importance	Direct Human Benefits
Presence of Red Data Species	Flood attenuation	Water for human use
Populations of Unique Species	Streamflow regulation	Harvestable resources
Migration Sites	Sediment trapping	Cultivated foods
Protections Status of Wetland	Phosphate assimilation	Cultural heritage
Protection Status of Vegetation Type	Nitrate assimilation	Tourism and recreation
Regional Context of Ecological Integrity	Toxicant assimilation	Education and research
Size and Rarity of Wetland Type Present	Erosion control	
Diversity of Habitat Types	Carbon storage	
Sensitivity to Changes in Floods		
Sensitivity to Changes in Low Flows		
Sensitivity to Changes in Water Quality		

Table 1-12: Ecological importance and sensitivity categories. Interpretation of average scores for biotic and habitat determinants.

Ecological Importance and Sensitivity Category (EIS)	Range of Median	Recommended Ecological Management Class
Very high: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these floodplains is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	>3 and <=4	A

High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these floodplains may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and <=3	B
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2	C
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and <=1	D

6.4. Buffer Determination

Buffer zones have been defined as a strip of land with a use, function or zoning specifically designed to act as barriers between human activities and sensitive water resources with the aim of protecting these water resources them from adverse negative impacts. Appropriate buffers were estimated based on buffer zone guidelines developed by Macfarlane and Bredin (2017). These guidelines estimate required buffer zone widths based on a combination of input parameters which include, *inter alia*, the nature of the activity and associated impacts, basic climatic and soil conditions, the PES and EIS of potentially affected watercourses and the implementation of appropriate mitigation measures (optional).

For the purposes of sensitivity mapping, the implementation of appropriate mitigation measures has been considered in the determination of buffer zone widths.

6.5. Desktop Review

6.5.1. NFEPA

The National Freshwater Ecosystem Priority Areas (NFEPA) database (Nel et al., 2011) forms part of a comprehensive approach to the sustainable and equitable development of South Africa's scarce water resources. This database provides guidance on how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998).

The prospecting right falls within sub-quaternary reach 1267, which is not categorised as a Freshwater Ecosystem Priority Area (FEPA). None of the wetlands that fall within the prospecting right have been categorized as Wetland FEPAs.

6.5.2. Gauteng Conservation Plan v3.3 (2011, technical report updated 2014)

The Gauteng C-Plan v3.3, commonly known as a Critical Biodiversity Areas Map, delineates biodiversity priority areas called Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA) and Protected Areas (PA).

According to the spatial dataset of the GDARD C-Plan (GDARD, 2011), the majority of wetlands located within the prospecting right are regarded as Important CBAs. Farmland and grassland areas adjacent to these CBAs are regarded as ESAs (Figure 1-24).

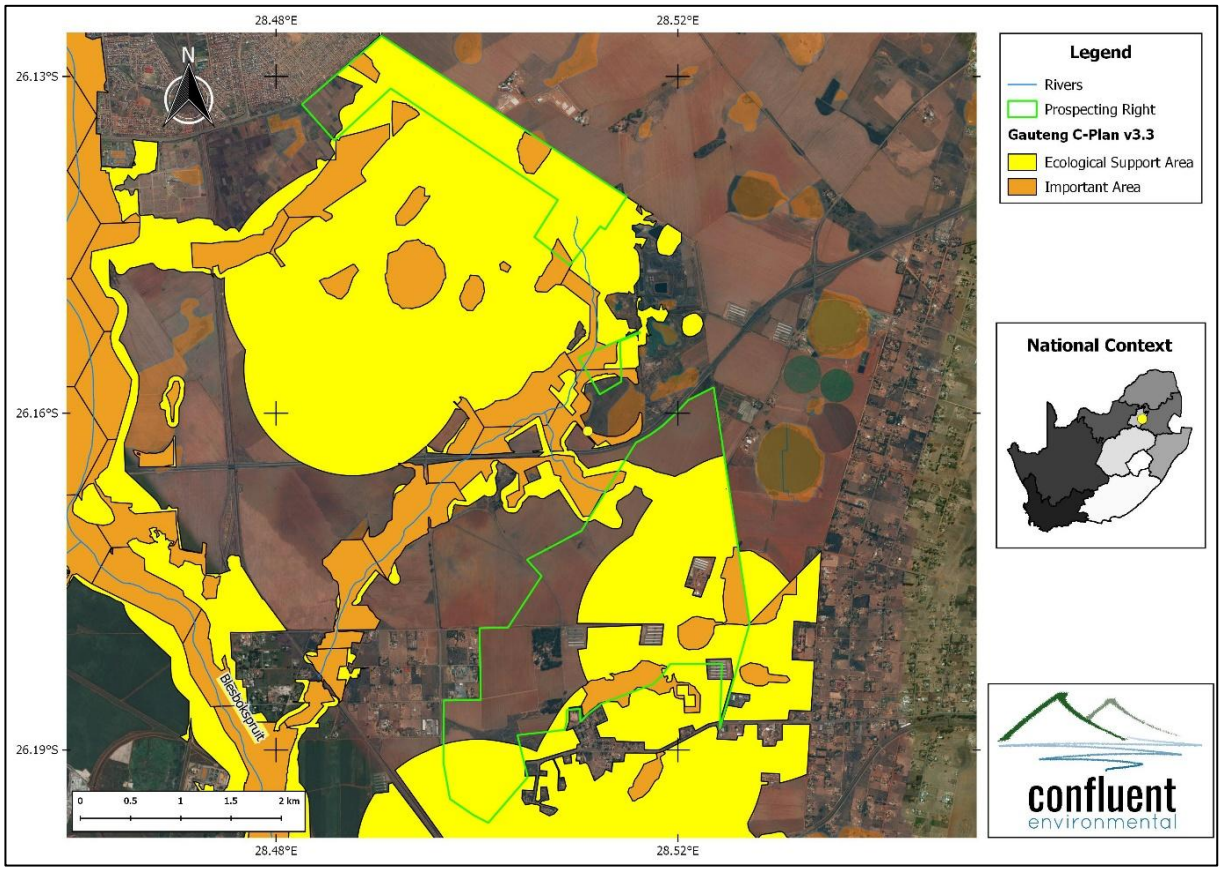


Figure 1-24: Gauteng C-Plan v3.3 in relation to the prospecting right.

6.6. Results: Wetland Assessment

The potential presence of wetlands was identified through use of desktop resources (e.g. NFEPA Wetlands layer – Nel et al., 2011) and confirmed during the field visit. Several wetland features occur within prospecting area. These wetlands were classified according to Ollis et al. (2013) and delineated using a combination of terrain, vegetation and soil indicators. This was augmented with current and historical Google Earth imagery and orthophotos. The outer most boundary of most wetland features generally coincided with the start of agricultural fields and was confirmed with inspection of soil cores that were obtained using a soil auger.

The majority of the surface area of Block 1 is covered by subsistence and commercial agriculture. Several

depression wetlands are located within the block as well as a seep wetland located on the eastern proximity of the block. All pans are immediately surrounded by agricultural fields and therefore have no natural buffer or connectivity to any natural, terrestrial vegetation. The main impacts associated with the pans relate primarily to the absence of appropriate buffers, colonization by annual weeds and increased sediment and nutrient loads originating from agricultural runoff.

The hillside seep to the east of Block 1 covers a large area dominated by grassland species. The channel that leads southwards to the Blesbokspruit originates from the lower section of the wetland area. Historical imagery indicates that large portions of this wetland have been ploughed in the past and there are two dams located within the area of the wetland as well as a series of drainage furrows, which were presumably excavated to facilitate drainage of the area.

A channeled valley bottom-wetland lies within the western portion of Block 2. The channel feeds into a dam (Lushof Dam). The eastern most portion of the block is highly degraded and consists of several large excavations or pits that have become inundated with water over time. An excavated channel appears to drain a portion of these wetland areas in the direction of the chanelled valley bottom wetland, which eventually drains into the Blesbokspruit. A hillside seep wetland drains into the channeled valley bottom wetland. The actual extent of the seep wetland is difficult to determine given the numerous excavations present within the block. This seep area was formerly under cultivation and has only recently been left to lie fallow. Apart from soil indicators, the seep area within this block does not show any other typical wetland indicators (e.g. vegetation is dominated by weeds).

Two large depression wetlands located to the east and one smaller pan located to the west occur within Block 3. The largest of these pans is permanently inundated, while the other two pans are seasonal. These pans experience similar impacts to those located within Block 1 and are all immediately surrounded by agricultural fields. A wetland flat lies along the southern boundary of Block 3. This wetland area is highly degraded and impacts include illegal dumping, a road crossing the entire length of the wetland and relatively high density of annual weeds and alien invasive trees (e.g. *Eucalyptus sp*,).

6.7. Sensitivity analysis, Buffers and no-go areas

Given the low impact nature of the prospecting and drilling activities, which can also easily be avoided, a preliminary minimum recommended buffer distance of 30 m has been applied to all wetlands within the prospecting right (Figure 1-25).

All buffers should be regarded as no-go areas and no drilling activities or access to drill sites should not take place within/through wetlands and their associated buffers. Additional assessment of the PES and EIS of the wetlands in the final report may however lead to changes in sensitivity as displayed in Figure 1-25. For example, given its highly degraded condition, drilling may potentially be permissible within the delineated area of the seep wetland in Block 2.

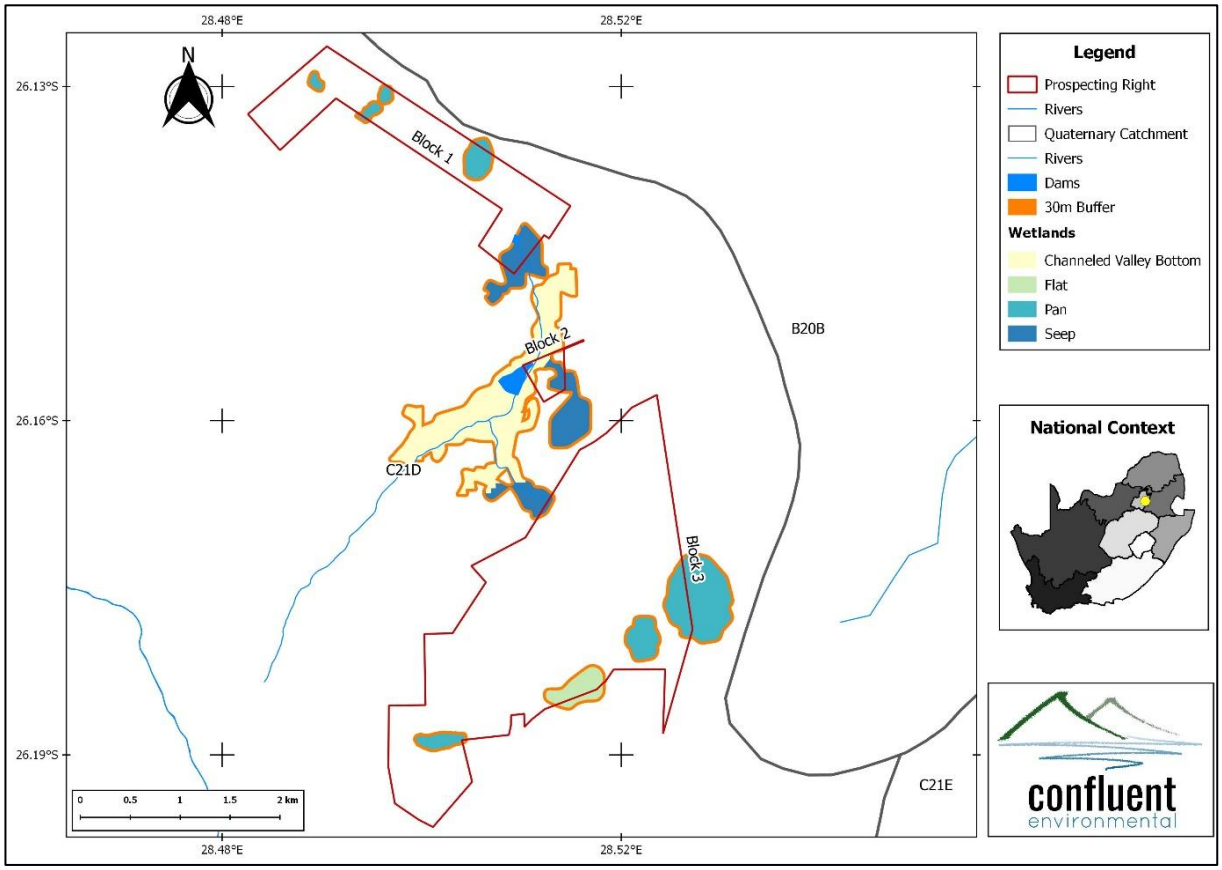


Figure 1-25: Sensitivity map indicating wetlands and associated buffer zones that should be excluded from any drilling activities.

6.8. IMPACT ASSESSMENT

A summary of identified impacts, the risk of these impacts to aquatic ecosystems and measures designed to mitigate these risks are described in the section below.

6.8.1 Water Quality Impacts

- Hydrocarbon spillage from trucks and vehicles close to wetlands can severely contaminate the associated watercourses.
- Serious spills can seriously affect mortality rates of aquatic and terrestrial fauna that wetland habitats as breeding and foraging habitat.

Mitigation

- All drilling activities must take place outside of the recommended buffer zone for each wetland;
- No vehicles or machinery are allowed within the buffer areas of identified wetlands;
- Designated areas should be indicated where vehicles and machinery are to be stored, repaired and refueled

within a bunded area;

- Implementation of rapid response emergency spill procedures to deal with spills immediately, including the provision of a spill kit and training of staff to deal with such instances;
- Driving through wetland areas must be avoided when navigating towards drilling locations;
- Vehicles and equipment must be regularly serviced and maintained;
- Any spillages must be cleaned up immediately to prevent further contamination; and
- All boreholes to be appropriately capped after completion of drilling to prevent deliberate or accidental contamination of groundwater.

Table 1-13: Impacts to water quality

	Without Mitigation	With Mitigation
Intensity	Moderate	Negligible
Duration	Short term	Brief
Extent	Limited	Very Limited
Probability	Probably	Unlikely
Significance	**Minor (-)**	**Negligible (-)**
Reversibility	High	High
Irreplaceability	Low	Low
Confidence	High	High

6.8.2 Aquatic Habitat Impacts

- Physical disturbance of wetland habitat when setting up the drill rig and executing drilling activities.

Mitigation

- All drilling activities must take place outside of the recommended buffer zone for each wetland;
- No vehicles or machinery are allowed within the buffer areas of identified wetlands.

Table 1-14: Impacts to aquatic habitats

	Without Mitigation	With Mitigation
Intensity	High	Negligible
Duration	Short term	Brief
Extent	Limited	Very Limited
Probability	Probably	Highly Unlikely
Significance	**Minor (-)**	**Negligible (-)**
Reversibility	High	High
Irreplaceability	Low	Low
Confidence	High	High

6.8.3 Erosion & Sedimentation Impacts

- Potential erosion of sites that have been cleared for establishment of the drill rig.

Mitigation Measures

- The soil disturbance and clearance of vegetation at drill pad areas must be limited to the absolute minimum required;

Table 1-15: Impacts on erosion

	Without Mitigation	With Mitigation
Intensity	Low	Very Low
Duration	Short term	Brief
Extent	Limited	Very Limited
Probability	Probably	Unlikely
Significance	Negligible (-)	Negligible (-)
Reversibility	High	High
Irreplaceability	Low	Low
Confidence	High	High

6.9 Sensitivity analysis, Buffers and no-go areas

Given the PES and EIS of wetlands within the prospecting blocks and the relatively low impact of the drilling activities (which can be easily mitigated through implementation of no-go buffer areas), a minimum recommended buffer distance of 30 m has been applied to all wetlands within the prospecting right (Figure 1-25). This can be regarded as a conservative buffer as the buffer calculator developed by Macfarlane and Bredin (2017) recommended a narrower buffer distance of 15 m for endorheic pans (which have a relatively high PES and EIS in comparison to other wetland types included in the prospecting blocks). The wider buffer is recommended as it would ensure negligible impacts (see impact tables above), while still allowing for large areas to be prospected within each block.

All buffers should be regarded as no-go areas and no drilling activities or access to drill sites should take place within or through wetlands and their associated buffers.

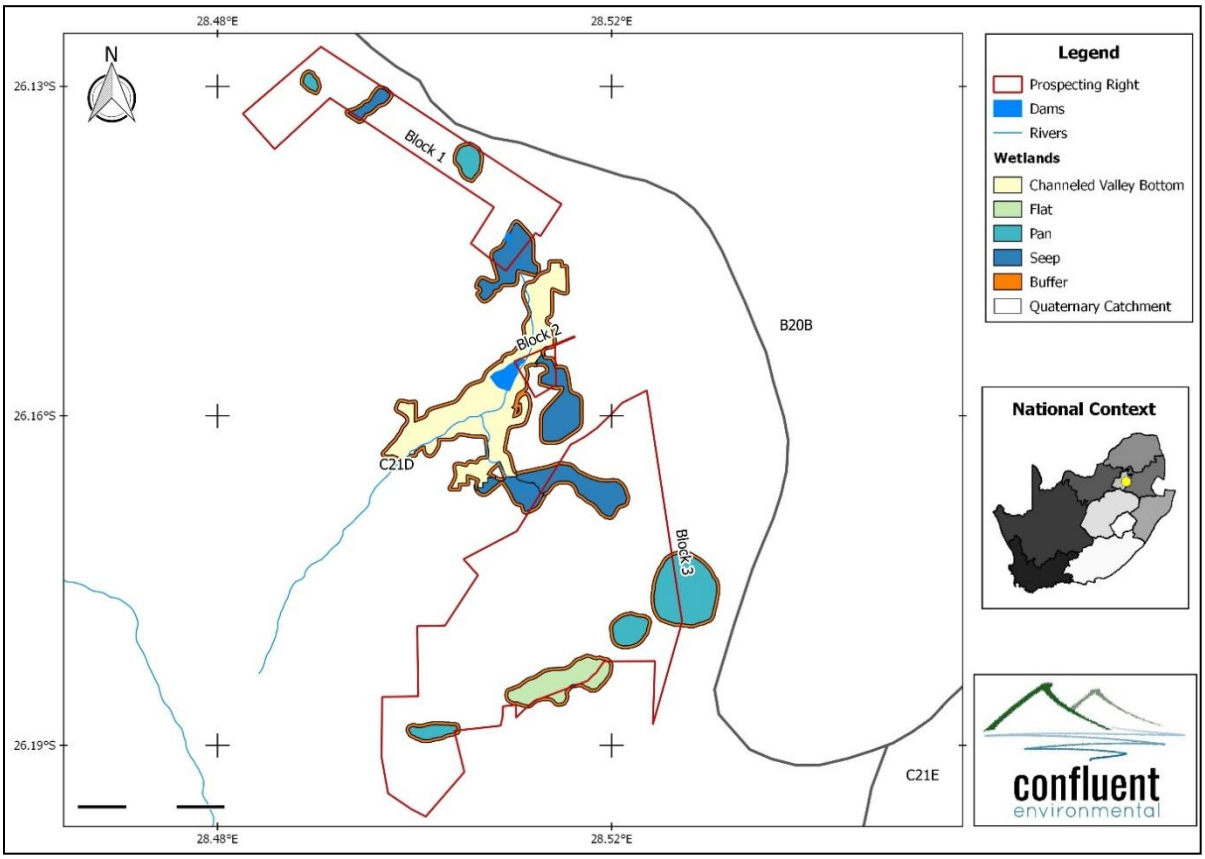


Figure 1-26: Sensitivity map indicating wetlands and associated buffer zones that should be excluded from any drilling activities.

6.10. Conclusion

While several wetlands are located throughout the proposed prospecting blocks, given their modified to seriously modified state, the low nature of impacts associated with drilling and easily implementable mitigation measures, it is not anticipated that prospecting activities will have any significant impact on the wetlands that fall within the prospecting right.

Drilling for prospecting purposes should therefore be authorised subject to the implementation of minimum recommended buffer distances for all wetlands identified as part of this study.

7. Heritage resources

REGIONAL OVERVIEW

7.1 General Information

7.1.1. Literature search

Few heritage studies were conducted in the immediate vicinity of the study area (SAHRA report mapping project V1.0 and SAHRIS). Studies consulted for this study include:

Author	Year	Project	Findings
Pelser, A.	2015	Baseline Study & Heritage Assessment Report For The Proposed Gold One International Holfontein Project, Near Springs, Gauteng	Historical gold mining features
Hemming, M	2013	Motivation for Exemption from Heritage Assessment: 24G Application for Rectification, Holfontein Stockpile	No features

7.1 2. Public consultation

A public participation process is facilitated by Enviro-Insight CC as per the Basic Assessment process.

7.1.3. Google Earth and mapping survey

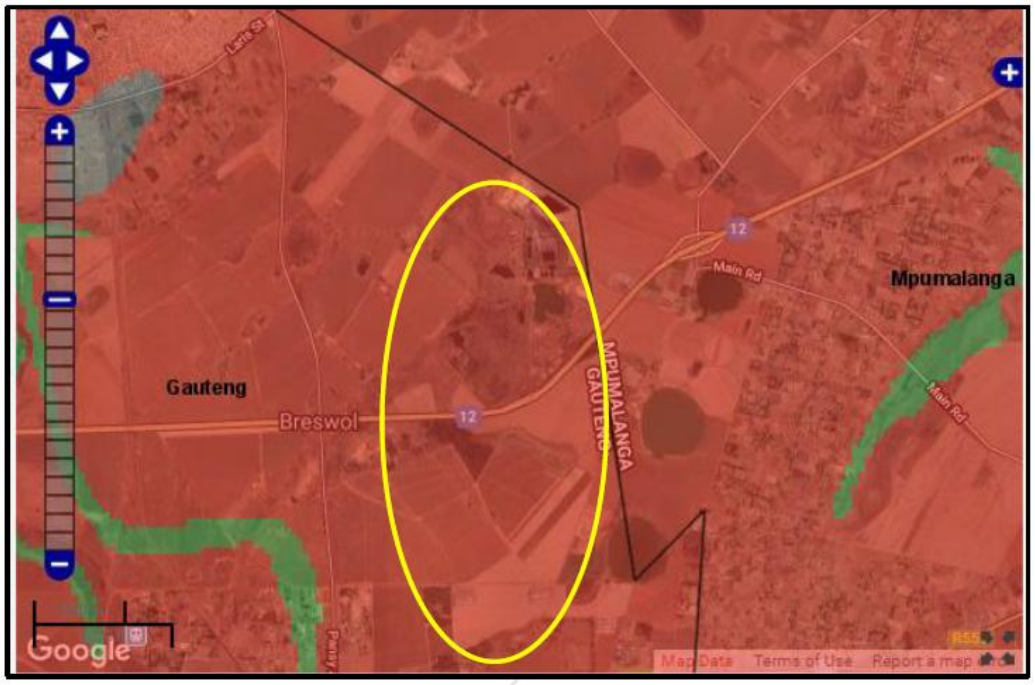
Google Earth and 1:50 000 maps of the area was utilised to identify possible places where archaeological sites might be located.

7.1.4. Genealogical Society of South Africa

No grave sites are indicated within the study area.

7. 2. Palaeontology

According to the SAHRIS Paleontological map the area is of high paleontological significance and it is recommended that a palaeontological study should be conducted by a qualified palaeontologist.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 1-27: Palaeontological sensitivity map with the approximate location of the study area (yellow polygon).

7.3 Archaeological and Historical Information Available on the Study Area

The Stone Age can be divided in three main phases as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago.
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

Although there are no well-known Stone Age sites located on or around the study area there is evidence of the use of the larger area by Stone Age communities for example along the Kliprivier where ESA and MSA tools where recorded. LSA material is recorded along ridges to the south of the current study area (Huffman 2008). Petroglyphs occur at Redan as well as along the Vaal River (Berg 1999).

Extensive Stone walled sites are recorded at Klipriviers Berg Nature reserve 20 km to the south west belonging to the Late Iron Age period. A large body of research is available on this area. These sites (Taylor's Type N, Mason's Class 2 & 5) are now collectively referred to as Klipriviersberg (Huffman 2007).

These settlements are complex in that aggregated settlements are common, the outer wall sometimes includes scallops to mark back courtyards, there are more small stock kraals, and straight walls separate households in the residential zone. These sites dates to the 18th and 19th centuries and was built by people in the Fokeng cluster.

In this area the Klipriviersberg walling would have ended at about AD 1823, when Mzilikazi entered the area (Rasmussen 1978). This settlement type may have lasted longer in other areas because of the positive interaction between Fokeng and Mzilikazi.

J. S. Bergh's historical atlas of the four northern provinces of South Africa is a very useful source for researching local and regional history. This source serves as a helpful tool in plotting where certain events had taken place in the past.

In Southern Africa the domestication of the environment began only a couple of thousands of years ago, when agriculture and herding were introduced. At some time during the last half of the first millennium BC, people living in the region where Botswana, Zambia and Angola are today, started moving southward, until they reached the Highveld and the Cape in the area of modern South Africa. Over the centuries, as the sub-continent became fully settled, these agro-pastoralists, who spoke Bantu languages, started dominating all those areas which were ecologically suitable for their way of life. This included roughly the eastern half of modern South Africa, the eastern fringe of Botswana and the north of Namibia. There are no signs that Stone Age or Iron Age communities had been active in the modern-day Springs area in the past, and at the beginning of the 19th century no prominent black tribe had settled in this area yet. This would soon change. The Difaqane (Sotho), or Mfekane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's. It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka's Zulus to attack other tribes. By 1827 Mzilikazi's Ndebele were moving through the area where Johannesburg is located today. This group went on raids to various other areas in order to expand their area of influence.

By 1832 Zulu raiders however travelled close by the Springs area to attack the Ndebele tribe (Ross 1995: 6, 7; Packard 2001: 594; Bergh 1999: 4-8, 10, 11, 14, 116-119). During the time of the Difaqane, a northwards migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa, some already as early as the 1720's. One Hume travelled through the area north of Springs in 1830, but it does not seem that any of the early travellers visited

this specific area (Bergh 1999: 13).

It was only by the late 1820's that a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent. Between 1839 and 1840, farm boundaries were drawn up in an area that includes the present-day Springs. As can be expected, the migration of whites into the Northern provinces would have a significant impact on the black people who populated the land (Ross 2002: 39; Bergh 1999: 15).

The area of interest for this report is located approximately 30 kilometers east of Johannesburg, in a region formerly known as the Far East Rand, within the larger Witwatersrand gold mining area. The first gold discovered in this part of the Witwatersrand was on the farm Varkensfontein in 1888, only two years after gold was first discovered in the Witwatersrand. The discovery of diamonds and gold in the northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history (Till 1992: 1).

The situation in the Witwatersrand also served as a trigger for the commencement of the Anglo-Boer War. The rush of *uitlanders* (foreigners) that followed the discovery of gold in the Witwatersrand, and the resultant fear of the Afrikaners of being overwhelmed, caused President Kruger to resist the granting of the franchise to incomers. Increased resentment towards Kruger fuelled Cecil Rhodes' plot to oust Kruger's government. At the outbreak of the war in October 1899, Johannesburg provided a commando under Commandant B. J. Viljoen, whilst the *uitlanders* left for Lourenco Marques to join the British troops at Durban. To the south of the Magaliesberg range, between Johannesburg and Mafeking, stands the Witwatersrand range of hills. These hills were skillfully exploited by Boers during the guerrilla phase of the war, and especially by Assistant Commandant-general Koos de la Rey and Chief-commandant Christiaan de Wet (Marix Evans 2000: 128-129, 163).

Some skirmishes were recorded near Springs. The Johannesburg Mounted Rifles British corps was founded in December 1900, and the greater portion of these troops was stationed in the Springs district in the early part of 1901. Here the Boer enemy was always in the vicinity, and opportunities for confrontation often came up. On 17 January 1901, Lieutenant S. A. Anderson and Captain D. W. Talbot ambushed Boer troops near Springs. (Angloboerwar.com 1999).

By the late 1940s mining was booming on the East Rand. There were 22 mines in operation working the Main and Kimberley reefs from more than 90 shafts. The area's prosperity however did not last; during the 1950's and 1960's many of the mines closed because their ore reserves had become depleted. The mines that stayed in operation started to mine their second reef low grade ore because the high-grade ore had been depleted. By 1992 only four operating mines were left in the East Rand.

7.4 Historical Maps of the study area

The site under investigation is located to the north and south of the N12, about eight kilometres north east of Springs in Gauteng Province.

Figure 1-28: 1957-1965 Topographical map of the site under investigation. The approximate study area is indicated with yellow borders. The sites under investigation were located on the farms Holfontein 71 IR and Welgedacht 74 IR. Northern site: Secondary roads can be seen along the north western and southern borders of this site, and the entire area was used as cultivated lands. Other developments on the property included a dam, a chicken farm with various buildings and a windmill, as well as a traditional hut / kraal and four other settlement sites with between two and three buildings. Small, central site: A section of cultivated land and two graves are visible. The Lusthof Dam can be seen to the west of the site. Southern site: A number of secondary roads went through the area, and almost the entire property was used as cultivated lands.. Other developments included two dams, some individual buildings and huts at various locations, a power line, an excavation site and two graves. (Topographical Map 1957; Topographical Map 1965).

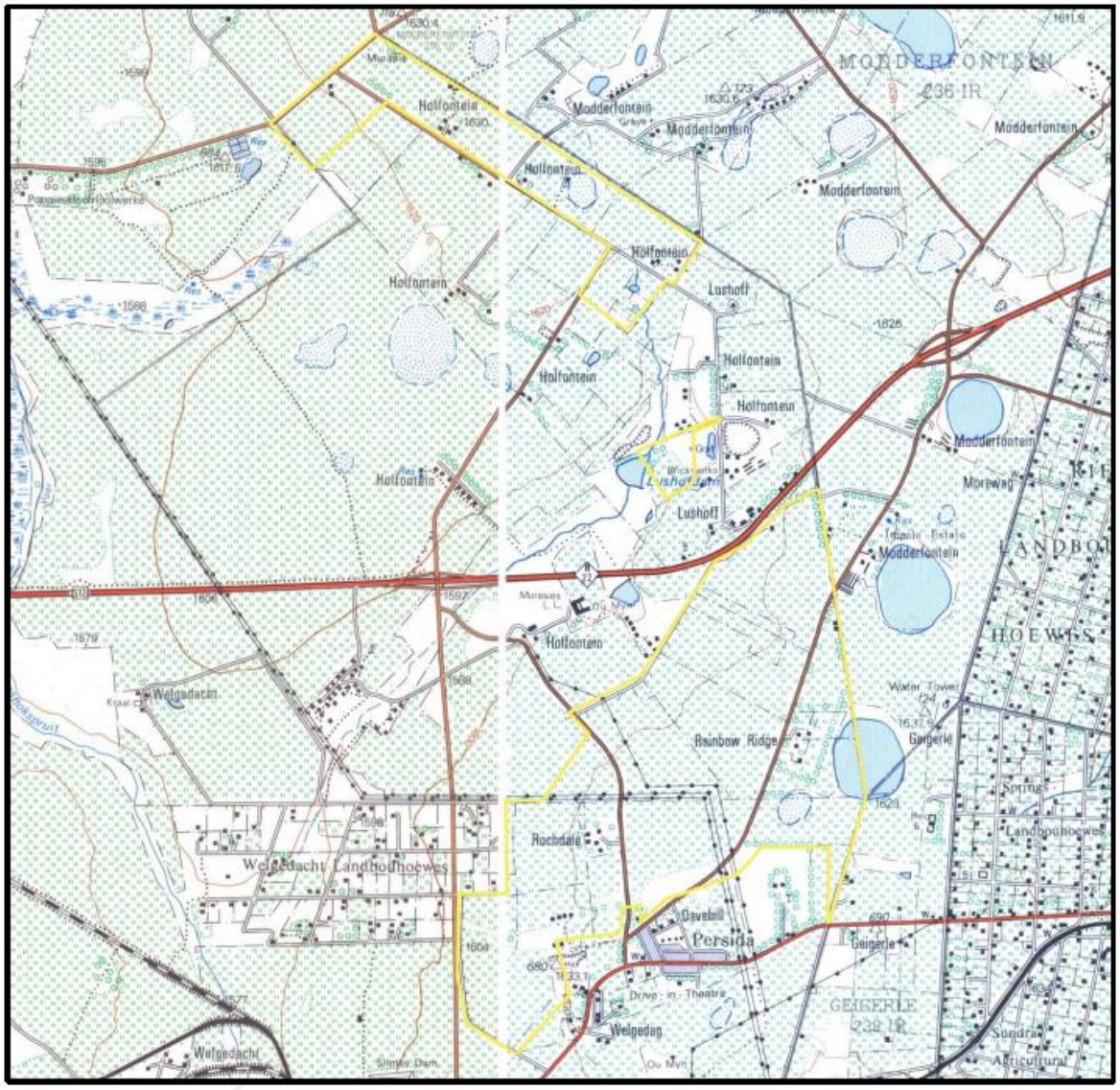


Figure 1-29: 1976-1977 Topographical map of the site under investigation. The approximate study area is indicated with a yellow border. The sites under investigation were located on the farms Holfontein 71 IR and Welgedacht 74 IR. Northern site: Secondary roads can be seen along the north western and southern borders of this site, and the entire area was used as cultivated lands. Other developments on the property included two dams, a ruin, as well as six settlement sites with between one and four buildings. Small, central site: A section of cultivated land and a grave are visible. The Lusthof Dam can be seen to the west of the site, and a brickworks was located close by. Southern site: A number of secondary roads went through the area, and almost the entire property was used as cultivated lands. Other developments included two dams, six sites with between one and five buildings, an excavation site and three power lines. (Topographical Map 1976; Topographical Map 1977).

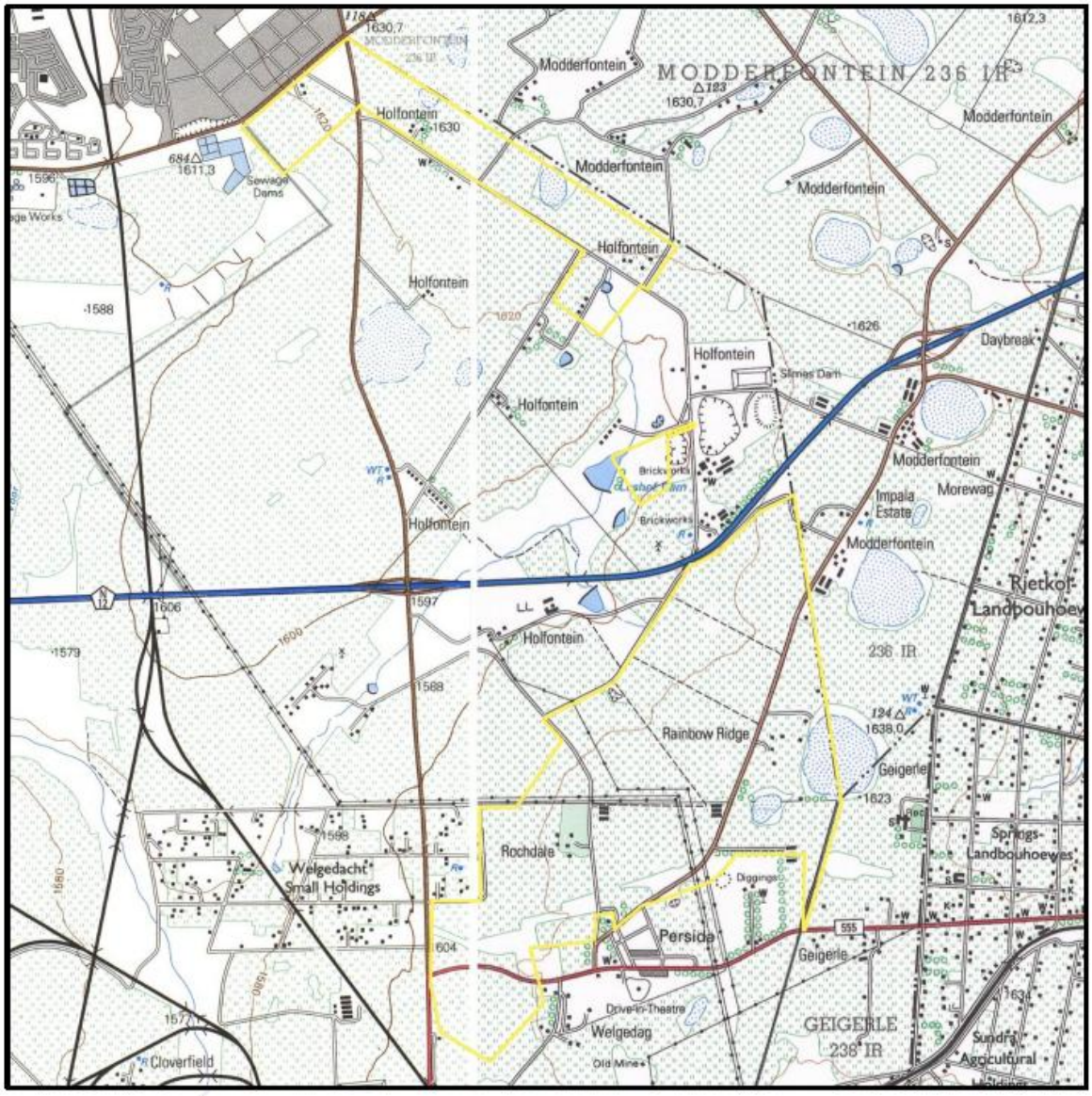


Figure 1-30: 1995 Topographical map of the site under investigation. The approximate study area is indicated with a yellow border. The sites under investigation were located on the farms Holfontein 71 IR and Welgedacht 74 IR. Northern site: Secondary roads can be seen in the north western part of this site, and almost the entire area was used as cultivated lands. Other developments on the property included three dams, as well as four settlement sites with between two and four buildings. Small, central site: A section of cultivated land is visible. The Lusthof Dam can be seen in the western part of the site, and an excavation site (part of a brickworks) is visible to the east. Southern site: A number of secondary roads and a main road went through the area, and almost the entire property was used as cultivated lands. Other developments included two dams, several sites with between one and six buildings, an excavation site and three power lines. (Topographical Map 1995).

Figure 1-31: 2018 Google Earth image showing the study area in relation to the N12, the R555, Springs, Brakpan, Benoni and other sites. (Google Earth 2018).

7.5. PROBABILITY OF OCCURRENCE OF SITES

Based on the above information, it is possible to determine the probability of finding archaeological and cultural heritage sites within the study area to a certain degree. For the purposes of this section of the report the following terms are used – low, medium and high probability. Low indicates that no known occurrences of sites have been found previously in the general study area, medium probability indicates some known occurrences in the general study area are documented and can therefore be expected in the study area and a high probability indicates that occurrences have been documented close to or in the study area and that the environment of the study area has a high degree of probability having sites.

» Palaeontological landscape
Fossil remains. *Medium - High probability.*

» Archaeological and Cultural Heritage Landscape
NOTE: *Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface*.

Archaeological remains dating to the following periods can be expected within the study area:

» Stone Age finds
ESA: *Low- Probability*

MSA*: Low- Probability*
LSA: Low-Medium Probability
LSA –Herder: Low Probability

» Iron Age finds
EIA: *Low Probability*
MIA: Low Probability
LIA: Low -Medium Probability

» Historical finds
Historical period: *Medium- High Probability*
Historical dumps: *Medium- High Probability*
Structural remains: *Medium- High Probability*
Cultural Landscape*: Low probability*

» Living Heritage
For example, rainmaking sites: *Low Probability*

» Burial/Cemeteries

Burials over 100 years: *Medium Probability*
Burials younger than 60 years*: High Probability*

Subsurface excavations including ground levelling, landscaping, and foundation preparation can expose any number of these.

7.7. FINDINGS

The heritage desktop study revealed that the following heritage sites, features and objects can be expected within the study area.

7.7.1. Palaeontological

The area is of high paleontological sensitivity and further studies will be required prior to development.

7.7.2. Archaeology

7.7.2.1 Archaeological finds

Almost no archaeological sites are on record close to the study area. This does not mean that there are no sites in the study area but can be attributed to the lack of systematic research in the area. There is a low - medium likelihood of finding LSA material close to pans and rocky outcrops.

7.7.2.2 Nature of Impact

The project (invasive prospecting activities) could directly impact on surface and subsurface archaeological sites.

7.7.2.3 Extent of impact

The project could have a low impact on a local scale.

7.7.3. Historical period

7.3.1 Historical finds:

Historical finds include middens, structural remains and cultural landscape. Several homesteads/structures are visible on Google earth in the study area although the age of these structures are not known and will be verified during the field work phase of the project.

7.7.3.2 Nature of Impact

The project (invasive prospecting activities) can directly impact on both the visual context and sense of place of historical sites.

7.7.3.3 Extent of impact

Invasive Exploration activities of the project could have a low impact on a local scale.

7.7.4. Burials and Cemeteries

7.7.4.1 Burials and Cemeteries

Graves and informal cemeteries can be expected anywhere on the landscape. Several grave sites are indicated on archival maps of the area (Figure 1-28; Figure 1-29; Figure 1-30) it is not known if these still exist and will have to be verified during the field work phase of the project. The approximate location of these graves are recorded in Table 1-16 and indicated on Figure 1-32.

Table 1-16: Grave locations in the study area

LABEL	LONGITUDE	LATITUDE
Cemetery 1	28° 30' 09.9021" E	26° 11' 22.2418" S
Cemetery 2	28° 30' 46.6031" E	26° 09' 21.4493" S
Cemetery 3	28° 30' 51.4227" E	26° 09' 16.6936" S
Cemetery 4	28° 31' 09.3406" E	26° 10' 45.9347" S
Cemetery 5	28° 31' 11.9264" E	26° 10' 38.2663" S

7.7.4.2 Nature of Impact

The project (invasive prospecting activities) could directly impact on marked and unmarked graves.

7.7.4.3 Extent of impact

The project could have a medium to high impact on a local scale.

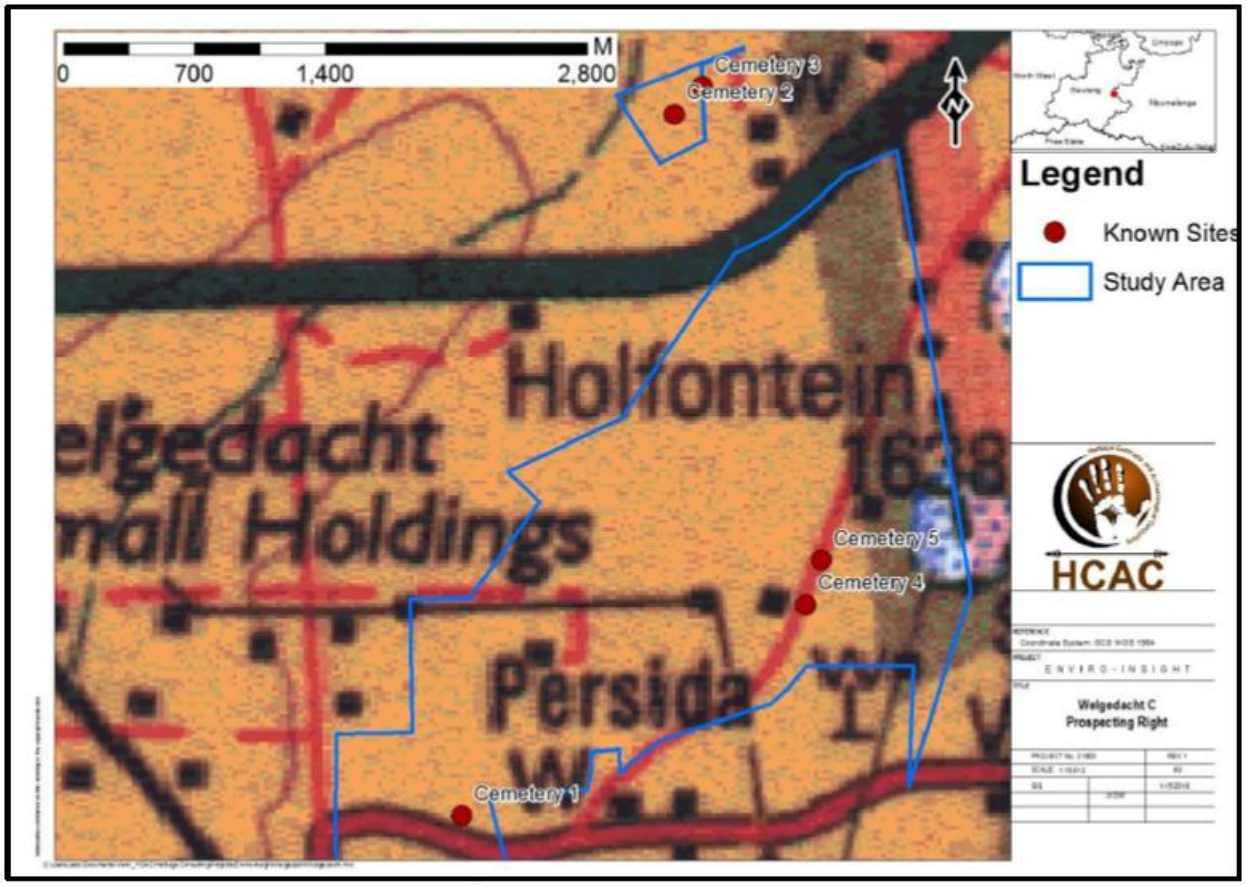


Figure 1-32: Grave sites in relation to the study area.

7.8. POTENTIAL SIGNIFICANCE OF HERITAGE RESOURCES

Based on the current information obtained for the area at a desktop level it is anticipated that any archaeological or historical sites that occur within the proposed development area will have a Generally Protected B (GP. B) field rating and all sites should be mitigatable and no red flags are identified. Graves are of high social significance and can be expected anywhere in the landscape and poses the biggest risk to the project.

7.9. CONCLUSIONS AND RECOMMENDATIONS

This desktop study revealed that very few known heritage sites occur in the vicinity of the study area, this can be attributed to a lack of systematic research in the area. It should also be noted that the study area has been extensively disturbed by agricultural activities. Every site is relevant to the Heritage Landscape, but it is anticipated that no site in the study area could have conservation value. The following conclusions are applicable to the following sites:

» Archaeological sites

If any sites occur in the study area, they could be mitigated either in the form of conservation of the sites with in the development or by a Phase 2 study where the sites will be recorded and sampled before the client can apply

for a destruction permit for these sites prior to development.

» Historical finds and Cultural landscape
Some structures could occur that are older than 60 years. No impact on structures older than 60 years is foreseen during prospecting activities, however if structures are to be impacted destruction/ alteration permits will have to be applied for.

» Burials and cemeteries
Formal and informal cemeteries as well as pre-colonial graves occur widely across Southern Africa. It is generally recommended that these sites are preserved with in a development. These sites can however be relocated if avoidance is not possible, but this option must be seen as a last resort and is not advisable. The presence of any grave sites must be confirmed the public consultation process.

» General
It is recommended that as part of the public consultation process the presence of graves, archaeological and historical sites should be determined.

7.9.1 Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during drilling any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

7.9.2 Reasoned Opinion

From a heritage perspective, the proposed project is acceptable. If the above recommendations are adhered to and based on approval from SAHRA, HCAC is of the opinion that the development can continue as the development will not impact negatively on the heritage record of the area.

(b) Description of the current land uses

Land cover information is a crucial reference dataset that informs a wide variety of activities ranging from environmental planning and protection, development planning, economic development, compliance monitoring, enforcement and strategic decision making.

When the global accessibility of Landsat 8 satellite imagery became available, it offered the opportunity to create the national land-cover dataset for South Africa, circa 2013-14, which replaced and updated the previous 1994 and 2000 South African National Landcover datasets (GEOTERRAIMAGE, 2015). The 2013-14 National Landcover dataset is based on 30x30m raster cells, and is ideally suited for ± 1:75,000 - 1:250,000 scale GIS-based mapping and modelling applications.

From the 2013-14 National Landcover dataset, the majority of the study area is located on cultivated commercial fields, with some permanent water bodies, wetlands, grassland, thicket and bush interspersed between the fields. Furthermore, some informal urban areas and plantations exist within the study area (Figure 1-33).

(c) Description of specific environmental features and infrastructure on the site.

The current infrastructure on the site are mostly related to agricultural operations and include farm offices, houses, storerooms, feedlots, etc. Other infrastructure include a wedding venue, telephone and electric cables (transmission towers), a newly constructed reservoir and associated pump station, pipelines and access road at Etwatwa EX 19. None of these will be disturbed by the proposed prospecting activities.

In terms of environmental features, refer to the Baseline Environment section above.

(d) Environmental and current land use map.

(Show all environmental, and current land use features)

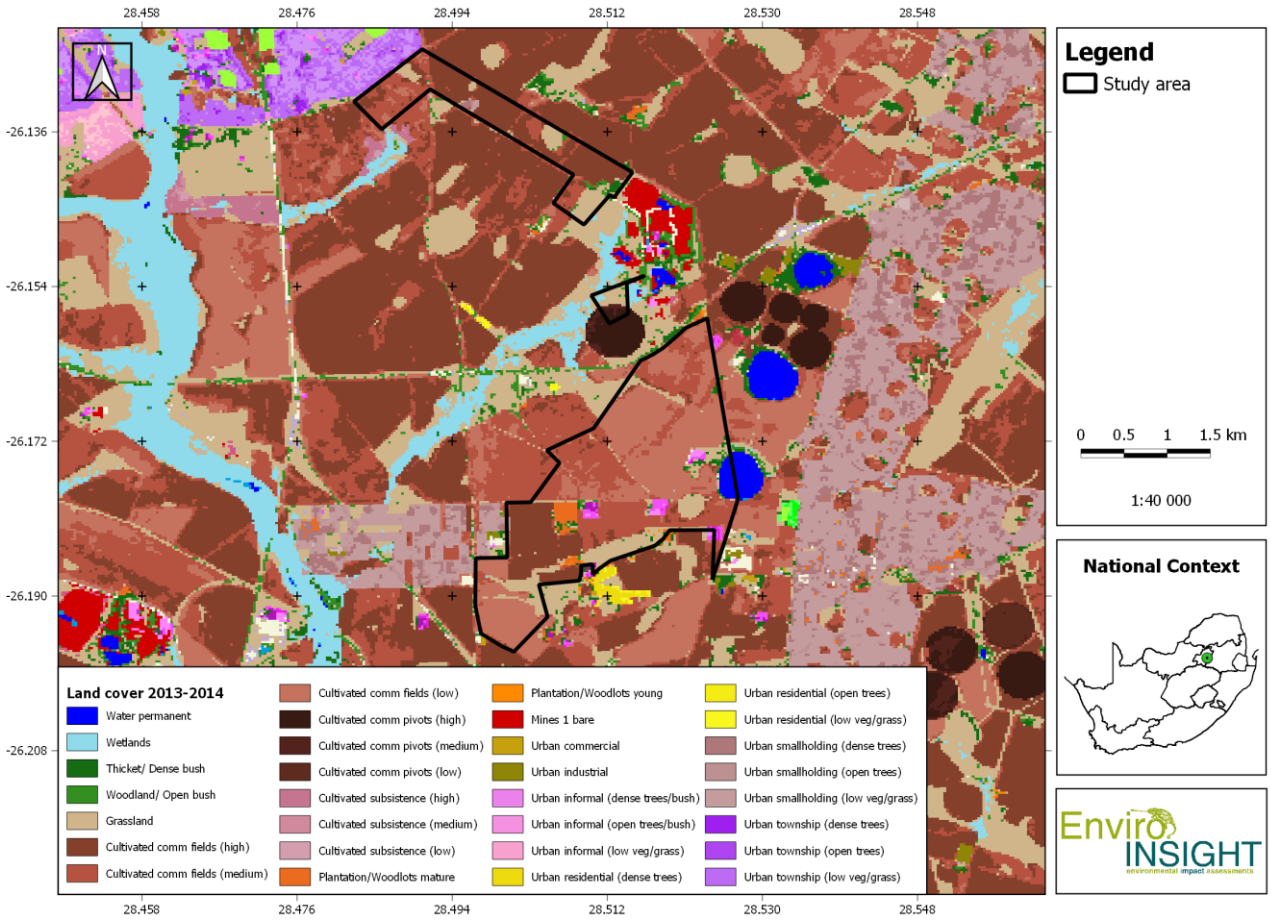


Figure 1-33: Land cover map (2013-2014) of the study area.

v. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

PROJECT ASPECT	POTENTIAL IMPACT	EXTENT	DURATION	SEVERITY	PROBABI-LITY	SIGNIFICANCE (PREMITIGATION)	PROPOSED MITIGATION
FAUNA AND FLORA	Loss of natural habitat / sensitive areas	1	4	3	4	12 (Medium/High)	• Clearings associated with core drilling should occur in as small a footprint as possible. • The surrounding natural area that is not part of the layout design may not be disturbed or damaged. • The site camps and laydown areas should be located in low sensitivity areas and should be demarcated. • Core drilling should occur within disturbed areas or areas indicated as low sensitivity. • Drilling should not take place within 30 m of a watercourse/wetland. • Re-vegetation where required after clearance should commence immediately after drilling. • An environmental induction for all staff members must be mandatory.
	Loss of flora and fauna SCC	1	5	4	4	16 (High)	• Core drilling should be planned in order to avoid loss of or damage to SCC as well as primary habitat. • The layout design for the proposed mine should be adjusted to exclude sensitive areas. • Keep the footprint of the disturbed area to the minimum and designated areas only. • An environmental induction for all staff members must be mandatory to discuss these impacts such as the presence of SCC.

	Staff or construction workers poaching and hunting fauna	1	3	2	4	8 (Medium)	• An environmental induction for all staff members must be mandatory. • No animals may be harmed or killed during the operation of this project. • Several staff members should complete a snake handling course in order to safely remove snakes from designated areas. Snakes should only be handled after inductions have taken place due to the risks of envenomation.
	Fauna mortality due to collisions with vehicles	1	3	2	4	8 (Medium)	• An environmental induction for all staff members must be mandatory. • All vehicle speeds associated with the project should be monitored and should be limited to 40 km/h (maximum). • The ECO should monitor live animal observations in order to monitor trends in animal populations and thus implement proactive adaptable mitigation of vehicle movements.
	Fauna mortality due to vegetation and ground clearing	1	3	2	4	8 (Medium)	• An environmental induction for all staff members must be mandatory • Should holes or burrows be located at the drilling sites, it is suggested to either avoid these areas, or if this is not possible, to contact a zoological specialist to investigate and possibly remove any species located within them • Layout design should exclude natural areas, especially breeding habitat
	Disruption/alteration of ecological life cycles) due to noise, dust and lighting	1	1	2	4	8 (Medium)	• Equipment with low noise emissions must be used; • A dust monitoring system should be implemented • Reduce exterior lighting to that necessary for safe operation, and implement operational strategies to reduce spill light. • Keep noise levels down as per the local municipality or national standards.
	Alien Invasive species management	1	3	3	4	12 (Medium/High)	• An environmental induction for all staff members must be mandatory • Alien vegetation control should take place during all phases of the proposed operation • Disturbance of natural areas should be avoided and the spread of alien flora into natural areas should be controlled • Continuous monitoring of the growth and spread of alien and invasive flora coupled with an adaptive management approach to identify suitable control mechanisms (e.g. mechanical, chemical or biological control). Mechanical

							control is preferred for this project. • Cleaning of vehicles and equipment before entering natural areas to remove large deposits of foreign soils and plant material sourced from elsewhere
AQUATIC AND WETLANDS	Loss of wetland habitat	1	3	3	3	9 (Medium)	• Prospecting activities undertaken within a watercourse or buffer area as determined by wetland specialist will result in application of a water use licence. • Driving through wetland areas must be avoided when navigating towards drilling locations • All wetlands and associated 30 m buffer areas should be avoided • If not possible, the soil disturbance and clearance of vegetation at drill pad areas must be limited to the absolute minimum required
	Erosion and sedimentation	1	2	2	3	6 (Medium)	• The soil disturbance and clearance of vegetation at drill pad areas must be limited to the absolute minimum required
	Hydrocarbon spillage	1	3	3	4	12 (Medium/High)	• Vehicles and equipment must be regularly serviced and maintained; • Refuelling of vehicles and equipment must be done with care to minimise the chance of spillages; • A spill kit must be available on each site where prospecting activities are in progress; and • Any spillages must be cleaned up immediately to prevent further contamination.
	Water quality	1	2	3	3	9 (Medium)	• All drilling activities must take place outside of the recommended buffer zone for each wetland; • No vehicles or machinery are allowed within the buffer areas of identified wetlands; • Designated areas should be indicated where vehicles and machinery are to be stored, repaired and refueled within a bunded area; • Implementation of rapid response emergency spill procedures to deal with spills immediately, including the provision of a spill kit and training of staff to deal with such instances;

							• Driving through wetland areas must be avoided when navigating towards drilling locations; • Vehicles and equipment must be regularly serviced and maintained; • Any spillages must be cleaned up immediately to prevent further contamination; and • All boreholes to be appropriately capped after completion of drilling to prevent deliberate or accidental contamination of groundwater.
SOILS	Site clearance and drilling	1	3	2	4	8 (Medium)	• Disturbance of soil kept to a minimum, only area where drilling is required • Preserve topsoil for rehabilitation after drilling • Stay out of agricultural lands and natural areas not part of drilling operations
	Disturbance of wetland soils	1	3	3	4	12 (Medium/High)	• Avoid wetlands from drilling operations as far as possible • Driving through wetland areas must be avoided when navigating towards drilling locations
HERITAGE	Loss of historical buildings	1	5	4	4	16 (High)	Avoid dismantling of any structures during prospecting operations. All historical buildings must be protected *in situ*
	Destruction of graveyards/ graves	1	5	4	4	16 (High)	Avoid destroying or damaging any graves/graveyards during prospecting operations. All graves/graveyards must be protected *in situ*.
	Loss of palaeontological features	1	4	3	4	12 (Medium/High)	The HIA investigation will identify resources and sites to be avoided or removed/ relocated. The specialist recommendations will be required
SOCIAL AND ECONOMIC	Creation of temporary jobs					Positive	
	Determining viability of economical resource					Positive	

	Disturbance of landowners daily operations	1	3	3	3	9 (Medium)	• Personnel are not permitted on other properties without permission. • No interference with daily farm operations • Compensate the landowner where necessary
	Surrounding neighbours	1	3	3	3	9 (Medium)	• Personnel are not permitted on other properties without permission. • Avoid conflict with surrounding landowners
NOISE	Noise pollution from machinery	1	3	3	3	9 (Medium)	• Noisy machinery to be used predominately during daylight hours • Adaptive project design to avoid excessive noise disturbance
GROUND-WATER CONTAMI-NATION	Spillage of hydrocarbons and other chemicals	1	3	4	3	12 (Medium/High)	• Regular service of vehicles and machinery • No storage or service of vehicles/machinery close to wetlands/watercourse • Monitoring of groundwater during drilling
DUST POLLUTION	• Generated from vehicles on gravel roads • Drilling activities	1	3	3	3	9 (Medium)	• The removal of vegetation will be minimised during stripping to reduce the effects of dust pollution as a result of exposed soil. • Dust monitoring must be undertaken

vi. Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

Direct, indirect and cumulative impacts of the issues identified during the specialist investigations were assessed in terms of these six standard rating scales to determine their significance. The rating system used for assessing impacts (or when specific impacts cannot be identified, the broader term issue should apply) is based on five criteria, namely:

- **Status of impacts** (Table 1-17) – determines whether the potential impact is positive, negative, or neutral (i.e. no perceived cost or benefit to the environment). A positive impact will have a low score value as the impact is considered favourable to the environment;
- **Extent of impacts** (Table 1-18) – determines the spatial scale of the impact on a scale of localised to global effect. Potential impact is expressed numerically on a scale of 1 (site-specific) to 5 (global);
- **Duration of impacts** (Table 1-19) – determines the extent of the impact in terms of timescale and longevity. Potential impact is expressed numerically on a scale of 1 (project duration) to 5 (permanent);
- **Severity of impacts** (Table 1-20) – quantifies the impact in terms of the magnitude of effect on environment (receptor) and is derived by consideration of points 1, 2 and 3 above; and
- **Probability of impacts** (Table 1-21) – quantifies the impact in terms of the likelihood of the impact occurring on a percentage scale of <5% (improbable) to >95% (definite).

Table 1-17: Status of Impacts

Rating	Description	Quantitative Rating
Positive	A benefit to the receiving environment (positive impact)	+
Neutral	No determined cost or benefit to the receiving environment	N
Negative	At cost to the receiving environment (negative impact)	-

Table 1-18: Extent of Impacts

Rating	Description	Quantitative Rating
Very Low	**Site Specific** – impacts confined within the project site boundary	1
Low	**Proximal** – impacts extend to within 1 km of the project site boundary	2
Medium	**Local** – impacts extend beyond to within 5 km of the project site boundary	3
High	**Regional** – impacts extend beyond the site boundary and have a widespread effect - i.e. > 5 km from project site boundary	4
Very High	**Global** – impacts extend beyond the site boundary and have a national or global effect	5

Table 1-19: Duration of Impacts

Rating	Description	Quantitative Rating
Very Low	**Project duration** – impacts expected only for the duration of the project or not greater than 1 year	1
Low	**Short term** – impacts expected on a duration timescale of 1 to 2 years	2
Medium	**Medium term** – impacts expected on a duration timescale of 2-5 years	3
High	**Long term** – impacts expected on a duration timescale of 5-15 years	4
Very High	**Permanent** – impacts expected on a duration timescale exceeding 15 years	5

Table 1-20: Severity of Impacts

Rating	Description	Quantitative Rating
Very Low	Negligible – zero or very low impact	1
Low	Site specific and short term impacts	2
Medium	Local scale and / or short term impacts	3
High	Regional and / or long term impacts	4
Very High	Global scale and / or permanent environmental change	5

Table 1-21: Probability of Impacts

Rating	Description	Quantitative Rating
Highly Improbable	Likelihood of the impact arising is estimated to be negligible; <5%.	1
Improbable	Likelihood of the impact arising is estimated to be 5-35%.	2
Possible	Likelihood of the impact arising is estimated to be 35-65%	3
Probable	Likelihood of the impact arising is estimated to be 65-95%.	4
Highly Probable	Likelihood of the impact arising is estimated to be > 95%.	5

These five criteria are combined to describe the overall significance rating (Table 1-22). Calculated significance of impact – determines the overall impact on (or risk to) a specified receptor and is calculated as: the product of the probability (P) of the impact occurring and the severity (S) of the impact if it were to occur (Impact = P × S). This is a widely accepted methodology for calculating risk and results in an overall impact rating of Low (L), Low/Medium (LM), Medium (M), Medium/High (MH) or High (H). The significance of a particular impact is depicted in and assigned a particular colour code in relation to its severity (Table 1-23).

Table 1-22: Significance of Impacts

Rating	Description		Quantitative Rating
Low	P x S = 1-3	(low impact significance)	L
Low/Medium	P x S = 4-5	(low/medium impact significance)	LM
Medium	P x S = 6-9	(medium impact significance)	M
Medium/High	P x S = 10-14	(medium/high impact significance)	MH
High	P x S = 15-25	(High impact significance)	H

Table 1-23: Perceived Significance of Impacts

Probability (P)	Severity (S)				
	1	2	3	4	5
1	L	L	L	LM	LM
2	L	LM	M	M	MH
3	L	M	M	MH	H
4	LM	M	MH	H	H
5	LM	MH	H	H	H

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant**: the potential impact is negligible and will not have an influence on the decision regarding the proposed development;
- **Low**: the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed development;
- **Low/Medium**: the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development;
- **Medium**: the potential impact should influence the decision regarding the proposed activity/development;
- **Medium/High**: the potential impact will affect the decision regarding the proposed activity/development; and
- **High**: the proposed activity should only be approved under special circumstances.

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of the recommended mitigation (and/or optimisation) measures. Mitigation and optimisation measures are either:

- Essential: measures that must be implemented and are non-negotiable; or
- Best Practice: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

vii. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Positive impacts are currently limited as the job creation is minimal for the prospecting phase. The main positive impact of this project is the determination of the quality and quantity of coal that can be optimally mined, if at all.

Negative impacts raised by the affected parties include the following:

- Dust pollution: Dust generated from prospecting activities influence daily farming activities.
- Groundwater quantity: Concerned regarding reduction of groundwater quantity, mostly during the mining operation when blasting takes place.
- Visual impact: Visually not appealing to the landscape, especially the surrounding landowners (mostly during the mining process).
- High potential agricultural land destroyed (during the mining process).
- Potential mining impacts on the waste facility (EnviroServ). Blasting could cause leaking of waste material into the surface and groundwater.
- Value of properties decrease if situated next to a mine.
- The yield of the crop reduces adjacent a mine and nobody would want to buy crops polluted by the mine.

viii. The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

Refer to section **v. 84Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts** on page 74 for more details on mitigation measures proposed for the impacts identified above. Where impacts are not relevant to the prospecting process, the impacts were not assessed and therefore no mitigation measures proposed. All mining related impacts need to be assessed and addressed during the mining right application process, once it is

applied for in the future, depending on the outcome of the prospecting phase.

ix. Motivation where no alternative sites were considered.

Minerals are site specific and accordingly alternative sites were not selected for this project. Furthermore, alternative sites may already have an existing prospecting or mining right which limits sites for the applicant. If prospecting does not indicate the desired mineral to be mined, alternative sites will be considered by the applicant. All sensitive features have been considered and will be excluded from the prospecting activities.

x. Statement motivating the alternative development location within the overall site. **(Provide a statement motivating the final site layout that is proposed)**

The preferred development activities will be chosen based on the sensitive areas and features identified from the specialists. The following was considered based on specialists inputs and were excluded from the development activities:

- Wetlands and watercourse including a 30 m buffer;
- Sensitive natural areas including primary vegetation, irreplaceable sites and important foraging and nesting habitat for fauna;
- Fauna and Flora species of conservation concern;
- Graveyards or individual graves including a 30 m buffer;
- Historical buildings including a 30 m buffer.

It should be noted that each of the phases is dependent on the results and success of the preceding phase. The location and extent of soil sampling and possible drilling will be determined based on information derived from the geophysics surveys.

i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity. **(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)**

In order to identify the potential impacts associated with the proposed prospecting activities the following steps were undertaken:

- The stakeholder consultation process was undertaken in a manner to be interactive, providing landowners and identified stakeholders with the opportunity to provide input into the project. This is a key focus, as the local residence has capabilities of providing site specific information, which may not be available in desktop research material. Stakeholders are requested to provide their views on the project and any potential concerns which they may have. All comments and concerns are captured and formulated into the impact assessment.
- A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations various resources were used to

determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

- Detailed mapping based on existing data sources applicable to the study area
- Geographic Information System base maps;
- Municipal Integrated Development Plan
- Municipal Strategic Development Framework
- Literature and existing data/reports for the study area

- Site visits were conducted on 16 of January and 13 of February 2019. This ensured that the information gathered as part of the Desktop investigation reflected the current status of the land.
- The ratings of the identified impacts were undertaken in a quantitative manner as provided in Impact Assessment Section. The ratings were undertaken in a manner to calculate the significance of each of the impacts. The EAP also assesses the outcomes of the calculation to determine whether the outcome reflects the perceived and the actual views.
- The identification of management measures are done based on the significance of the impacts and measures that have been considered appropriate and successful, specifically as Best Practical and Economical Options.

j) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
Drill site, site camp	Loss of natural habitat / sensitive areas	Flora and fauna	High (-)	• Clearings associated with core drilling should occur in as small a footprint as possible. • The surrounding natural area that is not part of the layout design may not be disturbed or damaged. • The site camps and laydown areas should be located in low sensitivity areas and should be demarcated. • Core drilling should occur within disturbed areas or areas indicated as low sensitivity • Drilling should not take place within 30m of a watercourse/wetland • Re-vegetation where required after clearance should commence immediately after drilling; • An environmental induction for all staff members must be mandatory	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
Drill site, site camp	Loss of flora and fauna SCC	Flora and fauna	High (-)	• Core drilling should be planned in order to avoid loss of or damage to SCC as well as primary habitat • The layout design for the proposed mine should be adjusted to exclude sensitive areas. • Keep the footprint of the disturbed area to the minimum and designated areas only. • An environmental induction for all staff members must be mandatory to discuss these impacts such as the presence of SCC	Low (-)
Prospecting operational activities	Staff or construction workers poaching and hunting fauna	Flora and fauna	Medium (-)	• An environmental induction for all staff members must be mandatory. • No animals may be harmed or killed during the operation of this project. • Several staff members should complete a snake handling course in order to safely remove snakes from designated areas. Snakes should only be handled after inductions have taken place due to the risks of envenomation.	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
Access roads, site establishment	Fauna mortality due to collisions with vehicles	Flora and fauna	Medium (-)	• An environmental induction for all staff members must be mandatory. • All vehicle speeds associated with the project should be monitored and should be limited to 40 km/h (maximum). • The ECO should monitor live animal observations in order to monitor trends in animal populations and thus implement proactive adaptable mitigation of vehicle movements.	Low (-)
Drilling and trenching	Fauna mortality due to vegetation and ground clearing	Flora and fauna	Medium (-)	• An environmental induction for all staff members must be mandatory • Should holes or burrows be located at the drilling sites, it is suggested to either avoid these areas, or if this is not possible, to contact a zoological specialist to investigate and possibly remove any species located within them • Layout design should exclude natural areas, especially breeding habitat	Low (-)
Drilling and trenching, site establishment	Disruption/alteration of ecological life cycles) due to noise, dust and lighting	Flora and fauna	Medium (-)	• Equipment with low noise emissions must be used; • A dust monitoring system should be implemented • Reduce exterior lighting to that necessary for safe operation, and implement operational strategies to	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
				reduce spill light. • Keep noise levels down as per the local municipality or national standards.	
Drilling and trenching, site establishment, rehabilitation	Alien Invasive species management	Flora and fauna	High (-)	• An environmental induction for all staff members must be mandatory • Alien vegetation control should take place during all phases of the proposed operation • Disturbance of natural areas should be avoided and the spread of alien flora into natural areas should be controlled • Continuous monitoring of the growth and spread of alien and invasive flora coupled with an adaptive management approach to identify suitable control mechanisms (e.g. mechanical, chemical or biological control). Mechanical control is preferred for this project. • Cleaning of vehicles and equipment before entering natural areas to remove large deposits of foreign soils and plant material sourced from elsewhere	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
Drilling and trenching, site establishment	Loss of wetland habitat	Aquatics and wetlands	High (-)	• Prospecting activities undertaken within a watercourse or buffer area as determined by wetland specialist will result in application of a water use licence. • Driving through wetland areas must be avoided when navigating towards drilling locations • All wetlands and associated 30 m buffer areas should be avoided • If not possible, the soil disturbance and clearance of vegetation at drill pad areas must be limited to the absolute minimum required	Low (-)
Drilling and trenching, site establishment	Hyrdocarbon spillage	Aquatics and wetlands	High (-)	• Vehicles and equipment must be regularly serviced and maintained; • Refuelling of vehicles and equipment must be done with care to minimise the chance of spillages; • A spill kit must be available on each site where prospecting activities are in progress; and • Any spillages must be cleaned up immediately to prevent further contamination.	Low (-)
Drilling and	Site clearance and drilling	Soil and vegetation	High (-)	• Disturbance of soil kept to a minimum, only area where drilling is required	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
trenching				• Preserve topsoil for rehabilitation after drilling • Stay out of agricultural lands and natural areas not part of drilling operations	
Drilling and trenching, site establishment	Loss of historical buildings	Heritage	High (-)	Avoid dismantling of any structures during prospecting operations. All historical buildings must be protected *in situ*	Low (-)
Drilling and trenching, site establishment	Destruction of graveyards/ graves	Heritage	High (-)	Avoid destroying or damaging any graves/graveyards during prospecting operations. All graves/graveyards must be protected *in situ*.	Low (-)
Drilling and trenching, site establishment	Loss of palaeontological features	Heritage	High (-)	The HIA investigation will identify resources and sites to be avoided or removed/ relocated. The specialist recommendations will be required	Low (-)
Prospecting	Creation of temporary jobs	Economic	Positive		Positive
Prospecting	Determining viability of economical resource	Economic	Positive		Positive

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
Drilling and trenching, site establishment	Disturbance of landowners daily operations	Social and Economic	Medium (-)	• Personnel are not permitted on other properties without permission. • No interference with daily farm operations • Compensate the landowner where necessary	Low (-)
Drilling and trenching, site establishment	Surrounding neighbours	Social and Economic	Medium (-)	• Personnel are not permitted on other properties without permission. • Avoid conflict with surrounding landowners	Low (-)
Drilling and trenching, site establishment	Noise pollution from machinery	Noise	Medium (-)	• Noisy machinery to be used predominately during daylight hours • Adaptive project design to avoid excessive noise disturbance	Low (-)
Drilling and trenching, site establishment	Spillage of hydrocarbons and other chemicals	Groundwater contamination	High (-)	• Regular service of vehicles and machinery • No storage or service of vehicles/machinery close to wetlands/watercourse • Monitoring of groundwater during drilling • Setback distance of at least 100m from domestic supply and boreholes. • Identify high risk areas • Ensure additives are non-hazardous, non – toxic and biodegradable • Ensure spillage kit are readily available • Making use of oil mats and other avoidance measures • Ensure no discharge to ground via karst	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigated
				features	
Drilling and trenching, site establishment	• Generated from vehicles on gravel roads • Drilling activities	Dust pollution	Medium (-)	• The removal of vegetation will be minimised during stripping to reduce the effects of dust pollution as a result of exposed soil. • Dust monitoring must be undertaken	Low (-)

k) Summary of specialist reports

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form) – **Refer to Appendix 5**:

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)
Terrestrial Ecology	• No drilling must take place within natural areas identified as CBA: Important areas and a suitable buffer area of at least 30m from these areas should be implemented in order to account for edge, indirect and cumulative effects. • Post-prospecting operations should rehabilitate the land to its original state as far as possible with no net loss of wetland areas. • The high risk category B of the Mining and Biodiversity guidelines is predominantly due to the presence of wetlands and watercourses on site and should be avoided at all cost. • No SCC have been observed within the study area, although a high probability of SCC are likely in wetland and primary vegetation areas. These natural areas (highly sensitive) are to be avoided at all cost. • A Search and Rescue Plan should be drafted by a fauna and flora specialist in order for the relocation of medicinal plant species and Species of Conservation Concern, including breeding adults of Giant Bullfrog should the wetland areas not be protected from the proposed prospecting activities	X

Wetland/ Aquatic Delineation	• All drilling activities must take place outside of the recommended buffer zone for each wetland; • Driving through wetland areas must be avoided when navigating towards drilling locations; • The soil disturbance and clearance of vegetation at drill pad areas must be limited to the absolute minimum required; • Vehicles and equipment must be regularly serviced and maintained; • Refuelling of vehicles and equipment must be done with care to minimise the chance of spillages; • A spill kit must be available on each site where prospecting activities are in progress; and • Any spillages must be cleaned up immediately to prevent further contamination	**X**

Heritage Impact Assessment	• Based on the current information obtained for the area at a desktop level it is anticipated that any archaeological or historical sites that occur within the proposed development area will have a Generally Protected B (GP. B) field rating and all sites should be mitigatable and no red flags are identified. • Graves are of high social significance and can be expected anywhere in the landscape and poses the biggest risk to the project. These sites can be relocated if avoidance is not possible, but this option must be seen as a last resort and is not advisable. Cemetery 2 and 3 are located in an area where brick works used to occur and the area is characterised by extensive earthworks. Cemetery 4 and 5 are located in areas currently used as agricultural fields. • No impact on structures older than 60 years is foreseen during prospecting activities, however if structures are to be impacted destruction/ alteration permits will have to be applied for • No archaeological sites were identified during the survey. This can be attributed to extensive cultivation throughout the study area. If any archaeological sites occur in the study area, they could be mitigated either in the form of conservation of the sites within the development or by a Phase 2 study where the sites will be recorded and sampled before the client can apply for a destruction permit for these sites prior to development. • An independent paleontological study (Bamford 2019) found that the site is on shales, sandstones, mudstones and coals of the Vryheid Formation (Ecca Group, Karoo Supergroup) and contains coals that will be exploited and could potentially also contain plants of the *Glossopteris* flora in the shales between the coal seams. Fossils are not visible in the coal itself and no vertebrates are likely to occur. The uppermost coal seam in this part of the Witbank coalfield is about 80m below the land surface. Since there is a small chance that fossils could occur below the surface a Fossil Chance Find Protocol should be added to the EMPr for when excavations commence (Bamford 2019)	**X**
Prospecting Works Programme	Recommends the specific manner in which the mining should take place	**X**

I) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

The findings are that the proposed prospecting activities will result in low to medium impact in all aspects of the physical and socio-economic environment. Low impact in terms of disturbances such as dust, lighting and noise may arise from the drilling. All natural areas including watercourses/wetlands and primary vegetation should be excluded from drilling sites; all historical features such as buildings and graves/graveyards should be excluded from drilling sites. There is a risk of hydrocarbon pollution due to leakage from vehicles and machinery, but this can be managed and mitigated to acceptable levels.

Monitoring of the required mitigation measures is to take place on site at a continuous basis by the project manager, contractors and ECO. Annual monitoring audits are to take place by an appointed independent environmental assessment practitioner.

(ii) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.

The exact location of drilling points cannot be pinpointed as the prospecting activities are conducted in phases, and each phase depends on the success of the previous phase. The drill points must be identified after the geophysical surveys have confirmed the presence of the ore body. The sensitive areas will be identified during the planning phase of the project and no activities will be undertaken at any sensitive area (refer to Figure 1-32). A detailed map can be produced after the geophysical surveys has been undertaken, although the map will be subjected to changes depending on the results of the preliminary drilling and assaying.

(iii)Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Given that no feasible alternatives have been identified at this stage, the positive and negative impacts of the proposed activity as described in this document is described below:

Negative impacts / risk to the environment:

1) Dust, lighting and noise impact from prospecting activities. Impacts can be minimised and mitigated
2) Potential for hydrocarbon pollution is low and easily manageable.

Positive impacts include:

1) Temporary employment of staff
2) Confirmation as to the quality and possibly quantity of the coal that could be mined optimally

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr:

Impact management objectives are described in terms of the Mitigation Hierarchy of the ERM Impact Assessment Standard. The mitigation hierarchy is as follows:

- **Avoid at Source:** Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by placing or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, installation of noise silencers, operate in daylight hours).
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- **Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g. agricultural land due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Compensate in Kind; Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of resources, recreation and amenity space).

n) Aspects for inclusion as conditions of Authorisation

Any aspects which must be made conditions of the Environmental Authorisation

- All mitigation measures given in the Environmental Management Programme Report (EMPr) should be adhered to;
- Measures and recommendations suggested by specialist should be followed;
- An Environmental Control Officer should be appointed to do regular monitoring as suggested in the EMPr;
- All graves/graveyards should be protected in situ and a 30m buffer area should be applied where no prospecting activities may take place;
- All wetlands and watercourses should be protected in situ and a 30m buffer area should be applied where no prospecting activities may take place;
- The combined sensitivity map should be followed where no activity may take place within high sensitive areas;
- Rehabilitation of drill holes should take place immediately after work has ceased and should be done in a responsible manner

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The following assumptions have been identified with regards to the project:

- The public participation process has sought to involve key stakeholders and individual landowners. It is assumed that where participation has been sought from the organisational representative/s, that these parties have the authority to comment on behalf of their organisation;
- Third party information provided by the applicant is correct at the time of writing this report;
- Prospecting activities will take place in Phases and each phase is determined and dependent on the previous phase. Accordingly, the exact drilling locations will only be determined later.

p) Reasoned opinion as to whether the proposed activity should or should not be authorised

ii) Reasons why the activity should be authorized or not.

No fatal flaws were identified in terms of this project as long as the mitigation and recommendations proposed are adhered to. The specialist studies indicated no critical issues that cannot be lowered to an acceptable level through the suggested mitigation measures, resulting in a fatal flaw. All sensitive areas identified throughout the process will be excluded from the proposed development.

Coal is still a strategic mineral in South Africa; even thought there has been pressure to reduce the carbon footprint of the country and the energy sector is phasing out coal as the primary energy source in the country. Alternative energy sources such as renewable energy is expected to dominate the energy market by 2050, but until then coal is still a major part of the local and international economy.

It is recommended by the EAP that the proposed prospecting could be authorised, on the assumption that the environmental and social management commitments included in this BA/EMPr are adhered to, the project description remains as per the description provided in this document and considering the positive social impacts associated with the project. It should also be ensured that proper rehabilitation is provided for and that risks are controlled by having emergency plans in place.

iii) Conditions that must be included in the authorisation

To ensure compliance with, and implementation of the EMPr by:

- Appointing a suitably qualified Environmental Control Officer to oversee implementation of the EMPr and undertake audits on a regular basis throughout the construction and operational phase of the project, where applicable;
- To ensure that all staff, contractors and sub-contractors are aware of and understand the requirements of the EMPr and environmental issues in relation to their individual areas of work by:

- Developing an induction and training program covering the EMPr, environmental awareness, dealing with environmental incidents and waste management; and
- Advising staff commissioned during pre-construction and construction, including sub-contractors, of the EMPr requirements through the induction program.

q) Period for which the Environmental Authorisation is required.

The Prospecting Right and Environmental Authorisation should be valid for a period of 5 years.

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

The EAP undertakes that the information provided is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

Operational rehabilitation has been catered for in the Budget lodged with the application in the Prospecting Work Programme. In terms of decommissioning rehabilitation (or the so called Rehabilitation Quantum) the amount to be provided by Bank Guarantee or cash deposit is R35 000.

iv) Explain how the aforesaid amount was derived.

It was determined that R2500 will be required for rehabilitation per drill hole. Refer to the Prospecting Work Programme in Appendix 6.

v) Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

The Applicant has direct access to sufficient financial resources required as per the budget to enable it to conduct the proposed prospecting operation optimally in accordance with the Prospecting Work Program. The Applicant Company will be funded by its share holding companies, ErgoMark (Pty) Ltd of South Africa and Action Group of India. Refer to the Prospecting Work Programme in Appendix 6

t) Specific Information required by the competent Authority

vi) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

(1) Impact on the socio-economic conditions of any directly affected person. **(**Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix** .

Current land uses inside the prospecting area, such as grazing, may be temporarily impacted through the presence of the fenced areas that drill rigs will operate within. These are however, small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing. The farmers raised issues like leaving the gates open and opening of many access roads.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. **(**Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The heritage assessment for the mining area was undertaken by Jaco van der Walt and can be found in Annexure 5 of this report. The results of this study indicated that there are graveyards/grave on the study area that require to be protected in situ or the necessary permit needs to be applied for in terms of relocating them.

u) Other matters required in terms of sections 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as an annexure if not listed below.

Mineral resources are by nature very difficult to locate as it requires extensive prospecting and calculated determination of stock. Minerals can only be mined where they exist; therefore site alternatives are not always feasible.

The design and layout of the drilling activity is solemnly dependant on the geophysical and geological investigations. The proposed drilling layout will be developed to reduce any impacts on the environment by avoiding sensitive features as indicated by the specialists.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

2) Draft Environmental Management Programme.

a) Details of the EAP **(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).**

ITEM	CONSULTANT CONTACT DETAILS
Name	Enviro-Insight CC
Tel no	012 807 0637
Contact	Corné Niemandt
E-mail address	corne@enviro-insight.co.za
Postal address and Physical Address	Unit 8, Oppidraai Office Park 862 Wapadrand Rd Wapadrand Security Village Pretoria 0081

Senior Environmental Practitioner – Corné Niemandt: Mr Niemandt has expertise in Environmental Authorisation applications related to mining and other sectors. He has 3 years of experience within the environmental field, and six years experience within the ecological field. He holds a Master's degree in Plant Science from the University of Pretoria and is registered with SACNASP as a Pr. Sci. Nat. in Ecological Sciences. He is also a member of the South African Affiliate for the International Association for Impact Assessment and of the South African Association of Botanists.

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

Yes, refer to PART A, section (1)(h)

c) Composite Map (Provide a map (Attached as an Appendix 3) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

A composite map is provided based on all sensitive areas but excludes the proposed activities, associated structures, and infrastructure as the location of the drilling holes have not been determined yet. Once the drilling holes have been determined and the temporary infrastructure location has been determined can this composite map be updated based on the specialists findings. Accordingly, the location of the drill sites as well as the infrastructure may not be located in sensitive areas or within their respective boundaries. Refer to Appendix 2 and Appendix 3 for individual maps created.

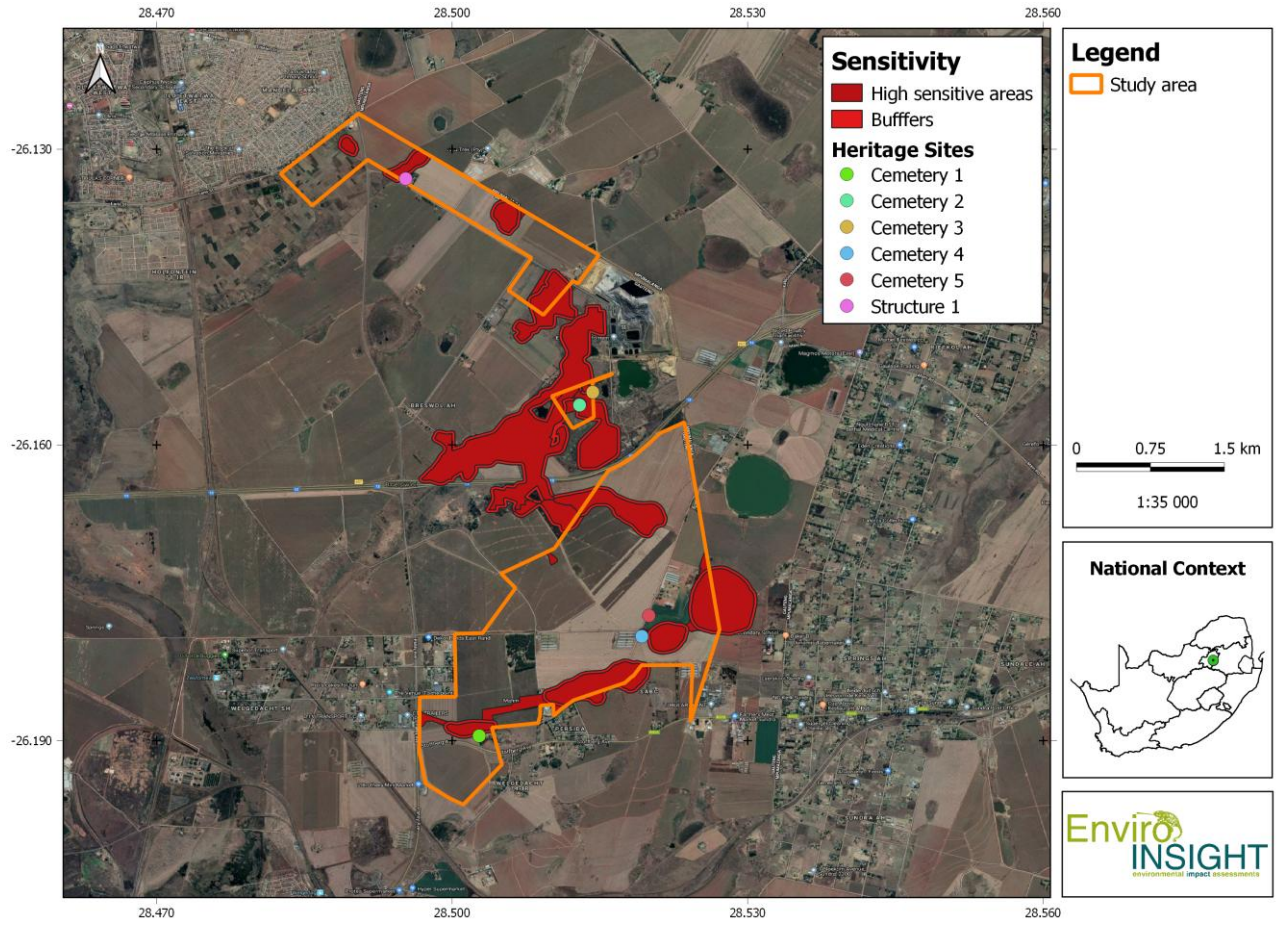


Figure 1-32: Composite map indicating sensitive areas

d) Description of Impact management objectives including management statements

The overall closure objective is to return each of the drill sites so that it can form part of the surrounding pan environment without impediment. In addition, it is an objective that the disturbance area is kept to an absolute minimum and no access to areas outside of the disturbance area will be permitted.

i. Volumes and rate of water use required for the operation.

This information is not available at this time, but a water use licence will not be required for this project.

ii. Has a water use licence has been applied for?

No, a WULA is not required. The volume of water to be used during the prospecting activities does not trigger any NWA listed activities. The Department of Water Affairs and Sanitation will be consulted as a project stakeholder.

iii. Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m^2)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Site Office and storage area	To be confirmed	• Arrangements may be done with farmers to use existing structures for offices and other infrastructure requirements. • A security company may be contracted to protect the drilling equipment overnight or over weekends if the drill contractors have a weekend off.	Applicant will ensure that all employees, contractors, visitors comply with the EMPr	If infrastructure is constructed, all material and equipment must be removed after completion of prospecting activities, and any disturbance caused must be rehabilitated directly afterwards

Accommodation	To be confirmed	In order to minimise impacts in the prospecting area, no camp site will be established. All employees will stay outside prospecting area. The employees will drive to the site every day when drilling operations are in progress.	Applicant will ensure that all employees, contractors, visitors comply with the EMPr	NA
Trenching	To be confirmed	The area that was disturbed by the drilling operation at each site shall be rehabilitated, as far as is practicable, to its original state as soon as the drilling is completed. Photographs, for monitoring purposes, should be taken before drilling commences and after each drilling site has been rehabilitated. These photographs should be included in the required Performance Assessment Reports.	Applicant will ensure that all employees, contractors, visitors comply with the EMPr	Rehabilitate upon cessation of the individual activity that is as soon as a trench is completed. No trench shall be left open overnight unless if guarded.
Drill sites	To be confirmed	• Every effort must be made to minimise the area needed at each drilling site. • Vegetation should not be cut or trimmed unless absolutely essential. • The area that was disturbed by the drilling operation at each site shall be rehabilitated, as far as is practicable, to its original state as soon as the drilling is completed. • Photographs, for monitoring purposes, should be taken before drilling commences and after each drilling site has been rehabilitated. These photographs should be included in the required Performance Assessment Reports.	Applicant will ensure that all employees, contractors, visitors comply with the EMPr	Rehabilitate upon cessation of the individual activity that is as soon as a drill hole is completed.
Access routes	To be confirmed	• No new roads will be constructed on this site. Tracks across areas covered by natural vegetation will be kept to the absolute minimum required. • Employees must comply with all speed and traffic regulations on public roads and should not exceed 40km/hour on farm roads	Applicant will ensure that all employees, contractors, visitors comply with the EMPr	Rehabilitate immediately

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph);

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site Office and storage area	Only if established will the surface bed disturbed including soil and vegetation	Only if constructed: • Soil • Vegetation • Visual Social aspects of landowner farming activity	No construction on site. If required utilise existing buildings by arrangement with landowners	Impact avoided
Accommodation	Only if established will the surface bed disturbed including soil and vegetation	Only if constructed: • Soil • Vegetation • Visual Social aspects of landowner farming activity	No construction on site. If required utilise existing buildings by arrangement with landowners	Impact avoided
Site establishment	Dust and noise from vehicles driving to area to access the proposed drill site	• Visual • Air quality • Landowners and neighbours disturbed • Faunal mortality from vehicle collisions	Noise control: silencers should be fitted on all engines. Reduce dust by driving slow on gravel roads. Ensure vehicles and equipment is maintained.	Impact controlled

Trenching	Topsoil loss and removal of vegetation	• Topsoil loss • Vegetation loss if in natural area • Crop loss if in agricultural fields	Trenching sites to be located in disturbed areas wherever possible. No disturbance of sensitive areas including wetlands. The prospecting area including trench sites and access routes are to be rehabilitated to as near original condition as possible. If possible, prospect post-harvesting of crops. No fires to be made in the prospecting area. Limited disturbance by reducing operation activities footprint. Storage of topsoil if in agricultural fields.	Impact controlled
	Dust generation	• Air quality	Dust control measures	Impact controlled
	Noise	• Social nuisance	Ensure vehicles and equipment is maintained. Silencers should be fitted on all engines.	Impact controlled
Drill sites	Dust generation	• Air quality	Dust control measures	Impact controlled
	Noise	• Social nuisance	Ensure vehicles and equipment is maintained. Silencers should be fitted on all engines.	Impact controlled
	Removal of topsoil and vegetation	• Topsoil loss • Vegetation loss if in natural area • Crop loss if in agricultural fields	Drill sites to be located in disturbed areas wherever possible. No disturbance of sensitive areas including wetlands. The prospecting area including trench sites and access routes are to be rehabilitated to as near original condition as possible. If possible, prospect post-harvesting of crops. No fires to be made in the prospecting area. Limited disturbance by reducing operation activities footprint. Storage of topsoil if in agricultural field.	Impact controlled

			Areas to be rehabilitated must be planted with a mixture of local pioneer species indigenous to the area, as soon as the new growing season starts. Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the Environmental Control Officer and in compliance with EMP.	
	Use of drilling mud during drilling operations	Ground water contamination	Control measures and monitoring if required	Impact controlled
	Breakdown of machinery, oil spillages	Surrounding environment and water contamination	Establish EMPr procedures to minimise hydrocarbon spills.	Impact controlled

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).	**POTENTIAL IMPACT** (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.	**MITIGATION TYPE** (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either: Upon cessation of the individual activity	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Site Office and storage area	Only if established will the surface bed disturbed including soil and vegetation	No construction on site. If required utilise existing buildings by arrangement with landowners	NA	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
Accommodation	Only if established will the surface bed disturbed including soil and vegetation	No construction on site. If required utilise existing buildings by arrangement with landowners	NA	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
Site establishment	Dust and noise from vehicles driving to area to access the proposed drill site	Noise control: silencers should be fitted on all engines. Reduce dust by driving slow on gravel roads. Ensure vehicles and equipment is maintained.	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
Trenching	Topsoil loss and removal of vegetation	Trenching sites to be located in disturbed areas wherever possible. No disturbance of sensitive areas including wetlands. The prospecting area including trench sites and	Upon cessation of individual activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors

		access routes are to be rehabilitated to as near original condition as possible. If possible, prospect post-harvesting of crops. No fires to be made in the prospecting area. Limited disturbance by reducing operation activities footprint. Storage of topsoil if in agricultural fields.		comply with the EMPr.
	Dust generation	Dust control measures	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
	Noise	Ensure vehicles and equipment is maintained. Silencers should be fitted on all engines.	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
Drill sites	Dust generation	Dust control measures	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
	Noise	Ensure vehicles and equipment is maintained. Silencers should be fitted on all engines.	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.

	Removal of topsoil and vegetation	Drill sites to be located in disturbed areas wherever possible. No disturbance of sensitive areas including wetlands. The prospecting area including trench sites and access routes are to be rehabilitated to as near original condition as possible. If possible, prospect post-harvesting of crops. No fires to be made in the prospecting area. Limited disturbance by reducing operation activities footprint. Storage of topsoil if in agricultural field. Areas to be rehabilitated must be planted with a mixture of local pioneer species indigenous to the area, as soon as the new growing season starts. Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the Environmental Control Officer and in compliance with EMP.	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
	Use of drilling mud during drilling operations	Control measures and monitoring if required	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.
	Breakdown of machinery, oil spillages	Establish EMPr procedures to minimise hydrocarbon spills.	Ongoing during activity	The applicant and appointed sub-contractors will ensure that all employees, contractors, visitors comply with the EMPr.

vii) Financial Provision

(1) Determination of the amount of Financial Provision.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

For a prospecting operation such as this, the primary closure and environmental objectives are to:

- Minimise the area to be disturbed and to ensure that the areas disturbed during the prospecting activities are rehabilitated and stable, as per the commitments made in the EMPr.
- Sustain the pre-prospecting land use.
- To record and communicate the results of the monitoring programme during decommissioning to the participating stakeholders.
- To receive an effective closure certificate.

The closure objectives for mining internationally and in South Africa focuses on the restoration of previous land use capabilities, the zero net loss of biodiversity, and the satisfaction of community requirements.

Rehabilitation measures are designed to meet closure objectives:

The objectives of rehabilitation and closure are:

- To ensure closure complies with the Mineral and Petroleum Resources Development Act 28 of 2002.
- To ensure that the mining footprints are rehabilitated to an acceptable standard, where there is ecosystem functioning and that all environmental and social risks have been reduced and do not pose any threat to the environment post mine-closure.
- To ensure that the goals which were specified in the rehabilitation plan have been met and that the land may have a sustainable use.
- To implement management strategies that will ensure that the negative impacts (risks) associated with the Borrow pit is eliminated or minimized to acceptable standards.
- To leave the area in a manner that is environmentally safe and does not pose any health risks to the neighbouring communities.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

Stakeholder engagement involved the availability of the Draft BAR for public review, consultation meetings with landowners and a public meeting (refer to Appendix 4). Feedback from stakeholders was incorporated into the report. Please take note that limited participation from landowners took place as no comments were received on the draft BA report and none attended the public meeting (only a

surrounding landowner Mr Francois Neuhoff attended the public meeting, who also represented his father Mr Jannie Neuhoff). No comments were received from a commenting authority or other I&APs.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The closure objective is to return the drill sites to previous landuse. In order to achieve this, the following actions are required:

- Note that the locations of the proposed drill holes once determined serve as a guide to the prospecting applicant and sub-contractor. They must, prior to drilling, meet on site and select each of the drill sites based on location close to existing tracks where possible. The aim is to limit disturbance as much as possible whilst still achieving the desired results of representative prospecting.
- Once the drill arrives it must only use existing roads until the closest point to the drill hole. Access to and from existing road to the drill must occur on the same track back to the existing track/ road.
- Drill holes tailings are to be kept in as small a heap as possible and must be used to backfill the hole after successful drilling.
- After the drill rig has left the site, the site must be checked for hydrocarbon leaks and treated if required.
- Rehabilitation entails the physical restoring of the drill holes and returning the disturbed site back to its original landuse.
- This includes removal of alien vegetation, soil erosion control and revegatation of natural vegetation where required.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

Drill site rehabilitation will be undertaken by the contract drilling company on completion of every borehole. The Rehabilitation plan for this project will allow the proposed prospecting operation to achieve the following objectives:

- Comply with relevant legislation and policy requirements with regards to rehabilitation.
- Avoid or mitigate impacts associated with the project which may be detrimental to the environment.
- Land rehabilitation to a predetermined and agreed upon state that allows sustainable land use and capability of the site, that is to return the site to the condition that existed prior to prospecting or an agreed upon state.
- Cost effective and efficient closure of prospecting operations.
- Management and monitoring of the area post-closure.

The rehabilitation plan will thus be aligned to the closure objectives and tailored to the project to achieve these objectives. It will include information about the site prior to the mining operation and provide information on the maintenance of resources required for the rehabilitation process, as well detail how rehabilitation will be undertaken. It will also provide information on the management and monitoring of disturbance to avoid or minimise detrimental impacts. It will also include information associated with post-closure environmental monitoring of the site to ensure that the rehabilitation plan is followed and its objectives are achieved.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

Operational rehabilitation has been catered for in the Budget lodged with the application in the Prospecting Work Programme. In terms of decommissioning rehabilitation (or the so called Rehabilitation Quantum) the amount to be provided by Bank Guarantee or cash deposit is R35 000. Refer to Appendix 6.

(f) Confirm that the financial provision will be provided as determined.

The Budget has been prepared by the applicant as part of the Prospecting Work Programme and that includes a provision for Rehabilitation in the prospecting budget. The applicant confirms herewith that the amount can be (and will be) provided from operating expenditure. The quantum must be approved by the DMR after which the applicant will provide for the quantum by way of bank guarantee.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- **g) Monitoring of Impact Management Actions**
- **h) Monitoring and reporting frequency**
- **i) Responsible persons**
- **j) Time period for implementing impact management actions**
- **k) Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Drilling and Trenching (Site Establishment)	The clearing of vegetation	Monitor daily Monitor monthly	Geologist/Contractor Environmental Assessment Practitioner (EAP) / Environmental Control Officer (ECO)	Daily by Geologist/ Contractor. Monthly site visit and annual report by independent EAP or ECO to compile the required annual environmental compliance report required by the DMR
Drilling	The storage of hydrocarbon based materials on site	Monitor daily Monitor monthly	Geologist/Contractor EAP/ECO	Daily by Geologist/ Contractor. Monthly site visit and annual report by independent EAP or ECO to compile the required annual environmental compliance report required by the DMR
Trenching and Drilling	On-site waste management	Monitor daily Monitor monthly	Geologist/Contractor EAP/ECO	Daily by Geologist/ Contractor. Monthly site visit and annual report by independent EAP or ECO to compile the required annual environmental compliance report required by the DMR

Trenching and Drilling	The removal of storage and soil	Monitor daily Monitor monthly	Geologist/Contractor EAP/ECO	Daily by Geologist/ Contractor. Monthly site visit and annual report by independent EAP or ECO to compile the required annual environmental compliance report required by the DMR
Drilling	Groundwater: Monitor the water quality of the boreholes	Monitor monthly	Geologist/Contractor EAP/ECO	Monthly site visit and annual report by independent EAP or ECO to compile the required annual environmental compliance report required by the DMR

l) Indicate the frequency of the submission of the performance assessment/ environmental audit report.

Environmental audit report will be submitted annually by the Environmental Control Officer in compliance with the provided EMPr contents and guidelines.

m) Environmental Awareness Plan

The Applicant will develop an Environmental Awareness "course" as part of the Environmental Management System to be presented to staff prior to drilling. This will include all aspects of the EMPr.

1. Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Wozimart has to appoint an independent qualified Environmental Control Officer (ECO) whose duty includes implementing an effective environmental awareness plan aimed to educate workers and contractors in terms of the biodiversity on site, environmental risks associated with the proposed development and land management of the site. All employees must be provided with environmental awareness training to inform them of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment as well as safety measures. Employees should be provided with environmental awareness training before prospecting operations start, and include all new employees. Induction courses will be provided to all employees by a reputable trainer, preferably the appointed ECO.

2. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

All employees must be provided with environmental awareness training to inform them of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. Employees should be provided with environmental awareness training before prospecting operations start, and include all new employees. Induction courses will be provided to all employees by a reputable trainer, preferably the appointed ECO. The EMPr addresses potential risks and ways to deal with them as proposed by the specialists and EAP in order to avoid pollution or the degradation of the environment.

n) Specific information required by the Competent Authority

All potential risks have been identified within this document and are to be communicated to all contractors and is indicated in the EMPr which will be available to all staff on site. Environmental training needs for each section should be identified and addressed to ensure environmental management is part of day to day operations. The environmental risk responsibilities guide the training requirements of each individual. Environmental training recommended for the different levels of management guide the training needs identification process. This is a minimum guideline and any additional training can be added where section specific issues or high risk items require training and awareness. It is the

responsibility of the project manager to ensure environmental training needs for individual staff members are identified, agreed to, facilitated and tracked. An environmental audit report will be submitted annually as per DMR requirements.

3) UNDERTAKING

The EAP herewith confirms

m) the correctness of the information provided in the reports ☒

n) the inclusion of comments and inputs from stakeholders and I&APs ; ☒

o) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒ and

p) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein. ☐

Signature of the environmental assessment practitioner:

Enviro-Insight CC

Name of company:

8/03/2019

Date:

-END-