



## mineral resources

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

# Basic Assessment Report And Environmental Management Programme

## FOR LISTED ACTIVITIES ASSOCIATED WITH PROSPECTING ACTIVITIES

### Environmental Authorisation in support of the Prospecting Right Application for Portion of Portion 170 of the Farm Paardekraal 279 JQ

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 (ACT NO. 59 OF 2008) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).

<b>NAME OF APPLICANT:</b>	Rustenburg Platinum Mines Limited (RPM)
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<b>FILE REFERENCE NUMBER SAMRAD:</b>	NW 30/5/1/1/3/2/11681 PR



**DIGBY WELLS**  
ENVIRONMENTAL

This document has been prepared by Digby Wells Environmental.

<b>Report Type:</b>	<b>Basic Assessment Report and Environmental Management Programme</b>
<b>Project Name:</b>	<b>Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ</b>
<b>Project Code:</b>	<b>AMP3249</b>

<b>Name</b>	<b>Responsibility</b>	<b>Signature</b>	<b>Date</b>
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## 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 prospecting or 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) (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—

- 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;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- 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:
  - the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
- the degree to which these impacts—
  - can be reversed;
  - may cause irreplaceable loss of resources; and
  - can be managed, avoided or mitigated;
- 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—
  - identify and motivate a preferred site, activity and technology alternative;
  - identify suitable measures to manage, avoid or mitigate identified impacts; and
  - identify residual risks that need to be managed and monitored.



## EXECUTIVE SUMMARY

### Introduction

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11681 PR], for a portion of Portion 170 (formerly known as Portion 21) of the Farm Paardekraal 279 JQ.

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey which are nonintrusive and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body. Invasive methods will include the diamond core drilling to ascertain the stratigraphic sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the prospecting activities. The prospecting sites will be an area of approximately 10m by 10m. Cleared topsoil will be stockpiled on site to a maximum height of 1m.

Digby Wells Environmental (Digby Wells) has been appointed by RPM as the independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment Process for the proposed prospecting activities.

## Project Applicant

The particulars for RPM are detailed in the table below.

**Table A: Particulars of the Applicant**

<b>Applicant Name:</b>	Rustenburg Platinum Mines Limited (RPM)
<b>Contact Person:</b>	Xolisa Teti
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## Project Overview

RPM has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11681 PR], for a portion of Portion 170 (formerly known as Portion 21) of the Farm Paardekraal 279 JQ. The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGM) and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthenium (Ru);
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).



## Purpose of this Report

The overarching objectives of this Basic Assessment Report are to:

- Identify and assess potential environmental impacts associated with the proposed Project; and
- Recommend mitigation and management measures to ensure that the development is undertaken in such a way as to minimise negative impacts.

This report also describes the status quo of the biophysical and socio-economic environment of the Project area through specialist studies undertaken. Furthermore, an Environmental Management Plan Report (EMPr) has been developed to mitigate and manage environmental impacts associated with each Project activity.

This Basic Assessment Report will be submitted to the public for input and comments which will then be addressed and incorporated into the Final Basic Assessment Report to be submitted to the Department of Mineral Resources (DMR) for consideration. The details of the listed and specified activities for the Project are included below.

**Table 1: List and Specified Activities for the Project**

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Site clearance and vegetation removal.	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	Not Listed	N/A
Establishment of access roads/tracks.	Dependant on Prospecting site Location.	Not Listed	N/A
Topsoil stockpiling.	3 m <sup>3</sup>	Not Listed	N/A
Development of three sumps (oil-sludge-water separation).	3 m <sup>3</sup>	Not Listed	N/A
Drilling of prospecting boreholes.	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	X – Activity 20	GNR 983
Rehabilitation (topsoil cover, ripping and vegetation establishment).	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	Not Listed	N/A



## **Public Participation Process**

A Public Participation Process (PPP) has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations<sup>1</sup>, and as required in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), but is also designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate all aspects of the proposed Project. The aim is to maximise the Project benefits while minimising its adverse effects. This Basic Assessment Report will be available for public review for 30 days from 17 June 2015 to 16 July 2015 and will be available at publically accessible places, and on the Digby Wells website ([www.digbywells.com](http://www.digbywells.com)).

## **Project Alternatives**

The Project area is limited in extent (15.4 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed sites (100 m<sup>2</sup>). The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive environments or receptors will be avoided with the stipulated buffer zones implemented.

## **Project Environment**

Several specialist studies were conducted to assess the baseline environment, including: groundwater, surface water, biodiversity, wetlands, heritage, and soil. The Project area is located 7.5 km northeast of Rustenburg, in the North West Province and has a Land Type classified as Land Type Ea3. The land capability from the land type database shows that the dominate land capability for the prospecting area is Class III (Moderate cultivation). The dominant land use based on the land type data for Paardekraal is natural areas, with a small portion of cultivated land in the eastern extent of the Project site. The Paardekraal Project site is located adjacent to the Boitekong Village to the east and on the banks of the Hex River to the west. The Project area has previously been impacted upon by agricultural activities, with the old fields still visible on site. The eastern sections of the Project area have been subjected to dumping of refuse and building rubble. The regional vegetation is the Marikana Thornveld. Fauna occurring on the site include assemblages within the terrestrial ecosystem: mammals, birds, invertebrates, reptiles and amphibians. There are two National Freshwater Ecosystem Priority Areas (NFEPA) wetland types present in and within 100m of the boundary of the project area, namely an un-channelled and a channelled valley bottom wetland. The regional geology comprises of the Rustenburg Layered Suite, of the Bushveld Igneous Complex (BIC). The Paardekraal study area is located near an old

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<sup>1</sup> Published in GN R 982 of 4 December 2014.



secondary route that ran from the old 'Native Location' to outskirts of the town of Rustenburg.

### **Summary of the Potential Environmental Impacts**

The predominant impacts associated with the Establishment Phase are as a result of site clearing, which may impact on the Marikana Thornveld and habitats for faunal species. Site clearing activities will remove vegetation and expose soil surfaces. The exposed soils may become eroded, compacted and contaminated during the Establishment Phase. The erosion of soils may result in additional impacts on the wetlands and surface water resources, such as the Hex River which is found immediately west of the project boundary, as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. The construction activities are limited in footprint and hence the potential impacts are of a minor significance.

The predominant risk during the Operational Phase is due to the presence of drill fluid circulating throughout the drilling process which is utilised to cool the drill. The fluid could spill into the environment and cause soil, surface water and groundwater pollution, if not managed correctly. Although contingency provisions are in place to address the risk of spillages, it is not an anticipated impact.

The impacts associated with decommissioning are similar to the impacts during the Establishment Phase, with soil erosion and the resultant sedimentation of surface water resources being the predominant impacts.

### **Conclusions and recommendations**

The impacts identified are expected to be confined to site specific impacts and the significance of such impacts is greatly reduced with the implementation of mitigation and management measures. With the implementation of the mitigation and management measures, it is recommended that the proposed Project be granted Environmental Authorisation.



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# Part A: Scope of Assessment and Basic Assessment Report



## 1 Introduction

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11681 PR], and an Environmental Authorisation on a Portion of Portion 170 (formerly known as the Remaining Extent of Portion 21) of the farm Paardekraal 279 JQ, located near Rustenburg, North West province. The regional and local settings for the Project are displayed in Plan 1 and Plan 2, Appendix A. The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGM) and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthrnum (Ru)
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).

Digby Wells Environmental (Digby Wells) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process in support of a Prospecting Right Application for the Project.

## 2 Project Applicant

As noted above, RPM has applied for a Prospecting Right in terms of Section 16 of the MPRDA. The particulars for RPM are detailed in



Table 2-1.


**Table 2-1: Particulars of the Application**

<b>Applicant Name:</b>	Rustenburg Platinum Mines Limited (RPM)
<b>Contact Person:</b>	Xolisa Teti
<b>Telephone No:</b>	011 373 6111
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<b>Physical Address:</b>	55 Marshal Street Johannesburg
<b>Postal Address:</b>	P. O. Box 62179 Marshalltown, 2107

## 2.1 Details of the Environmental Assessment Practitioner

Digby Wells has been appointed by RPM as the independent EAP to conduct the Basic Assessment according to the NEMA, as well as the required Public Participation Process (PPP). Digby Wells is a South African company with international expertise in delivering comprehensive environmental and social solutions, with specific focus on the mining and energy industries. The particulars of the EAP undertaking the EIA process is supplied in Table 2-2.

**Table 2-2: Contact details of the EAP**

<b>EAP Company Name:</b>	Digby Wells Environmental
<b>EAP:</b>	Duncan Pettit
<b>Telephone No:</b>	011 789 9495
<b>Fax No:</b>	011 789 9498
<b>Email Address:</b>	<a href="mailto:duncan.pettit@digbywells.com">duncan.pettit@digbywells.com</a>
<b>Physical Address:</b>	Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191
<b>Postal Address:</b>	Private Bag X10046, Randburg, 2125

## 2.2 Item 3(a)(ii): Expertise of the EAP

### 2.2.1 The Qualifications of the EAP

Duncan Pettit is an Environmental Consultant in the Environmental and Legal Services Department at Digby Wells. Duncan obtained a BSc (Bachelor of Science) degree in Environmental Management: Zoology Stream from the University of South Africa. Proof of Duncan's qualification is included in Appendix B.



## 2.2.2 Summary of the EAP's Past Experience

The CV of Duncan Pettit, including the relevant project experience, is included in Appendix B.

## 3 Location of the Overall Activity

The prospecting site area is located 7.5 km northeast of Rustenburg, in the North West Province. The site area is situated in an area of gently undulating plains, approximately 10 km northeast of the Magaliesberg Mountains. Regionally the topography slopes to the north towards the Elands River and to the southeast, towards Baspoort Dam.

The farm associated with the proposed prospecting activities is detailed in Table 3-1.

**Table 3-1: Description of the Directly Affected Farm Portion**

<b>Farm Name:</b>	A portion of Portion 170 of the Farm Paardekraal 279 JQ, formerly known as the Remaining Extent of Portion 21 of the Farm Paardekraal 279 JQ. Note: Remaining Extent of Portion 21 has now been consolidated into Portion 170.
<b>Application Area (Ha):</b>	15.4 ha
<b>Magisterial District:</b>	Rustenburg Magisterial District Rustenburg Local Municipality Bojanala Platinum District Municipality
<b>Distance and direction from nearest town:</b>	7.5 km northeast of Rustenburg
<b>21 Digit Surveyor General Code for the Directly Affected Farm Portion:</b>	T0JQ0000000027900170

## 4 Locality Map

The regional and local setting of the Project area is displayed in Plan 1 and Plan 2, Appendix A.



## 5 Description of the Scope of the Proposed Overall Activity

RPM intends to prospect for PGMs and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthenium (Ru);
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body. Invasive methods will include the diamond core drilling to ascertain the stratigraphy sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the prospecting activities. Cleared topsoil will be stockpiled on site to a maximum height of 1 m. The prospecting sites will be an area of approximately 10m by 10m.



## 5.1 Listed and Specified Activities

New EIA Regulations<sup>2</sup>, repealing and replacing the previous 2010 Regulations came into effect on 08 December 2014 (the EIA Regulations, 2014). Together with the EIA Regulations, 2014, the Minister published the following Regulations in terms of Sections 24 and 24D of the NEMA:

- Regulation GN R. 983 – Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and must follow the Basic Assessment process as described in Regulation 19 and Regulation 20 of the NEMA EIA Regulations;
- Regulation GN R. 984 – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation and must follow an EIA process as described in Regulation 21 to Regulation 24 of the NEMA EIA Regulations; and
- Regulation GN R. 985 – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies. The undertaking of such activities within the stipulated provincial boundaries will require environmental authorisation and the Basic Assessment process as described in Regulation 19 and Regulation 20 of the NEMA EIA Regulations will need to be followed.

The Listed Activities applicable to the proposed prospecting activities, as defined in the EIA Regulations, 2014, are outlined in Table 5-1.

**Table 5-1: Listed and Specified Activities for the Project**

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Site clearance and vegetation removal.	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	Not Listed	N/A
Establishment of access roads/tracks.	Dependant on Prospecting site location.	Not Listed	N/A
Topsoil stockpiling.	3 m <sup>3</sup>	Not Listed	N/A
Development of three sumps (oil-sludge-water separation).	3 m <sup>3</sup>	Not Listed	N/A

<sup>2</sup> Published in GN R982 of 4 December 2014.





Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Drilling of prospecting boreholes.	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	X – Activity 20	GNR 983
Rehabilitation (topsoil cover, ripping and vegetation establishment).	100 m <sup>2</sup> per borehole 400 m <sup>2</sup> in total	Not Listed	N/A

## 5.2 Description of the Activities to be undertaken

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body.

Once the prospecting sites have been identified, invasive prospecting activities will be undertaken. The identified site will be cleared of vegetation and the topsoil will be stripped and stockpiled, with a maximum stockpile height of 1 m. The site cleared of vegetation will be a maximum size of 10 m by 10 m. Three sumps will be developed for the separation of oil, sludge and water and a drill rig will be transported to site. The prospecting site will utilise existing roads where possible, with tracks being used if necessary to access the specific site. The drill rig will utilise diamond core drilling to ascertain the stratigraphy sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

Following the completion of the drilling activities, the core will be transported for laboratory analysis and the borehole will either be backfilled, or cased and sealed, dependent on the land owners request. The topsoil will be spread over the prospecting site and the area will be ripped to ensure that the land is not compacted. Due to the short timeframes associated with the drilling (less than three months), vegetation should establish itself from the seed bank remaining in the topsoil resources. The rehabilitation of the site will be monitored by RPM and the site will be vegetated with indigenous vegetation, if necessary.

### 5.2.1 Project Activities

The activities associated with the proposed substation and power line route are described in



Table 5-2.



**Table 5-2: Project Activities**

<b>Activity No.</b>	<b>Activity</b>
<b>Establishment Phase</b>	
1	Site clearance and topsoil removal prior to the commencement of physical construction activities. Topsoil will be stored in stockpiles not greater than 1m in height.
<b>Operational Phase</b>	
2	Drilling of prospecting boreholes.
<b>Decommissioning Phase</b>	
3	Rehabilitation of topsoil cover, ripping and vegetation establishment.

## **6 Policy and Legislative Context**

From an environmental and social perspective, the proposed Project needs to comply with all requirements in terms of the provisions of the NEMA and MPRDA. The legislative guidelines directing the Project are outlined in further detail below.

**Table 6-1: Applicable Legislation and Guidelines Applicable to the Proposed Project**

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><b><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></b></p> <p>Section 24 of the Constitution provides that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ul style="list-style-type: none"> <li>i. Prevent pollution and ecological degradation;</li> <li>ii. Promote conservation; and</li> <li>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</li> </ul>	<p>The implementation of the mitigation and management measures to minimise and prevent negative impacts associated with the Project, while promoting justifiable socio-economic development, have been included in Part B, Section 5.</p>	<p>The environmental management objectives of the project will be to protect ecologically sensitive areas and to support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development.</p>
<p><b><u>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)</u></b></p> <p>In terms of the provisions of Section 16 and 17 of the MPRDA, a Prospecting Right Application must be accepted provided the operation does not result in unacceptable pollution or damage to the environment. The applicant must submit an EMP to the DMR and consult with I&amp;APs for comment regarding the Project.</p>	<p>In terms of Section 16 (3)(b) of the EIA Regulation (2014), any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority. This Report has been compiled as per the requirements of the DMR.</p>	<p>This Basic Assessment Report has been compiled in accordance with the requirements of the NEMA EIA Regulations, 2014, with the environmental management objective to protect ecologically sensitive areas.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><b><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></b></p> <p>The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of sections 24(2) and 24D of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.</p>	<p>Environmental authorisation is required for listed activities in terms of the EIA Regulations (2014 of the NEMA. The Listed Activities are set out in Table 5-1.</p>	<p>This Basic Assessment Report has been compiled in accordance with the requirements of the NEMA EIA Regulations (2014).</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><b><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></b></p> <p>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority (PHRA), be notified as early as possible of any developments that may exceed certain minimum thresholds.</p>	<p>A Notification of Intent to Develop (NID) has been compiled and will be submitted to the SAHRA and PHRA of North West. The heritage baseline is provided in Section 12.1.9.</p>	<p>An NID has been undertaken in support of an approval in terms of the NHRA. The NID will be attached to the Final Basic Assessment as an Appendix.</p>
<p><b><u>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA)</u></b></p> <p>According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured.</p>	<p>Mitigation measures have been included for the potential impacts on the air quality. The mitigation measures will be in compliance with the NEM:AQA, as referred to in Part B, Section 5.</p>	<p>The mitigation and management measures to be implemented as part of the Project aim to manage and prevent potential impacts to air quality.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><b><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</u></b></p> <p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. This Act works in accordance to the framework set under NEMA. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:</p> <ul style="list-style-type: none"> <li>■ Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014) ;</li> <li>■ National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations;</li> <li>■ National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011).</li> </ul>	<p>Mitigation measures have been included for the potential impacts on flora and fauna and the biodiversity of the Project site. The mitigation measures will be in compliance with the NEM:BA, as referred to in Part B, Section 5.</p>	<p>The mitigation and management measures to be implemented as part of the Project aim to manage and conserve biological diversity, as well as to minimise alien invasive species.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><b><u>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)</u></b></p> <p>CARA aims to provide for the conservation of the natural agricultural resources of the country through the maintenance of the production potential of land, by combatting and preventing erosion and the weakening of water sources. In addition, this Act aims to protect vegetation, while combatting weeds and invader plants</p>	<p>Mitigation measures have been included for the potential impacts on soils and land capability. The mitigation measures will be in compliance with the CARA, as referred to in Part B, Section 5.</p>	<p>Section 12 of the CARA details the maintenance of soil conservation in which every land user will be responsible for the maintenance and conservation of soil. The mitigation measures recommended as part of this Basic Assessment Report aim to prevent the compaction, erosion and degradation of the soil resources.</p>
<p><b><u>Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA)</u></b></p> <p>ECA makes provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.</p>	<p>Mitigation measures have been included for the potential impacts due to the generation of noise. The mitigation measures will be in compliance with the ECA, as referred to in Part B, Section 5.</p>	<p>The proposed Project will not exceed the SANS 10103: 2008 limits for baseline noise measurements, thus conforming to the requirements of the ECA.</p>





## **7 Need and Desirability of the Proposed Activities**

It is an established fact that mining activities are essential to the economic development of South Africa. The establishment of a mine would result in significant tax contributions towards the country, as well as potential royalties paid which will benefit receiving communities. In addition, employment opportunities are likely to be provided should a new mine be established which will improve the socio-economic profile of the region.

Before any mining activities can take place and in terms of designated legislation, prospecting activities are undertaken to inquire about the geology and grade of an area. Once the relative resource becomes known during this process, feasibility of a prospective mine will be undertaken. Several auxiliary benefits such as employment, tax benefits and royalties may come about as a result of future mining activities. Sustainable development serves the interests of the public whilst maintaining the integrity of national policies and legislation.

Allowing RPM the opportunity to prospect the area and to determine the geology would in turn allow progress with further potential mining activities.

## **8 Motivation for the Overall Preferred Site, Activities and Technology Alternative**

The Project area is limited in extent (15.4 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed sites (100 m<sup>2</sup>). The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive environments have been identified as part of the baseline description and mitigation measures have been provided for potential nuisance impacts to surrounding receptors. The prospecting sites will be determined based on non-invasive methods and will avoid all wetlands and water courses, as well as implementing the stipulated buffer zones.

## **9 Full Description of the Process followed to reach the Proposed Preferred Alternatives within the Site**

### **9.1 Details of the Development Footprint Alternatives Considered**

Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives aid in identifying the most appropriate method of developing the Project, taking into account location or site alternatives, activity alternatives, technology alternatives, as well as the no-project alternative. Alternatives also aid in determining the activity with the least environmental impact.

Some of the potential alternatives that have been identified to date are provided below.



### **9.1.1 Site Alternatives**

The location of the prospecting activities is determined by the location of the resource. The prospecting area is limited to 100m<sup>2</sup> and prospecting activities will avoid sensitive environments, such as watercourses and wetlands. All prospecting site alternatives will take into consideration the sensitive environments on site.

### **9.1.2 Technology Alternatives**

The possible technology alternatives include drill rig types, as well as alternative methods for prospecting. Trenching is a prospecting alternative; however, quite apart from the depth of the ore body, such activities result in significant environmental impacts and permanent scars on the topography. As a result, trenching is not a desired option. Drilling is the only way to reach the depth of ore without having significant residual impacts on the surrounding environment.

### **9.1.3 No-Go option**

The No-go option would result in the resources remaining un-investigated and therefore unknown. Not proceeding with the Project may result in a lack of development in the mining industry.

## **10 Details of the Public Participation Process Followed**

A Public Participation Process (PPP) has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations, 2014 and as required in terms of Chapter 5 of NEMA and the MPRDA but is also designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate all aspects of the proposed Project.

The PPP enables the project team to incorporate stakeholder comments as far as possible into the proposed Project and provided stakeholders with sufficient opportunity to partake meaningfully in the environmental regulatory process.

The PPP has been broken down into three phases as follows:

- Announcement Phase;
- Basic Assessment Phase; and
- Decision Making Phase.

### **10.1 Announcement Phase**

The Project was announced prior to the availability of this report for public comment. The announcement phase included the activities below.



### 10.1.1 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed project, the following stakeholder identification methods were used to develop a stakeholder database:

- Conducting Windeed and related desktop searches in and around the project to verify landownership and obtain contact details;
- Responses to be received from newspaper advertisement and site notices;
- Responses on the distribution of the Background Information Letter (BIL); and
- Telephonic consultations with landowners to identify additional I&APs.

Stakeholders for the proposed project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and indirectly affected landowners;
- **Land occupiers:** Directly affected and indirectly affected land occupiers;
- **Communities:** Surrounding communities;
- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** associations or organisations focussed on agricultural activities; and
- **Business:** small medium enterprises and formal organisations.

A stakeholder database has been compiled which will be updated throughout the environmental regulatory process with new stakeholders (**refer to Appendix C**). Directly affected landowners for the proposed project are included in Table 10-1.

**Table 10-1: Directly Affected Landowners**

Farm	Portion	Owner
Paardekraal 279 JQ	Portion of Portion 170 (formerly the Remaining Extent of Portion 21)	Rustenburg local Municipality


**Table 10-2: Indirectly affected Landowners**

Farm	Portion	Owner
Paardekraal 279 JQ	RE 70	Rustenburg Local Municipality
Paardekraal 279 JQ	RE 71	Rustenburg Local Municipality

### 10.1.2 Public Participation Documentation

The following documents were developed for the project announcement:

- **Background Information Letter (BIL):** a BIL which included a project description, information about the required legislation, the competent authorities and details of the appointed EAP and the registration process as an I&AP was prepared. The BIL also included a registration and comment form.
- **Newspaper advertisement:** a newspaper advert was placed in one local newspaper. The advert included a brief project description, information about the required legislation, the competent authorities and details of the appointed EAP.
- **Site notices:** site notices were put up at various places as indicated in Table 10-3. The site notices contained a brief project description, information about the required legislation, the competent authorities and details of the EAP.

## 10.2 Basic Assessment Phase

The Draft BAR was made available for a public comment period of thirty (30) days from Wednesday, 17 June 2015 to Thursday, 16 July 2015. The Draft BAR was made available for review at publically accessible places and on the Digby Wells Website. The following engagement activities have been undertaken during the comment review period:

- The Draft BAR has been made available for public comment at publically accessible places, and on the Digby Wells website ([www.digbywells.com](http://www.digbywells.com));
- Engagement with I&APs has taken place. Directly and indirectly affected landowners were contacted by means of telephonic consultations; and
- Emails were sent to directly and indirectly affected landowners as a reminder to provide comment on the Project.

No comments have been received to date.

This Final BAR has been submitted to the DMR for consideration. The Final BAR has also been placed on the Digby Wells website to provide I&APs with further opportunity to comment and review the BAR.

## 10.3 Summary of Public participation activities undertaken to date

Table 10-3 provides a summary of the PPP activities undertaken thus far, together with referencing materials included as annexures in Appendix C.


**Table 10-3: Public Participation Activities**

Activity	Details	Reference in Report
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.	Appendix C Stakeholder database
Land Claims Enquiry	An enquiry to identify land claims within the proposed project area was submitted to the Department of Rural Development, Land Claims Commission on Tuesday, 9 June 2015. A letter was received on Tuesday 23 June 2015 from the Department stating that feedback would be provided within 10 days. Digby Wells followed up further on 13 July 2015 but are still awaiting feedback.	Appendix C Public Participation Materials
Distribution of BIL announcement letter	BIL with Registration and Comment Form was emailed and posted to stakeholders on Thursday, 11 June 2015.	Appendix C Public Participation Materials
Placing of newspaper advertisement	An advert was placed in the Rustenburg Herald on Thursday, 18 June 2015	Appendix C Public Participation Materials
Putting up of site notices	Site notices were put up at the proposed project site, local libraries, municipal offices and frequently visited shops or recreational venues on Tuesday, 16 June 2015: <ul style="list-style-type: none"> <li>▪ Rustenburg Local Municipality Public Library</li> <li>▪ Bonajala District Municipality Public Library</li> </ul>	Appendix C Public Participation Materials
Announcement of Draft Basic Assessment Report	Announcement of availability of the Draft BAR was emailed and posted to stakeholders together with the formal project announcement on Thursday, 11 June 2015. Copies of the Draft BAR are available at: <ul style="list-style-type: none"> <li>▪ Rustenburg Local Municipality Public Library</li> <li>▪ Bonajala District Municipality Public Library</li> </ul> The Draft BAR was also made available on <a href="http://www.digbywells.com">www.digbywells.com</a> (under Public Documents). <b><i>(Comment period: Wednesday, 17 June to Thursday, 16 July 2015)</i></b>	Appendix C Progress Letters
Telephonic Engagement	Engagement with directly and indirectly affected landowners took place on 13 and 14 July 2015, by means of telephonic consultations to remind stakeholders to submit comments. These phone calls were also followed up by emails. No comments have been received to date	
Announcement of Final Basic Assessment Report	Announcement of availability of the Final BAR Report was emailed and posted to stakeholders on Monday, 20 July 2015. The Final BAR Report has been made available on the Digby Wells website <a href="http://www.digbywells.com">www.digbywells.com</a> (under Public Documents)	



## 10.4 Decision Making Phase

Once the competent authority has taken a decision regarding the application all registered I&APs will be notified of the environmental authorisation decision by email, letter or fax and as required by legislation an advert will be placed in a local newspaper.

## 11 Summary of Issues Raised by I&APs

No comments were received by I&APs for the proposed Project. Engagement with directly and indirectly affected landowners took place on 13 and 14 July 2015, by means of telephonic consultations to remind stakeholders to submit comments. These phone calls were also followed up by emails. No comments have been received to date.

## 12 The Environmental Attributes Associated with the Alternatives

### 12.1 Baseline Environment

A summary of the baseline environment in the proposed Project area is provided in the sections below. With the exception of the heritage study, no site visits were conducted by the remaining specialists.

#### 12.1.1 Climate

##### 12.1.1.1 Rainfall

The Mean Annual Precipitation (MAP) obtained from the WR2005 manual for quaternary catchment A22H amounts to 658 mm as indicated in Table 12-9 below and is the adopted MAP for the project area.

**Table 12-1: Summary of rainfall data extracted from the WR2005**

Month	MAP
January	121.4
February	93.7
March	83.5
April	40.9
May	17.3
June	6.8
July	5.1
August	5.5
September	18.6
October	62.2



Month	MAP
November	99.4
December	103.6
<b>MAP</b>	<b>658</b>

### 12.1.1.2 Evaporation

Monthly evaporation data was obtained from the WR2005 manual, (WR2005, 2009). The project area lies predominantly within quaternary catchments A22H, which has a MAE of 1700 mm. The area has a negative climatic water balance, as evaporation exceeds rainfall levels. The evaporation obtained is based on Symons pan evaporation measurements and needs to be converted to lake evaporation. This is due to the Symons pan being located below the ground surface, and painted black which results in the temperature in the water being higher than that of a natural open water body. The Symons pan is then multiplied by a lake evaporation factor<sup>3</sup> to obtain the adopted lake evaporation. Below in Table 12-10 is a summary of the adopted evaporation for the project site.

**Table 12-2: Summary of evaporation data**

Months	Symons Pan Evaporation (mm)	Lake Evaporation Factor	Lake Evaporation (mm)
January	181.9	0.84	152.8
February	151.8	0.88	133.6
March	147.2	0.88	129.6
April	116.1	0.88	102.2
May	98.8	0.87	85.9
June	81.3	0.85	69.1
July	90.1	0.83	74.8
August	119.3	0.81	96.7
September	159.8	0.81	129.4
October	185.6	0.81	150.4
November	176.3	0.82	144.6
December	191.8	0.83	159.2
<b>Total</b>	<b>1700</b>	<b>N/A</b>	<b>1428</b>

<sup>3</sup> Evaporation factor obtained from WR2005



## 12.1.2 Topography and Visual Environment

The topography of the Project area and its surrounds is located 7.5 km northeast of Rustenburg, in the North West Province. The site area is situated in an area of gently undulating plains, approximately 10 km northeast of the Magaliesberg Mountains. Regionally the topography slopes to the north towards the Elands River and to the southeast, towards Baspoort Dam. The R510 Regional road runs approximately 1 km to the west of the Project site, with communities directly adjacent to the east and north of the Project area. Although the prospecting activities may have a visual impact on these receptors, the state of place will not be impacted upon as an Anglo American Platinum mine is 1 km to the south of the Project area.

### 12.1.3 Soil, Land Capability and Land Use

Existing Land Type data was used to obtain generalised soil patterns and terrain types for the Project site. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1989).

These maps are general guidelines of what soils can be expected in the area.

#### 12.1.3.1 Land Type

According to the Land Type data, the study site is classified as Land Type Ea3. The dominant soil form expected within this land type is the Acadia soil form which comprises approximately 70% of the study site, with 15.9% of the site comprising of shallow rocky or the Mispah soil form and the remainder comprising of a diversity of soils. These soils are described in more detail below. The Land Type for the Project area is illustrated in Plan 3, Appendix A.

#### 12.1.3.2 Arcadia Soil Form

The Acadia soil form (70% of the study site) consist of deep Vertic A horizons overlying unspecified subsoil. These soils are have a texture that is high in clay (>55%). The interpretation of Land Type data of the study site suggests that the Acadia soil form occurs on level to gently sloping areas (1-4% slope gradients), with soil depths greater than 800mm, suggesting that these soils have a low potential to erode.

Arcadia soils are extremely physically active. They shrink when dry and swell when wet (Fey *et al.*, 2010). Heave can exceed 100 mm and the movement can lift buried pipes and poles to the surface. With the dry season, Arcadia soils are dry and cracked and water infiltration rate is high. Loose soil particles on the surface fall into the cracks towards deeper profiles of the soil body. When it rains, the soil swells and the cracks close and infiltration rate slows (Fey *et al.*, 2010). Arcadias have typically inverted profiles and lack horizons due to the random mixing when wet, therefore are not sensitive to disturbance (Soil Classification Working Group, 1991). In addition, Arcadia soils store large amounts of organic carbon (Smith, 2006).





The active nature of Arcadia soil forms often results in the shearing and tearing of plant roots. Additionally, in wet conditions these soils are prone to absorb and hold water rather than make it available for plants. It is for these reasons that these soils are often inferior for irrigated crop production. Despite this, Arcadia soils can accommodate a selected composition of vegetation such as grazing vegetation with monitored cultivation.

#### **12.1.3.3 Mispah soil form**

The Mispah soil form (15.9% of the study site) consists of an Orthic A horizon overlying impermeable rock. These soils are generally shallow with depths ranging from 100-400mm. From the interpretation of Land Type data these soils occur on steep gradients (2%). The Mispah soil form is sensitive to erosion and varies in clay percentages and water-holding capacity depending on the rock type from which they are derived.

Despite their shallow nature, Mispah soils can accommodate a wide variety of short shrub vegetation (Smith, 2006).

#### **12.1.3.4 Land Capability**

Land capability is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long term sustainable use of land under rain-fed conditions. From the Land Type data the generalised land capability of a particular area can be defined.

The land capability from the land type database shows that the dominate land capability for the prospecting area (Plan 4, Appendix A) is Class III (Moderate cultivation).

#### **12.1.3.5 Land Use**

The dominant land use based on the land type data for Paardekraal (Plan 5, Appendix A) is natural with a small portion of cultivated to the east. This is high level information and the current state might indicate something different.

The Paardekraal Project site is located adjacent to the Boitekong Village and on the banks of the Hex River. The Project area has previously been impacted upon by agricultural activities, with the old fields still visible on site. The eastern sections of the Project area have been subjected to dumping of refuse and building rubble.

### **12.1.4 Fauna and Flora**

The diversity and concentrations of the flora component in conjunction with geomorphological factors such as hills, valleys, rocky outcrops, streams and anthropogenic activities were used as the basis for delineating vegetation types or communities. A desktop study of the expected plant and animal species present within the study area has been conducted to determine the baseline environment of the Project area. The flora study component consisted of the delineation of different communities at a desktop level. Additional specialist study components associated with the identified vegetation communities included the identification of the following:



- Red data species;
- Medicinal species;
- Endemic species; and
- Alien invasive species.

The fauna study component consisted of the identification of various faunal species as an indicator of the delineated vegetation communities and habitat features. These faunal species consisted of endemic, endangered and protect species. The special faunal components which were assessed for this study include:

- Mammals;
- Avifauna;
- Invertebrates; and,
- Herpetofauna (Reptiles and Amphibians).

#### **12.1.4.1 Regional Vegetation**

According to Mucina and Rutherford (2006) the regional vegetation is the Marikana Thornveld (SVcb6) (Plan 6, Appendix A) that falls within the Savanna Biome and the greater Central Bushveld Bioregion Group. The Marikana Bushveld vegetation unit is distributed in the Gauteng and North-West provinces, with altitudes ranging between 1050 – 1450m.

The landscape is characterised by open *Acacia karroo* woodland in valleys and slightly undulating plains. Shrubbery is denser along drainage lines, rocky outcrops and other areas protected from fire. Table 12-3 shows flora taxa that are important within the vegetation unit and Appendix D shows plants species that are likely to occur within the site.

This vegetation unit is considered endangered as of 2006 (Mucina and Rutherford, 2006) and poorly conserved as less than 1% officially protected within the Magaliesburg Nature Area. In 2006, 48% of the unit had been transformed by agricultural and urban developments. The areas of the unit towards the east were under threat due to larger industrial developments.

**Table 12-3: Flora of the Marikana Thornveld**

<b>Marikana Thornveld</b>	
<b>Tall Trees</b>	<i>Acacia burkei</i>
<b>Small Trees</b>	<i>Acacia caffra</i> , <i>A. gerrardii</i> , <i>A. karroo</i> , <i>Combretum molle</i> , <i>Rhus lancea</i> , <i>Ziziphus mucronata</i> , <i>A. nilotica</i> , <i>A. tortilis subsp. heteracantha</i> , <i>Celtis africana</i> , <i>Dombeya rotundifolia</i> , <i>Pappea capensis</i> , <i>Peltophorum africanum</i> , <i>Terminalia sericea</i>



<b>Marikana Thornveld</b>	
<b>Tall Shrubs</b>	<i>Euclea crispa subsp. crispa, Olea europeae subsp. africana, Rhus pyroides subsp. pyroides, Diospyros lycoides subsp. geurkei, Ehretia rigida subsp. rigida, Euclea undulata, Grewia flava, Pavetta gardeniifolia</i>
<b>Low Shrubs</b>	<i>Asparagus cooperi, Rhynchosia nitens, Indigofera zeyherri, Justicia flava</i>
<b>Woody Climbers</b>	<i>Clematis brachiata, Helinus integrifolius</i>
<b>Herbaceous Climbers</b>	<i>Pentarrhinum insipidum, Cyphostemma cirrhosum</i>
<b>Gramnoids</b>	<i>Elionarus muticus, Eragrostis lehmanniana, Seterai sphacelata, Themeda triandra, Aristida scabrilaralis subsp. scabralis, Fingerhathia africana, Heteropogon contortus, Hyperthelia dissoluta, Melinis nerriglumis, Pogonarthria squarrosa</i>
<b>Herbs</b>	<i>Hermannia depressa, Ipomoea obseura, Barleria macrostrgia, Dianthus mooiensis, Ipomoea oblongata, Vernonia oligocephala</i>
<b>Geophytic Herbs</b>	<i>Ledebouria revoluta, Ornithogalum tennifolium, Sansevieria aethiopica</i>

#### **12.1.4.2 Regional Fauna**

Fauna occurring on the site include assemblages within the terrestrial ecosystem: mammals, birds, invertebrates, reptiles and amphibians. Each of these assemblages occurs within unique habitats and ecological state of these habitats directly relates to the number of species found within them.

As the region is used primarily for farming and mining (with associated nature reserves or natural areas), there will be a large number of mammals, both naturally occurring and possibly introduced. The majority of these make use of the Bushveld habitat for grazing, browsing and hunting. Small mammals will also be quite common in the area.

The Marikana Bushveld consists of a dominant woody layer and a grass layer that provides sufficient cover for both herbivorous and predatory species. The vegetation unit supports a diverse range of ungulate species such as represented in Table 12-4. The grass cover also provides habitat for smaller mammal species such as the Scrub Hare (*Lepus saxatilis*) and Common Dwarf Mongoose (*Helogale parvula*). Big predatory species such as the Leopard (*Panthera pardus*) would be well supported by the dominant woody layer and tall grass cover, although due to the Project's proximity to the town of Rustenburg, it is unlikely to encounter such species. Reptile species would survive well in the hot summers and habitat provided by the rocky outcrops and drainage channels flowing throughout the vegetation unit.


**Table 12-4: Possible Mammal Species**

Family	Species	Common name	Red list category
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Least Concern
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern
Bovidae	<i>Sylvicapra grimmia</i>	Bush Duiker	Least Concern
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern
Felidae	<i>Panthera pardus</i>	Leopard	Vulnerable
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern
Herpestidae	<i>Helogale parvula</i>	Common Dwarf Mongoose	Least Concern
Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern
Leporidae	<i>Pronolagus randensis</i>	Jameson's Red Rock Hare	Least Concern
Macroscelididae	<i>Elephantulus myurus</i>	Eastern Rock Elephant Shrew	Least Concern
Muridae	<i>Acomys</i>	Spiny Mice	Not listed
Muridae	<i>Aethomys ineptus</i>	Tete Veld Aethomys	Least Concern
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
Muridae	<i>Lemniscomys rosalia</i>	Single-Striped Lemniscomys	Data Deficient



Family	Species	Common name	Red list category
Muridae	<i>Mastomys</i>	Multimammate Mice	Not listed
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern
Mustelidae	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern
Nesomyidae	<i>Dendromus melanotis</i>	Gray African Climbing Mouse	Least Concern
Procaviidae	<i>Procavia capensis</i>	Rock Hyrax	Least Concern
Soricidae	<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	Data Deficient
Soricidae	<i>Myosorex varius</i>	Forest Shrew	Data Deficient
Thryonomyidae	<i>Thryonomys swinderianus</i>	Greater Cane Rat	Least Concern
Vespertilionidae	<i>Neoromicia capensis</i>	Cape Serotine	Least Concern
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern

#### 12.1.4.3 Reptiles

Southern African endemic reptiles that are found in the Magaliesberg Mountain region include the Kalahari Tent Tortoise *Psammobates oculiferus*, Duerden's burrowing asp *Atractaspis duerdeni*, Distant's Thread snake *Leptotyphlops distanti*, two-striped shovel-snout *Prosymna bivittata*, shield-nose snake *Aspidelaps scutatus* and thin-tailed legless skink *Acontias gracilicauda*. Threatened reptiles present include southern African python *Python sebae natalensis*. Table 12-5 shows the reptile species likely to be found on the site.

**Table 12-5: Possible Reptile Species**

Family	Species	Common name	Red list category
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern (SARCA 2014)
Colubridae	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	Least Concern (SARCA 2014)
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)
Lacertidae	<i>Meroles squamulosus</i>	Common Rough-scaled Lizard	Least Concern (SARCA 2014)



Family	Species	Common name	Red list category
Scincidae	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis varia</i>	Variable Skink	Least Concern (SARCA 2014)

Amphibious species are found mainly in wet or moist areas within the landscape such as drainage channels and wetland areas where the aquatic and terrestrial systems merge. The study area is likely to support amphibian species along the wetlands and drainage channels; with the denser shrubbery providing sufficient shade cover to keep it cool and moist.



Table 12-6 represents amphibious species that are likely to occur on the site.

**Table 12-6: Possible Amphibian Species**

Family	Species	Common name	Red list category
Bufoidea	<i>Amietophrynus garmani</i>	Olive Toad	Least Concern
Bufoidea	<i>Amietophrynus gutturalis</i>	Guttural Toad	Least Concern
Bufoidea	<i>Amietophrynus poweri</i>	Power's Toad	Least Concern
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	Least Concern
Pipidae	<i>Xenopus laevis</i>	Common Platanna	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i>	Plain Grass Frog	Least Concern
Ptychadenidae	<i>Ptychadena mossambica</i>	Broadbanded Grass Frog	Least Concern
Pyxicephalidae	<i>Amietia queckettii</i>	Queckett's River Frog	Least Concern
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern
Pyxicephalidae	<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern
Pyxicephalidae	<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	Least Concern
Pyxicephalidae	<i>Tomopterna natalensis</i>	Natal Sand Frog	Least Concern

#### 12.1.4.4 Avifauna

The South African Important Bird Area (IBA) Programme is coordinated by BirdLife South Africa. The purpose of the IBA Programme is to identify and protect a network of sites, at a biogeographical scale, critical for the long-term viability of naturally-occurring bird populations. The nearest Important Bird Area (IBA) is the Magaliesberg Bird Area situated less than 100 km south-west of the proposed project area (Plan 7, Appendix A). This IBA consists of the Magaliesberg Nature Conservation. Several large rivers have their headwaters in the Magaliesberg Mountains; these include the Crocodile, Sterkstroom, Magalies and Skeerpoort Rivers. Three major impoundments have been built along the





Magaliesberg: the massive Hartbeespoort Dam in the east, Buffelspoort Dam in the centre and Olifantsnek Dam about 7 km south of Rustenburg.

Many raptor species occur in area due to the close proximity of the Magaliesberg Mountains, including Cape Vulture *Gyps coprotheres*, White-backed Vulture *Gyps africanus* and Lappet-faced Vulture *Torgos tracheliotus*. Verreaux's Eagle *Aquila verreauxii* breeds in the Magaliesberg, and African Grass Owl *Tyto capensis* and Secretarybird *Sagittarius serpentarius* are regularly recorded. The likely avifauna of the study area, identified to fall within the Quarter Degree Square (QDS) 2527CB, was determined using the South African Bird Atlasing Project (SABAP2) website (Appendix D).

Nine species of conservation concern have a high probability of occurring due to the presence of suitable habitat; these include: Kori Bustard (*Ardeotis kori*), White-backed Vulture (*Gyps africanus*), Tawny Eagle (*Aquila rapax*), Martial Eagle (*Polemaetus bellicosus*), Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), Marabou Stork (*Leptoptilos crumeniferus*), Red-billed Oxpecker (*Buphagus erythrorhynchus*), and Short-clawed Lark (*Certhilauda chuana*). The desktop study identified 6 bird species of special concern as shown in Table 12-7 below.

**Table 12-7: Possible Bird Species of Special Concern**

Common Name	Species Name	Conservation Status
Cape Vulture	<i>Gyps coprotheres</i>	VU
Greater Flamingo	<i>Phoenicopterus ruber</i>	NT
Lesser Flamingo	<i>Phoenicopterus minor</i>	NT
Lesser Kestrel	<i>Falco naumanni</i>	VU
Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>	NT
Yellow-billed Stork	<i>Mycteria ibis</i>	NT

#### **12.1.4.5 Current Biodiversity Status**

The study site(s) is located in close proximity to urban developments and within agricultural fields. It is expected that natural environment has been impacted upon and is currently moderately modified. The anthropogenic pressures placed upon the natural environment in most instances lead to the establishment of alien invasive plant species and the alteration of the natural vegetation. Commercial agricultural practices alter vegetation structures and water regimes of the area and have an adverse effect on the environment which in turn may lead to habitat fragmentation which may cause the loss of faunal species due to migration or decline in numbers. The area in which the sites of interest are situated is extra-urban to rural and it is expected that the biodiversity will be low as a result of industrial, agricultural and anthropogenic impacts

#### **12.1.5 Wetlands**

There are two National Freshwater Ecosystem Priority Areas (NFEPA) wetland types present in and within 100m of the boundary of the project area, namely an unchannelled and



a channelled valley bottom wetland. Both of these wetland types are of a Rank 6 according to NFEPA. These wetlands appear to be connected to a water treatment plant on site. The Hex River is found immediately west of the project boundary and an unnamed tributary is found running north through the project area. These drain into the large dam immediately north, which is also characterised as a Rank 6 (of no importance), channelled valley bottom wetland.

The Hex River and the unnamed tributary are part of a large channelled valley bottom system, as shown in Plan 8, Appendix A. A desktop delineation of the wetland areas is included in Plan 9, Appendix A.

## 12.1.6 Surface Water

### 12.1.6.1 Regional Hydrology

The Project area is located within the Hex River catchment which forms part of quaternary catchment A22H, this falls within the Crocodile West and Marico Water Management Area (WMA 3) in the mid to southern section of quaternary catchment A22H.

The surface water attributes of the affected catchments namely Mean Annual Runoff (MAR), MAP and Mean Annual Evaporation (MAE) were obtained from the water research commission of South Africa (WRC, 2005) and are summarised below in Table 12-8 below.

**Table 12-8: Summary of the surface water attributes of the B20D quaternary catchment**

Quaternary Catchment	Total Area (km <sup>2</sup> )	MAP (mm)	MAR m <sup>3</sup> *10 <sup>6</sup>	MAE (mm)
A22H	579	658	9.11	1700

The A22H quaternary catchment area is 579 km<sup>2</sup> in extent and has an MAR of 9.11 million cubic metres (Mm<sup>3</sup>). Runoff emanating from this quaternary catchment drains in a northerly direction via the Hex River.

Elevations in the A22H quaternary range from 1711 metres above mean sea level (mamsl) at the highest point within the catchment, and drop to 1073 mamsl at the outlet of the catchment.

#### 12.1.6.1.1 Rivers and Drainage

The four rivers making up the primary drainage for the A22H quaternary catchment are the Hex River, the Dorpspruit River, Waterkloofspruit River and the Sandspruit. All runoff within quaternary catchment A22H eventually reports to the Hex River at the outlet just below the Bospoort Dam. The Dorpspruit River, Waterkloofspruit River and the Sandspruit form tributaries of the Hex River which drain a large portion of the upper southern section of the catchment.



The Hex River is the nearest watercourse to the Paardekraal project area, with the western extent of Paardekraal being located on the eastern bank of the Hex River. No prospecting activities will be undertaken within the stipulated buffer zones of the Hex River or other water courses.

### **12.1.6.2 Climate**

#### **12.1.6.2.1 Rainfall**

The MAP obtained from the WR2005 manual for quaternary catchment A22H amounts to 658 mm as indicated in Table 12-9 below and is the adopted MAP for the project area.

**Table 12-9: Summary of rainfall data extracted from the WR2005**

<b>Month</b>	<b>MAP</b>
January	121.4
February	93.7
March	83.5
April	40.9
May	17.3
June	6.8
July	5.1
August	5.5
September	18.6
October	62.2
November	99.4
December	103.6
<b>MAP</b>	<b>658</b>

#### **12.1.6.3 Evaporation**

Monthly evaporation data was obtained from the WR2005 manual, (WR2005, 2009). The project area lies predominantly within quaternary catchments A22H, which has a MAE of 1700 mm. The evaporation obtained is based on Symons pan evaporation measurements and needs to be converted to lake evaporation. This is due to the Symons pan being located below the ground surface, and painted black which results in the temperature in the water being higher than that of a natural open water body. The Symons pan is then multiplied by a



lake evaporation factor<sup>4</sup> to obtain the adopted lake evaporation. Below in Table 12-10 is a summary of the adopted evaporation for the project site.

**Table 12-10: Summary of evaporation data**

Months	Symons Pan Evaporation (mm)	Lake Evaporation Factor	Lake Evaporation (mm)
January	181.9	0.84	152.8
February	151.8	0.88	133.6
March	147.2	0.88	129.6
April	116.1	0.88	102.2
May	98.8	0.87	85.9
June	81.3	0.85	69.1
July	90.1	0.83	74.8
August	119.3	0.81	96.7
September	159.8	0.81	129.4
October	185.6	0.81	150.4
November	176.3	0.82	144.6
December	191.8	0.83	159.2
<b>Total</b>	<b>1700</b>	<b>N/A</b>	<b>1428</b>

#### ***12.1.6.4 Storm Rainfall Depths***

The Design Rainfall Estimation programme (DRE) (Smithers and Schulze, 2003), was used to extract storm rainfall depth information for the six nearest rainfall stations relative to the project site. A summary of these stations are presented in

<sup>4</sup> Evaporation factor obtained from WR2005



Table 12-11 below.


**Table 12-11: Summary of six closest rainfall stations**

Station Name	SAWS Number	Distance (km)	Record Length (years)	Lat (°) (')	Lon (°)	MAP (mm)	Altitude (m)
Rustenburg (POL)	0511400 W	7.6	87	25° 40'	27° 14'	665	1155
Bospoortdam	0511573 W	10.2	54	25° 33'	27° 21'	609	1070
Klipfontein	051162 W	10.2	71	25° 41'	27° 21'	633	1173
Rustenburg-AGR	0511523 A	10.9	41	25° 43'	27° 18'	639	1141
Kroondal	0511523 W	10.9	33	25° 43'	27° 18'	639	1141
Kroondal	0511554 W	10.9	40	25° 43'	27° 18'	639	1141

The adopted storm rainfall depths for the 1 day storm event are based on the Rustenburg (POL) station (0511400 W). Below in Table 12-12 is a summary of the rainfall depths for the 1 day storm event for various recurrence intervals (years).

**Table 12-12: Summary of adopted storm rainfall depths**

Design rainfall return period (yrs)	1:2	1:5	1:10	1:20	1:50	1:100	1:200
1 day design peak rainfall (mm)	59.9	81.3	96.8	112.5	134.5	152.3	171.1

## 12.1.7 Groundwater

### 12.1.7.1 Geology

The regional geology comprises the Rustenburg Layered Suite, of the Bushveld Igneous Complex (BIC). The rocks of the Rustenburg Layered Suite (RLS) range from ultrabasic pyroxenite and anorthosite in the lower parts to norite, gabbro and magnetite-gabbro in the upper parts. The RLS is subdivided into the Marginal, Lower, Critical, Main and Upper zones.

The surface area is predominantly underlain by the Mathlagame norite-anorthosite formation of the Critical Zone and the Pyramid gabbro-norite of the Main Zone. Rocks of the Critical Zone comprise of alternating layers of norite, anorthosite pyroxenite and chromitite while the Main Zone consists predominantly of norite.

The Merensky Reef and UG2 Chromitite Layer seams occur in the Upper Critical Zone and the seams run parallel to each other approximately 600 m apart at outcrop. A black turf of



almost 2 m thickness covers most of the prospecting area, formed due to the in-situ weathering of the gabbro/norite rocks. Various dolerite dykes (up to 40 m thick) and lamprophyre dykes (0.2 m to 2 m thick) occur in the area. The dykes occur in the form of swarms and generally trend south-easterly to north-westerly.

#### **12.1.7.2 Hydrogeological Environment**

Crystalline material, such as the norites and pyroxenites of the Bushveld Complex, comprise of an unweathered and intact rock matrix with negligible matrix porosity and permeability, as well as planes of discontinuity in the rock matrix, including both faults and joint planes (collectively referred to as fractures). The infiltration and flow of groundwater in such systems is controlled by the prevailing complex fracture network and can vary in space and time. Such conditions relate to structurally controlled flow systems. However, these fractures are often in-filled by precipitates from late-phase fluids (i.e. vein infill).

The following two layer aquifer model is proposed to conceptualise the Bushveld Complex aquifers at a regional scale:

- A shallow weathered aquifer system (i.e. intergranular water table aquifer) that may be laterally connected to alluvial aquifers associated with river systems; and
- A deeper, fractured bedrock aquifer system.

The shallow unconfined, phreatic (or water table) aquifer comprises of the saprolite (that formed as a result of intensive and in-situ weathering processes) to saprock (differentially weathered and fractured upper bedrock underlying the saprolite) zones. The soil and saprolite are collectively termed the regolith. The saprolite and saprock (classified as part of the bedrock) are generally treated as a single weathered aquifer unit, referred to as the weathered overburden, which varies in thickness from 12 to 50 m and is derived from the in-situ decomposition of the underlying noritic rocks. The degree/intensity of chemical weathering or more specifically the spatial and depth variations thereof, control the geometry of the shallow weathered aquifer profile. The weathered overburden is considered to have low to moderate transmissivity, but high storativity. Generally, crystalline/basement aquifers have very low transmissivity (T) values (i.e. geometric mean) ranging from 1 to 5 m<sup>2</sup> /day, with an order of magnitude lower and/or higher than these values, calculated in relation to a saturated thickness of the regolith varying from 12 m to 22 m (Chilton and Foster, 1995). Crystalline/basement aquifers are further characterized by poor connectivity of bedrock fractures and regions of low permeability resulting in significant local variations in yield and response to abstraction.

The unweathered and fractured, semi-confined bedrock aquifer consists of fractured norite, anorthosite and pyroxenite, underlying the upper weathered aquifer. The intact bedrock matrix has a very low matrix hydraulic conductivity and its effective hydraulic conductivity is determined by fractures and mine voids. Water is generally stored and transmitted in fractures and fissures within a relatively impermeable matrix.



Groundwater occurrence of the RLS of the BIC is associated mainly with deeply weathered and fractured mafic rocks. The groundwater yield potential is classified as poor since most of the boreholes produce less than 2 L/s. Mafic rocks of the BIC tend to weather to clay rich soil, which has low permeability and considered to reduce the recharge to underlying aquifers. The aquifer system underlying the area is described as an intergranular and fractured aquifer with borehole yields varying between 0.5 to 2 L/s.

### **12.1.7.3 Groundwater flow**

The infiltration of water from the shallow weathered aquifer system to the deeper fractured bedrock aquifer system is strongly heterogeneous and requires permeable soils, or permeable horizons (i.e. 'infiltration routes'), as well as open and interconnected fracture systems in the bedrock. Hydraulic continuity must exist between groundwater reservoirs in the overlying horizons (or weathered overburden) and the underlying bedrock. The fracture zones act as conduits for deeper flow from groundwater reservoirs located in upper permeable soils or the weathered overburden. Groundwater flows through interconnected fracture systems with the potential of rapid vertical groundwater flow from the weathered overburden (and surface water bodies) to greater depths along interconnected conductive zones. However, the generally low transmissivity values for the upper weathered aquifer inhibit both lateral flow (within the shallow weathered aquifer) and vertical flow (between the shallow and deeper aquifer systems).

As a result, the impacts on the shallow, weathered aquifer system may be negligible away from the immediate vicinity of the mining areas, given the hydrogeological characteristics of the weathered aquifer and the spatial heterogeneity in hydraulic connectivity between the shallow, weathered aquifer and the deeper fractured aquifer. The weathered and alluvial aquifers along the river courses support most irrigation and domestic water supply boreholes, despite being undermined. This indicates limited interaction between the shallow and deep aquifer systems.

Within the surface use areas and immediately above undermined zones, the shallow weathered aquifer may be drained due to slow vertical leakage to the dewatered, deeper fractured aquifer. However, the shallow aquifer has the potential to be replenished relatively quickly during sustained rainfall periods.

Lateral groundwater flow in the shallow aquifer is driven by topographic gradients and/or localised recharge mounds due to e.g. irrigation, leakage from tailings storage facilities. Due to mine dewatering in the Rustenburg area the local groundwater flow directions in the deeper fractured aquifer are generally re-directed towards the underground and open pit mines. This results in spatially different groundwater flow directions for the shallow and deeper aquifer systems.

Few boreholes close to the prospecting sites were located based on the data accessed from the National Groundwater Archive (NGA). The NGA database has few water levels reported in the area, and the water level range from 5-18 metres below ground level (mbgl).





#### **12.1.7.4 Groundwater Users**

Portion of Portion 170 of the farm Paardekraal 279 JQ is located south of the Baspoort Dam and close to Kanana village and Boitekong township. A large number of villages in the prospecting area rely on municipal water for their domestic water needs.

### **12.1.8 Socio-Economic and Political Structure**

The Project area falls within the Rustenburg Local Municipality (RLM).

Data on the socio-economic environment was predominantly obtained from the Rustenburg Integrated Development Plan (RIDP) 2012-2017. An overview of the socio-economic structure is provided below.

#### **12.1.8.1 Regional and District Overview**

##### **12.1.8.1.1 Demographic Profile**

The RLM consists of various racial groups and the population has been on the increase over the past few years. The bulk of the district's population is African (86.4% in 2010).

##### **12.1.8.1.2 Regional Employment**

Notably, a stable increase in the labour force participation rate is identified in the RIDP between 1996 and 2010. Similarly, the unemployment rate has gradually declined during the same period.

##### **12.1.8.2 Household Income**

According to the RIDP, majority of African individuals earn between R18 000 and R360 000 per year. The White population earn between R96 000 and R1 200 000 per year and Asian individuals between R132 000 and R600 000 annually. The gap income for the Coloured population ranges from R6 000 and R12 000 annually.

##### **12.1.8.3 Age and Gender Distribution**

From 2001 to 2010 the RLM population has grown. A significant contributor to the rise in population is the increase in mining activities found in the area. The gender distribution consists of 55% male in 2001 and 54% in 2010 which can be attributed to labour migration in the mining industry.

##### **12.1.8.4 Language**

The prominent language in the RLM is Traditional African or Setswana. Secondary languages in the area include Xhosa and Afrikaans.



## 12.1.9 Heritage

The cultural baseline is based on information sources such as previous Heritage Impact Assessments (HIA) conducted in the area and several databases. The HIA for the Project area, as well as for the farm Waterval<sup>5</sup>, is provided in Appendix E.

### 12.1.9.1 Regional and Local Study Area

#### 12.1.9.1.1 Geology and Palaeontological Sensitivity

The local underlying geology is part of the Bushveld Complex as shown in Table 12-13 below. The study area lies within the Western Limb of the Rustenburg Layered Suite which is a mafic formation (magma flows) which does not contain any sedimentary layers and therefore no fossils (Johnson, et al., 2006).

**Table 12-13: Lithographic units and fossil sensitivity (adapted from Johnson et al 2006 and SAHRIS<sup>6</sup>)**

Ma	Eon	Era		Lithostratigraphic units			Lithology	Sensitivity	Fossils					
2000-2050	Proterozoic	Eoproterozoic	Vaalian	Bushveld Complex	Rustenburg Layered (Vdir)	Critical Zone	Winterveld Norite-Anorthosite	Zero	None					
							Mooihoek Pyroexnite	Zero	None					
							Undetermined Quaternary	Zero	None					
2500						Proterozoic	Eoproterozoic	Vaalian	Bushveld Complex	Rustenburg Layered (Vdir)	Lower Zone	Tweelaagte Bronzitite	Zero	None
												Groenfontein Harzburgite	Zero	None
												Makope Bronzitite	Zero	None
	Eerlyk Bronzitite	Zero	None											

#### 12.1.9.1.2 The Stone Age

Surface accumulations of Middle and Later Stone Age (MSA and LSA) lithics have been recorded throughout the region, however, these finds are not commonly found *in situ* and provide limited contextual information.

A total of eight Stone Age surface scatter sites were identified as a result of previous HIAs within 14 km of the study area (Higgitt, 2015; Huffman & Schoeman, 2002; Magoma, 2014; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). These surface scatters included Early Stone Age Artifacts cores and flakes, MSA flakes, points and cores, and LSA flakes.

<sup>5</sup> Waterval is subject to a separate BAR.

<sup>6</sup> <http://www.sahra.org.za/sahris/fossil-heritage-layer-browser> accessed 23/04/2015



### ***12.1.9.1.3 Farming Communities***

The Farming Community Period marks the arrival of Bantu-speakers who brought with them agriculture and metal working skills. Archaeologically, common identifiers of this period in the region include ceramics and stone walled settlements (associated with the Late Farming Communities (LFC)).

A total of 46 LFC sites have been identified as a result of previous HIAs within 20 km of the study areas (Coetzee, 2008; Magoma, 2014; Higgitt, 2015; Huffman & Schoeman, 2002; Van Schalkwyk, 2003; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). The majority of these sites are well preserved stone walled settlements with cattle kraals, terraces, pottery (mostly Uitkomst/Rooiberg/Olifantspoort ceramic facies), and grinding stones. Additionally, an Iron Age engraving site was recorded 13 or 14 km from the study areas depicting a settlement layout of a stone-walled settlement (See Appendix B for site list).

### ***12.1.9.1.4 Historical period***

The historical period is commonly associated with contact between white Europeans with LFC, and consequent written records. The closest large town is Rustenburg which was established in 1850 (Raper, 1987). The town was involved in the South African War, when British troops arrived on the 14 June 1900. Three battles occurred in the vicinity i.e. Buffelspoort, Nooitgedacht and Vlakfontein (Bergh, 1999).

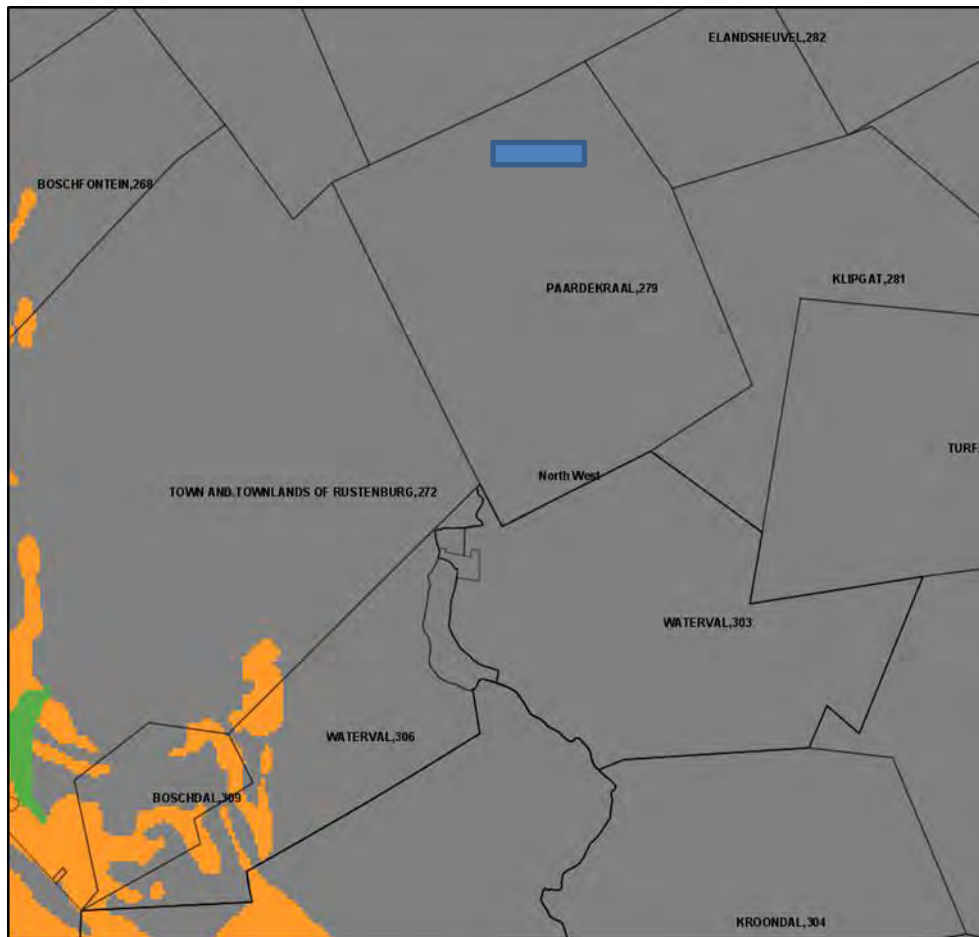
Five historic sites were identified between 4 and 15 km from the proposed study areas as a result of previous HIAs in the area. These include burial grounds, stonewalls and historic pottery surface scatters (van Vollenhoven & de Bruyn, 2014).

### ***12.1.9.2 Site Specific Study Area***

The Paardekraal Project site is located adjacent to the Boitekong Village and on the banks of the Hex River. The Project area has previously been impacted upon by agricultural activities, with the old fields still visible on site. The eastern sections of the Project area have been subjected to dumping of refuse and building rubble. No palaeontological or heritage resources were identified within the Project area.

#### ***12.1.9.2.1 Geology and Palaeontological Potential of the Study Area***

According to the SAHRIS PalaeoSensitivity Map, the Paardekraal study area (depicted as a green rectangle in Figure 12-1) is situated in an area of insignificant palaeontological sensitivity (grey area) depicted in below (SAHRIS, 2014).



**Figure 12-1: Palaeo Sensitivity of the study area**

**12.1.9.3 Historical period**

The Paardekraal study area is located near an old secondary route that ran from the old ‘Native Location’ to outskirts of the town of Rustenburg. Native Locations were formally established with the Native Land Act of 1913, which saw the majority of the country’s population forced into what were termed as “Homelands” (South African History Online, 2014) (Figure 12-2).

The Paardekraal site specific study area has undergone some changes since 1955. The area was dominated by agricultural fields decreasing the potential for surface markers of sub-surface in-situ archaeological remains. Currently, a small mining operation is located in the middle of the proposed Paardekraal study area (Plan 10, Appendix A).



Figure 12-2: 1902-1909 map of the Paardekraal study areas

## 12.2 Description of the Current Land Uses

The current land use is described in Section 12.1.3. The land use within the area is dominated by natural areas with a water treatment plant in the area. Land Type for the Project area is detailed in Plan 3, Appendix A.

Land capability is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long term sustainable use of land under rain-fed conditions. From the Land Type data the generalised land capability of a particular area can be defined.

The land capability from the land type database shows that the dominate land capability for the prospecting area (Plan 4, Appendix A) is Class III (Moderate cultivation).

## 12.3 Environmental and Current Land Use Map

The Plans indicating the environmental features of the Project site are summarised in Table 12-14.



**Table 12-14: Summary of the Plans indicating the Environmental Features of the Project Site**

Environmental Feature	Plan Number (Appendix A)
Land Type	Plan 3
Land Capability	Plan 4
Land Use	Plan 5
Regional Vegetation	Plan 6
Important Bird Area	Plan 7
Wetlands	Plan 8 and Plan 9
Heritage Resources	Plan 10 - 12

### **13 Impacts and Risks Identified including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts, including the Degree to which these Impacts can be Mitigated**

The potential impacts are discussed according to each Phase of the proposed Project: the Construction, Operational and Decommissioning Phases. The Project activities are summarised in Table 13-1.

This section also rates the significance of the potential impacts pre-mitigation and post-mitigation. The impacts below are a result of both the environment in which the activity takes place, as well activity itself. The impacts associated with the Project include the NEMA EIA Regulations Listed Activities, as well as the prospecting activities to take place at the Property. The methodology utilised to assess the significance of the potential impacts is described in Section 14.

**Table 13-1: Project Activities Summary**

Activity No.	Activity
<b>Establishment Phase</b>	
1	Site clearance and topsoil removal prior to the commencement of physical construction activities. Topsoil will be stored in stockpiles not greater than 1m in height.
<b>Operational Phase</b>	
2	Drilling of prospecting boreholes.
<b>Decommissioning Phase</b>	



Activity No.	Activity
3	Rehabilitation of topsoil cover, ripping and vegetation establishment.

### 13.1 Establishment Phase

No physical construction will take place as no permanent infrastructure will be established. Activities will relate to the possible establishment of a temporary access road, as well as the clearing of vegetation for the establishment of the prospecting drill site.

Potential access roads will be constructed from existing road infrastructure with the shortest possible route to the prospecting drill site being utilised, ensuring that there are minimal environmental impacts related to this activity. The temporary access roads will only be utilised by personnel vehicles for site inspections and the pick-up of drill core during the Operational Phase.

Three sumps will be constructed within the boundary of each prospecting drill site footprint to separate oil, sludge and water. Topsoil will be stockpiled and stored for future rehabilitation of the prospecting drill site once drilling has concluded. Topsoil stockpiles will be covered during windy and rainy months to prevent soil erosion. The wet season occurs between October and March.

#### 13.1.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-2.

**Table 13-2: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisance Impacts during the Establishments Phase**

Activity No 1: Site Clearance	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> <li>■ The Boitekong Village is likely to be impacted upon due to the Project site being located directly to the west of the village. Impacts due to dust and noise generation are likely to be a nuisance to such receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; and</li> <li>■ Ambient noise levels will increase due to vehicles and site clearing machinery.</li> </ul>



Mitigation required	<ul style="list-style-type: none"> <li>■ Keep soils moist to suppress possibility of dust;</li> <li>■ Site clearing to take place during daylight hours only;</li> <li>■ Ensure that dust suppressants are applied to gravel or unpaved roads that are in use;</li> <li>■ Vehicles and machinery will be properly maintained to minimise operating noise;</li> <li>■ Vehicles will obey speed limits; and</li> <li>■ Bulk Delivery of materials should be maximised to reduce the frequency of deliveries.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	1	3	5	- 25
Post-Mitigation	1	1	1	4	- 12

### 13.1.2 Soil, Land Use and Land Capability

The impacts associated with soil and land capability during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-3.

**Table 13-3: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Establishment Phase**

<b>Activity No. 1: Site Clearance</b>					
<b>Criteria</b>	<b>Details / Discussion</b>				
Description of impact	<ul style="list-style-type: none"> <li>■ Soil compaction due to machinery and increased personnel activity;</li> <li>■ Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and</li> <li>■ Loss of topsoil due to erosion.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Only clear vegetation when and where necessary;</li> <li>■ Only remove topsoil when and where necessary;</li> <li>■ Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and</li> <li>■ Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (October to March).</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	2	3	6	- 42
Post-Mitigation	1	2	2	5	- 25





### 13.1.3 Fauna and Flora

The impacts associated with fauna and flora during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-4.

**Table 13-4: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Establishment Phase**

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ Site clearing will result in the direct loss of vegetation communities;</li> <li>■ The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation; and</li> <li>■ Direct impact on Threatened Ecosystems of the Marikana Thornveld may result as the Project area is located within such ecosystems.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Only remove vegetation when and where necessary;</li> <li>■ Minimise the size of the prospecting drill sites as far as possible;</li> <li>■ Indigenous trees will not be removed;</li> <li>■ Drainage lines, and indigenous vegetation will be avoided; and</li> <li>■ Use existing access roads.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	- 35
Post-Mitigation	1	2	2	4	- 20

### 13.1.4 Surface Water and Wetlands

The impacts associated with surface water during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-5.

**Table 13-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Establishment Phase**

Activity No. 1: Site Clearing.	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> <li>■ Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 100 m</li> </ul>



	buffer from all watercourses.				
Mitigation required	<ul style="list-style-type: none"> <li>■ Ensure site clearing is limited to the designated areas;</li> <li>■ Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; and</li> <li>■ All watercourses will be avoided and a 100 m buffer implemented.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	3	3	-24
Post-Mitigation	1	3	2	2	-12

### 13.1.5 Groundwater

There are no anticipated impacts associated with groundwater resources for the site establishment phase.

### 13.1.6 Heritage Resources

The impacts associated with heritage resources during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-6.

**Table 13-6: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Heritage Resources during the Establishment Phase**

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ Damage or destruction of heritage resources may occur accidentally during site clearing. Such heritage resources may be protected in terms of Section 35 and 36 of the NHRA.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Chance Find Procedures must be developed and implemented to ensure chance finds are recorded and mitigated.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	5	1	1	- 7
Post-Mitigation	1	1	1	1	- 3



## 13.2 Operational Phase

### 13.2.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-7.

**Table 13-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operations Phase**

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ The Boitekong Village is likely to be impacted upon due to the Project site being located directly to the west of the village. Impacts due to dust and noise generation are likely to be a nuisance to such receptors. Drilling could increase the ambient noise levels in the area. The noise levels should be below 45 dB from the nearest farmstead according to the SANS 10103: 2008 guidelines for daylight, rural areas;</li> <li>■ Dust generation from vehicular activity; and</li> <li>■ Increased dust due to erosion of soil stockpiles.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Maintain drilling equipment and, if possible, fit silencing equipment;</li> <li>■ Drilling will only take place during daylight hours;</li> <li>■ Use a dust suppressant and keep access roads moist; and</li> <li>■ Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding.</li> </ul>				
<i>Parameters</i>	Spatial	Duration	Intensity	Probability	Significant rating
Pre-Mitigation	2	2	3	5	- 35
Post-Mitigation	1	2	2	4	- 20

### 13.2.2 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-8.



**Table 13-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase**

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ Compaction of soil due to machinery and personnel on site; and</li> <li>■ Stockpiles of topsoil could erode during windy and rainy days (October to March).</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	3	6	-54
Post-Mitigation	2	2	3	4	- 28

### 13.2.3 Fauna and Flora

The impacts associated with fauna and flora during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-9.

**Table 13-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Operational Phase**

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; and</li> <li>■ Risk of increase and encroachment of alien invasive species.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Remove alien invasive species as and when they occur;</li> <li>■ Maintain drilling equipment and, if possible, fit silencing equipment; and</li> <li>■ All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	- 35
Post-Mitigation	1	2	2	4	- 20



### 13.2.4 Surface Water and Wetlands

The impacts associated with surface water during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-10.

**Table 13-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Operational Phase**

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 100 m buffer from all watercourses.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; and</li> <li>Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	2	4	- 28
Post-Mitigation	2	1	2	3	-15

### 13.2.5 Groundwater

The impacts associated with groundwater during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-11.

**Table 13-11: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Groundwater during the Operational Phase**

Activity No. 2: Drilling of prospecting boreholes	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> <li>The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and</li> <li>Use of water from boreholes for the prospecting operations may impact on</li> </ul>



	groundwater quantity.				
Mitigation required	<ul style="list-style-type: none"> <li>■ Emergency spill response plan required to handle any unplanned spillages;</li> <li>■ Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns;</li> <li>■ An agreement with the landowner must be established for the use of water from the boreholes; and</li> <li>■ Source water from external resources should the groundwater supply not be sufficient for prospecting activities.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	3	3	- 24
Post-Mitigation	2	2	3	2	-14

### 13.3 Decommissioning Phase

Each Prospecting site will be rehabilitated immediately following the cessation of the drilling activities for that individual site. All Prospecting sites will be rehabilitated fully prior to the cessation of the Prospecting Right.

#### 13.3.1 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-12.

**Table 13-12: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommissioning Phase**

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>■ Soil could wash away into drainage and water systems should backfilling and levelling not take place;</li> <li>■ The site will be compacted due to heavy machinery and personnel movement on site, affecting land capability.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>■ Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; and</li> <li>■ All compacted areas will be ripped to loosen the soils during rehabilitation.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>



Pre-Mitigation	3	3	2	6	- 48
Post-Mitigation	1	1	2	2	- 8

### 13.3.2 Fauna and Flora

The impacts associated with fauna and flora during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-13.

**Table 13-13: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Decommissioning Phase**

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly;</li> <li>Increase and encroachment of alien invasive species due to the presence of disturbed areas; and</li> <li>Direct impact on Marikana Thornveld should alien invasive species encroach onto the site.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>Remove alien invasive species as and when they occur;</li> <li>An alien invasive management plan must be established;</li> <li>All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and</li> <li>Rehabilitation.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	-35
Post-Mitigation	1	2	2	3	-15

### 13.3.3 Surface Water and Wetlands

The impacts associated with surface water during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-14.



**Table 13-14: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Decommissioning Phase**

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> <li>Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and</li> <li>The decommissioning of sumps.</li> </ul>				
Mitigation required	<ul style="list-style-type: none"> <li>The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses;</li> <li>Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and</li> <li>The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on site must be cleaned up immediately.</li> </ul>				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	3	5	-40
Post-Mitigation	1	1	2	3	-12

## 14 Methodology used in Determining and Ranking the Nature, Significance, Consequence, Extent, Duration and Probability of Potential Environmental Impacts and Risks

The methodology utilised to assess the significance of potential social and heritage impacts is discussed in detail below. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

$$\text{Consequence} = \text{Type of Impact} \times (\text{Intensity} + \text{Spatial Scale} + \text{Duration})$$

And





*Probability = Likelihood of an Impact Occurring*

In addition, the formula for calculating consequence:

*Type of Impact (Nature) = +1 (Positive Impact) or -1 (Negative Impact)*

The weight assigned to the various parameters for positive and negative social and heritage impacts is provided for in the formula and is presented in Table 14-1. The probability consequence matrix for social and heritage impacts is displayed in Table 14-2, with the impact significance rating described in Table 14-3.

**Table 14-1: Impact Assessment Parameter Ratings**

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
7	<p>Very significant impact on the environment. Irreparable and irreplaceable damage to highly valued species, habitat or ecosystem. Persistent severe damage.</p> <p>Irreparable and irreplaceable damage to highly valued items of great cultural significance or complete breakdown of social order.</p>	<p>Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.</p>	<p><u>International</u></p> <p>The effect will occur across international borders.</p>	<p><u>Permanent: No Mitigation</u></p> <p>The impact will remain long after the life of the Project. The impacts are irreversible.</p>	<p><u>Certain/ Definite.</u></p> <p>There are sound scientific reasons to expect that the impact will definitely occur.</p>
6	<p>Significant impact on highly valued species, habitat or ecosystem. Significant management and rehabilitation measures required to prevent irreplaceable impacts.</p> <p>Irreparable damage to highly valued items of cultural significance or breakdown of social order.</p>	<p>Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.</p>	<p><u>National</u></p> <p>Will affect the entire country.</p>	<p><u>Beyond Project Life</u></p> <p>The impact will remain for some time after the life of a Project.</p>	<p><u>Almost certain/Highly probable</u></p> <p>It is most likely that the impact will occur.</p>

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread positive benefits to local communities which improves livelihoods, as well as a positive improvement to the receiving environment.	<u>Province/Region</u> Will affect the entire province or region.	<u>Project Life</u> The impact will cease after the operational life span of the Project.	<u>Likely</u> The impact may occur.
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	<u>Municipal Area</u> Will affect the whole municipal area.	<u>Long term</u> 6-15 years to reverse impacts.	<u>Probable</u> Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem functions. Rehabilitation requires intervention of external specialists and can be done in less than a month. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some.	<u>Local</u> Extending across the site and to nearby settlements.	<u>Medium term</u> 1-5 years to reverse impacts.	<u>Unlikely</u> Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur.



Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
2	<p>Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants.</p> <p>Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.</p>	<p>Low positive impacts experience by very few of population.</p>	<p><u>Limited</u></p> <p>Limited to the site and its immediate surroundings.</p>	<p><u>Short term</u></p> <p>Less than 1 year to completely reverse the impact.</p>	<p><u>Rare/ improbable</u></p> <p>Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.</p>
1	<p>Limited damage to minimal area of low significance that will have no impact on the environment. No irreplaceable loss of a significant aspect to the environment.</p> <p>Minimal social impacts, low-level repairable damage to commonplace structures.</p>	<p>Some low-level social and environmental benefits felt by very few of the population.</p>	<p><u>Very limited</u></p> <p>Limited to specific isolated parts of the site.</p>	<p><u>Immediate</u></p> <p>Less than 1 month to completely reverse the impact.</p>	<p><u>Highly unlikely/None</u></p> <p>Expected never to happen.</p>



**Table 14-2: Probability Consequence Matrix for Impacts**

		Significance																																					
		7	6	5	4	3	2	1																															
Probability	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Consequence																																					

**Table 14-3: Significance Threshold Limits**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the Project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	Minor (negative)



Score	Description	Rating
-73 to -108	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts will be irreplaceable and irreversible should adequate mitigation and management measures not be successfully implemented.	Major (negative)

#### 14.1 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 Effected

Considering the limited extent of the Project area, the likely impacts associated with such activities are also expected to be limited.

As noted above, the PPP has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations (December 2014), and as required in terms of Chapter 5 of NEMA, but is also designed to provide I&APs with an opportunity to evaluate all aspects of the proposed Project. The aim is to maximise the Project benefits while minimising its adverse effects. All comments, concerns and issues raised by I&APs regarding the proposed prospecting activities will be taken into consideration.

#### 14.2 The Possible Mitigation Measures that could be Applied and the Level of Risk

The most significant potential impacts identified for the proposed Project includes loss of vegetation and soil erosion during the Establishment Phase, possible spillage of drill fluid during the Operational Phase and soil erosion as a result of sedimentation of surface water during Decommissioning of the Project. The mitigation measures provided aim to prevent or reduce the impacts from occurring. Dust suppression must be used on exposed surfaces and the establishment of vegetation is crucial to manage and prevent soil erosion, leading to a loss of soil resources and containing the source for dust generation. The clearance of natural vegetation will be limited to the prospecting site footprints.

#### 14.3 Motivation where no Alternatives sites were Considered

The Project area is limited in extent (15.4 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed



sites (100 m<sup>2</sup>). Only one prospecting site will be drilled at a time, ensuring that several disturbed areas are not in operation concurrently. The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive areas, such as watercourse and wetlands, will be avoided and a 100 m buffer zone implemented.

The use of trenching as a prospecting activity was discarded due to the permanent scars and environmental impacts associated with the activity, as well as the trenching not suitable for the depths that are required to prospect for PGMs.

#### **14.4 Statement Motivating the Alternative Development Location within the Overall Site**

As noted above, the prospecting sites are small and exact locations will be determined based on non-invasive prospecting methods. All watercourses and wetlands will be avoided with buffers. The project site will also not require any permanent infrastructure to be constructed, with only temporary access routes being utilised.

### **15 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**

As the determination for the location of the prospecting boreholes will be based on non-invasive methods, very few impacts are anticipated. All impacts identified will be mitigated against to reduce the significance of such impacts.

## 16 Assessment of each Identified Potentially Significant Impact and Risk

The potential impacts per activity are detailed in Table 16-1 below. The impacts per phase of the Project are outlined in Section 13, Item 3 (g)(v) above and indicate the mitigation measures proposed, as well as the impact significance pre-mitigation and post mitigation.

**Table 16-1: Assessment of Each Identified Impact**

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Type	Significance
<b>Establishment Phase</b>						
<b>Site Clearance</b>	Social Nuisances	Air Quality and Noise	Project life	Minor Negative	Control through: <ul style="list-style-type: none"> <li>▪ Dust Management Plan.</li> <li>▪ Vegetation Establishment.</li> <li>▪ Operating hours.</li> <li>▪ Use of silencers.</li> <li>▪ Routine maintenance and services.</li> </ul>	Negligible Negative
	Loss of topsoil resources and land capability.	Soils	Establishment Phase	Minor Negative	Control through: <ul style="list-style-type: none"> <li>▪ Soil stripping procedure.</li> </ul>	Negligible Negative
	Loss of fauna and flora species.	Fauna and Flora	Establishment Phase	Minor Negative	Avoid through: <ul style="list-style-type: none"> <li>▪ Limitation of infrastructure footprint.</li> </ul>	Negligible Negative
	Sedimentation of surface water resources and wetlands.	Surface water	Establishment Phase Operational Phase	Negligible Negative	Prevent through: <ul style="list-style-type: none"> <li>▪ Storm Water Management Plan.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>▪ Implementation of buffer zones.</li> </ul>	Negligible Negative
	Groundwater contamination	Groundwater	Establishment Phase	Negligible Negative	Remedy and avoid through: <ul style="list-style-type: none"> <li>▪ Spill Response Plan.</li> </ul>	Negligible Negative
	Damage to heritage resources	Cultural Heritage	Establishment Phase	Negligible Negative	Avoid through: <ul style="list-style-type: none"> <li>▪ Chance Find Procedures.</li> </ul>	Negligible Negative
<b>Operational Phase</b>						
<b>Drilling of Prospecting Boreholes</b>	Social Nuisances	Air Quality and Noise	Project life	Minor Negative	Control through: <ul style="list-style-type: none"> <li>▪ Dust Management Plan.</li> <li>▪ Vegetation Establishment.</li> </ul>	Negligible Negative



Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Type	Significance
					<ul style="list-style-type: none"> <li>Operating hours.</li> <li>Use of silencers.</li> <li>Routine maintenance and services.</li> </ul>	
	Soil compaction and erosion	Soils	Operational Phase Decommissioning Phase	Minor Negative	Avoid and control through: <ul style="list-style-type: none"> <li>Vegetation establishment.</li> <li>Restrict access.</li> </ul>	Negligible Negative
	Encroachment of alien invasive vegetation.	Fauna and Flora	Operational Phase Decommissioning Phase	Negligible Negative	Control through: <ul style="list-style-type: none"> <li>Alien invasive management plan.</li> </ul>	Negligible Negative
	Sedimentation of surface water resources and wetlands	Surface Water	Operation Phase	Negligible Negative	Avoid through: <ul style="list-style-type: none"> <li>Implementation of buffer zones; and</li> <li>Erosion management.</li> </ul>	Negligible Negative
	Contamination of groundwater and reduction in groundwater quantity	Groundwater	Operation Phase	Negligible Negative	Prevent through: <ul style="list-style-type: none"> <li>Routine maintenance of drill rig</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Landowner agreements for water use.</li> </ul>	Negligible Negative
<b>Decommissioning Phase</b>						
<b>Rehabilitation</b>	Encroachment of alien invasive vegetation.	Fauna and Flora	Operational Phase Decommissioning Phase	Negligible Negative	Control through: <ul style="list-style-type: none"> <li>Alien invasive management plan.</li> </ul>	Negligible Negative
	Soil compaction and erosion	Soils	Operational Phase Decommissioning Phase	Minor Negative	Avoid and control through: <ul style="list-style-type: none"> <li>Vegetation establishment.</li> <li>Restrict access.</li> </ul>	Negligible Negative
	Sedimentation and contamination of surface water resources	Surface Water	Decommissioning Phase	Minor Negative	Control through: <ul style="list-style-type: none"> <li>Vegetation establishment</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Prevent through rehabilitation of sumps.</li> </ul>	Negligible Negative

## 17 Summary of Specialist Reports

Numerous specialist impact assessments were undertaken for the Project. Table 17-1 details the specialist studies undertaken for the Project, with the specialist input provided directly into this BAR. No individual specialist reports were compiled. The specialist input included the baseline environment, potential impacts and the recommended mitigation measures.

**Table 17-1: Specialist Studies undertaken for the Project**

List of Studies undertaken	Recommendations of Specialist Reports (Inputs of the Specialist Studies)	Specialist Recommendations that have been included in the EIA Report	Reference to Applicable Section of Report where Specialist Recommendations have been Included
Soils Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of impacts</li> <li>▪ Mitigation measures</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Soil Specialist.
Fauna and Flora Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of impacts</li> <li>▪ Mitigation measures</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Fauna and Flora Specialist.
Wetlands Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of impacts</li> <li>▪ Mitigation measures</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Wetlands Specialist.
Surface Water Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of impacts</li> <li>▪ Mitigation measures</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Surface Water Specialist.
Groundwater Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of impacts</li> <li>▪ Mitigation measures</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Groundwater Specialist.
Heritage Impact Assessment	<ul style="list-style-type: none"> <li>▪ Significance of heritage resources.</li> <li>▪ Recommendations.</li> </ul>	X	All mitigation and management measures included in this report were recommended by the Heritage Specialist. The HIA has been included in Appendix E.



## 18 Environmental Impact Statement

### 18.1 Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is utilised to summarise all of the potential environmental impacts identified during each phase of the proposed Project. The significance of the impacts associated with the biophysical environment, pre-mitigation and post-mitigation, is summarised in Table 18-1.

**Table 18-1: Summary of the Potential Impacts on the Biophysical Environment**

Project Phase	Receiving Environment	Impact Description	Pre-Mitigation Significance	Post-Mitigation Significance
Establishment Phase	Air Quality	Fugitive dust generation.	Minor Negative	Negligible Negative
	Soil, Land Use and Land Capability	Loss of topsoil resources and land capability.	Minor Negative	Negligible Negative
		Soil erosion and degradation.	Minor Negative	Negligible Negative
	Fauna and Flora	Loss of fauna and flora species.	Minor Negative	Negligible Negative
		Destruction of suitable habitats	Minor Negative	Negligible Negative
	Surface water	Sedimentation and contamination of surface water resources.	Minor Negative	Negligible Negative
	Groundwater	Groundwater contamination	Negligible Negative	Negligible Negative
	Noise	Noise generation	Negligible Negative	Negligible Negative
	Cultural Heritage	Damage to heritage resources	Negligible Negative	Negligible Negative
Operational Phase	Air Quality	Fugitive dust generation.	Minor Negative	Negligible Negative
	Soil, Land Use and Land Capability	Soil compaction	Minor Negative	Negligible Negative
	Wetlands	Contaminations of wetlands	Minor Negative	Negligible Negative
	Surface Water	Contaminations of surface water resources	Minor Negative	Negligible Negative



Project Phase	Receiving Environment	Impact Description	Pre-Mitigation Significance	Post-Mitigation Significance
	Noise	Noise generation	Negligible Negative	Negligible Negative
Decommissioning Phase	Air Quality	Fugitive dust generation.	Minor Negative	Negligible Negative
	Soil, Land Use and Land Capability	Soil contamination	Minor Negative	Negligible Negative
		Restoration of land capability	Minor Negative	Minor Negative
	Fauna and Flora	Destruction of suitable habitats	Negligible Negative	Negligible Negative
	Surface Water	Contaminations and sedimentation of surface water resources	Minor Negative	Negligible Negative

## 18.2 Final Site Map

The site specific locations of the prospecting sites have not been determined as the locations will be based on non-invasive prospecting methods. The prospecting sites will be 100m<sup>2</sup> in extent. The Project area is displayed in Plan 2, Appendix A.

## 18.3 Summary of the Positive and Negative Implications and Risks of the Proposed Activity and Identified Alternatives

The predominant impacts associated with the Establishment Phase are as a result of site clearing. Site clearing activities will remove vegetation and expose soil surfaces. The exposed soils may become eroded, compacted and contaminated during the Establishment Phase. The erosion of soils may result in additional impacts on the wetlands and surface water resources as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. The construction activities are limited in footprint and, hence, the potential impacts are expected to be of a minor significance.

The predominant impact during the Operational Phase is due to the presence of drill fluid circulating throughout the drilling process and is utilised to cool the drill. Negligible quantities of drill fluid may spill into the environment and cause soil, surface water and groundwater pollution, if not managed correctly. Another significant impact during the Operational Phase is the use of hydrocarbons:

The impacts associated with decommissioning are similar to the impacts during the Establishment Phase, with soil erosion and the resultant sedimentation of surface water resources the predominant impacts.



## **19 Proposed Impact Management Objectives and the Impact Management Outcomes for inclusion in the EMPR**

The EMP seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored.

This EMP addresses the environmental impacts during the Construction, Operational, Decommissioning and Post-Closure Phases of the Project. Due regard must be given to environmental protection during the entire Project; a number of environmental recommendations are made to achieve environmental protection. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- Minimise the extent of an impact during the life of the Project;
- Ensure appropriate restoration of areas affected by the Project; and
- Prevent long term environmental degradation.

## **20 Aspects for Inclusion as Conditions of Authorisation**

The implementation of the mitigation measures provided in this Report must be a condition of authorisation. Additional conditions include the implementation of a 100 m buffer zone from all watercourses and wetland areas.

## **21 Description of any Assumptions, Uncertainties and Gaps in Knowledge**

A high-level desktop baseline environment was undertaken for this Project and no site investigations were undertaken, with the exception of heritage studies. The baseline environment has, therefore not been confirmed based on the desktop data. In addition, the exact borehole locations were unknown at the time of compiling this report and will be determined based on the non-invasive prospecting methods and any sensitivities on site.

## **22 Reasoned Opinion as to Whether the Proposed Activity should or should not be authorised**

### **22.1 Reasons why the Activity should be Authorised or not**

Digby Wells recommends that the proposed prospecting activities be provided authorisation, provided the stipulated mitigation and management measures are implemented for the Project. The limited extent of the prospecting sites (100 m<sup>2</sup> each) will have minimal impacts on the environment and the activity will not result in the loss of critical habitat. In addition, wetlands and water courses will be avoided and a 100 m buffer zone implemented, ensuring that habitat function and river integrity is not compromised by the Project.

Furthermore, the site specific locations of the prospecting sites will aim to avoid the site specific sensitivities, such as indigenous vegetation.

## 22.2 Conditions that must be Included in the Authorisation

The implementation of the mitigation measures provided in this Report must be a condition of authorisation. Additional conditions include the implementation of a 100 m buffer zone from all watercourses and wetland areas.

## 23 Period for which the Environmental Authorisation is Required

The environmental authorisation is required for a period of 5 years.

## 24 Undertaking

An undertaking is provided in Part B, Section 13 of the EMPr and is applicable to the EIA and EMPr sections of this Report.

## 25 Financial Provision

As part of the requirements of the MPRDA, Digby Wells calculated the environmental closure liability for the Project according to the DMR guidelines. The financial provision will be made available to the DMR by RPM in the form of a guarantee from a financial institution to ensure that adequate rehabilitation will be undertaken. The closure cost is estimated per borehole is **R 9 649.70** amounting to a total of **R 38 598.80** for 4 boreholes.

### 25.1 Explain how the aforesaid Amount was derived

The environmental closure liability for the Project was calculated according to the DMR's "Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine".

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. During this assessment, the 2012 Master Rates, as published by the DMR, were increased by an average inflation rate of 5.7% (Statistics SA, 2013). An average rate of inflation of 5.9% (Statistics SA, 2014<sup>7</sup>) was added to the 2013 Master Rates to reflect 2014 costs.

The DMR Guideline Document classifies a mine according to a number of factors which allows one to determine the appropriate weighting factors to be used during the quantum calculation. The following factors are considered:

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<sup>7</sup> Inflation rate as released by Statistics South Africa (StatsSA): April 2014 (latest)

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

Table 25-1 provides a summary of the estimate calculated for each component for the proposed Project.

**Table 25-1: Environmental Liability for the Project according to the DMR Methodology**

<b><u>Financial Revision Calculation - Rehabilitation</u></b>					
<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Cost</b>	
<b>1</b> <u>Sump (4 m<sup>3</sup>)</u>					
Topsoil	m <sup>3</sup>	6	R 59.80	R	358.80
Fill Sump	Labour	1	R 168.00	R	168.00
<b>2</b> <u>Drill Area (20 m by 20 m)</u>					
Re-vegetate	ha	0.04	R 24 775.38	R	991.02
Rip area <sup>8</sup>	m <sup>2</sup>	400	R 6.68	R	2 672.00
Shape	ha	0.04	R 1 533.00	R	61.32
<b>3</b> <u>Borehole</u>					
Fill Borehole (100 m)	m <sup>3</sup>	7	R 19.11	R	133.77

<sup>8</sup> A mobilisation fee for the equipment hire will need to be included.





	Concrete	m <sup>3</sup>	0.7	R 30.28	R 21.19
4	<u>General Clean-up</u>	Labour	1	R 168.00	R 168.00
5	<u>Hydrocarbon clean-up</u>	m <sup>3</sup>	5	R 89.12	R 445.60
6	<u>Inspection</u>	Hours	1	R 870.00	R 870.00
7	<u>Audit</u>				
	Site Inspection	Hours	4	R 470.00	R 1 880.00
	Report Writing	Hours	4	R 470.00	R 1 880.00
				<b>Total</b>	<b>R 9 649.70</b>
	Grand Total (Total multiplied by 5 Boreholes)		5	<b>Grand Total</b>	<b>R 38 598.80</b>



## **25.2 Confirm that this Amount can be Provided for from Operating Expenditure**

RPM confirms that the amount determined in Section 25 can be provided in the form of a bank guarantee.

## **26 Specific Information Required by the Competent Authority**

### **26.1 Impact on the Socio-Economic Conditions of any Directly Affected Person**

Very few impacts on socio-economic conditions of any directly affected person have been identified. A potential impact is dust and noise nuisances which will be mitigated against. The prospecting area will also be rehabilitated to reduce any further impacts which may affect the surrounding areas.

No heritage resources will be directly impacted upon by the prospecting activities.

## **27 Other Matters Required in terms of Sections 24(4)(a) and (b) of the Act**

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. The outcome of the investigation has been provided in Section 7 to Section 19 of this Basic Assessment Report.



## **Part B: Environmental Management Programme Report**



## **1 Details of the EAP**

The details of the EAP have been provided in Section 2.1, Part A of this Report.

## **2 Description of the Aspects of the Activity**

The aspects of the activity as described in Section 5: Item 3(h) are covered by the EMP.

## **3 Composite Map**

The composite plan for the Project area, indicating sensitive areas, heritage resources watercourse buffers, is included as Plan 11, Appendix A.

## **4 Description of Impact Management Objectives including Management Statements**

### **4.1 Determination of Closure Objectives**

The closure objectives have been formulated for the Project. The closure objectives for the Project are as follows:

- Rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation;
- Rehabilitate all disturbed land to a condition that facilitates compliance with applicable environmental quality objectives, such as air and water quality objectives as an example;
- Reduce the visual impact of the prospecting sites through rehabilitation of all disturbed land and residue deposits;
- Keep authorities informed of the progress of the activities during the Decommissioning Phase;
- Submit monitoring results to the relevant authorities; and
- Maintain the required pollution control facilities and the condition of the rehabilitated land following closure.

### **4.2 Volumes and Rate of Water Use Required for the Operation**

Water will be required during the drilling activities to be passed over the drill bits to ensure that the drill does not overheat. Water will also be utilised for dust suppression, when required. The water will be sourced either through an agreement with the landowner, or transported in through a water truck. The volumes will be determined once a contractor has been appointed.



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### 4.3 Has a Water Use Licence has been Applied for

A water use licence has not been applied for as the site specific borehole locations have not yet been determined. A water use licence will be applied for any water uses triggered in terms of Section 21 of the NWA.

## 5 Impacts to be mitigated in their Respective Phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 5-1.

**Table 5-1: Impacts to be Mitigated**

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
<b>Establishment Phase</b>						
<b>Site Clearance</b>	Social Nuisance	Establishment Phase	Limited to the prospecting site	<ul style="list-style-type: none"> <li>▪ Keep soils moist to suppress possibility of dust;</li> <li>▪ Site clearing to take place during daylight hours only;</li> <li>▪ Ensure that dust suppressants are applied to gravel or unpaved roads that are in use;</li> <li>▪ Vehicles and machinery will be properly maintained to minimise operating noise;</li> <li>▪ Vehicles will obey speed limits; and</li> <li>▪ Bulk Delivery of materials should be maximised to reduce the frequency of deliveries.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dust Management Plan</li> <li>▪ Regular Vehicle Inspections in accordance with:</li> <li>▪ NEM:AQA; and</li> <li>▪ ECA.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing and Daily during:</li> <li>▪ Establishment Phase</li> </ul>
	Soils	Establishment Phase	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>▪ Only clear vegetation when and where necessary;</li> <li>▪ Only remove topsoil when and where necessary;</li> <li>▪ Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and</li> <li>▪ Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (October to March).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Soil Rehabilitation Plan; and</li> <li>▪ Storm Water Management Plan in accordance with:</li> <li>▪ MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and</li> <li>▪ CARA.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing and Weekly during:</li> <li>▪ Establishment Phase</li> </ul>
	Fauna and Flora	Establishment Phase	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>▪ Only remove vegetation when and where necessary;</li> <li>▪ Minimise the size of the prospecting drill sites as far as possible;</li> <li>▪ Indigenous trees will not be removed;</li> <li>▪ Drainage lines, and indigenous vegetation will be avoided; and</li> <li>▪ Use existing access roads.</li> </ul>	<ul style="list-style-type: none"> <li>▪ NEM:BA; and</li> <li>▪ ECA.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing during:</li> <li>▪ Establishment Phase</li> </ul>

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Surface water and Wetlands	Establishment Phase	Local	<ul style="list-style-type: none"> <li>Ensure site clearing is limited to the designated areas;</li> <li>Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; and</li> <li>All watercourses will be avoided and a 100 m buffer implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Buffer zones; and</li> <li>Spill Response Plan in accordance with:                             <ul style="list-style-type: none"> <li>NWA;</li> <li>Best Practice Guidelines;</li> <li>MPRDA.</li> </ul> </li> </ul>	As required and throughout: <ul style="list-style-type: none"> <li>Establishment Phase</li> </ul>
	Groundwater	Establishment Phase	Local	<ul style="list-style-type: none"> <li>All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated;</li> <li>Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills;</li> <li>All vehicles and machinery to be serviced in a hard park area or at an off-site location; and</li> <li>Vehicles with leaks must have drip trays in place.</li> </ul>	<ul style="list-style-type: none"> <li>Spill Response Plan; and</li> <li>Vehicle Maintenance Plan in accordance with:                             <ul style="list-style-type: none"> <li>NWA;</li> <li>Best Practice Guidelines</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>As required</li> </ul>
	Cultural Heritage	Establishment Phase	Site specific	<ul style="list-style-type: none"> <li>Chance Find Procedures must be developed and implemented to ensure chance finds are recorded and mitigated.</li> </ul>	<ul style="list-style-type: none"> <li>Section 35 of the NHRA.</li> </ul>	<ul style="list-style-type: none"> <li>Daily during:                             <ul style="list-style-type: none"> <li>Establishment Phase</li> </ul> </li> </ul>
<b>Operational Phase</b>						
<b>Drilling of Prospecting Boreholes</b>	Social Nuisance	Operational Phase	Limited	<ul style="list-style-type: none"> <li>Maintain drilling equipment and, if possible, fit silencing equipment;</li> <li>Drilling will only take place during daylight hours;</li> <li>Use a dust suppressant and keep access roads moist; and</li> <li>Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding.</li> </ul>	<ul style="list-style-type: none"> <li>Dust Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing and Daily during:                             <ul style="list-style-type: none"> <li>Establishment Phase</li> </ul> </li> </ul>
	Fauna and Flora	Operational Phase	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>Remove alien invasive species as and when they occur;</li> <li>Maintain drilling equipment and, if possible, fit silencing equipment; and</li> <li>All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss.</li> </ul>	<ul style="list-style-type: none"> <li>NEM:BA; and</li> <li>ECA.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing during:                             <ul style="list-style-type: none"> <li>Operational Phase</li> </ul> </li> </ul>

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Soil	Operational Phase Decommissioning Phase	Site Specific	<ul style="list-style-type: none"> <li>Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion.</li> </ul>	<ul style="list-style-type: none"> <li>MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and</li> <li>CARA.</li> </ul>	As required and throughout: <ul style="list-style-type: none"> <li>Operational Phase</li> </ul>
	Surface Water and wetlands	Operational Phase	Local	<ul style="list-style-type: none"> <li>Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; and</li> <li>Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment.</li> </ul>	<ul style="list-style-type: none"> <li>Spill Response Plan in accordance with:</li> <li>MPRDA Regulation 56 (1) to (8); soil pollution and erosion control.</li> </ul>	As required and throughout: <ul style="list-style-type: none"> <li>Operational Phase</li> </ul>
	Groundwater	Operational Phase	Local	<ul style="list-style-type: none"> <li>Emergency spill response plan required to handle any unplanned spillages;</li> <li>Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns;</li> <li>An agreement with the landowner must be established for the use of water from the boreholes; and</li> <li>Source water from external resources should the groundwater supply not be sufficient for prospecting activities.</li> </ul>	<ul style="list-style-type: none"> <li>Spill Response Plan; and</li> <li>Vehicle Maintenance Plan in accordance with:</li> <li>NWA;</li> <li>Best Practice Guidelines</li> </ul>	As required
<b>Decommissioning Phase</b>						
<b>Rehabilitation</b>	Surface Water	Project life	Local	<ul style="list-style-type: none"> <li>The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses;</li> <li>Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and</li> <li>The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on site must be cleaned up immediately.</li> </ul>	<ul style="list-style-type: none"> <li>MPRDA Regulation 56 (1) to (8); soil pollution and erosion control;</li> <li>CARA</li> </ul>	As required during: <ul style="list-style-type: none"> <li>Operational Phase and Decommissioning Phase.</li> </ul>



Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Soil	Operational Phase Decommissioning Phase	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>■ Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; and</li> <li>■ All compacted areas will be ripped to loosen the soils during rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>■ Spill Response Plan; and</li> <li>■ Vehicle Maintenance Plan in accordance with:</li> <li>■ MPRDA Regulation 56 (1) to (8); soil pollution and erosion control;</li> <li>■ CARA.</li> </ul>	<ul style="list-style-type: none"> <li>■ As required</li> </ul>
	Fauna and Flora	Decommissioning Phase	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>■ Remove alien invasive species as and when they occur;</li> <li>■ An alien invasive management plan must be established;</li> <li>■ All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and</li> <li>■ Rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>■ NEM:BA; and</li> <li>■ ECA.</li> </ul>	<ul style="list-style-type: none"> <li>■ Ongoing during:</li> <li>■ Decommissioning Phase</li> </ul>

## 6 Impact Management Outcomes

A description of the objectives and outcomes of the EMP is outlined in Table 6-1, taking into account the impact and mitigation type.

**Table 6-1: Outcomes and Objectives of the EMP**

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
<b>Establishment Phase</b>					
<b>Site Clearance</b>	Fugitive dust and noise generation	Social Nuisance	Establishment Phase	Control through: <ul style="list-style-type: none"> <li>▪ Dust Management Plan.</li> <li>▪ Vegetation Establishment.</li> <li>▪ Operating hours.</li> <li>▪ Use of silencers.</li> <li>▪ Routine maintenance and services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To minimise fugitive dust generation emanating from the Project.</li> </ul>
	Loss of topsoil resources and land capability.	Soils	Establishment Phase	Control through: <ul style="list-style-type: none"> <li>▪ Soil stripping procedure.</li> </ul> Remedy through:	<ul style="list-style-type: none"> <li>▪ To prevent soil contamination and degradation.</li> </ul>
	Loss of fauna and flora species.	Fauna and Flora	Establishment Phase	Control through: <ul style="list-style-type: none"> <li>▪ Vegetation establishment.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>▪ Limitation of infrastructure footprint.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To prevent and minimise the loss of vegetation communities; and</li> <li>▪ To minimise habitat destruction.</li> </ul>
	Sedimentation of surface water resources and wetlands.	Surface water	Establishment Phase Operational Phase	Prevent through: <ul style="list-style-type: none"> <li>▪ Storm Water Management Plan.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>▪ Implementation of buffer zones.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To prevent sedimentation of surface water resources and wetlands.</li> </ul>
	Groundwater contamination	Groundwater	Establishment Phase	Remedy and avoid through: <ul style="list-style-type: none"> <li>▪ Spill Response Plan.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To prevent the contamination of groundwater resources</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	Damage to heritage resources	Cultural Heritage	Establishment Phase	Avoid through: <ul style="list-style-type: none"> <li>Chance Find Procedures</li> </ul>	<ul style="list-style-type: none"> <li>To prevent impacts to heritage resources.</li> </ul>
<b>Operational Phase</b>					
<b>Drilling of Prospecting Boreholes</b>	Fugitive dust and noise generation	Social Nuisance	Establishment Phase	Control through: <ul style="list-style-type: none"> <li>Dust Management Plan.</li> <li>Vegetation Establishment.</li> <li>Operating hours.</li> <li>Use of silencers.</li> <li>Routine maintenance and services.</li> </ul>	<ul style="list-style-type: none"> <li>To minimise fugitive dust generation emanating from the Project.</li> </ul>
	Soil contamination and degradation	Soil	Operational Phase Decommissioning Phase	Remedy through: <ul style="list-style-type: none"> <li>Spill Response Plan.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>Maintenance Procedures.</li> </ul>	<ul style="list-style-type: none"> <li>To prevent soil contamination and degradation.</li> </ul>
	Soil compaction	Soils	Operational Phase	Avoid and control through: <ul style="list-style-type: none"> <li>Vegetation establishment.</li> <li>Restrict access.</li> </ul>	<ul style="list-style-type: none"> <li>To prevent the compaction of soil resources.</li> </ul>
	Sedimentation of surface water resources and wetlands	Surface Water	Operational Phase	Remedy through: <ul style="list-style-type: none"> <li>Implementation of buffer zones; and;</li> <li>Erosion management</li> </ul>	<ul style="list-style-type: none"> <li>To prevent the sedimentation of surface water resources and wetlands.</li> </ul>
	Contamination of groundwater and reduction in groundwater quantity	Groundwater	Operational Phase	Prevent through: <ul style="list-style-type: none"> <li>Routine maintenance of drill rig</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Landowner agreement for water use.</li> </ul>	<ul style="list-style-type: none"> <li>To prevent contamination of groundwater and reduction in groundwater quality.</li> </ul>
<b>Decommissioning Phase</b>					
<b>Rehabilitation</b>	Restoration of indigenous vegetation and the potential encroachment of alien invasive vegetation	Fauna and Flora	Decommissioning Phase	Control through: <ul style="list-style-type: none"> <li>Alien invasive management plan.</li> </ul> Enhance through:	<ul style="list-style-type: none"> <li>To rehabilitate and establish vegetation to align with the closure objectives</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
				<ul style="list-style-type: none"> <li>Indigenous vegetation establishment and monitoring.</li> </ul>	
	Soil compaction and erosion	Soil	Operational Phase Decommissioning Phase	Void and control through: <ul style="list-style-type: none"> <li>Vegetation establishment;</li> <li>Restrict access.</li> </ul>	<ul style="list-style-type: none"> <li>To prevent soil contamination and degradation in accordance with the CARA.</li> </ul>
	Sedimentation and contamination of surface water resources and wetlands	Surface Water	Decommissioning Phase	Control : <ul style="list-style-type: none"> <li>Vegetation establishment</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Prevent through rehabilitation of sumps.</li> </ul>	<ul style="list-style-type: none"> <li>To prevent sedimentation and contamination of surface water resources and wetlands</li> </ul>

## 7 Impact Management Actions

A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in referenced in Table 7-1.

**Table 7-1: Impact Management Actions**

Activities	Potential Impacts	Aspects Affected	Mitigation Type	Time Period for Implementation	Compliance with Standards
<b>Establishment Phase</b>					
<b>Site Clearance</b>	Fugitive dust and noise generation.	Social Nuisances	Control through: <ul style="list-style-type: none"> <li>Dust Management Plan.</li> <li>Vegetation Establishment.</li> </ul>	Control through: <ul style="list-style-type: none"> <li>Dust Management Plan.</li> <li>Vegetation Establishment.</li> <li>Operating hours.</li> <li>Use of silencers.</li> <li>Routine maintenance and services.</li> </ul>	<ul style="list-style-type: none"> <li>Dust Management Plan</li> </ul>
	Loss of topsoil resources and land capability.	Soils	Control through: <ul style="list-style-type: none"> <li>Soil stripping procedure.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing and Weekly during: Establishment Phase</li> </ul>	<ul style="list-style-type: none"> <li>Soil Rehabilitation Plan; and</li> <li>Storm Water Management Plan in accordance with:                             <ul style="list-style-type: none"> <li>MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and</li> <li>CARA.</li> </ul> </li> </ul>
	Loss of fauna and flora species.	Fauna and Flora	Control through: <ul style="list-style-type: none"> <li>Vegetation establishment.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>Limitation of infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing during: Establishment Phase</li> </ul>	<ul style="list-style-type: none"> <li>NEM:BA; and</li> <li>ECA.</li> </ul>

Activities	Potential Impacts	Aspects Affected	Mitigation Type	Time Period for Implementation	Compliance with Standards
			footprint.		
	Sedimentation of surface water resources and wetlands	Surface water Wetlands	Prevent through: <ul style="list-style-type: none"> <li>▪ Storm Water Management Plan.</li> <li>▪ Avoid through:</li> <li>▪ Implementation of buffer zones.</li> </ul>	As required and throughout: <ul style="list-style-type: none"> <li>▪ Establishment Phase</li> </ul>	<ul style="list-style-type: none"> <li>▪ Buffer zones; and</li> <li>▪ Spill Response Plan in accordance with:</li> <li>▪ NWA;</li> <li>▪ Best Practice Guidelines;</li> <li>▪ MPRDA.</li> </ul>
	Groundwater contamination	Groundwater	Remedy and avoid through: <ul style="list-style-type: none"> <li>▪ Spill Response Plan.</li> </ul>	<ul style="list-style-type: none"> <li>▪ As required</li> </ul>	<ul style="list-style-type: none"> <li>▪ Spill Response Plan; and</li> <li>▪ Vehicle Maintenance Plan in accordance with:</li> <li>▪ NWA;</li> <li>▪ Best Practice Guidelines</li> </ul>
	Damage to Heritage Resources	Cultural Heritage	Avoid through: <ul style="list-style-type: none"> <li>▪ Chance Find Procedures.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Daily during:</li> <li>▪ Establishment Phase.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Section 35 of the NHRA.</li> </ul>
<b>Operational Phase</b>					
<b>Drilling of Prospecting Boreholes</b>	Fugitive dust and noise generation.	Social Nuisances	Control through: <ul style="list-style-type: none"> <li>▪ Dust Management Plan.</li> <li>▪ Vegetation Establishment.</li> </ul>	Control through: <ul style="list-style-type: none"> <li>▪ Dust Management Plan.</li> <li>▪ Vegetation Establishment.</li> <li>▪ Operating hours.</li> <li>▪ Use of silencers.</li> <li>▪ Routine maintenance and services.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dust Management Plan</li> </ul>
	Soil contamination and degradation	Soil	Remedy through: <ul style="list-style-type: none"> <li>▪ Spill Response Plan.</li> </ul> Avoid through: <ul style="list-style-type: none"> <li>▪ Maintenance Procedures.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing and Daily during:</li> <li>▪ Establishment Phase</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dust Management Plan</li> </ul>
	Soil compaction	Soils	Avoid and control through: <ul style="list-style-type: none"> <li>▪ Vegetation establishment.</li> <li>▪ Restrict access.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ongoing during:</li> <li>▪ Operational Phase</li> </ul>	<ul style="list-style-type: none"> <li>▪ NEM:BA; and</li> <li>▪ ECA.</li> </ul>
	Sedimentation of surface water resources and wetlands	Surface Water	Remedy through: <ul style="list-style-type: none"> <li>▪ Implementation of buffer zones; and;</li> <li>▪ Erosion management</li> </ul>	As required and throughout: <ul style="list-style-type: none"> <li>▪ Operational Phase</li> </ul>	<ul style="list-style-type: none"> <li>▪ Buffer zones; and</li> <li>▪ Spill Response Plan in accordance with:</li> <li>▪ NWA;</li> <li>▪ Best Practice Guidelines;</li> <li>▪ MPRDA.</li> </ul>

Activities	Potential Impacts	Aspects Affected	Mitigation Type	Time Period for Implementation	Compliance with Standards
	Contamination of groundwater and reduction in groundwater quantity	Groundwater	Prevent through: <ul style="list-style-type: none"> <li>Routine maintenance of drill rig</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Landowner agreement for water use.</li> </ul>	As required	<ul style="list-style-type: none"> <li>Spill Response Plan; and</li> <li>Vehicle Maintenance Plan in accordance with:                             <ul style="list-style-type: none"> <li>NWA;</li> <li>Best Practice Guidelines</li> </ul> </li> </ul>
<b>Decommissioning Phase</b>					
<b>Rehabilitation</b>	Restoration of indigenous vegetation and the potential encroachment of alien invasive vegetation	Fauna and Flora	Control through: <ul style="list-style-type: none"> <li>Alien invasive management plan.</li> </ul> Enhance through: <ul style="list-style-type: none"> <li>Indigenous vegetation establishment and monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>As required during:                             <ul style="list-style-type: none"> <li>Operational Phase and Decommissioning Phase.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>NEM:BA; and</li> <li>ECA.</li> </ul>
	Soil compaction and erosion	Soil	Void and control through: <ul style="list-style-type: none"> <li>Vegetation establishment;</li> <li>Restrict access.</li> </ul>	<ul style="list-style-type: none"> <li>As required</li> </ul>	<ul style="list-style-type: none"> <li>MPRDA Regulation 56 (1) to (8); soil pollution and erosion control;</li> <li>CARA.</li> </ul>
	Sedimentation and contamination of surface water resources and wetlands	Surface Water	Control : <ul style="list-style-type: none"> <li>Vegetation establishment</li> </ul> Manage through: <ul style="list-style-type: none"> <li>Prevent through rehabilitation of sumps.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing during:                             <ul style="list-style-type: none"> <li>Decommissioning Phase</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Buffer zones; and</li> <li>Spill Response Plan in accordance with:                             <ul style="list-style-type: none"> <li>NWA;</li> <li>Best Practice Guidelines;</li> <li>MPRDA.</li> </ul> </li> </ul>



## **8 Financial Provision**

### **8.1 Determination of the Amount of Financial Provision**

#### **8.1.1 Describe the Closure Objectives and the Extent to which they have been aligned to the Baseline Environment Described under the Regulation**

The closure objectives have been formulated for the Project. The closure objectives take in to account the baseline environment of the Project site. The closure objectives for the Project are as follows:

- Rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation;
- Rehabilitate all disturbed land to a condition that facilitates compliance with applicable environmental quality objectives, such as air and water quality objectives as an example;
- Reduce the visual impact of the prospecting sites through rehabilitation of all disturbed land and residue deposits;
- Develop a retrenchment programme in a timely manner;
- Keep authorities informed of the progress of the activities during the Decommissioning Phase;
- Submit monitoring results to the relevant authorities; and
- Maintain the required pollution control facilities and the condition of the rehabilitated land following closure.

#### **8.1.2 Confirm specifically that the Environmental Objectives in Relation to Closure have been consulted with Landowner and Interested and Affected Parties**

As part of the PPP, this Basic Assessment Report, along with the closure objectives, will be provided to I&APs for review and stakeholders will be able to provide comment.

#### **8.1.3 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 prospecting sites will be rehabilitated immediately following the commencement of the drilling activities. The rehabilitation process is summarised as follows:

- The drill rig and core will be removed from site;



- The sumps will be pumped empty and the oil and sludge disposed of at a registered disposal facility;
- The waste water will be removed from site and treated at a registered water treatment facility;
- All waste will be removed from site and disposed of accordingly;
- The sump liner will be removed and reused at another site, following the inspecting of the liner, or disposed of at a registered disposal facility;
- The sumps will be backfilled and levels;
- The site will be levelled and ripped to ensure there is no compaction;
- The topsoil will be spread over the site and the site vegetated with indigenous vegetation; and
- The site will be monitored for the success of the rehabilitation.

#### **8.1.4 Explain why it can be confirmed that the Rehabilitation Plan is Compatible with the Closure Objectives**

The rehabilitation plan has been compiled in support of the primary closure objective which is to rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation remediation of the impact land to a post-mining land use capable of supporting grazing activities.

#### **8.1.5 Calculate and State the Quantum of the Financial Provision required to manage and Rehabilitate the Environment in accordance with the Applicable Guideline**

The environmental closure liability for the Project was calculated according to the DMR's "Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine".

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. During this assessment, the 2012 Master Rates, as published by the DMR, were increased by an average inflation rate of 5.7% (Statistics SA, 2013). An average rate of inflation of 5.9% (Statistics SA, 2014<sup>9</sup>) was added to the 2013 Master Rates to reflect 2014 costs.

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<sup>9</sup> Inflation rate as released by Statistics South Africa (StatsSA): April 2014 (latest)





The DMR Guideline Document classifies a mine according to a number of factors which allows one to determine the appropriate weighting factors to be used during the quantum calculation. The following factors are considered:

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

Table 8-1 provides a summary of the estimate calculated for each component for the proposed Project.

**Table 8-1: Environmental Liability for the Project according to the DMR Methodology**

<b>Financial Revision Calculation - Rehabilitation</b>					
<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Cost</b>	
<b>1</b>	<u>Sump (4 m<sup>3</sup>)</u>				
	Topsoil	m <sup>3</sup>	6	R 59.80	R 358.80
	Fill Sump	Labour	1	R 168.00	R 168.00
<b>2</b>	<u>Drill Area (20 m by 20 m)</u>				
	Re-vegetate	ha	0.04	R 24 775.38	R 991.02
	Rip area <sup>10</sup>	m <sup>2</sup>	400	R 6.68	R 2 672.00
	Shape	ha	0.04	R 1 533.00	R 61.32
<b>3</b>	<u>Borehole</u>				
	Fill Borehole (100 m)	m <sup>3</sup>	7	R 19.11	R 133.77

<sup>10</sup> A mobilisation fee for the equipment hire will need to be included.

	Concrete	m <sup>3</sup>	0.7	R 30.28	R 21.19
4	<u>General Clean-up</u>	Labour	1	R 168.00	R 168.00
5	<u>Hydrocarbon clean-up</u>	m <sup>3</sup>	5	R 89.12	R 445.60
6	<u>Inspection</u>	Hours	1	R 870.00	R 870.00
7	<u>Audit</u>				
	Site Inspection	Hours	4	R 470.00	R 1 880.00
	Report Writing	Hours	4	R 470.00	R 1 880.00
				<b>Total</b>	<b>R 9 649.70</b>
	Grand Total (Total multiplied by 5 Boreholes)		4	<b>Grand Total</b>	<b>R 38 598.80</b>



### **8.1.6 Confirm that the Financial Provision will be Provided as Determined**

The applicant, RPM, confirms that the financial provision will be provided for as determined in Section 8.1.5, Part B.

## **9 Monitoring Compliance with and Performance Assessment against the Environmental Management Programme and Reporting thereon**

RPM will be responsible for the implementation of all of the monitoring of mitigation and management measures, as well as compliance with the EMP. The recommended monitoring for the identified impacts is detailed below. RPM will keep a record of all environmental monitoring taken on site. A summary of the environmental monitoring to be undertaken is included in Table 9-1.

### **9.1 Monitoring of Impact Management Actions**

#### **9.1.1 List of Identified Impacts Requiring Monitoring Programmes**

The identified impacts that require monitoring programmes includes the following:

- Site clearing and establishment:
  - Removal of vegetation; and
  - Soil erosion.
- Drilling:
  - Soil erosion;
  - Dust and noise;
  - Water generated; and
  - Groundwater levels and quality.
- Heritage landscape;
- Hydrocarbon spillages;
- Domestic waste; and
- Fires.

Wetlands, pans and dams will be avoided during the prospecting activities.



### **9.1.2 Roles and Responsibilities for the Execution of the Monitoring Programmes**

Supervisors must be appointed to monitor the potential impacts of the above mentioned activities and Project Managers will foresee that all of the management plans are implemented. Once the prospecting activities have been completed, RPM will appoint an independent environmental officer to conduct a site visit to audit the rehabilitation and a report will be compiled and submitted to the DMR.

### **9.2 Monitoring and Reporting Frequency**

Table 9-1 discusses the monitoring and reporting frequency.

### **9.3 Responsible Persons**

Table 9-1 sets out roles and responsibilities with respecting to the monitoring programme.

### **9.4 Time Period for Implementing Impact Management Actions**

Table 9-1 captures the time period for implementing impact management actions.

### **9.5 Mechanism for Monitoring Compliance**

Table 9-1 sets out the method of monitoring the implementation of the impact management actions, the frequency of monitoring the implementation of the impact management actions, an indication of the persons who will be responsible for the implementation of the impact management actions, the time periods within which the impact management actions must be implemented and the mechanism for monitoring compliance with the identified impact management actions.

**Table 9-1: Monitoring and Management of Environmental Impacts**

Activities	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
All activities throughout the Project life	Removal of vegetation	<ul style="list-style-type: none"> <li>Vegetation cleared from the prospecting drill site will be stored adjacent to the prospecting drill site and removed from the area should it not be adequate to use for rehabilitation. Only the necessary vegetation required for the establishment of the prospecting drill site will be cleared and indigenous trees will be avoided</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily
	Soil erosion	<ul style="list-style-type: none"> <li>All topsoil removed will be stored in a stockpile and protected from erosion for use during rehabilitation. Daily site inspection will be undertaken by the site manager to ensure that all soil erosion mitigation measures are in place and implemented</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Soil Specialist</li> </ul>	Daily
	Dust and Noise	<ul style="list-style-type: none"> <li>Soil stockpiles must be covered with a plastic liner during windy conditions. The drill must be maintained and serviced regularly and, if possible, a silencing system should be fitted. Drilling must only take place during daylight hours, which are to be communicated to directly affected persons</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily
	Water generated	<ul style="list-style-type: none"> <li>Water generated from the drilling must be captured and treated as waste water, since drill fluids will be present in the water</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily
	Access roads	<ul style="list-style-type: none"> <li>Machinery operators and drivers must be made aware of the possible safety hazards that they could pose</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily
	Heritage landscape	<ul style="list-style-type: none"> <li>A Watching Brief must be implemented during site establishment in the event that heritage resources are discovered. Identified heritage resources (historical structures, graves and Iron Age sites) must be avoided and a 50 m buffer implemented</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily during site establishment
	Use of hydrocarbons	<ul style="list-style-type: none"> <li>During drilling, a spill tray will be placed under the machinery to collect any hydrocarbon leaks and spillages. Should spillages occur, the soil must be cleared and treated utilising bioremediation techniques. Should the soil not be adequately treated on site, the soil must be removed from the prospecting drill site and disposed of at a waste handling facility</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> </ul>	Daily

Activities	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
	Ablution facilities	<ul style="list-style-type: none"> <li>▪ The contents of the chemical toilets must be emptied on a regular basis, at least weekly, to prevent spillages</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental Manager</li> </ul>	Weekly
	Domestic waste	<ul style="list-style-type: none"> <li>▪ Bins will be placed at each prospecting drill site to collect the domestic waste and will be disposed of at a registered waste handling facility. The waste in the rubbish bins will be removed as required by the contractor</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental Manager</li> </ul>	Weekly
	Rehabilitation	<ul style="list-style-type: none"> <li>▪ Review of rehabilitation after each prospecting activity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental Manager</li> </ul>	After the completion of each prospecting activity



## **10 Indicate the Frequency of the Submission of the Performance Assessment/ Environmental Audit Report**

A performance assessment report for the prospecting sites will be submitted to the DMR every 2 years.

## **11 Environmental Awareness Plan**

### **11.1 Manner in which the Applicant intends to Inform his or her Employees of any Environmental Risk which may result from their Work**

RPM has developed Environmental, Health and Safety Policies. The Environmental Policy will be communicated to all personnel, whether they are contractors or permanent staff, and the policy will be erected at each active prospecting drill site.

Employees will receive general environmental awareness training on specific items contained in this EMP, as well as on Best Possible Environmental Practices (BPEP).

#### **11.1.1 General Awareness Training**

#### **11.1.2 Specific Environmental Training**

Environmental Awareness Training will be undertaken to make employees and contractors aware of the following:

- The importance of conforming with the environmental policy and procedures and with the requirements of the EMP;
- The significant social and environmental impacts of their work activities and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The potential consequences of departure from specified operating procedures; and
- Possible archaeological finds action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

The guidelines for training are summarized below, which are in line with the ISO 14001:2004 guidelines with regards to training and awareness creation.




**Table 11-1: Training Guidelines**

Types of Training	Audience	Purpose
Raising awareness of the strategic importance of environmental management.	Senior management	To gain commitment and alignment to the organisation's environmental policy.
Raising general environmental awareness.	All employees	To gain commitment to the environmental policy and objectives and to instil a sense of individual responsibility.
Skill enhancement.	Employees with environmental responsibilities	To improve performance in specific tasks.
Compliance.	Employees whose actions can affect compliance	To ensure that regulatory and internal requirements for training are met.

The training programme will consist of the following elements:

- Identification of employee training needs;
- Development of a training plan to address defined needs;
- Verification of conformance of the training programme to regulatory or organisation requirements and standards;
- Training of target employee groups;
- Documentation of training received; and
- Evaluation of training received.

This training is undertaken on an annual basis for all personnel, together with the annual required induction programmes. The training material provided will be subject to annual review, based on issues such as incidents, accidents, new legislative requirements, modified processes and environmental and social aspects identified from time to time. This training is to be carried out and coordinated internally by RPM.

RPM will, therefore, develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

In addition, an Emergency Preparedness Plan will be communicated and trained to all site personnel during the induction process.

## 11.2 Manner in which Risks will be Dealt with to avoid Pollution or the Degradation of the Environment

An Emergency Response Plan has been developed and is the approach used by RPM to respond to risks that may pollute or degrade the environment during the operational phase.



## 12 Specific Information Required by the Competent Authority

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by National Environmental Management Act, 1998, Act 107 of 1998), as amended, (NEMA) which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually.

## 13 Undertaking

The EAP herewith confirms:-

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

<b>Signature of the Environmental Assessment Practitioner:</b>	Duncan Pettit
<b>Name of Company:</b>	Digby Wells Environmental
<b>Date:</b>	

Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ

APM3249



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## Appendix A: Plans

# Rustenburg Platinum Mines Regional Setting

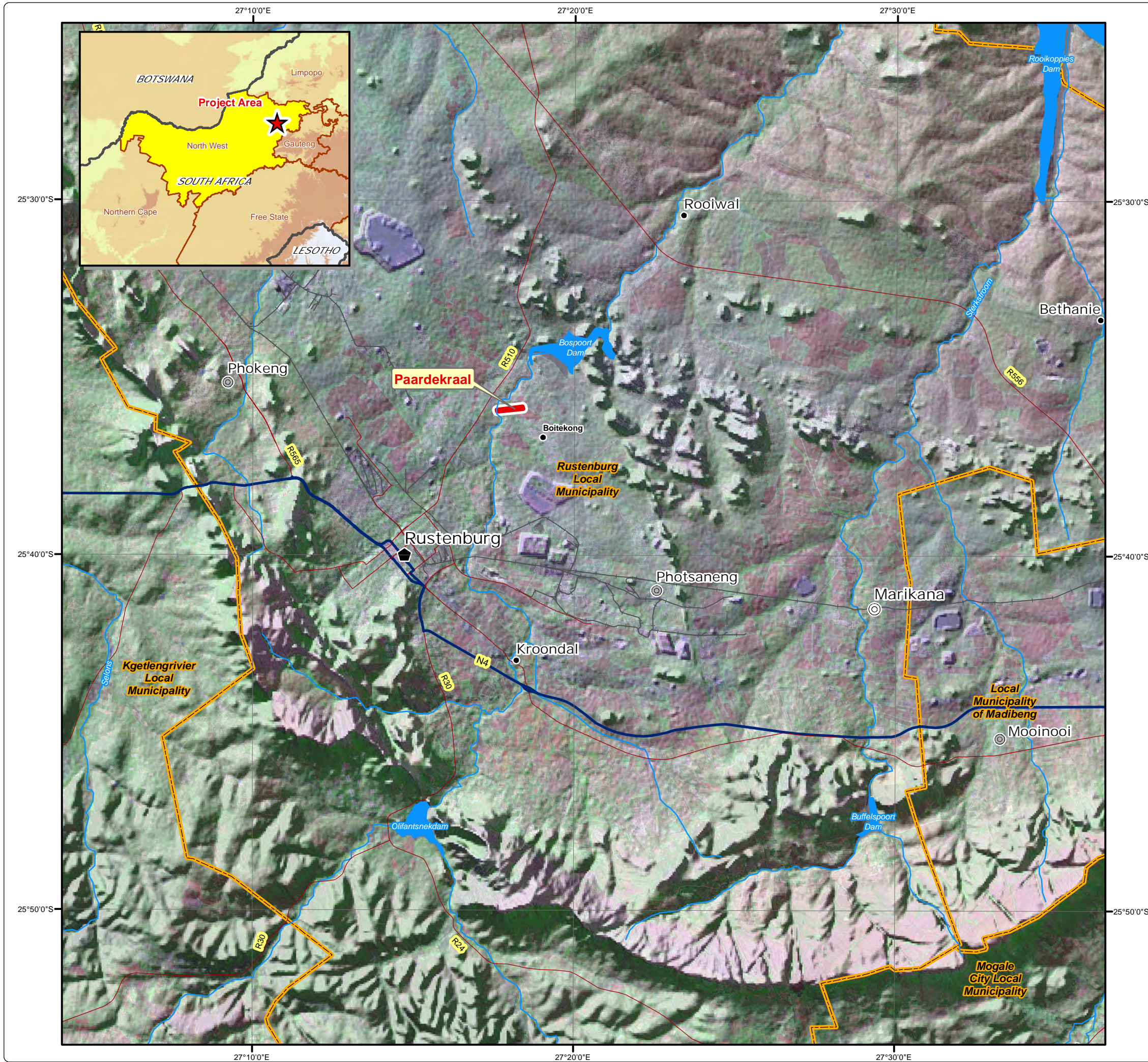
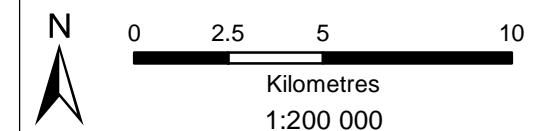
## Legend

- Paardekraal Project Area
- Major Town
- Secondary Town
- Other Town
- Settlement
- National Road
- Main Road
- Railway Line
- River
- Dam
- Local Municipal Boundary



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



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 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 12/06/2015






# Rustenburg Platinum Mines Land Type

## Legend

-  Paardekraal Project Area
  -  Settlement
  -  Power Line
  -  Main Road
  -  Railway Line
  -  Dam Wall
  -  Non-Perennial Stream
  -  Perennial Stream
  -  Dam / Lake
- ### Land Type
-  Bc8
  -  Ea3
  -  Ib116


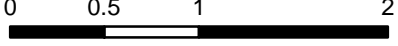




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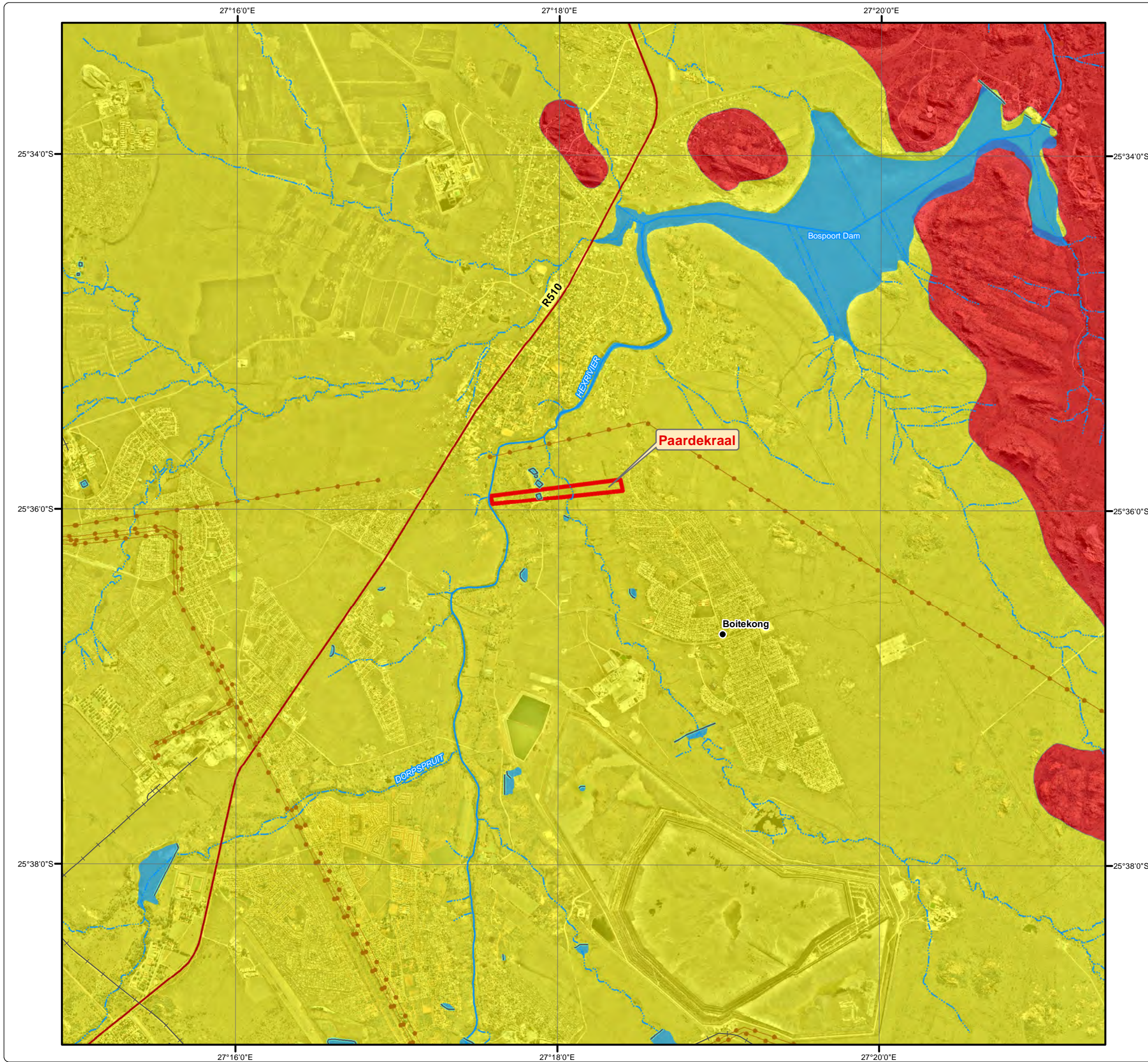
# Rustenburg Platinum Mines Land Capability


## Legend

-  Paardekraal Project Area
-  Settlement
-  Power Line
-  Main Road
-  Railway Line
-  Dam Wall
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake

## Land Capability

-  Class III: Moderate Cultivaton
-  Class VII: Light Grazing / Forestry


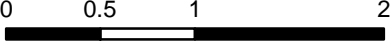




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# Rustenburg Platinum Mines

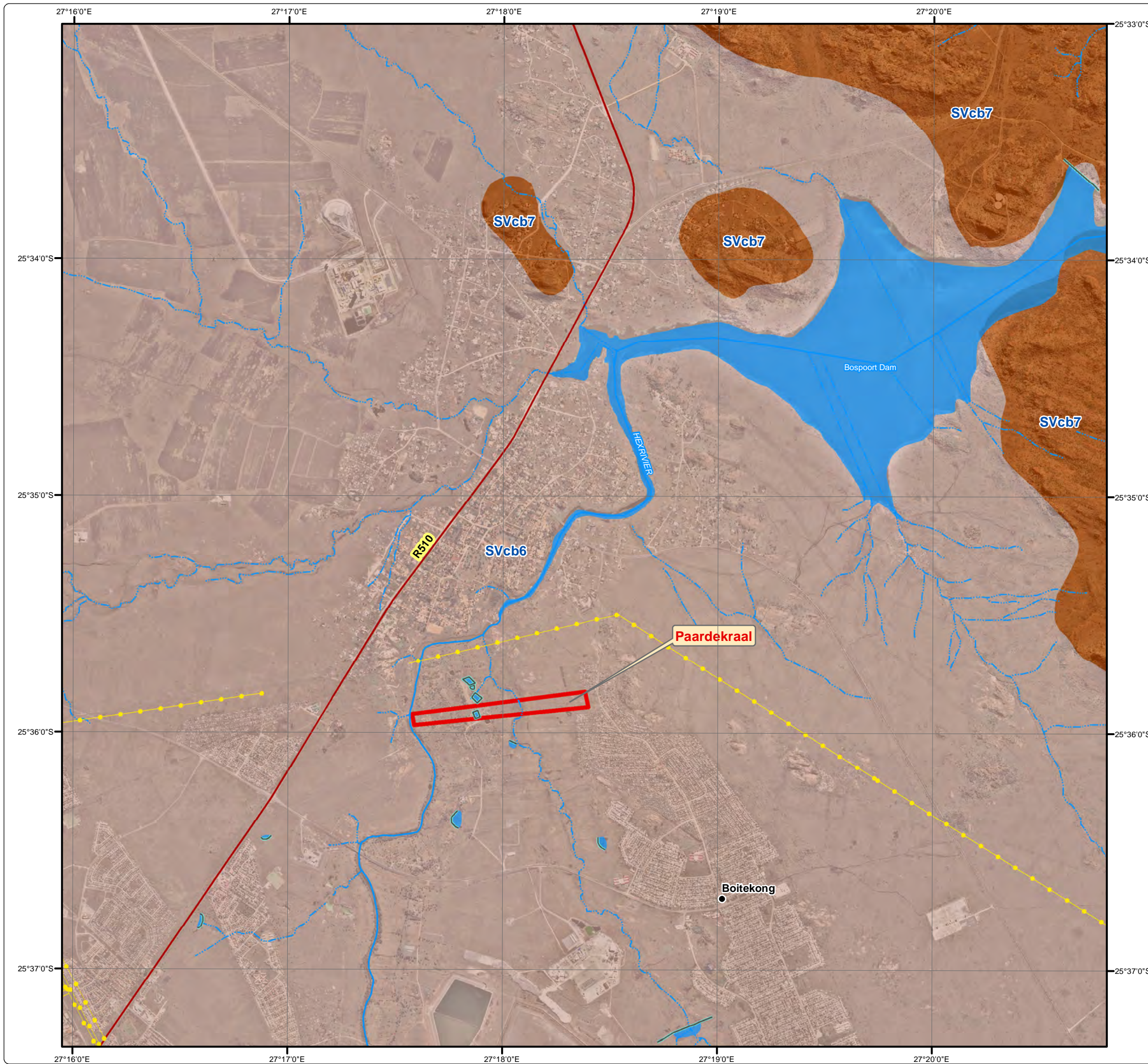
## Vegetation Types

### Legend

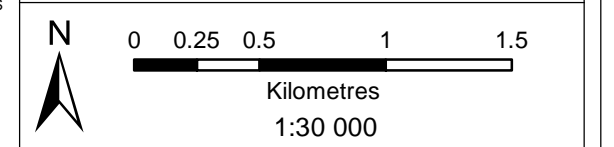
-  Paardekraal Project Area
-  Settlement
-  Power Line
-  Main Road
-  Dam Wall
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake

### Vegetation (Mucina & Rutherford, 2006)

-  SVcb 6 Marikana Thornveld
-  SVcb 7 Norite Koppies Bushveld



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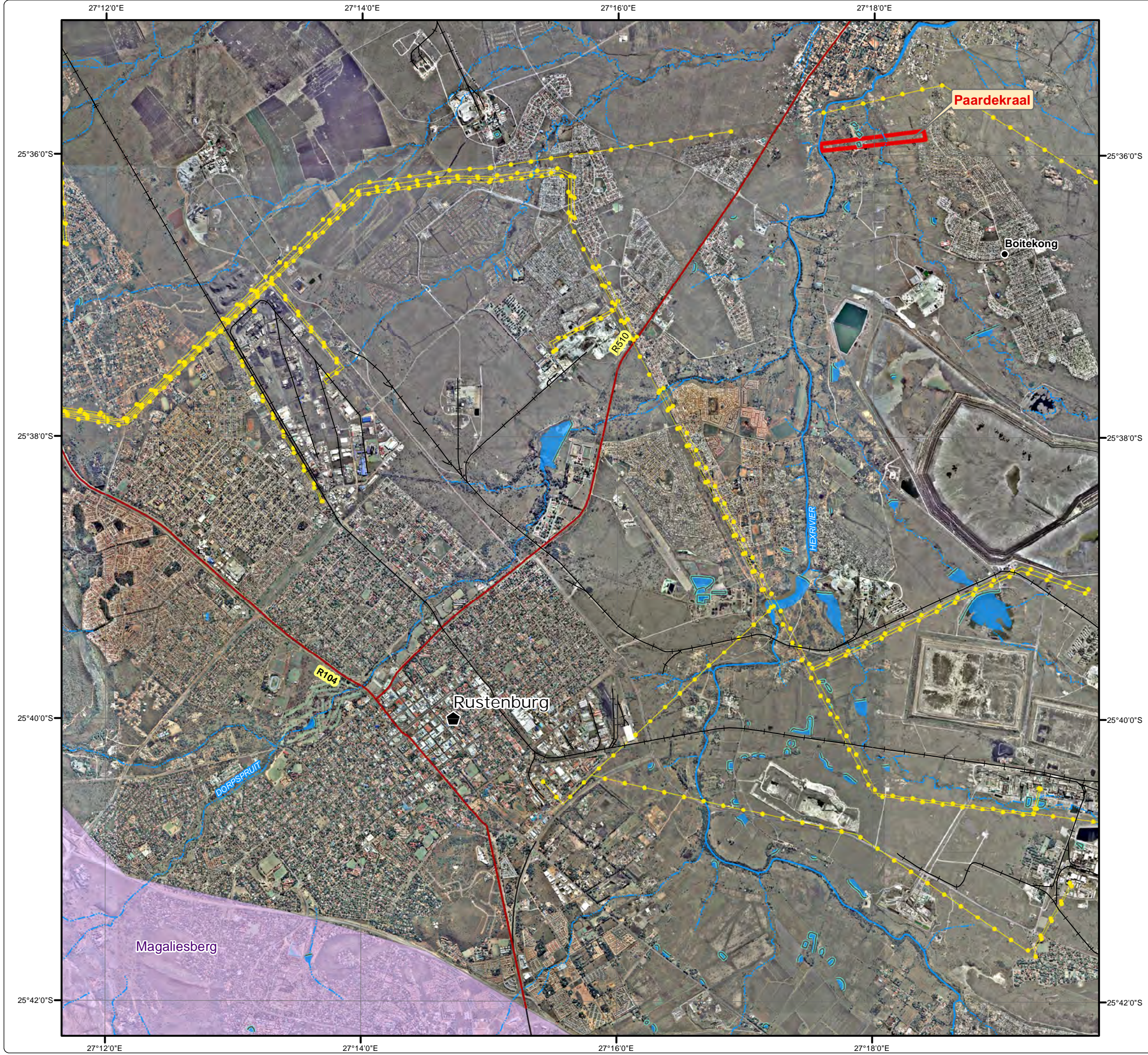


# Rustenburg Platinum Mines

## Important Bird Areas

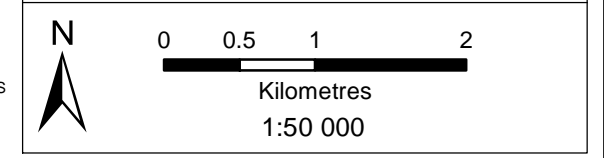
### Legend

- Paardekraal Project Area
- Major Town
- Settlement
- Power Line
- Main Road
- Minor Road
- Railway Line
- Dam Wall
- Non-Perennial Stream
- Perennial Stream
- Dam / Lake
- Important Bird Areas (Birdlife 2013)



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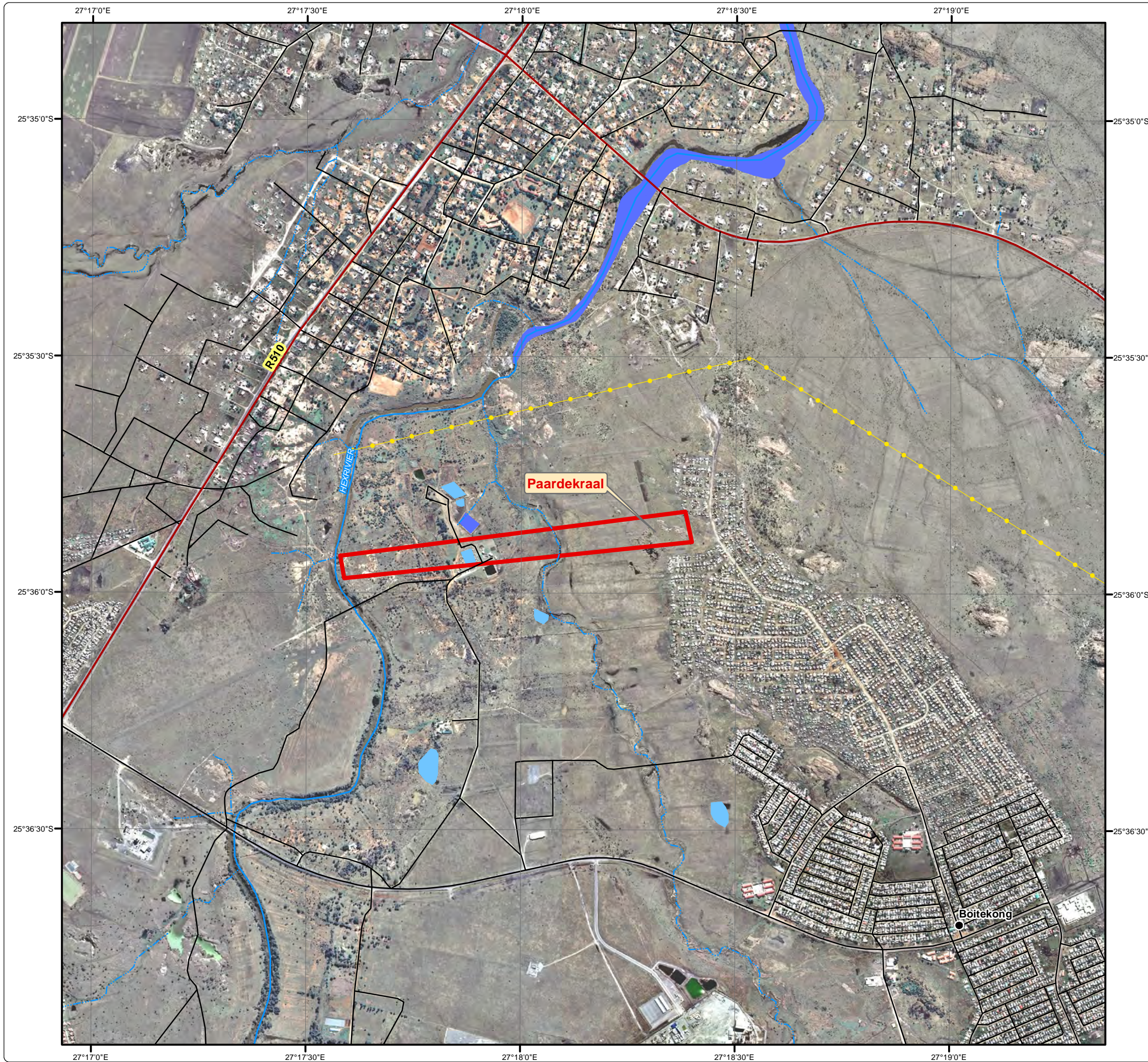



# Rustenburg Platinum Mines

## NFEPA Wetlands

### Legend

-  Paardekraal Project Area
  -  Settlement
  -  Power Line
  -  Main Road
  -  Minor Road
  -  Non-Perennial Stream
  -  Perennial Stream
- NFEPA Wetlands - Classification**
-  Valley floor:  
Channelled valley-bottom wetland,  
Rank 6
  -  Valley floor:  
Unchannelled valley-bottom wetland,  
Rank 6

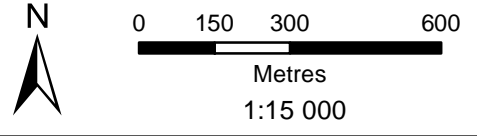




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# Rustenburg Platinum Mines

## Identified Heritage Resources

### Legend

-  Paardekraal Project Area
-  Other Town
-  Settlement
-  Main Road
-  Railway Line
-  Power Line
-  Dam Wall
-  Non-Perennial Stream
-  Perennial Stream
-  Dam / Lake

### Identified Heritage Resources

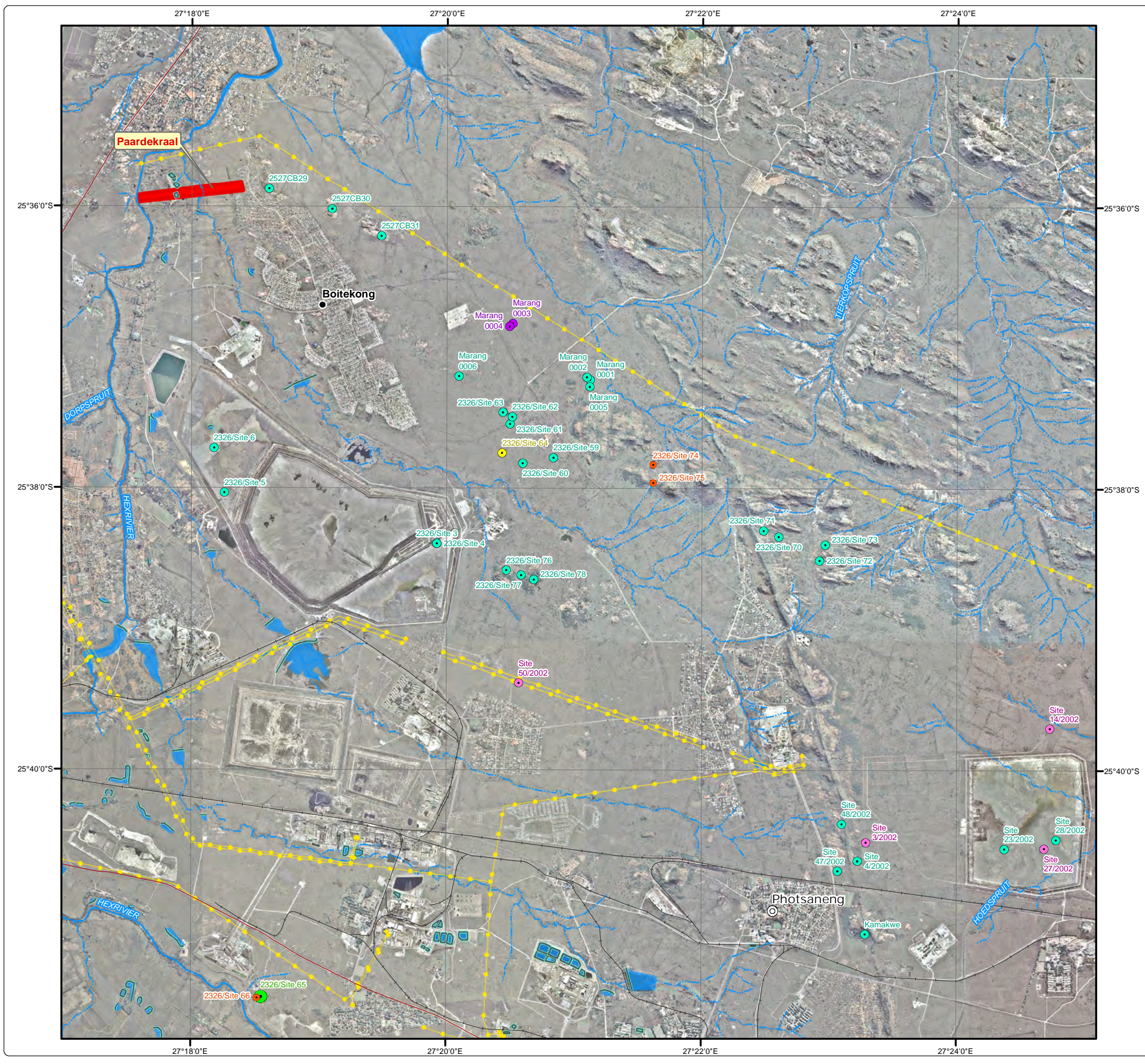
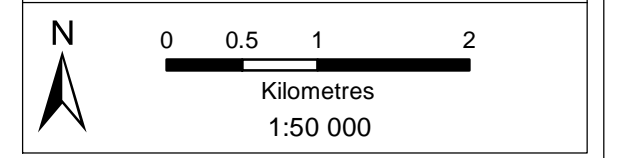
#### Time Period

-  ESA
-  MSA
-  LSA
-  LFC
-  Historic Tswana
-  Historic














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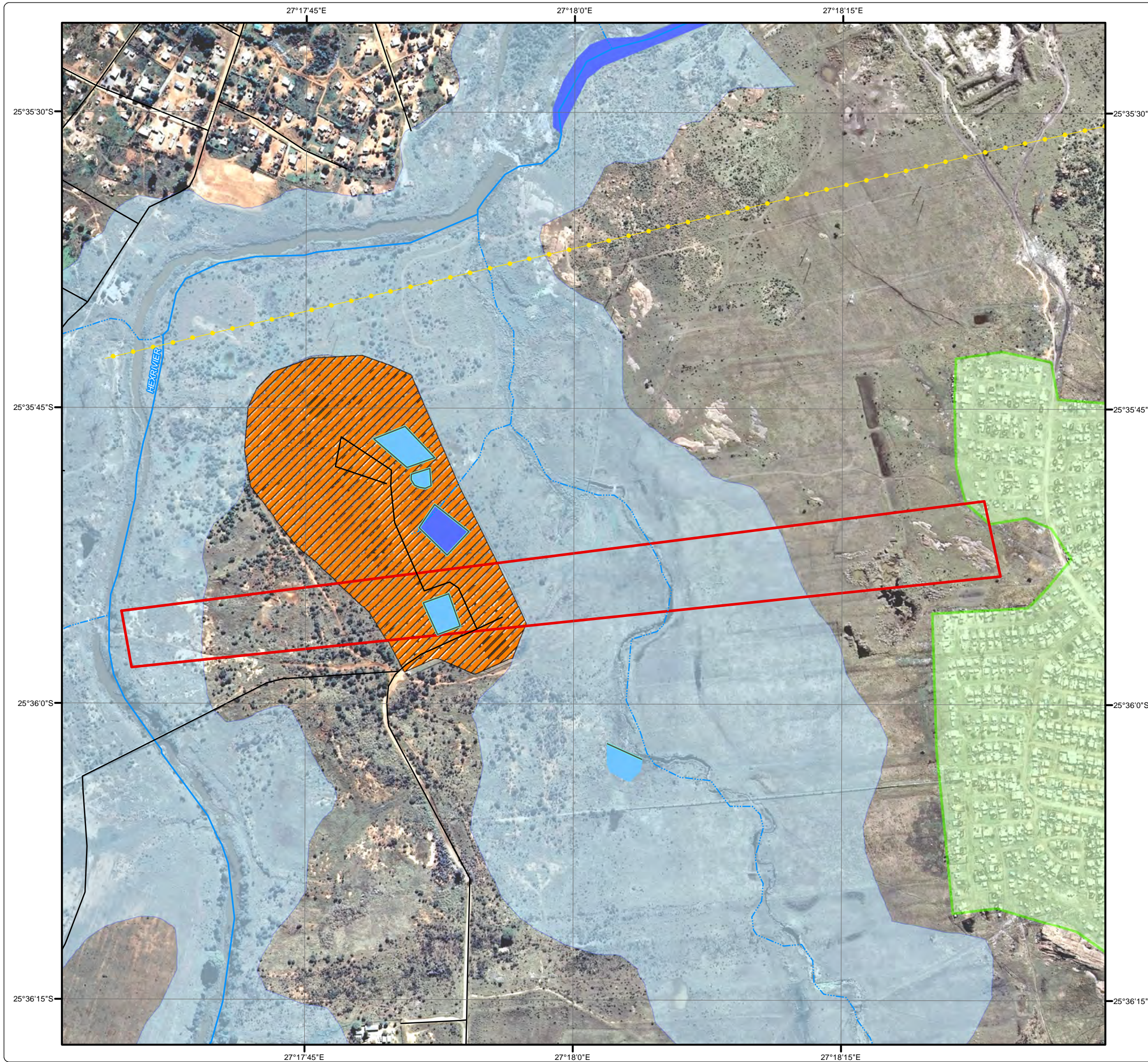
Projection: Transverse Mercator Ref #: jcf.APM3249.201506.120  
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Central Meridian: 27°E Date: 15/06/2015



# Rustenburg Platinum Mines Composite Map

## Legend

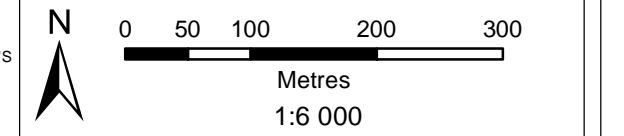
-  Paardekraal Project Area
  -  Power Line
  -  Minor Road
  -  Dam Wall
  -  Non-Perennial Stream
  -  Perennial Stream
  -  Residential Community
- NFEPA Wetlands - Classification**
-  Valley floor:  
Channelled valley-bottom wetland,  
Rank 6
  -  Valley floor:  
Unchannelled valley-bottom wetland,  
Rank 6
- Desktop Delineated Features**
-  Water Treatment Facility
  -  Possible Wetland



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• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator      Ref #: jcf.APM3249.201506.122  
 Datum: WGS 1984                              Revision Number: 1  
 Central Meridian: 27°E                        Date: 15/06/2015



Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ

APM3249



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## **Appendix B: Curriculum Vitae and Proof of Qualifications**



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## DUNCAN PETTIT

Mr. Duncan Pettit  
Environmental Consultant  
Environmental Legal Services  
Digby Wells Environmental

### 1 EDUCATION

2009 – 2012: BSc Environmental Management: Zoology Stream (UNISA)  
2007: Matriculated at St. David's Marist College

### 2 EMPLOYMENT

May 2013 – Present: Digby Wells Environmental as an Environmental Consultant

### 3 EXPERIENCE

Duncan is currently employed at Digby Wells Environmental as an Environmental Consultant. Duncan is part of the Environmental Legal Services Department and has undertaken positions of Project Administrator and Project Manager in numerous Projects. Duncan has been involved in projects that include Prospecting Rights Performance Assessments, the compilation of Environmental Management Plans (EMP) and Integrated Waste Management Licences (IWML).

Some of the Projects Include:

- Anglo American Platinum: Environmental Management Plan Performance Assessments;
- Anglo American Platinum: Prospecting Right EMP Reports;
- Anglo American Platinum: Public Participation Process for new Prospecting Right Applications, Mpumalanga Province;
- BHP Billiton Energy Coal South Africa Environmental Impact Assessment for the Klipspruit Extension: South Project;
- BHP Billiton Energy Coal South Africa Environmental Impact Assessment for the Klipspruit Extension: Weltevreden Project;
- Universal Coal: Roodekop Coal Mine Waste Licence Basic Assessment Report;
- Anglo American Thermal Coal: Scoping for an Integrated Waste Management Licence;
- Copper Sunset Sand: Section 102 Amendment for Mining Right expansion;





- Eskom Holdings (SOC) Limited Environmental Authorisation EIA Process for the management of decant at Kilbarchan Colliery, Newcastle;
- Randgold Resources EMP Audit for Kibali Gold Mine, Democratic Republic of Congo;
- Harmony Gold: Section 102 Amendment to storage facilities;
- Sable Platinum (Pty) Ltd: Prospecting Right EMP Report;
- ERGO Mining: EMP Consolidation;
- ERGO Mining: Reclaimed Dumps Mine Closure; Risk and Performance Assessment;
- Platreef Resources: Bulk Sampling Basic Assessment Report;
- Exxaro Grootegeluk Coal Mine: Water Use Licence and Integrated Water and Waste Management Plan;
- Exxaro Grootegeluk Coal Mine: Basic Assessment Report for Listed Activities associated with the railway expansion;
- Sasol Mining Basic Assessment Report and Integrated Water Use Licence for the Mooikraal to Sasolburg Operations Pipelines.

Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ

APM3249



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ENVIRONMENTAL

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## **Appendix C: Public Participation Process**

Project No: APM3249

Tuesday, 9 June 2015

Ms Keabitswe Mothupi  
Department of Rural Development and Land Reform  
Land Claims Commission (North West Province)  
North West Province

**BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE  
PROSPECTING OF PLATINUM GROUP METALS (PGM) AND ASSOCIATED MINERALS,  
NORTH WEST PROVINCE**

Dear Ms Mothupi

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has submitted an application for a Prospecting Right and Environmental Authorisation for Portions 53 of the farm Waterval 306 JQ and a Portion of Portion 170 (formerly the Remaining Extent of Portion 21) of the farm Paardekraal 279 JQ.

The Prospecting Right Application is for the prospecting for Platinum Group Metals (PGM) and associated minerals.

As part of the Basic Assessment for the proposed Prospecting Right Application, Digby Wells would like to enquire if there are any land claims on the following farms, as outlined in the table below:

<b>Farm Name and Number</b>	<b>Portion</b>	<b>Local Municipality</b>	<b>District Municipality</b>
<b>Directly Affected Landowners</b>			
Paardekraal 279 JQ	RE 170 (formerly the Remaining Extent of Portion 21)	Rustenburg Local Municipality	Bonajala District Municipality
Waterval 306 JQ	53	Rustenburg Local Municipality	Bonajala District Municipality
<b>Adjacent Landowners</b>			
Paardekraal 279 JQ	RE 70	Rustenburg Local Municipality	Bonajala District Municipality
Paardekraal 279 JQ	RE 71	Rustenburg Local Municipality	Bonajala District Municipality

<b>Farm Name and Number</b>	<b>Portion</b>	<b>Local Municipality</b>	<b>District Municipality</b>
Town and Townlands of Rustenburg 272 JQ	1	Rustenburg Local Municipality	Bonajala District Municipality
Waterval 306 JQ	2	Rustenburg Local Municipality	Bonajala District Municipality

Should you require additional information please do not hesitate to contact me.

Yours sincerely



**Vanessa Viljoen**

***Stakeholder Engagement Office***

**Digby Wells Environmental**

Tel: (011) 789 9495 or Fax: 086 583 5715

Email: [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com)

Postal Address: Private Bag X 10046, Randburg, 2125



OFFICE OF REGIONAL LAND CLAIMS COMMISSION: NORTH WEST PROVINCE  
UNIT 4, BATLHAPING STREET, MMABATHO, MAFIKENG / PRIVATE BAG X 08, MMABATHO 2735  
TEL +27 (0) 18 389 9600 / FAX +27 (0)18 389 9641

Reference: R/7/05/06/2015  
Enquiries: Mmakagisho Tlhasedi  
Tel: (018) 389 – 9605

**By E-Mail:** [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com)

Dear Vanessa Viljoen

**POSSIBLE LAND CLAIM:** R/E 170 (formerly the remaining extent of portion 21)  
of the farm Paardekraal 279 JQ.  
:Portion 53 of the farm Waterval 306 JQ.  
:R/E of portion 70 of the farm Paardekraal 279 JQ  
:R/E of portion 71 of the farm Paardekraal 279 JQ.  
:Portion 1 of Town and Townlands 272 JQ.  
:Portion 2 of the farm Waterval 306 JQ.

I acknowledge receipt of your letter dated the 09<sup>th</sup> June 2015 regarding the above mentioned matter.

Kindly note that a formal response could be expected from our office within the next 10(ten) working days.

Should you however required any additional information, you can contact **Ms K.W Mothupi, Ms AK Montwedi or Ms MI Tlhasedi** at the above mentioned contact details.

Yours faithfully

  
 **MR L.J BOGATSU**  
**CHIEF DIRECTOR: RESTITUTION SUPPORT**  
**NORTH WEST PROVINCE**  
**DEPARTMENT OF RURAL DEVELOPMENT AND LAND REFORM**  
**DATE: 23/06/2015**

Category	Company	Mr/Ms	First Name	Last Name	Position
Public Places	Rustenburg Local Municipality Public Library	Mr	Tshepo	Suze	
Public Places	Bonajala District Municipality Public Library	Mr	Abel	Khauoe	
Business and Commerce	Transnet	Mr	Phillip	De Klerk	
Business and Commerce	Eskom -North West	Ms	Katlego	Mlambo	Environmental Officer

#### Waterval

Waterval 306 JQ 2 Landowner Indirectly Affected	Rustenburg Platinum Mines Ltd	Ms	Madeleine	Bornman	Environmental Officer
Waterval 306 JQ 2 Landowner Indirectly Affected	Rustenburg Platinum Mines Ltd	Mr	Vinesh	Dilsook	Environmental Manager: Rustenburg Section and Water & Waste Specialist
Waterval 306 JQ 53 Landowner Directly Affected	Private	Mr	John	Micheaelis	Landowner
Town and Townlands of Rustenburg 272 JQ 1 Indirectly Affected	Rustenburg Local Municipality	Mr	B	Khenisa	Municipal Manager

#### Paardekraal

Paardekraal 279 JQ RE 170 Landowner Directly Affected	Rustenburg Local Municipality	Mr	B	Khenisa	Municipal Manager
Paardekraal 279 JQ Portion RE 70 Indirectly Affected	Rustenburg Local Municipality	Mr	B	Khenisa	Municipal Manager
Paardekraal 279 JQ Portion RE 71 Indirectly Affected	Rustenburg Local Municipality	Mr	B	Khenisa	Municipal Manager

#### Authorities

Authority	Department of Mineral Resources	Mr	John	Segobaetso	Technical Administration Officer
Authority	Department of Mineral Resources: North West Region	Ms	Lorraine	Nobela	Assistant Director: Environment
Authority	Department of Rural Development and Land Reform	Ms	Mmakagisho	Tlhasedi	Land Claims Commission
Authority	Department of Agricultural and Rural Development	Mr	Thebe	Mothosi	Director of AgriBusiness
Authority	Department of Water and Sanitation (DWS)	Ms	Lethabo	Ramashala	

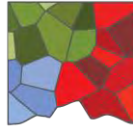
Authority	Department of Environmental Affairs (DEA)	Mr	Lucas	Mahlangu	Control Environmental Officer
Authority	Department of Rural ,Environment and Agriculture Development	Dr	Poncho	Mokaila	Head of Department
Authority	Bonajala District - Department of Agricultural and Rural Development	Mr	Daniel	Masina	Project Coordinator
Authority	Bonajala District - Department of Agricultural and Rural Development	Mr	Hugh	Zackey	District Manager
Authority	North West Province Department of Public Works	Mr	K A	Sitase	
Authority	North West Province Department of Public Works	Mr	JHP	Van Wyk	
Authority	North West Province Department of Public Works	Mr	L	Mafune	Chief Director for Roads
Authority	Department of Environmental Affairs (DEA)	Ms	Zingisa	Phohlo	Deputy Director
Authority	Department of Water and Sanitation (DWS) North West	Mr	C	Lobakeng	Chief Director
Authority	Department Culture, Arts and Traditional Affairs	Ms	Ogang	Mosiane	Head of Department
Authority	Department Culture, Arts and Traditional Affairs	Mr	Themba	Matakane	
Authority	South African Heritage Resources Agency (SAHRA)	Mr	Godfrey	Tshivhalavhala	Heritage Officer

#### Local Municipality

Local Authority	Rustenburg Local Municipality	Clr		Mohlasedi	
Local Authority	Rustenburg Local Municipality	Mr	Ipeleng	Senne	Secretary to Director
Local Authority	Rustenburg Local Municipality	Ms	Ronnette	Barnard	Senior Town Planner
Local Authority	Rustenburg Local Municipality	Mr	Nkonono	Mantswe	LED Manager
Local Authority	Rustenburg Local Municipality	Mr	B	Khenisa	Municipal Manager
Local Authority	Rustenburg Local Municipality	Ms	Lilian	Sefike	Environmental Manager
Local Authority	Rustenburg Local Municipality	Ms	Maria	Mokgosi	Mayor
Local Authority	Rustenburg Local Municipality	Ms	Gloria	Moopelwa	IDP Manager
District Authority	Bojanala District Municipality	Mr	Nozi	Masekwane	Environmental Manager

Environmental NGO	Birdlife Africa	Mr	Simon	Gear	Policy & Advocacy Manager
Environmental NGO	Wildlife and Environment Society of South Africa	Mr	Rudzani	Nemukula	Environmental Officer
Environmental NGO	EWT	Ms	D	Harriet	Conversation Manager
Agricultural Union	Agri SA	Mr		Du Toit	CEO





# DIGBY WELLS

## ENVIRONMENTAL

Thursday, 11 June 2015

Project No: APM3249

### **BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE PROSPECTING OF PLATINUM GROUP METALS (PGMs) AND ASSOCIATED MINERALS, NORTH WEST PROVINCE**

*Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR*

Dear Stakeholder,

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has submitted an application for a Prospecting Right and Environmental Authorisation for Portions 53 of the farm Waterval 306 JQ and a Portion of Portion 170 (formerly the Remaining Extent of Portion 21) of the farm Paardekraal 279 JQ.

The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGMs) and associated minerals, including: Palladium (Pd), Rhodium (Rh), Iridium (Ir), Osmium (Os), Platinum (Pt), Gold (Au), Copper (Cu), Nickel (Ni), Cobalt (Co), Silver (Ag) and Chromium (Cr).

## **1 PROJECT DESCRIPTION**

### **1.1 Project Locality**

The proposed Prospecting Right areas are found on the following farms: Portion 53 of the Farm Waterval 306 JQ which is approximately 1.5 km east of Rustenburg and a Portion of Portion 170 (formerly the Remaining Extent of Portion 21) of the Farm Paardekraal 279 JQ which is approximately 7.5 km north east of Rustenburg. Both farms are situated within in the Rustenburg Local Municipality (refer to Plan 1).

### **1.2 Prospecting Operations**











Prospecting activities will include invasive and non-invasive methods.

Non-invasive methods include:


- A ground magnetic survey;
- Datasets supplied by the Council of Geoscience;
- Remote sensing methods such as satellite and aerial imagery;
- Airborne geophysical surveys and
- Field reconnaissance of the area.

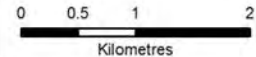


**Rustenburg Platinum Mines: Locality Map**


Legend					
	Paardekraal Project Area		Power Line		Non-Perennial Stream
	Waterval Project Area		Main Road		Perennial Stream
	Major Town		Railway Line		Dam / Lake
	Settlement				

Projection: Transverse Mercator  
 Central Meridian: 27°E  
 Datum: WGS 1984  
 Date: 08/06/2015  
 Ref #: jcf.APM3249.201506.021





0 0.5 1 2  
Kilometres



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 ENVIRONMENTAL

www.digbywells.com

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These non-invasive methods aid in the determination of the potential extent of the ore body and identification of areas to be drilled. These methods will have no impact on the receiving environment.

Invasive methods will include diamond core drilling to ascertain the rock layers (strata) and layering (stratification) sequence and reef horizons of the ore body. The core drilling will utilise a small diameter drill of 36.4mm. It is anticipated that a maximum of one borehole will be drilled per year over the course of five years. An Environmental Management Plan (EMP) including a rehabilitation plan will be developed to manage the environmental impacts associated with the drilling activities.

### 1.3 Prospecting Infrastructure and Activities

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the drilling operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The prospecting sites will be an area of approximately 10 m by 10 m. Cleared topsoil will be stockpiled on site to a maximum height of 1 m. Once drilling is complete the sites including the sumps, access roads/tracks and prospecting site will be rehabilitated in line with the EMP which will be developed.

## 2 Regulatory Requirements

Before the proposed prospecting can commence a Basic Assessment (BA) will be undertaken for the environmental authorisation of listed activities triggered in terms of Listing Notices (GNR 983 or GNR 985) and in accordance with the Environmental Impact Assessment (EIA) Regulations, 2014, promulgated in terms of National Environmental Management Act, 1998; (Act No. 107 of 1998) (NEMA). The Department of Mineral Resources, North West Region will be the competent authority. RPM has appointed Digby Wells Environmental (Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to undertake the BA and associated specialist input for the Prospecting Right Application.

## 3 Public Participation Process

A Public Participation Process (PPP) has been initiated as a legislated requirement for this project with the purpose of sharing project information and gathering comments from stakeholders. Stakeholders are hereby invited to register as Interested and Affected Parties (I&APs) and to submit comments about the proposed project.

Important upcoming milestones in the BA process: include

- **Project announcement:** This Background Information Letter (BIL), with Registration and Comment Sheet, has been provided to announce the project and provide information about the project.

- **Comment on the Basic Assessment Report (BAR):** The BAR will be available for public comment for 30 days from **Wednesday, 17 June to Thursday, 16 July 2015** on the Digby Wells website and at Public Libraries indicated in the table below.

Venue	Address	Contact Person	Contact Number
Rustenburg Local Municipality Public Library	Cnr of Thabo Mbeki and Heystek Street, Rustenburg	Tshepo Suze	(014) 590 3294
Bonajala District Municipality Public Library	Cnr Dewet Jan Smuts and Kgetleng River Street, Rustenburg	Abel Khauoe	(014) 543 2004
The reports will also be available on the Digby Wells website: <a href="http://www.digbywells.com">www.digbywells.com</a> under Public Documents or Phone and request a CD copy at (011) 789 9495			

The Final BAR will include a Comment and Response report (CRR) and specialist findings and will be submitted to the DMR once the BAR has been finalised.

### 3.1 How to comment on the BIL and BA Report

Stakeholders are invited to provide comments on this BIL or Draft BAR by addressing comments, concerns or suggestions to Digby Wells through any one of the communication media below:

- Completing the Registration and Comment Form and submitting it to the Stakeholder Engagement Office;
- Writing a letter, email, or fax or
- By telephone call to the Stakeholder Engagement Office.

Should you wish to be registered as an I&AP, obtain additional information or comment on the proposed prospecting right application, please contact Vanessa Viljoen at Tel: (011) 789 9495, Fax: 086 583 5715, Post: Private Bag X10046, Randburg, 2125 or email: [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com).

Regards,



**Vanessa Viljoen**

**Stakeholder Engagement Office**

*Enclosed*

- Registration and Comment Form



**BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE PROSPECTING OF PLATINUM GROUP METALS (PGM) AND ASSOCIATED MINERALS, NORTH WEST PROVINCE**

Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR

**REGISTRATION AND COMMENT FORM**

**June 2015**

Registered Interested and Affected Parties (I&APs) will be informed about availability of reports via their preferred means of communication (SMS, email, post or fax). Comments raised by I&APs will assist in informed decision-making for authorities and provides information to be considered by the project. Please register as an I&AP and provide comments by sending this Registration and Comment Form or other written correspondence to the contact details provided below:

**Vanessa Viljoen** of Digby Wells Environmental: **Fax:** 0865835715 or **Email:** [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com), or visit [www.digbywells.com](http://www.digbywells.com) **Postal Address:** Private Bag X10046, Randburg, 2125

Please formally register me as an Interested and Affected Party (I&AP)	Yes		No	
I would like to receive my notifications by	Email	SMS	Post	Fax

**Please fill in your contact details below for the project database**

Title, Full Name				
Designation				
Cellphone	Fax	Tel		
Email				
Postal Address				

**Please indicate to which you are associated with by providing a name next to the applicable category**

Non-Government Organisation	
Business	
Community	
Government Department	
Municipality	

**If you are a landowner or land occupier, please indicate which farm(s) and portion(s) you reside on**

Landowner	
Land occupier	

How do you think the project might impact (affect) you?

How do you think the project might impact (affect) your socio-economic conditions? (e.g. livelihoods, farm, business, household)

How can these impacts be managed, avoided and / or fixed?
What is the land being used for?
Where are these land uses taking place?
Are there any environmental features which we need to be aware of? (e.g. water, heritage sites, rare plants or animals)
Where are these found?
Do you think the project could impact (affect) infrastructure you might have? (e.g. houses, buildings, roads)
If so how can these impacts (affects) be managed, avoided or fixed?

**General Comments**


If there are any other stakeholders we should include onto the stakeholder database for the proposed project, please provide their contact details.

Title, Full Name		Title, Full Name	
Organisation		Organisation	
Cellphone		Cellphone	
Email		Email	

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_

# Union hands memorandum to Three Star

RUSTENBURG HERALD – RUSTENBURG – On Friday, 12 June, members of the South African Commercial, Catering and Allied Workers Union (SACCAWU), an alleged affiliate of the Congress of South African Trade Unions (COSATU), marched from the Rustenburg Police Station to Three Star Cash & Carry to hand over a memorandum.

The march, the Rustenburg Herald was told, started at approximately 15:30 on Friday and is connected to the SACCAWU strike at Three Star Cash & Carry which started on 1 June.

remains firm in its stance and wants to continue being consistent regarding fair labour practices.

The memorandum was regarding a wage agreement with agreed items which Three Star's management describe as mutually beneficial, significantly higher and more favourable than the industry norm. However, on Friday, staff and customers of Three Star were blocked from exiting the store via the main gate by striking workers.

The Rustenburg Herald was later told that police presence during this time was limited and after five hours the Tactical Response Team of the Rustenburg Police eventually arrived at the scene to open the gate, allowing those stuck inside to leave the premises at approximately 20:30.

"We as Three Star Cash & Carry would like for this strike to end peacefully and amicably. We apologize for any inconvenience caused to customers during this period," Three Star Cash & Carry Managing Director José De Gouveia told the Rustenburg Herald following Friday's incident.

Three Star Cash & Carry, the Rustenburg Herald was told, remains open for business and the safety of its customers and its staff, is of utmost importance. The company

## Amplats lights up classrooms with fuel cells

RUSTENBURG HEALD – RUSTENBURG – Anglo American Platinum (Amplats) announced on Friday, 12 June, that through the power of platinum-based fuel cells, and in collaboration with the Department of Science and Technology (DST), it is helping to bring power to three classrooms.

The power generated by these fuel cells is used as back-up power and at certain times, primary power for the Information Communications and Technology equipment as well as charging of electronic devices at the Arthur Mfebe Senior Secondary School, St Marks and Mvuzo Junior

This project is part of the energy working group of the Technology for Rural Education and Development (TECH4RED) that the DST is piloting in the Nciba Circuit in Cofimvaba as a research initiative to assess how technology can contribute to the improvement of education in the area.

Speaking at the launch in the Eastern Cape, the Minister of Science and Technology, Naledi Pandor, noted that the Cofimvaba initiative demonstrated

that collaboration between the public and private sectors was essential to improving living conditions in society.

"The knowledge and experience gained from the Cofimvaba pilot project and others taking place throughout the country will not only promote awareness of the technology, but will assist in creating a market for technologies that are being developed through the Hydrogen South Africa (HySA) Programme," said Minister Pandor.

Andrew Hinkly, Amplats' Executive Head of Marketing said, "The Cofimvaba initiative demonstrates that collaboration between the public and private sectors is essential in improving living conditions in society and the lives of South Africans."

The fuel cell project started in 2014 and will run for three years.

## ANC small talk wants to fool voters

RUSTENBURG HERALD – RUSTENBURG – The Democratic Alliance on Wednesday, 10 June, accused the ANC in the North West of once again proving to be "a party of hypocrites" which is "clearly in election mode".

According to DA Provincial Legislature Leader in the North West, Chris Hattingh, Dakota Legoete, ANC Provincial Secretary told the media that officials who defaulted according to the latest Auditor-General Consolidated Report on North West Municipalities will be fired.

"It is clear the ANC is yet again making political small talk and trying to fool taxpayers for the sudden assertiveness towards mismanagement and inappropriate use of money – this is a clear indication that the ANC is in election mode and will once again step up the misleading of voters in preparation for

the 2016 Local Government Elections."

The DA in North West has called upon the leadership of the current government to intervene and stop redeployment and take a strong stand against mismanagement, fraud, corruption and wasteful expenditure.

"The DA is even more amused that Legoete, who was suspended as Municipal Manager of the Tswaing municipality – only to be redeployed to Potchefstroom – was one of the worst performing municipal managers – is sending out these threats to his cadres."

## Department makes progress in medicine supply

RUSTENBURG HERALD – RUSTENBURG – The Department of Health says it is busy addressing problems affecting the supply of various medicines to both the private and public sectors.

On Wednesday, 10 June, department spokesperson Joe Maila said the supply of about 80 medicines had been resolved as the suppliers had already started delivering the medicines. The country was facing a limited supply of various medicines because of a global shortage of active pharmaceutical ingredients (APIs).

Maila said all outstanding orders in the group of 51 medicines would be supplied within the next three to four weeks.

"In the interim, alternative therapeutic medicines will have to be prescribed," Maila said.

Antiretroviral medicines were not affected by manufacturer supply problems.

The Medicines Control Council (MCC) Registrar Joey Gouws said the MCC has resolved to allow for the sourcing of APIs from alternative manufacturing sites that have been pre-qualified by the World Health Organization (WHO).

"This will allow for expedited availability of some medicines, once an application for an API variation has been submitted, as MCC will use the WHO information to facilitate

approval to ensure that any medicine that is in short supply is accessed," Gouws said.

He said the MCC has a list of APIs that are pre-qualified by the WHO.

The MCC is a statutory health council responsible for the appropriate regulation of medicines, scheduled substances and medical devices, on the basis of efficacy, safety and quality. (sanews.gov.za)

BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE PROSPECTING OF PLATINUM GROUP METALS (PGM) AND ASSOCIATED MINERALS, NEAR RUSTENBURG, NORTH WEST PROVINCE

Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has submitted an application for a Prospecting Right and Environmental Authorisation for prospecting activities on Portions 53 of the farm Waterval 306 JQ and a Portion of Portion 170 (formerly the Remaining Extent of Portion 21) of the farm Paardekraal 279 JQ. The Prospecting Right Application is for the prospecting of PGMs and associated minerals.

#### Project Description

Prospecting activities will include invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey, review of datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance. These non-invasive methods will have no impact on the receiving environment.

Invasive methods will include diamond core drilling. No permanent infrastructure will be constructed as part of the drilling activities. It is anticipated that a maximum of one borehole will be drilled per year over a 5 year period. An Environmental Management Plan (EMP) will be developed to manage the environmental impacts associated with the drilling activities and will include a rehabilitation plan.

#### Regulatory Requirements

A Basic Assessment (BA) is required for the consideration of a Prospecting Right Application and will be undertaken for the environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations, 2014, promulgated in terms of National Environmental Management Act, 1998; (Act No. 107 of 1998) (NEMA). The Department of Mineral Resources, North West Region will be the competent authority. RPM has appointed Digby Wells Environmental (Digby Wells) as the independent Environmental Assessment Practitioner (EAP) to undertake the BA and associated specialist inputs for the Prospecting Right Application.

#### How to comment

You are encouraged to comment on the proposed project and Basic Assessment Report, which will be available for comment from Wednesday, 17 June to Thursday, 16 July 2015 at the following venues:

Venue	Address	Contact Person	Contact Number
Rustenburg Local Municipality Public Library	Cnr of Thabo Mbeki and Heystek Street, Rustenburg	Tshepo Suze	(014) 590 3294
Bonajala District Municipality Public Library	Cnr Dewet Jan Smuts and Kgetleng River Street, Rustenburg	Abel Khauoe	(014) 543 2004

The reports will also be available on the following website: [www.digbywells.com](http://www.digbywells.com) under Public Documents. Phone and request a CD copy at (011) 789 9495.

Please address your comments to:

**Digby Wells Environmental**

Vanessa Viljoen or Qondile Monareng

Tel: (011) 789 9495 Fax: 086 583 5715

Email: [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com) or

[qondile.monareng@digbywells.com](mailto:qondile.monareng@digbywells.com)

Postal address: Private Bag X10046, Randburg, 2125



Project Number: APM3249

# HOU JOU GELD !

## BO EN BEHALWE JOU VOLLE POLISWAARDE, BIED AVBOB JOU:

- 'n GRATIS basiese begrafnis of verassing\*
- GRATIS vervoer van die oorledene in Suid Afrika\*

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Hierdie GRATIS begrafnisvoordele\* is *bo en behalwe* jou poliswaarde en spesiale bonusse wat verklaar is.

Praat met Wilhelm, jou plaaslike verteenwoordiger in verband met al jou begrafnisversekering en begrafnisbehoefes:

Rustenburg-tak

Wilhelm Craukamp

Nelson Mandela-straat 59, Rustenburg

Tel: (014) 592 8293

\*Bepalings en voorwaardes geld. AVBOB is 'n gemagtigde verskaffer van Finansiële Dienste. \*Begrafnisvoordele is slegs van toepassing indien AVBOB Begrafnisdiens die begrafnis onderneem. AVBOB is 'n vlak 2 SEB bydraer. VFD 20656.

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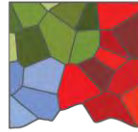
LID VAN DIE NASIONALE BEGRAFNIS DIREKTEURE ASSOSIASIE

'N LID VAN DIE VERENIGING VIR SPAAR EN BELEGGING IN SUID-AFRIKA



Ons is hier vir jou

Sedert 1918



# DIGBY WELLS ENVIRONMENTAL

## BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE PROSPECTING OF PLATINUM GROUP METALS (PGM) AND ASSOCIATED MINERALS, NORTH WEST PROVINCE





Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR


### SITE NOTICES

#### SITE NOTICES PLACED AT THE FOLLOWING VENUES/PUBLIC PLACES:

Where site notice was placed (Organisation and/or address)	Coordinates	Date	Photo
<b>Bojanalo District Municipality</b>  1 x Basic Assessment Report	001 (Map)  25.63720" S 027.24099" E	17 <sup>th</sup> June 2015	
<b>Rustenburg Local Municipality Public Library</b>  1 x Basic Assessment Report	002 (Map)  25.66990 "S 027.23734 " E	17 <sup>th</sup> June 2015	



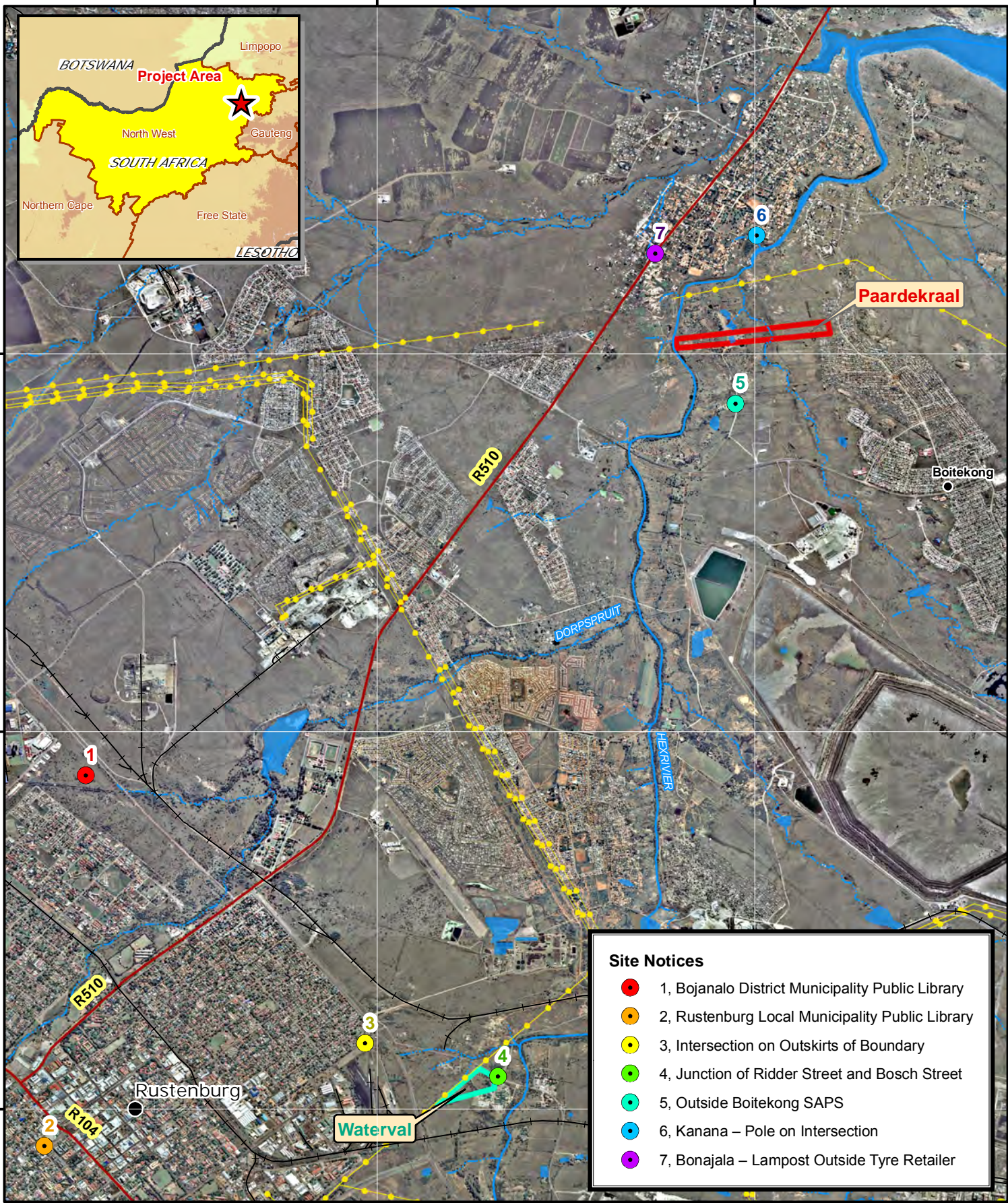
Where site notice was placed (Organisation and/or address)	Coordinates	Date	Photo
<b>Intersection on Outskirts of Boundary</b>  1 x Site Notice	PLT1 (Map)  25.66082 "S 027.26561 " E	17 <sup>th</sup> June 2015	
<b>Junction of Ridder Street and Bosch Street</b>  1 x Site Notice	PLT2 (Map)  25.66375 "S 027.27733 "E	17 <sup>th</sup> June 2015	
<b>Outside Boitekong SAPS</b>  1 x Site Notice	PLT3 (Map)  25.60439 "S 027.29830 "E	17 <sup>th</sup> June 2015	
<b>Kanana – Pole on Intersection</b>  1 x Site Notice	PLT4 (Map)  25.58952 " S 027.30017" E	17 <sup>th</sup> June 2015	

Where site notice was placed (Organisation and/or address)	Coordinates	Date	Photo
<p><b>Bonajala – Lampost Outside Tyre Retailer</b></p> <p>1 x Site Notice</p>	<p>PLT 5 (Map)</p> <p>25.59114" S 027.29123 " E</p>	<p>17<sup>th</sup> June 2015</p>	

PROJECT NO: APM3249

27°16'0"E

27°18'0"E



25°36'0"S

25°36'0"S

25°38'0"S

25°38'0"S

25°40'0"S

25°40'0"S

27°16'0"E

27°18'0"E

- Site Notices**
- 1, Bojanalo District Municipality Public Library
  - 2, Rustenburg Local Municipality Public Library
  - 3, Intersection on Outskirts of Boundary
  - 4, Junction of Ridder Street and Bosch Street
  - 5, Outside Boitekong SAPS
  - 6, Kanana – Pole on Intersection
  - 7, Bonajala – Lampost Outside Tyre Retailer

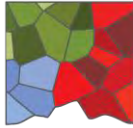
## Rustenburg Platinum Mines: Site Notices

- Legend**
- ▭ Paardekraal Project Area
  - ▭ Waterval Project Area
  - Major Town
  - Settlement
  - Power Line
  - Main Road
  - Railway Line
  - Non-Perennial Stream
  - Perennial Stream
  - Dam / Lake

Projection: Transverse Mercator  
 Central Meridian: 27°E  
 Datum: WGS 1984  
 Date: 24/06/2015  
 Ref #: jcf.APM3249.201506.216

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 ENVIRONMENTAL

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# DIGBY WELLS

## ENVIRONMENTAL

Project No: APM3249

Monday, 20 July 2015

### **BASIC ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION FOR THE PROSPECTING OF PLATINUM GROUP METALS (PGMs) AND ASSOCIATED MINERALS, NORTH WEST PROVINCE**

*Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR*

#### **FINAL BASIC ASSESSMENT REPORT (FBAR) AVAILABLE FOR COMMENT**

Dear Stakeholder

Rustenburg Platinum Mines Limited (RPM) has submitted applications for Prospecting Rights and Environmental Authorisation for two properties; Portion 53 of the Farm Waterval 306 JQ, which is located approximately 1.5 km east of Rustenburg, and a Portion of Portion 170 (formerly the Remaining Extent of Portion 21) of the Farm Paardekraal 279 JQ, which is located approximately 7.5 km north east of Rustenburg. The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGMs) and associated minerals, including: Palladium (Pd), Rhodium (Rh), Iridium (Ir), Osmium (Os), Platinum (Pt), Ruthenium (Ru), Gold (Au), Copper (Cu), Nickel (Ni), Cobalt (Co), Silver (Ag) and Chrome O (Cr).

The Final Basic Assessment Report (FBAR) for the proposed project is available for public comment for 21 days from **Tuesday, 21 July – Wednesday, 12 August 2015**. The FBAR will be made available on the following website: [www.digbywells.com](http://www.digbywells.com) under **Public Documents**.

Should you wish to comment on the report, comments can be forwarded directly to the government official responsible. Also please copy Digby Wells Environmental in your correspondence using the contact details provided.

**Reference:** Reference numbers: NW 30/5/1/1/3/2/11682 PR and NW 30/5/1/1/3/2/11681 PR, The Department of Mineral Resources, North West Region

**Attention:** Ms Lorraine Nobela

**Postal Address:** Private Bag A1, Klerksdorp, 2570.

**Physical Address:** Cnr Margaret Prinsloo and Voortrekker Street, Vaal University of Technology Building, Klerksdorp, 2571

**Email address:** [Lorraine.Nobela@dmr.gov.za](mailto:Lorraine.Nobela@dmr.gov.za)

**Department central telephone number:** Tell: 018 487 4300 EXT 4365

Should you require any additional information please feel free to contact me at Tel: (011) 789 9495, Fax: 086 5835 715, Post: Private Bag X10046, Randburg, 2125 or email: [vanessa.viljoen@digbywells.com](mailto:vanessa.viljoen@digbywells.com) or [nestus.bredenhann@digbywells.com](mailto:nestus.bredenhann@digbywells.com).

Regards,

**Vanessa Viljoen**

**Stakeholder Engagement Office**

Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ

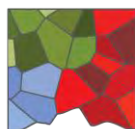
APM3249



**DIGBY WELLS**  
ENVIRONMENTAL

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## Appendix D: Fauna and Flora List



# DIGBY WELLS

## ENVIRONMENTAL

### Possible Plant Species

Family	Species	Threat status
ACANTHACEAE	<i>Barleria pretoriensis</i> C.B.Clarke	LC
ACANTHACEAE	<i>Blepharis integrifolia</i> (L.f.) E.Mey. ex Schinz var. <i>integrifolia</i>	LC
ACANTHACEAE	<i>Blepharis leendertziae</i> Oberm.	LC
ACANTHACEAE	<i>Crabbea hirsuta</i> Harv.	LC
ACANTHACEAE	<i>Hypoestes forskalii</i> (Vahl) R.Br.	LC
ACANTHACEAE	<i>Isoglossa grantii</i> C.B.Clarke	LC
ACANTHACEAE	<i>Justicia anagalloides</i> (Nees) T.Anderson	LC
ACANTHACEAE	<i>Ruellia cordata</i> Thunb.	LC
ACANTHACEAE	<i>Thunbergia atriplicifolia</i> E.Mey. ex Nees	LC
AMARANTHACEAE	<i>Achyranthes aspera</i> L. var. <i>sicula</i> L.	Not Evaluated
AMARANTHACEAE	<i>Amaranthus thunbergii</i> Moq.	LC
AMARANTHACEAE	<i>Hermbstaedtia odorata</i> (Burch.) T.Cooke var. <i>odorata</i>	LC
AMARYLLIDACEAE	<i>Crinum graminicola</i> I.Verd.	LC
AMARYLLIDACEAE	<i>Cyrtanthus breviflorus</i> Harv.	LC
ANACARDIACEAE	<i>Ozoroa paniculosa</i> (Sond.) R. & A.Fern. var. <i>paniculosa</i>	LC
ANACARDIACEAE	<i>Ozoroa paniculosa</i> (Sond.) R. & A.Fern. var. <i>salicina</i> (Sond.) R. & A.Fern.	LC
ANACARDIACEAE	<i>Searsia chirindensis</i> (Baker f.) Moffett	LC
ANACARDIACEAE	<i>Searsia lancea</i> (L.f.) F.A.Barkley	LC
ANACARDIACEAE	<i>Searsia magalismontana</i> (Sond.) Moffett subsp. <i>magalismontana</i>	LC
ANACARDIACEAE	<i>Searsia pyroides</i> (Burch.) Moffett var. <i>pyroides</i>	LC
APIACEAE	<i>Deverra burchellii</i> (DC.) Eckl. & Zeyh.	LC
APOCYNACEAE	<i>Acokanthera oppositifolia</i> (Lam.) Codd	LC
APOCYNACEAE	<i>Asclepias densiflora</i> N.E.Br.	LC
APOCYNACEAE	<i>Aspidoglossum glabrescens</i> (Schltr.) Kupicha	LC
APOCYNACEAE	<i>Brachystelma gracile</i> E.A.Bruce	LC
APOCYNACEAE	<i>Carissa bispinosa</i> (L.) Desf. ex Brenan	LC
APOCYNACEAE	<i>Raphionacme galpinii</i> Schltr.	LC
APOCYNACEAE	<i>Sarcostemma viminalis</i> (L.) R.Br. subsp. <i>viminalis</i>	LC
ARALIACEAE	<i>Cussonia spicata</i> Thunb.	LC
ASPARAGACEAE	<i>Asparagus virgatus</i> Baker	LC
ASPHODELACEAE	<i>Bulbine angustifolia</i> Poelln.	LC
ASPHODELACEAE	<i>Kniphofia ensifolia</i> Baker subsp. <i>ensifolia</i>	LC
ASTERACEAE	<i>Berkheya latifolia</i> J.M.Wood & M.S.Evans	LC
ASTERACEAE	<i>Dicoma macrocephala</i> DC.	LC
ASTERACEAE	<i>Doellia cafra</i> (DC.) Anderb.	LC
ASTERACEAE	<i>Geigeria burkei</i> Harv. subsp. <i>burkei</i> var. <i>zeyheri</i> (Harv.) Merxm.	LC
ASTERACEAE	<i>Helichrysum argyrosphaerum</i> DC.	LC
ASTERACEAE	<i>Helichrysum cerastioides</i> DC. var. <i>cerastioides</i>	LC
ASTERACEAE	<i>Helichrysum kraussii</i> Sch.Bip.	LC
ASTERACEAE	<i>Helichrysum mixtum</i> (Kuntze) Moeser var. <i>mixtum</i>	LC
ASTERACEAE	<i>Schistostephium heptalobum</i> (DC.) Oliv. & Hiern	LC



Family	Species	Threat status
ASTERACEAE	<i>Senecio lydenburgensis</i> Hutch. & Burt Davy	LC
ASTERACEAE	<i>Senecio venosus</i> Harv.	LC
ASTERACEAE	<i>Sonchus friesii</i> Boulos var. <i>friesii</i>	LC
ASTERACEAE	<i>Tagetes minuta</i> L.	Not Evaluated
ASTERACEAE	<i>Ursinia nana</i> DC. subsp. <i>leptophylla</i> Prassler	LC
ASTERACEAE	<i>Vernonia fastigiata</i> Oliv. & Hiern	LC
ASTERACEAE	<i>Vernonia staehelinoides</i> Harv.	LC
BARTRAMIACEAE	<i>Philonotis africana</i> (Müll.Hal.) Rehmann ex Paris	
BLECHNACEAE	<i>Blechnum australe</i> L. subsp. <i>australe</i>	LC
BRYACEAE	<i>Bryum pycnophyllum</i> (Dixon) Mohamed	
BUDDLEJACEAE	<i>Buddleja saligna</i> Willd.	LC
BURMANNIACEAE	<i>Burmattia madagascariensis</i> Mart.	LC
CAPPARACEAE	<i>Boscia albitrunca</i> (Burch.) Gilg & Gilg-Ben.	LC
CAPPARACEAE	<i>Cadaba aphylla</i> (Thunb.) Wild	LC
CARYOPHYLLACEAE	<i>Corrigiola litoralis</i> L. subsp. <i>litoralis</i> var. <i>litoralis</i>	LC
CELASTRACEAE	<i>Maytenus undata</i> (Thunb.) Blakelock	LC
CELASTRACEAE	<i>Pterocelastrus echinatus</i> N.E.Br.	LC
COLCHICACEAE	<i>Colchicum melanthoides</i> (Willd.) J.C.Manning & Vinn. subsp. <i>melanthoides</i>	LC
COMBRETACEAE	<i>Combretum molle</i> R.Br. ex G.Don	LC
COMBRETACEAE	<i>Combretum zeyheri</i> Sond.	LC
COMMELINACEAE	<i>Commelina africana</i> L. var. <i>krebsiana</i> (Kunth) C.B.Clarke	LC
COMMELINACEAE	<i>Commelina livingstonii</i> C.B.Clarke	LC
COMMELINACEAE	<i>Floscopa glomerata</i> (Willd. ex Schult. & J.H.Schult.) Hassk.	LC
CONVOLVULACEAE	<i>Convolvulus sagittatus</i> Thunb.	LC
CONVOLVULACEAE	<i>Evolvulus alsinoides</i> (L.) L.	LC
CONVOLVULACEAE	<i>Ipomoea bolusiana</i> Schinz	LC
CONVOLVULACEAE	<i>Ipomoea coscinosperma</i> Hochst. ex Choisy	LC
CONVOLVULACEAE	<i>Ipomoea oblongata</i> E.Mey. ex Choisy	LC
CONVOLVULACEAE	<i>Ipomoea obscura</i> (L.) Ker Gawl. var. <i>obscura</i>	LC
CONVOLVULACEAE	<i>Xenostegia tridentata</i> (L.) D.F.Austin & Staples subsp. <i>angustifolia</i> (Jacq.) Lejoly & Lisowski	LC
CRASSULACEAE	<i>Crassula setulosa</i> Harv. var. <i>setulosa</i> forma <i>setulosa</i>	Not Evaluated
CUCURBITACEAE	<i>Momordica balsamina</i> L.	LC
CYPERACEAE	<i>Ascolepis capensis</i> (Kunth) Ridl.	LC
CYPERACEAE	<i>Carex spicatopaniculata</i> Boeckeler ex C.B.Clarke	LC
CYPERACEAE	<i>Cyperus congestus</i> Vahl	LC
CYPERACEAE	<i>Cyperus esculentus</i> L. var. <i>esculentus</i>	LC
CYPERACEAE	<i>Cyperus leptocladus</i> Kunth	LC
CYPERACEAE	<i>Isolepis fluitans</i> (L.) R.Br. var. <i>fluitans</i>	LC
CYPERACEAE	<i>Kyllinga alba</i> Nees	LC
CYPERACEAE	<i>Schoenoplectus brachyceras</i> (Hochst. ex A.Rich.) Lye	LC
CYPERACEAE	<i>Schoenoplectus muricinux</i> (C.B.Clarke) J.Raynal	LC
DICRANACEAE	<i>Campylopus pilifer</i> Brid. var. <i>pilifer</i>	
DIOSCOREACEAE	<i>Dioscorea retusa</i> Mast.	LC
DIPSACACEAE	<i>Scabiosa columbaria</i> L.	LC
DROSERACEAE	<i>Drosera collinsiae</i> N.E.Br. ex Burt Davy	LC
EBENACEAE	<i>Diospyros lycioides</i> Desf. subsp. <i>lycioides</i>	LC
EQUISETACEAE	<i>Equisetum ramosissimum</i> Desf. subsp.	LC



Family	Species	Threat status
	<i>ramosissimum</i>	
EUPHORBIACEAE	<i>Acalypha angustata</i> Sond.	LC
EUPHORBIACEAE	<i>Acalypha indica</i> L. var. <i>indica</i>	LC
EUPHORBIACEAE	<i>Acalypha segetalis</i> Müll.Arg.	LC
EUPHORBIACEAE	<i>Acalypha villicaulis</i> Hochst.	LC
EUPHORBIACEAE	<i>Clutia pulchella</i> L. var. <i>pulchella</i>	LC
EUPHORBIACEAE	<i>Croton gratissimus</i> Burch. var. <i>subgratissimus</i> (Prain) Burt Davy	LC
EUPHORBIACEAE	<i>Euphorbia clavarioides</i> Boiss. var. <i>truncata</i> (N.E.Br.) A.C.White, R.A.Dyer & B.Sloane	LC
EUPHORBIACEAE	<i>Euphorbia heterophylla</i> L.	Not Evaluated
EUPHORBIACEAE	<i>Tragia incisifolia</i> Prain	LC
EUPHORBIACEAE	<i>Tragia okanyua</i> Pax	LC
FABACEAE	<i>Abrus laevigatus</i> E.Mey.	LC
FABACEAE	<i>Acacia burkei</i> Benth.	LC
FABACEAE	<i>Acacia caffra</i> (Thunb.) Willd.	LC
FABACEAE	<i>Acacia karroo</i> Hayne	LC
FABACEAE	<i>Acacia robusta</i> Burch. subsp. <i>robusta</i>	LC
FABACEAE	<i>Alysicarpus zeyheri</i> Harv.	LC
FABACEAE	<i>Burkea africana</i> Hook.	LC
FABACEAE	<i>Chamaecrista biensis</i> (Steyaert) Lock	LC
FABACEAE	<i>Chamaecrista mimosoides</i> (L.) Greene	LC
FABACEAE	<i>Eriosema burkei</i> Benth. ex Harv. var. <i>burkei</i>	LC
FABACEAE	<i>Eriosema pauciflorum</i> Klotzsch var. <i>pauciflorum</i>	LC
FABACEAE	<i>Erythrina lysistemon</i> Hutch.	LC
FABACEAE	<i>Indigofera heterotricha</i> DC.	LC
FABACEAE	<i>Indigofera hilaris</i> Eckl. & Zeyh. var. <i>hilaris</i>	LC
FABACEAE	<i>Indigofera oxytropis</i> Benth. ex Harv.	LC
FABACEAE	<i>Indigofera praticola</i> Baker f.	LC
FABACEAE	<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	LC
FABACEAE	<i>Ophrestia oblongifolia</i> (E.Mey.) H.M.L.Forbes var. <i>oblongifolia</i>	LC
FABACEAE	<i>Pearsonia sessilifolia</i> (Harv.) Dummer subsp. <i>sessilifolia</i>	LC
FABACEAE	<i>Rhynchosia albissima</i> Gand.	LC
FABACEAE	<i>Rhynchosia caribaea</i> (Jacq.) DC.	LC
FABACEAE	<i>Rhynchosia crassifolia</i> Benth. ex Harv.	LC
FABACEAE	<i>Rhynchosia totta</i> (Thunb.) DC. var. <i>totta</i>	LC
FABACEAE	<i>Rhynchosia venulosa</i> (Hiern) K.Schum.	Not Evaluated
FABACEAE	<i>Sphenostylis angustifolia</i> Sond.	LC
FABACEAE	<i>Stylosanthes fruticosa</i> (Retz.) Alston	LC
FABACEAE	<i>Tephrosia capensis</i> (Jacq.) Pers. var. <i>capensis</i>	LC
FABACEAE	<i>Tephrosia multijuga</i> R.G.N.Young	LC
FABACEAE	<i>Tephrosia villosa</i> (L.) Pers. subsp. <i>ehrenbergiana</i> (Schweinf.) Brummitt var. <i>ehrenbergiana</i>	LC
FABACEAE	<i>Tylosema esculentum</i> (Burch.) A.Schreib.	LC
FABACEAE	<i>Zornia linearis</i> E.Mey.	LC
FISSIDENTACEAE	<i>Fissidens ovatus</i> Brid.	
GENTIANACEAE	<i>Chironia purpurascens</i> (E.Mey.) Benth. & Hook.f. subsp. <i>humilis</i> (Gilg) I.Verd.	LC
GENTIANACEAE	<i>Sebaea junodii</i> Schinz	LC
GLEICHENIACEAE	<i>Gleichenia polypodioides</i> (L.) Sm.	LC
HYACINTHACEAE	<i>Dipcadi marlothii</i> Engl.	LC





Family	Species	Threat status
HYACINTHACEAE	<i>Dipcadi papillatum</i> Oberm.	LC
HYACINTHACEAE	<i>Dipcadi viride</i> (L.) Moench	LC
HYACINTHACEAE	<i>Ledebouria cooperi</i> (Hook.f.) Jessop	LC
HYPERICACEAE	<i>Hypericum lalandii</i> Choisy	LC
ICACINACEAE	<i>Apodytes dimidiata</i> E.Mey. ex Arn. subsp. <i>dimidiata</i>	LC
IRIDACEAE	<i>Gladiolus permeabilis</i> D.Delaroche subsp. <i>edulis</i> (Burch. ex Ker Gawl.) Oberm.	LC
IRIDACEAE	<i>Lapeirousia sandersonii</i> Baker	LC
IRIDACEAE	<i>Tritonia nelsonii</i> Baker	LC
LAMIACEAE	<i>Acrotome hispida</i> Benth.	LC
LAMIACEAE	<i>Ocimum gratissimum</i> L. subsp. <i>gratissimum</i> var. <i>gratissimum</i>	LC
LAMIACEAE	<i>Ocimum obovatum</i> E.Mey. ex Benth. subsp. <i>obovatum</i> var. <i>obovatum</i>	LC
LAMIACEAE	<i>Orthosiphon suffrutescens</i> (Thonn.) J.K.Morton	LC
LAMIACEAE	<i>Pycnostachys reticulata</i> (E.Mey.) Benth.	LC
LAMIACEAE	<i>Tetradenia brevispicata</i> (N.E.Br.) Codd	LC
LAMIACEAE	<i>Vitex zeyheri</i> Sond.	LC
LOBELIACEAE	<i>Cyphia assimilis</i> Sond.	LC
LOBELIACEAE	<i>Monopsis decipiens</i> (Sond.) Thulin	LC
LOPHIOCARPACEAE	<i>Corbichonia decumbens</i> (Forssk.) Exell	LC
LORANTHACEAE	<i>Agelanthus natalitius</i> (Meisn.) Polhill & Wiens subsp. <i>natalitius</i>	LC
LYCOPODIACEAE	<i>Lycopodiella cernua</i> (L.) Pic.Serm.	LC
MALPIGHIACEAE	<i>Sphedamnocarpus pruriens</i> (A.Juss.) Szyszyl. subsp. <i>galphimiifolius</i> (A.Juss.) P.D.de Villiers & D.J.Botha	LC
MALPIGHIACEAE	<i>Sphedamnocarpus pruriens</i> (A.Juss.) Szyszyl. subsp. <i>pruriens</i>	LC
MALVACEAE	<i>Abutilon angulatum</i> (Guill. & Perr.) Mast. var. <i>angulatum</i>	LC
MALVACEAE	<i>Abutilon pycnodon</i> Hochr.	LC
MALVACEAE	<i>Corchorus argillicola</i> M.J.Moeaha & P.J.D.Winter	
MALVACEAE	<i>Corchorus asplenifolius</i> Burch.	LC
MALVACEAE	<i>Corchorus schimperii</i> Cufod.	LC
MALVACEAE	<i>Grewia flava</i> DC.	LC
MALVACEAE	<i>Grewia monticola</i> Sond.	LC
MALVACEAE	<i>Grewia occidentalis</i> L. var. <i>occidentalis</i>	LC
MALVACEAE	<i>Grewia subspathulata</i> N.E.Br.	LC
MALVACEAE	<i>Hermannia burkei</i> Burt Davy	LC
MALVACEAE	<i>Hermannia floribunda</i> Harv.	LC
MALVACEAE	<i>Hermannia grisea</i> Schinz	LC
MALVACEAE	<i>Hermannia quartiniana</i> A.Rich.	LC
MALVACEAE	<i>Hibiscus engleri</i> K.Schum.	LC
MALVACEAE	<i>Hibiscus lunarifolius</i> Willd.	LC
MALVACEAE	<i>Hibiscus marlothianus</i> K.Schum.	LC
MALVACEAE	<i>Hibiscus pusillus</i> Thunb.	LC
MALVACEAE	<i>Hibiscus sidiformis</i> Baill.	LC
MALVACEAE	<i>Hibiscus subreniformis</i> Burt Davy	LC
MALVACEAE	<i>Sida chrysantha</i> Ulbr.	LC
MALVACEAE	<i>Triumfetta annua</i> L. forma <i>annua</i>	Not Evaluated
MALVACEAE	<i>Triumfetta annua</i> L. forma <i>piliger</i> Sprague &	Not Evaluated



Family	Species	Threat status
	<i>Hutch.</i>	
MALVACEAE	<i>Waltheria indica</i> L.	LC
MELIACEAE	<i>Turraea obtusifolia</i> Hochst.	LC
MESEMBRYANTHEMACEAE	<i>Frithia pulchra</i> N.E.Br.	Rare
MESEMBRYANTHEMACEAE	<i>Khadia acutipetala</i> (N.E.Br.) N.E.Br.	LC
MOLLUGINACEAE	<i>Limeum viscosum</i> (J.Gay) Fenzl subsp. <i>viscosum</i> var. <i>viscosum</i>	LC
MOLLUGINACEAE	<i>Mollugo nudicaulis</i> Lam.	
MORACEAE	<i>Ficus ingens</i> (Miq.) Miq.	LC
MORACEAE	<i>Ficus salicifolia</i> Vahl	LC
MYRICACEAE	<i>Morella serrata</i> (Lam.) Killick	LC
OCHNACEAE	<i>Ochna pulchra</i> Hook.f.	LC
OLEACEAE	<i>Menodora africana</i> Hook.	LC
OLEACEAE	<i>Olea capensis</i> L. subsp. <i>enervis</i> (Harv. ex C.H.Wright) I.Verd.	LC
ORCHIDACEAE	<i>Bonatea saundersioides</i> (Kraenzl. & Schltr.) Cortesi	LC
ORCHIDACEAE	<i>Satyrium hallackii</i> Bolus subsp. <i>ocellatum</i> (Bolus) A.V.Hall	LC
OROBANCHACEAE	<i>Striga bilabiata</i> (Thunb.) Kuntze subsp. <i>bilabiata</i>	LC
OROBANCHACEAE	<i>Striga forbesii</i> Benth.	LC
OSMUNDACEAE	<i>Osmunda regalis</i> L.	LC
PEDALIACEAE	<i>Dicerocaryum senecioides</i> (Klotzsch) Abels	LC
PHYLLANTHACEAE	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt subsp. <i>virosa</i>	LC
PHYLLANTHACEAE	<i>Phyllanthus incurvus</i> Thunb.	LC
PITTOSPORACEAE	<i>Pittosporum viridiflorum</i> Sims	LC
PLUMBAGINACEAE	<i>Plumbago zeylanica</i> L.	Not Evaluated
POACEAE	<i>Aristida adscensionis</i> L.	LC
POACEAE	<i>Aristida aequiglumis</i> Hack.	LC
POACEAE	<i>Aristida bipartita</i> (Nees) Trin. & Rupr.	LC
POACEAE	<i>Arundinella nepalensis</i> Trin.	LC
POACEAE	<i>Brachiaria deflexa</i> (Schumach.) C.E.Hubb. ex Robyns	LC
POACEAE	<i>Chrysopogon serrulatus</i> Trin.	LC
POACEAE	<i>Cynodon dactylon</i> (L.) Pers.	LC
POACEAE	<i>Dichanthium annulatum</i> (Forssk.) Stapf var. <i>papillosum</i> (A.Rich.) de Wet & Harlan	LC
POACEAE	<i>Enneapogon cenchroides</i> (Licht. ex Roem. & Schult.) C.E.Hubb.	LC
POACEAE	<i>Eragrostis capensis</i> (Thunb.) Trin.	LC
POACEAE	<i>Eragrostis cilianensis</i> (All.) Vignolo ex Janch.	LC
POACEAE	<i>Eragrostis curvula</i> (Schrud.) Nees	LC
POACEAE	<i>Eragrostis heteromera</i> Stapf	LC
POACEAE	<i>Eragrostis hierniana</i> Rendle	LC
POACEAE	<i>Fingerhuthia africana</i> Lehm.	LC
POACEAE	<i>Hyparrhenia dregeana</i> (Nees) Stapf ex Stent	LC
POACEAE	<i>Imperata cylindrica</i> (L.) Raeusch.	LC
POACEAE	<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	LC
POACEAE	<i>Setaria incrassata</i> (Hochst.) Hack.	LC
POACEAE	<i>Sporobolus stapfianus</i> Gand.	LC
POACEAE	<i>Stiburus alopecuroides</i> (Hack.) Stapf	LC
POACEAE	<i>Tragus berteronianus</i> Schult.	LC



Family	Species	Threat status
POACEAE	<i>Urochloa panicoides</i> P.Beauv.	
POLYGALACEAE	<i>Polygala hottentotta</i> C.Presl	LC
POLYGONACEAE	<i>Persicaria decipiens</i> (R.Br.) K.L.Wilson	LC
PORTULACACEAE	<i>Portulaca oleracea</i> L.	Not Evaluated
PROTEACEAE	<i>Faurea saligna</i> Harv.	LC
PROTEACEAE	<i>Protea gaguedi</i> J.F.Gmel.	LC
RANUNCULACEAE	<i>Clematis brachiata</i> Thunb.	LC
RHAMNACEAE	<i>Berchemia zeyheri</i> (Sond.) Grubov	LC
RHAMNACEAE	<i>Helinus integrifolius</i> (Lam.) Kuntze	LC
RHAMNACEAE	<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	LC
RUBIACEAE	<i>Afrocanthium mundianum</i> (Cham. & Schltld.) Lantz	LC
RUBIACEAE	<i>Canthium suberosum</i> Codd	LC
RUBIACEAE	<i>Kohautia caespitosa</i> Schnizl. subsp. <i>brachyloba</i> (Sond.) D.Mantell	LC
RUBIACEAE	<i>Pavetta eylesii</i> S.Moore	LC
RUBIACEAE	<i>Pavetta gardeniifolia</i> A.Rich. var. <i>subtomentosa</i> K.Schum.	LC
RUBIACEAE	<i>Pentanisia angustifolia</i> (Hochst.) Hochst.	LC
RUBIACEAE	<i>Pygmaeothamnus zeyheri</i> (Sond.) Robyns var. <i>zeyheri</i>	LC
RUBIACEAE	<i>Vangueria infausta</i> Burch. subsp. <i>infausta</i>	LC
RUBIACEAE	<i>Vangueria parvifolia</i> Sond.	
RUTACEAE	<i>Zanthoxylum capense</i> (Thunb.) Harv.	LC
SAPINDACEAE	<i>Erythrophysa transvaalensis</i> I.Verd.	LC
SINOPTERIDACEAE	<i>Cheilanthes hirta</i> Sw. var. <i>hirta</i>	LC
SINOPTERIDACEAE	<i>Cheilanthes viridis</i> (Forssk.) Sw. var. <i>viridis</i>	LC
SINOPTERIDACEAE	<i>Pellaea calomelanos</i> (Sw.) Link var. <i>calomelanos</i>	LC
SOLANACEAE	<i>Solanum catombelense</i> Peyr.	LC
SOLANACEAE	<i>Withania somnifera</i> (L.) Dunal	LC
SPHAGNACEAE	<i>Sphagnum truncatum</i> Hornsch.	
STRYCHNACEAE	<i>Strychnos pungens</i> Soler.	LC
URTICACEAE	<i>Pouzolzia mixta</i> Solms var. <i>mixta</i>	LC
VAHLIACEAE	<i>Vahlia capensis</i> (L.f.) Thunb. subsp. <i>vulgaris</i> Bridson var. <i>linearis</i> E.Mey. ex Bridson	LC
VERBENACEAE	<i>Chascanum hederaceum</i> (Sond.) Moldenke var. <i>hederaceum</i>	LC
VERBENACEAE	<i>Lantana rugosa</i> Thunb.	LC
VERBENACEAE	<i>Lippia scaberrima</i> Sond.	LC
VITACEAE	<i>Cissus cactiformis</i> Gilg	LC
VITACEAE	<i>Cyphostemma omburense</i> (Gilg & M.Brandt) Desc.	LC
VITACEAE	<i>Cyphostemma puberulum</i> (C.A.Sm.) Wild & R.B.Drumm.	LC
VITACEAE	<i>Cyphostemma sulcatum</i> (C.A.Sm.) J.J.M.van der Merwe	LC
VITACEAE	<i>Rhoicissus tridentata</i> (L.f.) Wild & R.B.Drumm. subsp. <i>cuneifolia</i> (Eckl. & Zeyh.) Urton	Not Evaluated



### Possible Bird Species

Common Name	Species Name	Conservation Status
Abdim's Stork	<i>Ciconia abdimii</i>	LC
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	LC
African Black Duck	<i>Anas sparsa</i>	LC
African Black Swift	<i>Apus barbatus</i>	LC
African Cuckoo Hawk	<i>Aviceda cuculoides</i>	LC
African Darter	<i>Anhinga rufa</i>	LC
African Firefinch	<i>Lagonosticta rubricata</i>	LC
African Fish-eagle	<i>Haliaeetus vocifer</i>	LC
African Green-pigeon	<i>Treron calvus</i>	LC
African Grey Hornbill	<i>Tockus nasutus</i>	LC
African Harrier-Hawk	<i>Polyboroides typus</i>	LC
African Hoopoe	<i>Upupa africana</i>	LC
African Jacana	<i>Actophilornis africanus</i>	LC
African Olive-pigeon	<i>Columba arquatrix</i>	LC
African Palm-swift	<i>Cypsiurus parvus</i>	LC
African Paradise-flycatcher	<i>Terpsiphone viridis</i>	LC
African Pied Wagtail	<i>Motacilla aguimp</i>	LC
African Pipit	<i>Anthus cinnamomeus</i>	LC
African Purple Swamphen	<i>Porphyrio madagascariensis</i>	LC
African Quailfinch	<i>Ortygospiza atricollis</i>	LC
African Reed-warbler	<i>Acrocephalus baeticatus</i>	LC
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	LC
African Scops-owl	<i>Otus senegalensis</i>	LC
African Snipe	<i>Gallinago nigripennis</i>	LC
African Spoonbill	<i>Platalea alba</i>	LC
African Stonechat	<i>Saxicola torquatus</i>	LC
African Wattled Lapwing	<i>Vanellus senegallus</i>	LC
Alpine Swift	<i>Tachymarptis melba</i>	LC
Amethyst Sunbird	<i>Chalcomitra amethystina</i>	LC
Amur Falcon	<i>Falco amurensis</i>	LC
Arrow-marked Babbler	<i>Turdoides jardineii</i>	LC
Barn Owl	<i>Tyto alba</i>	LC
Barn Swallow	<i>Hirundo rustica</i>	LC
Barred Wren-warbler	<i>Calamonastes fasciolatus</i>	LC
Bar-throated Apalis	<i>Apalis thoracica</i>	LC
Black & Yellow-billed Kite	<i>Milvus migrans</i>	LC
Black Crake	<i>Amaurornis flavirostris</i>	LC
Black Cuckoo	<i>Cuculus clamosus</i>	LC
Black Cuckoo-shrike	<i>Campephaga flava</i>	LC



Common Name	Species Name	Conservation Status
Black Heron	<i>Egretta ardesiaca</i>	LC
Black Sparrowhawk	<i>Accipiter melanoleucus</i>	LC
Black-backed Puffback	<i>Dryoscopus cubla</i>	LC
Black-chested Prinia	<i>Prinia flavicans</i>	LC
Black-chested Snake-eagle	<i>Circaetus pectoralis</i>	LC
Black-collared Barbet	<i>Lybius torquatus</i>	LC
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	LC
Black-crowned Tchagra	<i>Tchagra senegalus</i>	LC
Black-faced Waxbill	<i>Estrilda erythronotos</i>	LC
Black-headed Heron	<i>Ardea melanocephala</i>	LC
Black-headed Oriole	<i>Oriolus larvatus</i>	LC
Black-shouldered Kite	<i>Elanus caeruleus</i>	LC
Blacksmith Lapwing	<i>Vanellus armatus</i>	LC
Black-throated Canary	<i>Criethagra atrogularis</i>	LC
Black-winged Stilt	<i>Himantopus himantopus</i>	LC
Blue Waxbill	<i>Uraeginthus angolensis</i>	LC
Blue-cheeked Bee-eater	<i>Merops persicus</i>	LC
Bokmakierie Bokmakierie	<i>Telophorus zeylonus</i>	LC
Bronze Mannikin	<i>Spermestes cucullatus</i>	LC
Brown Snake-eagle	<i>Circaetus cinereus</i>	LC
Brown-backed Honeybird	<i>Prodotiscus regulus</i>	LC
Brown-crowned Tchagra	<i>Tchagra australis</i>	LC
Brown-hooded Kingfisher	<i>Halcyon albiventris</i>	LC
Brown-throated Martin	<i>Riparia paludicola</i>	LC
Brubru Brubru	<i>Nilaus afer</i>	LC
Buffy Pipit	<i>Anthus vaalensis</i>	LC
Burchell's Coucal	<i>Centropus burchellii</i>	LC
Burnt-necked Eremomela	<i>Eremomela usticollis</i>	LC
Cape Bunting	<i>Emberiza capensis</i>	LC
Cape Crow	<i>Corvus capensis</i>	LC
Cape Glossy Starling	<i>Lamprotornis nitens</i>	LC
Cape Grassbird	<i>Sphenoeacus afer</i>	LC
Cape Longclaw	<i>Macronyx capensis</i>	LC
Cape Penduline-tit	<i>Anthoscopus minutus</i>	LC
Cape Robin-chat	<i>Cossypha caffra</i>	LC
Cape Rock-thrush	<i>Monticola rupestris</i>	LC
Cape Shoveler	<i>Anas smithii</i>	LC
Cape Sparrow	<i>Passer melanurus</i>	LC
Cape Teal	<i>Anas capensis</i>	LC
Cape Turtle-dove	<i>Streptopelia capicola</i>	LC



Common Name	Species Name	Conservation Status
<b>Cape Vulture</b>	<b><i>Gyps coprotheres</i></b>	<b>VU</b>
Cape Wagtail	<i>Motacilla capensis</i>	LC
Cape Weaver	<i>Ploceus capensis</i>	LC
Cape White-eye	<i>Zosterops virens</i>	LC
Capped Wheatear	<i>Oenanthe pileata</i>	LC
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	LC
Caspian Tern	<i>Sterna caspia</i>	LC
Cattle Egret	<i>Bubulcus ibis</i>	LC
Chestnut-backed Sparrowlark	<i>Eremopterix leucotis</i>	LC
Chestnut-vented Tit-babbler	<i>Parisoma subcaeruleum</i>	LC
Chinspot Batis	<i>Batis molitor</i>	LC
Cinnamon-breasted Bunting	<i>Emberiza tahapisi</i>	LC
Cloud Cisticola	<i>Cisticola textrix</i>	LC
Comb Duck	<i>Sarkidiornis melanotos</i>	LC
Common (Southern) Fiscal	<i>Lanius collaris</i>	LC
Common Greenshank	<i>Tringa nebularia</i>	LC
Common House-martin	<i>Delichon urbicum</i>	LC
Common Moorhen	<i>Gallinula chloropus</i>	LC
Common Myna	<i>Acridotheres tristis</i>	LC
Common Ostrich	<i>Struthio camelus</i>	LC
Common Peacock	<i>Pavo cristatus</i>	LC
Common Quail	<i>Coturnix coturnix</i>	LC
Common Sandpiper	<i>Actitis hypoleucos</i>	LC
Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	LC
Common Swift	<i>Apus apus</i>	LC
Common Waxbill	<i>Estrilda astrild</i>	LC
Coqui Francolin	<i>Peliperdix coqui</i>	LC
Crested Barbet	<i>Trachyphonus vaillantii</i>	LC
Crested Francolin	<i>Dendroperdix sephaena</i>	LC
Crimson-breasted Shrike	<i>Laniarius atrococcineus</i>	LC
Crowned Lapwing	<i>Vanellus coronatus</i>	LC
Cuckoo Finch	<i>Anomalospiza imberbis</i>	LC
Curlew Sandpiper	<i>Calidris ferruginea</i>	LC
Cut-throat Finch	<i>Amadina fasciata</i>	LC
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>	LC
Desert Cisticola	<i>Cisticola aridulus</i>	LC
Diderick Cuckoo	<i>Chrysococcyx caprius</i>	LC
Dusky Indigobird	<i>Vidua funerea</i>	LC
Eastern Clapper Lark	<i>Mirafrasi fasciolata</i>	LC
Egyptian Goose	<i>Alopochen aegyptiacus</i>	LC



Common Name	Species Name	Conservation Status
Emerald-spotted Wood-dove	<i>Turtur chalcospilos</i>	LC
European Bee-eater	<i>Merops apiaster</i>	LC
Fairy Flycatcher	<i>Stenostira scita</i>	LC
Familiar Chat	<i>Cercomela familiaris</i>	LC
Fiscal Flycatcher	<i>Sigelus silens</i>	LC
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	LC
Fulvous Duck	<i>Dendrocygna bicolor</i>	LC
Giant Kingfisher	<i>Megaceryle maximus</i>	LC
Glossy Ibis	<i>Plegadis falcinellus</i>	LC
Golden-breasted Bunting	<i>Emberiza flaviventris</i>	LC
Golden-tailed Woodpecker	<i>Campethera abingoni</i>	LC
Goliath Heron	<i>Ardea goliath</i>	LC
Great Crested Grebe	<i>Podiceps cristatus</i>	LC
Great Egret	<i>Egretta alba</i>	LC
Great Reed-warbler	<i>Acrocephalus arundinaceus</i>	LC
Great Sparrow	<i>Passer motitensis</i>	LC
Great Spotted Cuckoo	<i>Clamator glandarius</i>	LC
Greater Double-collared Sunbird	<i>Cinnyris afer</i>	LC
<b>Greater Flamingo</b>	<b><i>Phoenicopterus ruber</i></b>	<b>NT</b>
Greater Honeyguide	<i>Indicator indicator</i>	LC
Greater Kestrel	<i>Falco rupicoloides</i>	LC
Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC
Greater Striped Swallow	<i>Hirundo cucullata</i>	LC
Green Wood-hoopoe	<i>Phoeniculus purpureus</i>	LC
Green-backed Heron	<i>Butorides striata</i>	LC
Green-winged Pytilia	<i>Pytilia melba</i>	LC
Grey Go-away-bird	<i>Corythaixoides concolor</i>	LC
Grey Heron	<i>Ardea cinerea</i>	LC
Grey Tit-flycatcher	<i>Myioparus plumbeus</i>	LC
Grey-backed Camaroptera	<i>Camaroptera brevicaudata</i>	LC
Grey-headed Bush-shrike	<i>Malaconotus blanchoti</i>	LC
Grey-headed Gull	<i>Larus cirrocephalus</i>	LC
Groundscraper Thrush	<i>Psophocichla litsipsirupa</i>	LC
Hadeda Ibis	<i>Bostrychia hagedash</i>	LC
Half-collared Kingfisher	<i>Alcedo semitorquata</i>	LC
Hamerkop Hamerkop	<i>Scopus umbretta</i>	LC
Helmeted Guineafowl	<i>Numida meleagris</i>	LC
Hottentot Teal	<i>Anas hottentota</i>	LC
House Sparrow	<i>Passer domesticus</i>	LC
Icterine Warbler	<i>Hippolais icterina</i>	LC



Common Name	Species Name	Conservation Status
Jacobin Cuckoo	<i>Clamator jacobinus</i>	LC
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>	LC
Kalahari Scrub-robin	<i>Cercotrichas paena</i>	LC
Karoo Thrush	<i>Turdus smithi</i>	LC
Kittlitz's Plover	<i>Charadrius pecuarius</i>	LC
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	LC
Kurrichane Buttonquail	<i>Turnix sylvaticus</i>	LC
Kurrichane Thrush	<i>Turdus libonyanus</i>	LC
Lanner Falcon	<i>Falco biarmicus</i>	LC
Laughing Dove	<i>Streptopelia senegalensis</i>	LC
Lazy Cisticola	<i>Cisticola aberrans</i>	LC
<b>Lesser Flamingo</b>	<b><i>Phoenicopterus minor</i></b>	<b>NT</b>
Lesser Grey Shrike	<i>Lanius minor</i>	LC
Lesser Honeyguide	<i>Indicator minor</i>	LC
<b>Lesser Kestrel</b>	<b><i>Falco naumanni</i></b>	<b>VU</b>
Lesser Masked-weaver	<i>Ploceus intermedius</i>	LC
Lesser Striped Swallow	<i>Hirundo abyssinica</i>	LC
Lesser Swamp-warbler	<i>Acrocephalus gracilirostris</i>	LC
Levaillant's Cisticola	<i>Cisticola tinniens</i>	LC
Levaillant's Cuckoo	<i>Clamator levaillantii</i>	LC
Lilac-breasted Roller	<i>Coracias caudatus</i>	LC
Little Bee-eater	<i>Merops pusillus</i>	LC
Little Bittern	<i>Ixobrychus minutus</i>	LC
Little Egret	<i>Egretta garzetta</i>	LC
Little Grebe	<i>Tachybaptus ruficollis</i>	LC
Little Rush-warbler	<i>Bradypterus baboecala</i>	LC
Little Sparrowhawk	<i>Accipiter minullus</i>	LC
Little Stint	<i>Calidris minuta</i>	LC
Little Swift	<i>Apus affinis</i>	LC
Long-billed Crombec	<i>Sylvietta rufescens</i>	LC
Long-billed Pipit	<i>Anthus similis</i>	LC
Long-tailed Paradise-whydah	<i>Vidua paradisaea</i>	LC
Long-tailed Widowbird	<i>Euplectes progne</i>	LC
Maccoa Duck	<i>Oxyura maccoa</i>	LC
Magpie Shrike	<i>Corvinella melanoleuca</i>	LC
Malachite Kingfisher	<i>Alcedo cristata</i>	LC
Mallard Duck	<i>Anas platyrhynchos</i>	LC
Marico Flycatcher	<i>Bradornis mariquensis</i>	LC
Marico Sunbird	<i>Cinnyris mariquensis</i>	LC
Marsh Owl	<i>Asio capensis</i>	LC





Common Name	Species Name	Conservation Status
Marsh Sandpiper	<i>Tringa stagnatilis</i>	LC
Marsh Warbler	<i>Acrocephalus palustris</i>	LC
Mocking Cliff-chat	<i>Thamnolaea cinnamomeiventris</i>	LC
Namaqua Dove	<i>Oena capensis</i>	LC
Natal Spurfowl	<i>Pternistis natalensis</i>	LC
Neddicky Neddicky	<i>Cisticola fulvicapilla</i>	LC
Northern Black Korhaan	<i>Afrotis afraoides</i>	LC
Orange-breasted Bush-shrike	<i>Telophorus sulfureopectus</i>	LC
Orange-breasted Waxbill	<i>Amandava subflava</i>	LC
Pearl-breasted Swallow	<i>Hirundo dimidiata</i>	LC
Pearl-spotted Owlet	<i>Glaucidium perlatum</i>	LC
Peregrine Falcon	<i>Falco peregrinus</i>	LC
Pied Avocet	<i>Recurvirostra avosetta</i>	LC
Pied Crow	<i>Corvus albus</i>	LC
Pied Kingfisher	<i>Ceryle rudis</i>	LC
Pin-tailed Whydah	<i>Vidua macroura</i>	LC
Plain-backed Pipit	<i>Anthus leucophrys</i>	LC
Purple Heron	<i>Ardea purpurea</i>	LC
Purple Indigobird	<i>Vidua purpurascens</i>	LC
Rattling Cisticola	<i>Cisticola chiniana</i>	LC
Red-backed Shrike	<i>Lanius collurio</i>	LC
Red-billed Firefinch	<i>Lagonosticta senegala</i>	LC
<b>Red-billed Oxpecker</b>	<b><i>Buphagus erythrorhynchus</i></b>	<b>NT</b>
Red-billed Quelea	<i>Quelea quelea</i>	LC
Red-billed Teal	<i>Anas erythrorhyncha</i>	LC
Red-breasted Swallow	<i>Hirundo semirufa</i>	LC
Red-capped Lark	<i>Calandrella cinerea</i>	LC
Red-chested Cuckoo	<i>Cuculus solitarius</i>	LC
Red-collared Widowbird	<i>Euplectes ardens</i>	LC
Red-crested Korhaan	<i>Lophotis ruficrista</i>	LC
Red-eyed Dove	<i>Streptopelia semitorquata</i>	LC
Red-faced Mousebird	<i>Urocolius indicus</i>	LC
Red-headed Finch	<i>Amadina erythrocephala</i>	LC
Red-knobbed Coot	<i>Fulica cristata</i>	LC
Red-winged Starling	<i>Onychognathus morio</i>	LC
Reed Cormorant	<i>Phalacrocorax africanus</i>	LC
Rock Dove	<i>Columba livia</i>	LC
Rock Martin	<i>Hirundo fuligula</i>	LC
Ruff Ruff	<i>Philomachus pugnax</i>	LC
Rufous-naped Lark	<i>Mirafraga africana</i>	LC



Common Name	Species Name	Conservation Status
Sabota Lark	<i>Calendulauda sabota</i>	LC
Scaly-feathered Finch	<i>Sporopipes squamifrons</i>	LC
Secretarybird Secretarybird	<i>Sagittarius serpentarius</i>	LC
Shaft-tailed Whydah	<i>Vidua regia</i>	LC
Shikra Shikra	<i>Accipiter badius</i>	LC
Short-toed Rock-thrush	<i>Monticola brevipes</i>	LC
Southern Black Flycatcher	<i>Melaenornis pammelaina</i>	LC
Southern Black Tit	<i>Parus niger</i>	LC
Southern Boubou	<i>Laniarius ferrugineus</i>	LC
Southern Grey-headed Sparrow	<i>Passer diffusus</i>	LC
Southern Masked-weaver	<i>Ploceus velatus</i>	LC
Southern Pale Chanting Goshawk	<i>Melierax canorus</i>	LC
Southern Pied Babbler	<i>Turdoides bicolor</i>	LC
Southern Pochard	<i>Netta erythrophthalma</i>	LC
Southern Red Bishop	<i>Euplectes orix</i>	LC
Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>	LC
Speckled Mousebird	<i>Colius striatus</i>	LC
Speckled Pigeon	<i>Columba guinea</i>	LC
Spotted Eagle-owl	<i>Bubo africanus</i>	LC
Spotted Flycatcher	<i>Muscicapa striata</i>	LC
Spotted Thick-knee	<i>Burhinus capensis</i>	LC
Spur-winged Goose	<i>Plectropterus gambensis</i>	LC
Squacco Heron	<i>Ardeola ralloides</i>	LC
Steppe Buzzard	<i>Buteo vulpinus</i>	LC
Streaky-headed Seedeater	<i>Crithagra gularis</i>	LC
Striped Pipit	<i>Anthus lineiventris</i>	LC
Swainson's Spurfowl	<i>Pternistis swainsonii</i>	LC
Tawny-flanked Prinia	<i>Prinia subflava</i>	LC
Temminck's Courser	<i>Cursorius temminckii</i>	LC
Thick-billed Weaver	<i>Amblyospiza albifrons</i>	LC
Three-banded Plover	<i>Charadrius tricollaris</i>	LC
Verreaux's Eagle	<i>Aquila verreauxii</i>	LC
Village Indigobird	<i>Vidua chalybeata</i>	LC
Village Weaver	<i>Ploceus cucullatus</i>	LC
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>	LC
Violet-eared Waxbill	<i>Granatina granatina</i>	LC
Wattled Starling	<i>Creatophora cinerea</i>	LC
Whiskered Tern	<i>Chlidonias hybrida</i>	LC
White-backed Duck	<i>Thalassornis leuconotus</i>	LC
White-backed Mousebird	<i>Colius colius</i>	LC



Common Name	Species Name	Conservation Status
White-bellied Sunbird	<i>Cinnyris talatala</i>	LC
White-breasted Cormorant	<i>Phalacrocorax carbo</i>	LC
White-browed Scrub-robin	<i>Cercotrichas leucophrys</i>	LC
White-browed Sparrow-weaver	<i>Plocepasser mahali</i>	LC
White-crested Helmet-shrike	<i>Prionops plumatus</i>	LC
White-faced Duck	<i>Dendrocygna viduata</i>	LC
White-fronted Bee-eater	<i>Merops bullockoides</i>	LC
White-rumped Swift	<i>Apus caffer</i>	LC
White-throated Robin-chat	<i>Cossypha humeralis</i>	LC
White-throated Swallow	<i>Hirundo albigularis</i>	LC
White-winged Tern	<i>Chlidonias leucopterus</i>	LC
White-winged Widowbird	<i>Euplectes albonotatus</i>	LC
Willow Warbler	<i>Phylloscopus trochilus</i>	LC
Wing-snapping Cisticola	<i>Cisticola ayresii</i>	LC
Wood Sandpiper	<i>Tringa glareola</i>	LC
Woodland Kingfisher	<i>Halcyon senegalensis</i>	LC
Yellow Canary	<i>Crithagra flaviventris</i>	LC
Yellow-bellied Eremomela	<i>Eremomela icteropygialis</i>	LC
Yellow-billed Duck	<i>Anas undulata</i>	LC
Yellow-billed Egret	<i>Egretta intermedia</i>	LC
Yellow-billed Kite	<i>Milvus aegyptius</i>	LC
<b>Yellow-billed Stork</b>	<b><i>Mycteria ibis</i></b>	<b>NT</b>
Yellow-crowned Bishop	<i>Euplectes afer</i>	LC
Yellow-fronted Canary	<i>Crithagra mozambicus</i>	LC
Yellow-fronted Tinkerbird	<i>Pogoniulus chrysoconus</i>	LC
Yellow-throated Petronia	<i>Petronia superciliaris</i>	LC
Zitting Cisticola	<i>Cisticola juncidis</i>	LC

Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for a Portion of Portion 170 of the Farm Paardekraal 279 JQ

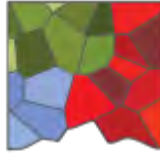
APM3249



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ENVIRONMENTAL

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## **Appendix E: Heritage Impact Assessment**



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## Environmental Authorisation Application: Prospecting Right Application for Paardekraal 279JQ & Waterval 306JQ, Phase 2

## Heritage Basic Assessment Report

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**Project Number:**

APM3249

**Prepared for:**

Rustenburg Platinum Mines (Pty) Ltd

July 2015

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(C.E.O)  
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This document has been prepared by Digby Wells Environmental.

<b>Report Type:</b>	<b>Heritage Basic Assessment Report</b>
<b>Project Name:</b>	<b>Environmental Authorisation Application: Prospecting Right Application for Paardekraal 279JQ &amp; Waterval 306JQ, Phase 2</b>
<b>Project Code:</b>	<b>APM3249</b>

<b>Name</b>	<b>Responsibility</b>	<b>Signature</b>	<b>Date</b>
<b>Natasha Higgitt</b> Assistant Heritage Consultant ASAPA Member No.335	Overall Report Compiler and site visit		July 2015
<b>Johan Nel</b> HRM Unit Manager ASAPA Member No 095	1 <sup>st</sup> Review		17 July 2015

*This report is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose without Digby Wells Environmental prior written consent.*

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I, Natasha Higgitt as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Rustenburg Platinum Mines (Pty) Ltd, other than fair remuneration for work performed, specifically in connection with the Heritage Resources Management (HRM) Process for the proposed Paardekraal and Waterval Prospecting Right Application Project, North-West Province.



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Full name: Natasha Higgitt  
Title/ Position: Assistant Heritage Management Consultant: Archaeologist  
Qualification(s): BA Honours in Archaeology  
Experience (years): 4 years' experience  
Registration: Association of Southern African Professional Archaeologists (ASAPA)  
South African Museums Association (SAMA)

## EXECUTIVE SUMMARY

Digby Wells Environmental (Digby Wells) has been appointed by Rustenburg Platinum Mines (Pty) Ltd (RPM) to submit an Environmental Authorisation (EA) application in support of a Prospecting Right Application (PRA). The PRA is for portion 21 of the farm Paardekraal 279JQ and portion 53 of Waterval 306JQ in the North-West Province near Rustenburg. The EA and PRA will be completed in terms of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014, with reference to listed activity 20 of GN R.983.

This report constitutes a Heritage Basic Assessment Report (HBAR) to inform the overall Basic Assessment Report (BAR).

The PRA is for the prospecting of Platinum Group Metals (PGM) and associated minerals. Prospecting activities will include invasive and non-invasive methods. Non-invasive methods will include a ground magnetic survey and a non-intrusive survey that will not have an impact on the receiving environment. Invasive methods will include diamond core drilling to ascertain the stratigraphy sequence and the reef horizons of the ore body. It is anticipated that a maximum of four boreholes will be drilled over a five year period.

The following Scope of Work (SoW) has been completed:

- Brief literature review based on existing impact assessment reports in the surrounding area and available databases; and
- Historical layering to identify potential structures older than 60 years.
- Pre-disturbance survey of the proposed study area to verify select heritage resources identified during desktop research and to record the current state of the cultural landscape;
- Statement of Significance;
- Impact Assessment and possible sources of risk; and
- Recommend mitigation measures.

Geologically, the study area is underlain by the Bushveld complex. The study area lies within the Western Limb of the Rustenburg Layered Suite that is a mafic formation (magma flows), which does not contain any sedimentary layers and therefore no fossils

Archaeologically, Stone Age and Late Farming Community (LFC) sites have been recorded within the regional study area, though none of these sites have been identified within the proposed prospecting areas. Most of the site specific study area is dominated by agricultural fields and a sewage treatment facility (Paardekraal site only).

A historical werf (Wf-001) was identified within the Waterval Prospecting site specific study area. The werf is currently still occupied and older than 60 years, determined through



historical aerial images dating to 1955. The werf was assigned a negligible cultural significance rating taking into account aesthetics, historical and social aspects.

Potential impacts to heritage resources include accidental damage or destruction to heritage resources associated with the werf during site clearance for temporary road/route construction, prospecting sites and rehabilitation purposes. However, these impacts are highly unlikely as the prospecting is not likely to occur in an occupied werf.

Additional impacts can include the accidental exposure of unidentified heritage resources and the subsequent damage and/or destruction of these heritage resources.

Based on the findings of this report, Digby Wells recommends the following mitigation and management plans:

- Exemption from further palaeontological assessments for the proposed infrastructure footprint as the palaeo-sensitivity is insignificant.
- A 50 m buffer must be maintained around the historical werf at the Waterval Prospecting area;
- Chance Finds Procedures must be developed and implemented for both the Waterval and Paardekraal project areas as part of the EMP that clearly describe the process and appropriate management of the exposure of previously unidentified heritage resources; and
- Additionally, should the prospecting prove to be successful and a Mining Right be applied for, a full HRM process should be implemented inclusive of a Heritage Impact Assessment (HIA).



## LIST OF ACRONYMS, ABBREVIATIONS AND TERMS

Abbreviation	Meaning
<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>BA</b>	Bachelor of Arts
<b>Bsc</b>	Bachelor of Science
<b>Digby Wells</b>	Digby Wells Environmental
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>ESA</b>	Early Stone Age
<b>ESTA</b>	Extension of Security of Tenure Act (Act No. 62 of 1997)
<b>GIS</b>	Geographical Information System
<b>GPS</b>	Global Positioning System
<b>HBAR</b>	Heritage Basic Assessment Report
<b>HIA</b>	Heritage Impact Assessment
<b>Hons</b>	Honours degree
<b>HRA</b>	Heritage Resources Authority
<b>HRM</b>	Heritage Resources Management
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>LFC</b>	Late Farming Community also known as Late Iron Age
<b>LSA</b>	Late Stone Age
<b>MA</b>	Master of Arts
<b>MPRDA</b>	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
<b>MSA</b>	Middle Stone Age
<b>MSc</b>	Master of Science
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NWPRHA</b>	North West Provincial Heritage Resources Authority
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAHRIS</b>	South African Heritage Resources Information System
<b>SAMA</b>	South African Museum Association
<b>SoW</b>	Scope of Work
<b>Ste</b>	Structure
<b>UNESCO</b>	United Nations Education, Scientific and Cultural Organisation
<b>UP</b>	University of Pretoria
<b>Wits</b>	University of the Witwatersrand



## GLOSSARY

Term	Definition
<b>Alter</b>	Any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.
<b>Archaeological</b>	Material remains resulting from human activity that are in a state of disuse and older than 100 years, including artefacts, human and hominid remains and artificial features and structures. Rock art created through human agency older than 100 years, including any area within 10 m of such representation. Wrecks older than 60 years - either vessels or aircraft - or any part thereof that was wrecked in South Africa on land, internal or territorial waters, and any cargo, debris or artefacts found or associated therewith. Features, structures and artefacts associated with military history that are older than 75 years and the sites on which they are found, e.g. battlefields.
<b>Archaeologist</b>	A trained professional who uses scientific methods to excavate record and study archaeological sites and deposits.
<b>Ceramic (syn. pottery)</b>	In an archaeological context any vessel or other object produced from natural clay that has been fired. Indigenous ceramics associated with Farming Communities are low-fired wares, typically found as potsherds. Imported and more historic ceramics generally include high-fired wares such as porcelain, stoneware, etc.
<b>Ceramic facies / facies</b>	Subgroups of a primary ceramic tradition or sequence. Typically used in ceramic analyses. Various facies are attributed to different temporal periods based of radiometric dates obtained from archaeological contexts. Facies are often used to infer cultural identity of archaeological groups. However, in context of this study identified ceramic facies merely provide a relative temporal context for archaeological sites in the landscape.
<b>Development</b>	Any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including: <ul style="list-style-type: none"> <li>■ Construction, alteration, demolition, removal or change of use of a place or a structure at a place</li> <li>■ Carrying out any works on or over or under a place. Subdivision or consolidation of land comprising, a place, including the structures or airspace of a place.</li> </ul>



	<ul style="list-style-type: none"> <li>■ Constructing or putting up for display signs or hoardings.</li> <li>■ Any change to the natural or existing condition or topography of land.</li> <li>■ Any removal or destruction of trees, or removal of vegetation or topsoil.</li> </ul>
<b>Early Stone Age</b>	The South African ESA dates from ~3 Mya to c. 250 Kya. This period is associated with later <i>Australopithecus</i> and early <i>Homo</i> species. The lithic industries that characterise the ESA include Oldowan and Early Acheulian, typically as simple core tools, choppers handaxes and cleavers.
<b>Farming Community/ies</b>	Term signifying the appearance in the southern African archaeological of Bantu-speaking agricultural based societies from the early first millennium CE. The term replaces the <i>Iron Age</i> as a more accurate description for groups who practiced agriculture and animal husbandry, extensive manufacture and use of ceramics, and metalworking. The Farming Community period is divided into an Early and Late phase. The use of Later Farming Communities especially removes the artificial boundary between archaeology and history.
<b>Formal protection</b>	Places with qualities so exceptional that they are of special national significance as national heritage sites or that have special qualities as provincial heritage sites.
<b>General protection</b>	General protections are afforded to: <ul style="list-style-type: none"> <li>■ Objects protected in terms of laws of foreign states.</li> <li>■ Structures older than 60 years.</li> <li>■ Archaeological and palaeontological sites and material and meteorites.</li> <li>■ Burial grounds and graves.</li> <li>■ Public monuments and memorials.</li> </ul>
<b>Grave</b>	A place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
<b>Heritage Impact Assessment (HIA)</b>	An assessment of the cultural significance of, and possible impacts on, diverse heritage resources that may be affected by a proposed development. A HIA may include several specialist elements such as archaeological, built environment and palaeontological studies. The HIA must supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a



	development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved. The content of HIA reports are clearly outlined in Section 38(3) of the NHRA and SAHRA Minimum Standards.
<b>Heritage resource</b>	Any place or object of cultural significance.
<b>Heritage resources management</b>	Process required when development is intended categorised as: Any linear development exceeding 300m in length. Construction of a bridge or similar structure exceeding 50 m in length. Any activity which will change the character of a site exceeding 0.5 hectares in extent or involving three or more existing erven or subdivisions thereof or that have been consolidated within the past five years or costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority. Re-zoning of a site exceeding one hectare in extent. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
<b>Late Farming Community/ies</b>	Farming Communities who either developed / evolved from EFC groups, or who migrated into southern African from the late first millennium / early second millennium CE. The LFC period evidences distinct changes in socio-political organisation, settlement patterns, trade and economic activities, including extensive trade routes. The LFC period is generally dated from c. 1000 CE well into the modern historical period of the nineteenth century.
<b>Late Stone Age</b>	The South African LSA dates from ~30 Kya. This period is associated with modern <i>Homo sapiens sapiens</i> and the complex hunter-gatherer societies, ancestral to the Bushmen / San and Khoi. The LSA lithic assemblage contains microlithic technology and composite tools such as arrows commonly produced from fine-grained cryptocrystallines, quartz and chert. The LSA is also associated with archaeological rock art including both paintings and engravings.
<b>Middle Stone Age</b>	The South African MSA dates from ~300 Kya to c. 30 Kya. This period is associated with the changing behavioural patterns and the emergence of modern cognitive abilities in early <i>Homo sapiens species</i> . The lithic industries that characterise the MSA are typically more complex tools with diagnostic identifiers, including convergent flake scars, multi-faceted platforms, retouch and backing. Assemblages are characterised as refined lithic technologies such as prepared core techniques, retouched blades and points manufactured from good quality raw material.



<b>National estate</b>	<p>The national estate as defined in Section 3 of the NHRA, i.e. heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations. The national estate may include:</p> <ul style="list-style-type: none"> <li>Places, buildings, structures and equipment of cultural significance.</li> <li>Places to which oral traditions are attached or which are associated with living heritage.</li> <li>Historical settlements and townscapes.</li> <li>Landscapes and natural features of cultural significance.</li> <li>Geological sites of scientific or cultural importance.</li> <li>Archaeological and palaeontological sites.</li> <li>Graves and burial grounds, including ancestral graves, royal graves and graves of traditional leaders, graves of victims of conflict, graves of individuals designated by the Minister by notice in the Gazette, historical graves and cemeteries, and other human remains which are not covered in terms of the National Health Act, 2003.</li> <li>Sites of significance relating to the history of slavery in South Africa.</li> <li>Movable objects, including objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; objects to which oral traditions are attached or which are associated with living heritage; ethnographic art and objects; military objects; objects of decorative or fine art; objects of scientific or technological interest.</li> <li>Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).</li> </ul>
<b>Palaeontological</b>	<p>Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.</p>
<b>Pedestrian survey</b>	<p>A method of examining a site in which surveyors, spaced at regular intervals, systematically walk over the area being investigated.</p>
<b>Pre-disturbance survey (syn. reconnaissance)</b>	<p>A survey to record a site as it exists, with all the topographical and other information that can be collected, without excavation or other disturbance of the site.</p>
<b>Public monuments / memorials</b>	<p>All monuments and memorials: erected on land belonging to any branch of central, provincial or local government; on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.</p>



<b>South African War</b>	Also known as the Second Anglo-Boer War, the Boer War, Second War of Independence. War between the Zuid-Afrikaansche Republiek (South African Republic / Transvaal) and the United Kingdom / British Empire (including soldiers for other British Colonies) from 1 October 1899 until 31 May 1902.
<b>Structure</b>	Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.
<b>Tangible heritage</b>	Physical heritage resources such as archaeological sites, historical buildings, burial grounds and graves, fossils, etc. Tangible heritage may be associated with intangible elements, e.g. the living cultural traditions, rituals and performances associated with burial grounds and graves and deceased persons.



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Appendix A: Specialist CV

Appendix B: Site list

## 1 Introduction

Digby Wells Environmental (Digby Wells) has been appointed by Rustenburg Platinum Mines (Pty) Ltd (RPM) to submit an Environmental Authorisation (EA) application in support of a Prospecting Right Application (PRA). The PRA is for portion 21 of the farm Paardekraal 279 JQ and portion 53 of Waterval 306 JQ in the North West Province near Rustenburg. The EA and PRA will be completed in terms of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 with reference to listed activity 20 of GN R. 983.

Digby Wells was appointed to undertake the necessary environmental and social studies required for the EA and PRA. This report constitutes a Heritage Basic Assessment Report (HBAR) to inform the overall Basic Assessment Report (BAR).

### 1.1 Terms of Reference

The Terms of Reference (ToR) for the HBAR were to conduct a Heritage Resources Management (HRM) Process as part of the BAR of the Project in accordance with section 38(8) of the National Heritage Resources Act, 1999 (NHRA).

### 1.2 Scope of Work

The Scope of Work (SoW) for the HBAR included:

- Brief literature review based on existing impact assessment reports in the surrounding area and available databases; and
- Historical layering to identify potential structures older than 60 years.
- Reconnaissance of the proposed study area to verify select heritage resources identified during desktop research and to record the current state of the cultural landscape;
- Statement of Significance;
- Impact Assessment and possible sources of risk; and
- Recommend mitigation measures.

### 1.3 Policy and Legal Framework

#### 1.3.1 National Legislation and Policies

##### ***1.3.1.1 The South African Constitution***

The South African Constitution supersedes all other legislation, entitling every South African citizen to certain rights (with responsibilities), and imposes obligations and restrictions on

individuals or entities. In terms of heritage, the Constitution entitles every person or community to the right to enjoy their culture, practise their religion and use their language.

### **1.3.1.2 National Heritage Resources Act, 1999 (NHRA)**

The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa. This Act considers various heritage resources as forming part of the national estate, contemplated in Section 3. In addition, certain other categories are afforded automatic formal or general protection. Sections considered relevant to this project are outlined below:

- Formal protection:
  - National and provincial heritage sites, Section 27;
  - Certain types of protected areas, Section 28; and
  - Heritage areas, Section 32.
- General protection:
  - Certain structures with demonstrable cultural significance or that are older than 60 years, Section 34;
  - Archaeological and palaeontological resources, Section 35;
  - Burial grounds and graves, Section 36; and
  - All public monuments and memorials, Section 37.

Section 5 of the NHRA encapsulates general principles for HRM that this specialist heritage component of the Project aims to adhere to. Section 38 outlines the HRM process and minimum requirements that need to be complied with namely:

- Subsection (8) requires a HIA study to be conducted if an impact assessment is required in terms of any other Act. In this instance impact assessments are required by several Acts, but notably the NEMA and MPRDA; and
- Subsection (3) outlines the minimum information that must be included in a HIA report.

This HBAR was completed to comply in part with sections 38 of the Act and will be submitted to the South African Heritage Resources Agency (SAHRA) and the North West Provincial Heritage Resources Authority (NWPHRA) for statutory comment.

Additionally, SAHRA published prerequisites for mining and prospecting projects with regards to heritage resources in 2006. The NHRA requires a permit if anyone wishes to disturb or destroy any heritage resources. In order to do this, a specialist report is required to allow the relevant authority to assess whether this approval can be granted. As such, no mining, prospecting or development can take place without prior heritage assessment and approval.



### **1.3.1.3 National Environmental Management Act, 1998 (NEMA)**

This Act provides that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions so as to ensure that development serves present and future generations. The Act further sets out the process for public participation in terms of the 2014 NEMA Regulations

A BAR must be completed when a development triggers any activity in Listing Notice 1 of the EIA Regulations, 2014. Chapter 4 Section 19 states that where a basic assessment must be applied for, the BAR consider impacts and risks associated with the proposed project, it must include specialist reports (i.e. heritage and cultural aspects and impacts must be considered) and an Environmental Management Plan Report (EMPr).

### **1.3.1.4 Mineral and Petroleum Resources Development Act, 2002 (MPRDA)**

Section 5(4) states that no person may mine or commence with any work incidental thereto on any area without an approved environmental management programme or approved EMPr.

## **1.4 Constraints and Limitations**

The following constraints and limitations were experienced as part of the report:

- The NEMA Regulations that came into effect on 8 December 2014 significantly constrains timeframes within which studies can be completed;
- The HRM process which the HBAR followed was scaled down to commensurate with the minimum needs for a BAR;
- Many tangible heritage resources, specifically archaeological resources, commonly occur below the visible surface, and may not be identified, documented and assessed without intrusive and destructive methods. Intrusive archaeological assessments require permits issued as per section 35 of the NHRA, however these are not issued as part of Impact Assessments. Therefore, the findings in the reviewed literature, and especially existing HIA reports, are in themselves limited to surface observations.

## **1.5 Expertise of the Specialist<sup>1</sup>**

**Natasha Higgitt compiled the overall HBAR.** She obtained her Bachelor of Arts (BA) Honours degree in Archaeology in 2010 from the University of Pretoria. She currently holds the position of Assistant Heritage Consultant: Archaeology Specialist at Digby Wells. She has more than 4 years' experience in archaeological survey and gained further generalist heritage experience since her appointment at Digby Wells in South Africa and Liberia.

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<sup>1</sup> Detailed curricula vitae of the specialists are attached as Appendix A

Natasha is a professional member of the Association of Southern African Archaeologists (ASAPA) (*Member No. 335*).

**Johan Nel undertook the first technical review of this HBAR.** He has more than 13 years of combined experience in the field of HRM including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. He has gained experience both within urban settings and remote rural landscapes. Since 2010 he has been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into EIA's. Many of the projects since have required compliance with IFC requirements such as Performance Standard 8: Cultural Heritage. This exposure has allowed Johan to develop and implement a HRM approach that is founded on international best practice, leading international conservation bodies such as the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and ICOMOS and aligned to the South African legislation. Johan has worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone.

Johan is a professional member of ASAPA (*Member No. 095*) and ICOMOS South Africa (*Member No. 13839*).

## 2 Project Background

This section summarises the basic project information for the Project.

### 2.1 General Project overview

RPM, a subsidiary of Anglo American Platinum Limited (AAP), intends to apply for a PRA and EA for portion 53 of the farm Waterval 306 JQ and portion 21 of the farm Paardekraal 279 JQ (see Table 2-1). The PRA is for the prospecting of Platinum Group Metals (PGM) and associated minerals.

**Table 2-1: Location of the prospecting areas**

<b>Province</b>	North West Province
<b>Magisterial District / Local Authority</b>	Rustenburg Magisterial District
<b>District Municipality</b>	Bojanala District Municipality
<b>Local Municipality</b>	Rustenburg Local Municipality
<b>Nearest Town</b>	Rustenburg (7 km north to Paardekraal study area; 2 km from Waterval study area)
<b>Property Name and Number</b>	Waterval 306JQ portion 53
	Paardekraal 279JQ portion 21
<b>1: 50 000 Map Sheet</b>	2527CB Rustenburg



<b>GPS Co-ordinates (relative centre point of study area)</b>	Waterval - -25.664425/ 27.275524
	Paardekraal - -25.598503/ 27.298974

The regional, local and site specific study area are depicted in Figure 3-1 to Figure 3-3 in section 3 below.

Prospecting activities will include invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey and a non-intrusive survey that will not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience will be used along with and remote sensing methods such as satellite and aerial imagery to define the extent of the ore body. Airborne geophysical surveys and field reconnaissance of the area will be also be undertaken to aid in the determination of the potential extent of the ore body.

### 2.1.1 Construction Phase (Site clearing)

No construction will take place as no permanent infrastructure will be established. Activities will be limited to possible temporary access roads, as well as the clearing of vegetation for the construction of the prospecting drill site. Three sumps will be constructed to separate and store oil, sludge and water. The prospecting sites will be an area approximately 10 m x 10 m. Cleared topsoil will be stockpiled on site to a maximum height of 1 m.

### 2.1.2 Operational Phase (Drilling)

Invasive methods will include diamond core drilling to ascertain the stratigraphic sequence and the reef horizons of the ore body. It is anticipated that a maximum of four boreholes will be drilled over a five year period.

No permanent infrastructure will be constructed as part of the prospecting activities.

### 2.1.3 Decommissioning Phase (Rehabilitation)

The sumps, access roads/tracks and prospecting sites will be rehabilitated following the prospecting activities.

The rehabilitation activities will include the following:

- Rehabilitation of each prospecting drill site concurrently with the prospecting work schedule. As the drill rig is removed from the site, rehabilitation will commence; and
- Where necessary, the site will be ripped where the soil has become compressed and compacted.





## 3 Methodology

### 3.1 Defining Study Areas

Notwithstanding that this is a basic assessment; the baseline data collection formed the foundation on which the evaluation of cultural significance and impact assessment was based. Defined study areas must therefore be useful for the impact assessment phase. The IFC (2012) generally defines a “study area” for an impact assessment as the area most likely to experience impacts arising from or to exert an influence on, the project or activity being assessed.

The relevance of the this distinction to defining the study area arises from the fact that heritage resources do not exist in isolation to the greater natural and social (including socio-cultural, -economic and -political).environment. In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three ‘concentric’ study areas were defined for the purposes of this study. These areas are defined below; each one encompasses its precursor and exceeds it in scale:

- The *regional study area* - this area was defined as the district municipality. Where necessary, the regional study area was extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts as shown in Figure 3-1.
- The *local study area* – the area most likely to be influenced by any changes to heritage resources in the study area, or where project development could cause heritage impacts. This area was defined as the immediate surrounding properties / farms, as well as the affected local municipality. The local study area was specifically examined to provide a backdrop to the socio-economic conditions within which the proposed development will occur. (See Figure 3-2)
- The *site-specific study area* – this is the area where heritage impacts are most probable due to development. This area is defined as the extent of the farm portions of the proposed study area including any buffer areas around the study area that may be required. (See Figure 3-3)

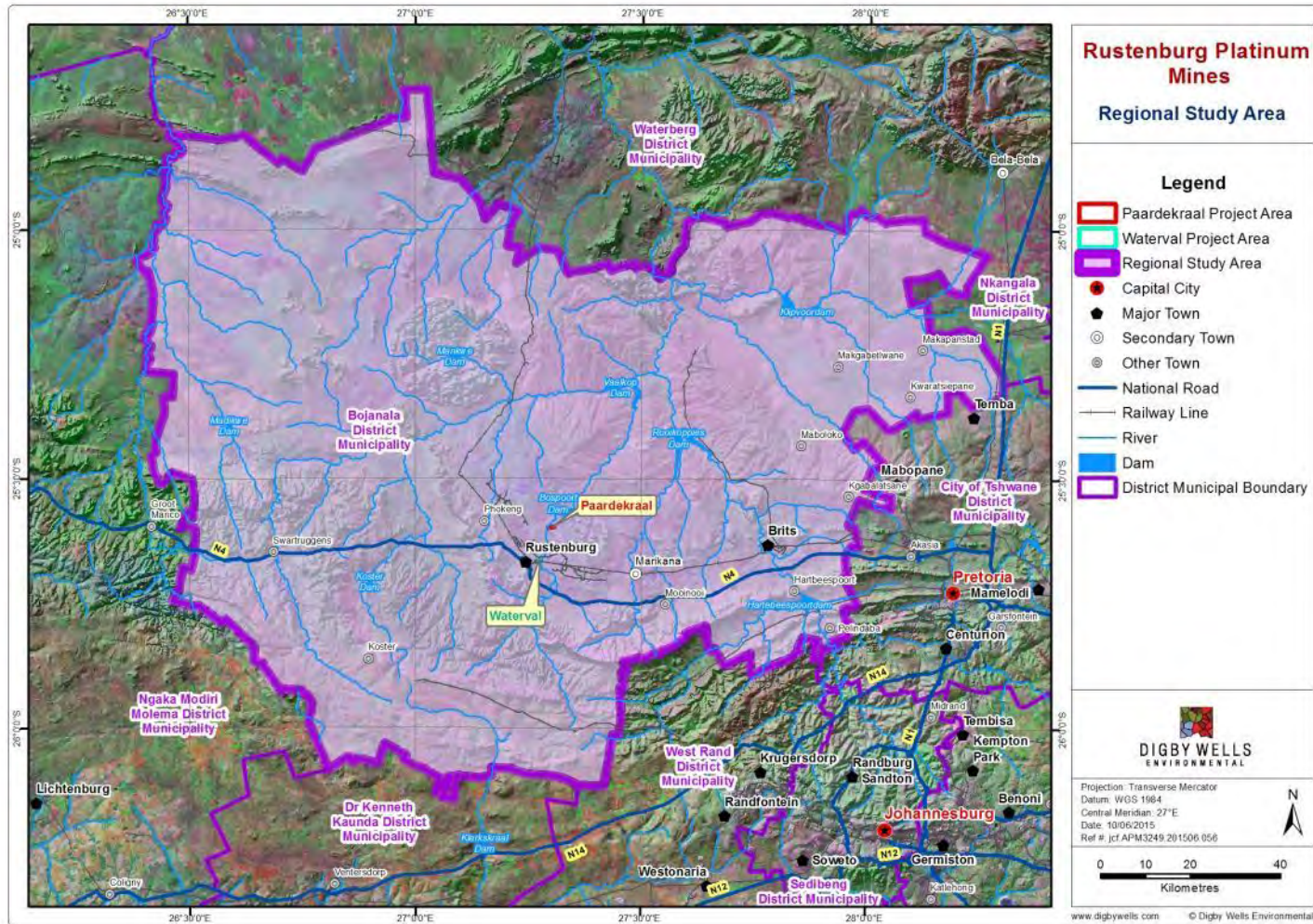


Figure 3-1: Regional Study Area

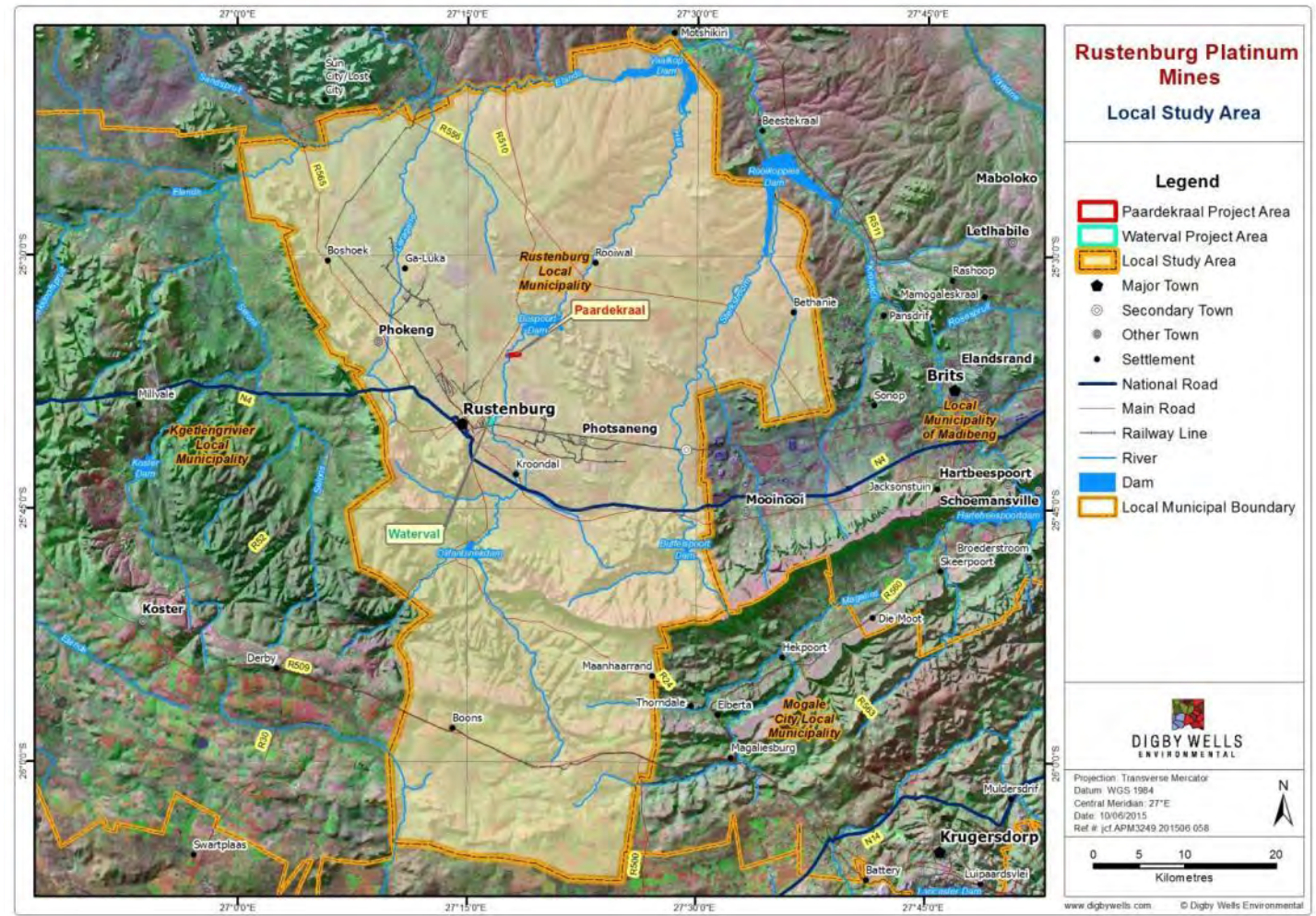


Figure 3-2: Local Study Area

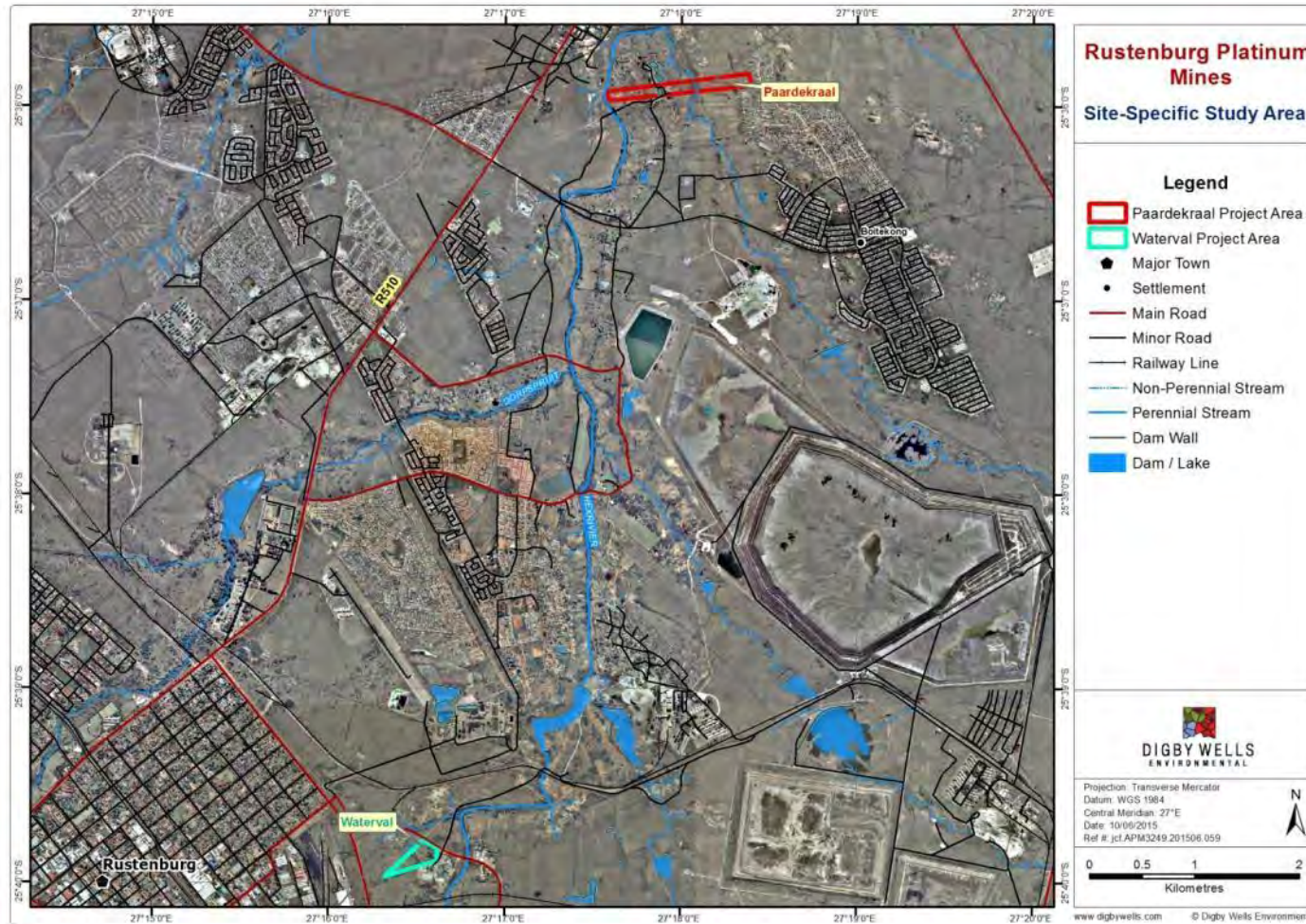


Figure 3-3: Site Specific Study Areas



### 3.1.1 Data Collection

Gathered information assisted in the development of the cultural heritage baseline profile, determination of cultural significance, and assessment of impacts. Qualitative and quantitative data were collected for the HBAR.

### 3.1.2 Qualitative Data Collection

Information sources that were consulted included reports located in the South African Heritage Resources Information System (SAHRIS) database and the University of the Witwatersrand (WITS) Archaeology Site Database. Relevant sources were cited and included in the reference list in Section 9 and in Table 3-1 below.

**Table 3-1: Summary of reviewed information sources**

Relevant Previous Heritage Studies		
Author	Report Type	Area/development
Coetzee, 2008	Cultural Heritage Survey	Rietfontein 338 JQ
Higgitt, 2015	Heritage Scoping Report	Lanxess Chrome Mine
Huffman & Schoeman, 2002	Archaeological Study	Western Limb Tailings Re-Treatment Project
Magoma, 2014	Phase 1 AIA	Marang B substation and 2km 400kV Powerlines
Van Schalkwyk, 2003	Cultural Heritage Survey	Boitekong Township Development Area
Van Schalkwyk & Pelsler, 1997	Cultural Heritage Survey	Kroondal 304JQ
van Vollenhoven & de Bruyn, 2014	Updated HIA	Anglo American Platinum: Rustenburg Platinum Mines

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using Geographic Information System (GIS). The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence/absence of visible features; and
- Identifies potential locations where heritage resources may exist within an area.

Cartographic sources referred to in this report are listed in Table 3-2 below.


**Table 3-2: Relevant reviewed cartographic sources**

Historical maps						
Map series		Name / number			Date	
Major Jackson		Rustenburg			1902-1909	
Aerial photographs						
Job no.	Flight plan	Photo no.	Map ref.	Area	Date	Reference
350	004	05502	2527	Rustenburg	1955	1955/004
350	005	05523	2527	Rustenburg	1955	1955/005

### 3.2 Quantitative Data Collection

Field based data collection was undertaken by Natasha Higgitt, a qualified and accredited archaeologist on 7 July 2015. The project area was surveyed through vehicular and pedestrian methods. Each proposed project area was inspected for heritage resources. The survey was recorded as a GPS track logs. Identified heritage resources were mapped as GPS waypoints and documented through photographic and written records.

### 3.3 Site Naming

Sites identified during the field survey are prefixed by the Digby Wells Project code, followed by the map sheet number, relevant period / feature code and site number, e.g. **APM3249/2527CB/Wf-001**.

This number may be shortened on any plans or maps to the period / feature code with the site number used in that report. For example: **Wf-001**

Site identified in previous relevant studies are prefixed by the SAHRIS case or map number and the original site name used by the author, i.e. **2529DD/HH06**

### 3.4 Mitigation Measures and Recommendations

The desired outcome of an impact assessment is the removal of negative impacts on heritage resources through the implementation of feasible mitigation measures. The mitigation and management measures recommended in this section comply with the General Principles set out under Section 5 of the NHRA.

Designation	Recommended mitigation
Negligible	Sufficiently recorded, no mitigation required
Low	Resource must be recorded before destruction, including detailed site mapping, surface sampling may be required
Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Medium High	Project design should aim to reduce or remove changes; Mitigation of resource to include extensive sampling and recording, e.g. test excavation, analyses, etc.
High	Project design must aim to avoid change to resource; Partly conserved, Conservation Management Plan (CMP)
Very High	Project design must change to avoid all change to resource; Conserved in entirety, CMP

**Box 1: Recommended minimum level of required mitigation**



The recommendations further considered the cultural significance of heritage resources and were informed by recommended minimum level of mitigation as published in the SAHRA Minimum Standards (See Box 1).

Recommended mitigation is therefore divided into two categories: *project related* and *mitigation of heritage resources* defined below.

- Project-related mitigation requires changes or amendments to project design, planning and siting of infrastructure to avoid or reduce physical impacts on heritage resources. Project-related mitigation measures are always the preferred option, especially where heritage resources with higher cultural significance will be impacted on. Project-related mitigation may include:
  - *In situ* preservation (i.e. no-development) of heritage resources for which Conservation Management Plans (CMPs) are required; and
  - Conservation of heritage resources through, for example, incorporating the resources into project design and planning, for which CMPs are also required.
- Mitigation of heritage resources may be necessary where project-related mitigation will not sufficiently conserve or preserve heritage resources, thus resulting in partial or complete changes (including destruction) to a resource. Such resources need to be mitigated to ensure that they are fully recorded, documented and researched before any negative change occurs. This may require mitigation such as:
  - Intensive detailed recording of sites through various non-intrusive techniques to create a documentary record of the site – “preservation by record”;
  - Intrusive recording and sampling such as shovel test pits (STPs) and excavations, relocation (usually burial grounds and graves, but certain types of sites may be relocated), restoration and alteration. Any form of intrusive mitigation is a regulated permitted activity for which permits need to be issued by the relevant heritage authorities. Such mitigation may result in a reassessment of the value of a resource that could require conservation measures to be implemented. Alternatively, an application for a destruction permit may be made if the resource has been sufficiently sampled; and
  - Where resources have negligible significance the specialist may recommend that no further mitigation is required and the site may be destroyed, for which a destruction permit must be applied for.

Appropriate mitigation measures were identified for each impact, and the procedure discussed above was to assess the possible consequence, probability and significance of each impact post-mitigation.

The post-mitigation rating provided an indication of the significance of residual impacts, while the difference between an impact’s pre- and post-mitigation ratings represents the degree to



which the recommended mitigation measures are expected to be effective in reducing or ameliorating that impact.

## 4 Cultural Heritage Baseline Description

The cultural baseline is based on information sources such as previous HIAs conducted in the area and databases described in section 3.1.2 above.

### 4.1 Regional and Local Study Area

#### 4.1.1 Geology and Palaeontological Sensitivity

The local underlying geology is part of the Bushveld Complex as shown in Table 4-1 below. The study area lies within the Western Limb of the Rustenburg Layered Suite which is a mafic formation (magma flows) which does not contain any sedimentary layers and therefore does not contain fossils (Johnson, et al., 2006).

**Table 4-1: Lithographic units and fossil sensitivity (adapted from Johnson et al 2006 and SAHRIS<sup>2</sup>)**

Ma	Eon	Era		Lithostratigraphic units			Lithology	Sensitivity	Fossils
2000-2050	Proterozoic	Eoproterozoic	Vaalian	Bushveld Complex	Rustenburg Layered (Var)	Critical Zone	Mathlagame Norite-Anorthosite	Zero	None
							Mooihoek Pyroexnite	Zero	None
							Undetermined Quaternary	Zero	None
2500					Main Zone	Pyramid Gabbronorite	Zero	None	

<sup>2</sup> <http://www.sahra.org.za/sahris/fossil-heritage-layer-browser> accessed 23/04/2015



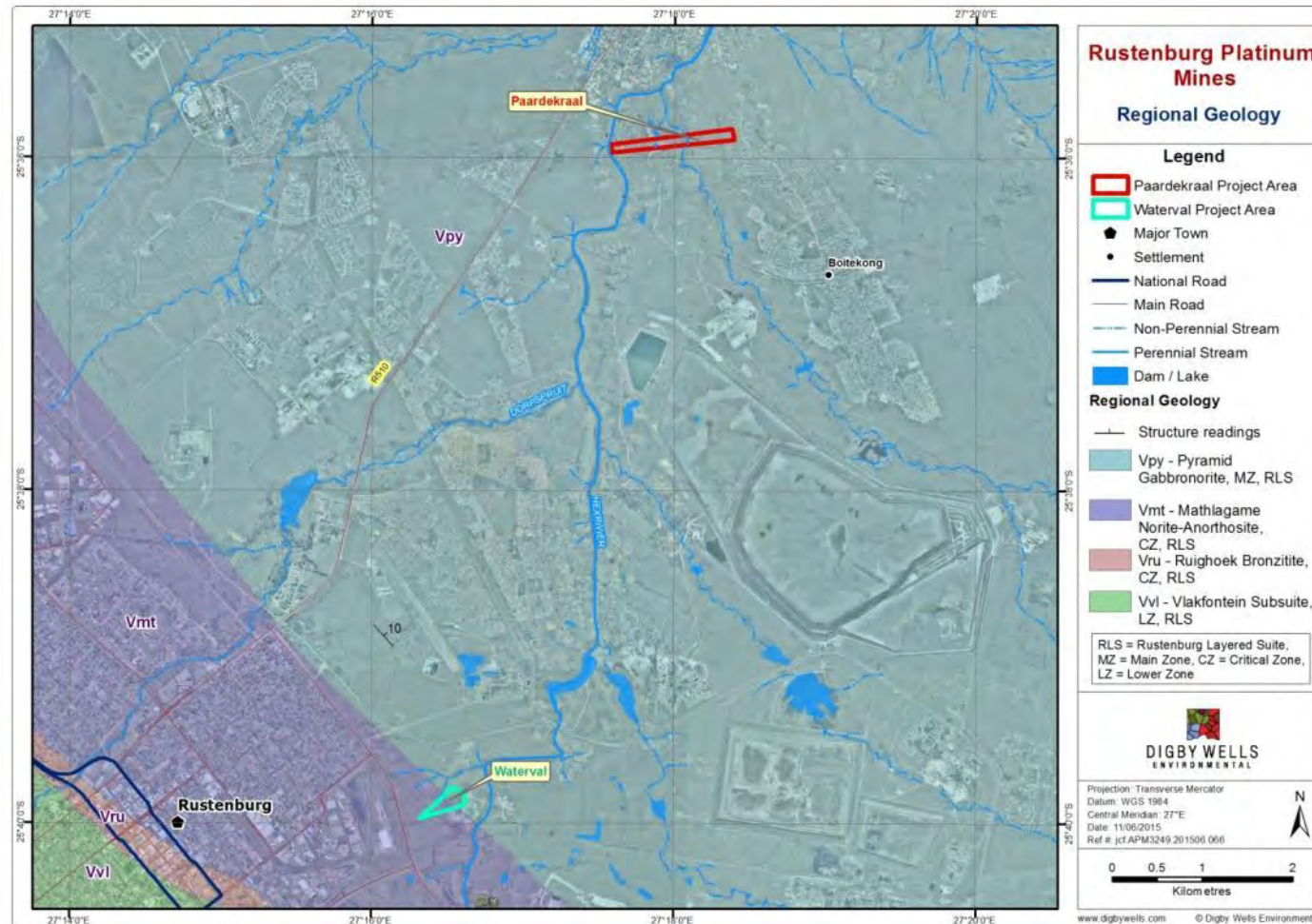


Figure 4-1: Geology of the study area



### 4.1.2 The Stone Age

Surface accumulations of Middle and Later Stone Age (MSA and LSA) lithics have been recorded throughout the region, however, these finds are commonly not found *in situ* and provide limited contextual information.

A total of eight Stone Age surface scatter sites were identified in previous HIAs within 14 km of the study areas (Higgitt, 2015; Huffman & Schoeman, 2002; Magoma, 2014; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). These surface scatters included ESA cores and flakes, MSA flakes, points and cores, and LSA flakes (See Appendix B for site list and Figure 4-2).

### 4.1.3 Farming Communities

The Farming Community Period marks the arrival of Bantu-speakers who brought with them agriculture and metal working skills. Archaeologically, common identifiers of this period in the region include ceramics and stone walled settlements (associated with Late Farming Communities (LFC)).

A total of 46 LFC sites have been identified through previous HIAs within 20 km of the study areas (Coetzee, 2008; Magoma, 2014; Higgitt, 2015; Huffman & Schoeman, 2002; Van Schalkwyk, 2003; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). The majority of these sites are well preserved stone walled settlements with cattle kraals, terraces, pottery (mostly Uitkomst/Rooiberg/Olifantspoort ceramic facies), and grinding stones. Additionally, an Iron Age engraving site was recorded around 14 km from the project study area depicting a settlement layout of a stone-walled settlement (See Appendix B for site list and Figure 4-2).

### 4.1.4 Historical period

The historical period is commonly associated with contact between white Europeans with Late Farming Communities, and consequent *written* records. The closest large town is Rustenburg which was established in 1850 (Raper, 1987). The town was involved in the South African War, when British troops arrived on the 14 June 1900. Three battles occurred in the vicinity i.e. Buffelspoort, Nooitgedacht and Vlakfontein (Bergh, 1999).

Five historic sites were identified between 4 and 15 km from the proposed study areas as a result of previous HIAs in the area. These include burial grounds, stonewalls and historic pottery surface scatters (van Vollenhoven & de Bruyn, 2014) (See Appendix B for site list and Figure 4-2).

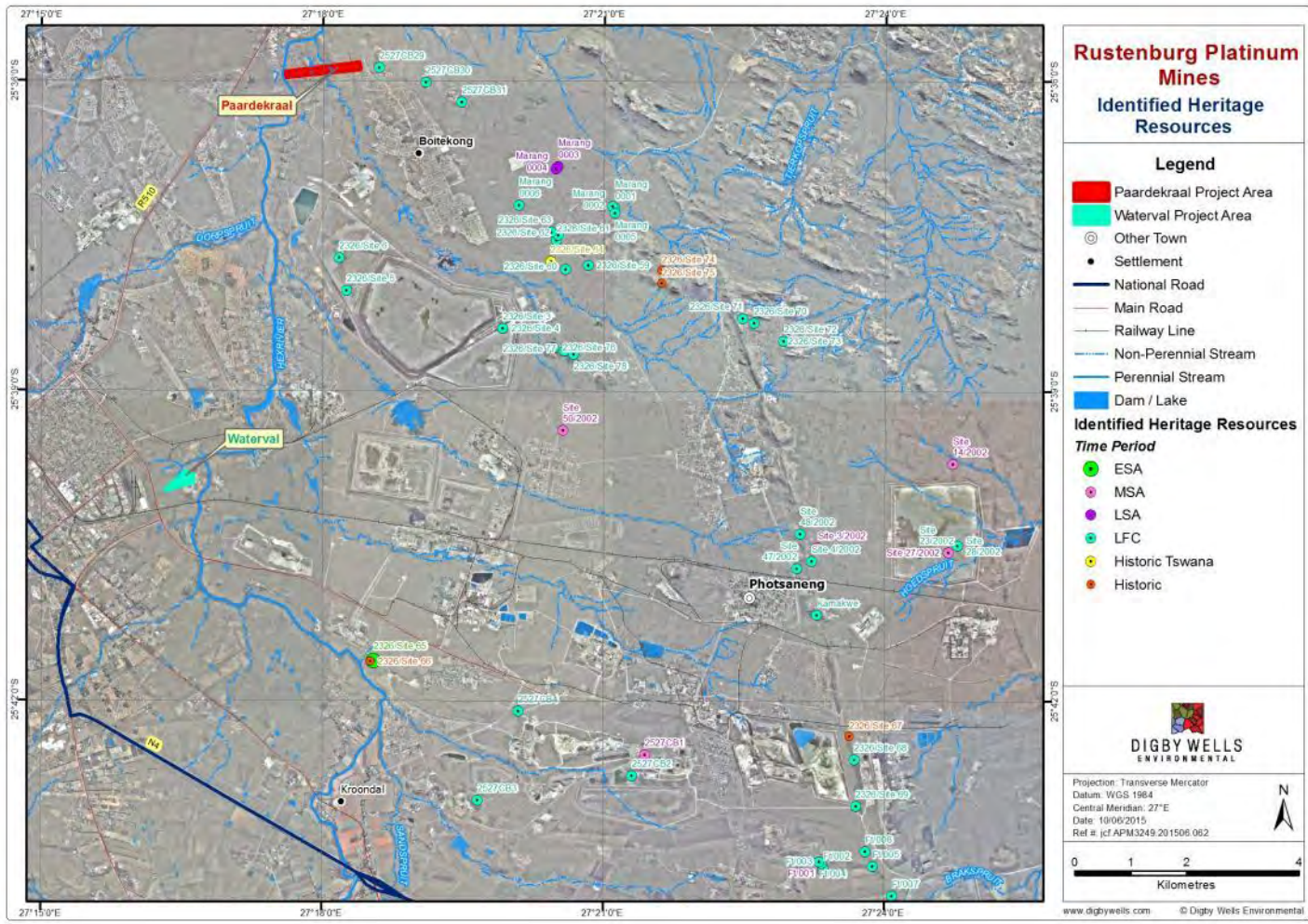


Figure 4-2: Identified heritage resources as a result of the qualitative data collection



## 4.2 Site Specific Study Area

The literature review did not identify any Stone Age or Farming Community heritage resources within the site specific areas and these heritage resources are not discussed further in this section.

### 4.2.1 Geology and Palaeontological Potential of the Study Area

According to the SAHRIS PalaeoSensitivity Map, the Waterval study area (depicted as a red circle in Figure 4-3 below) and the Paardekraal study area (depicted as a green rectangle in Figure 4-3 below) are situated in an area of insignificant palaeontological sensitivity (grey area) depicted in below (SAHRIS, 2014).

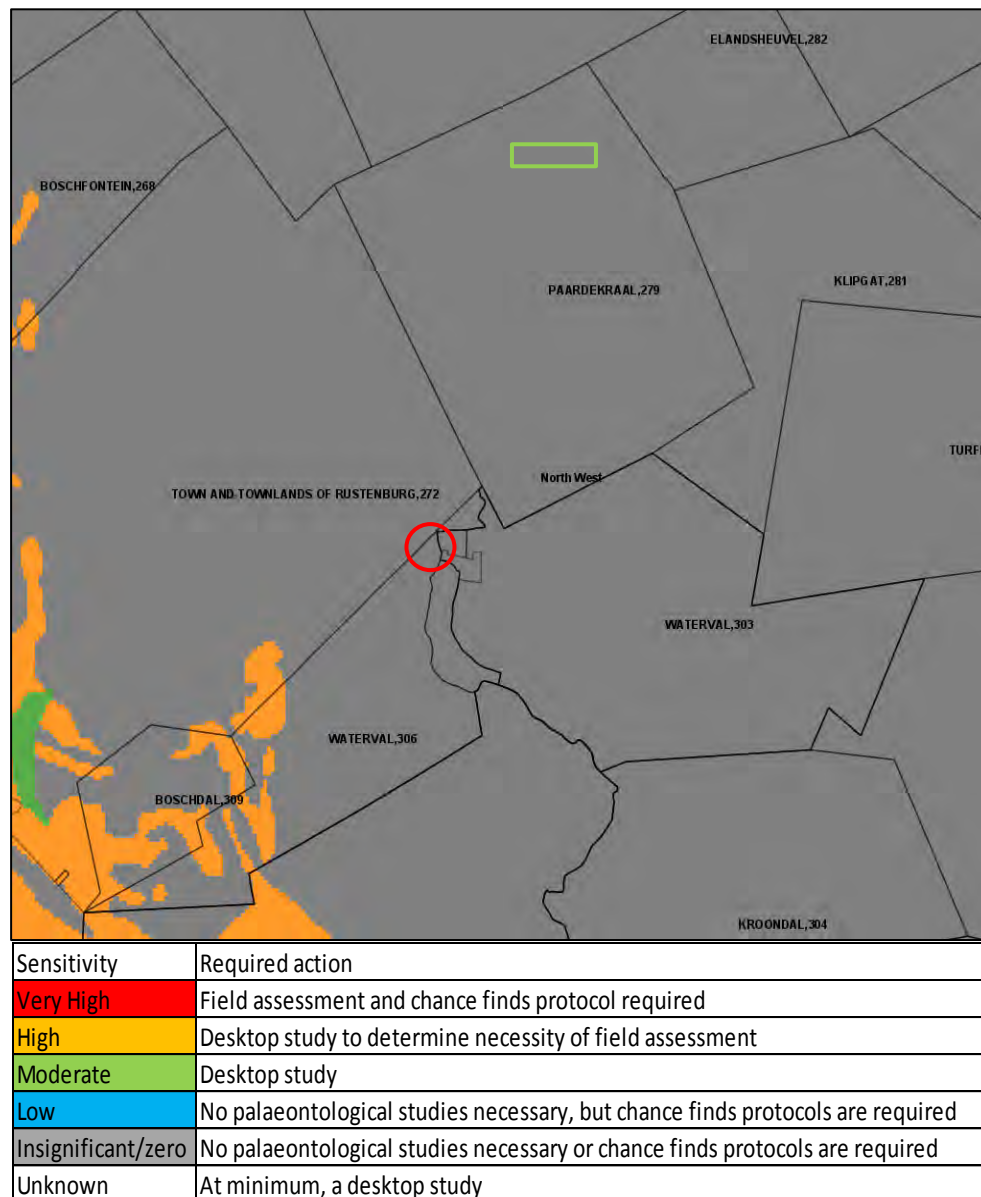


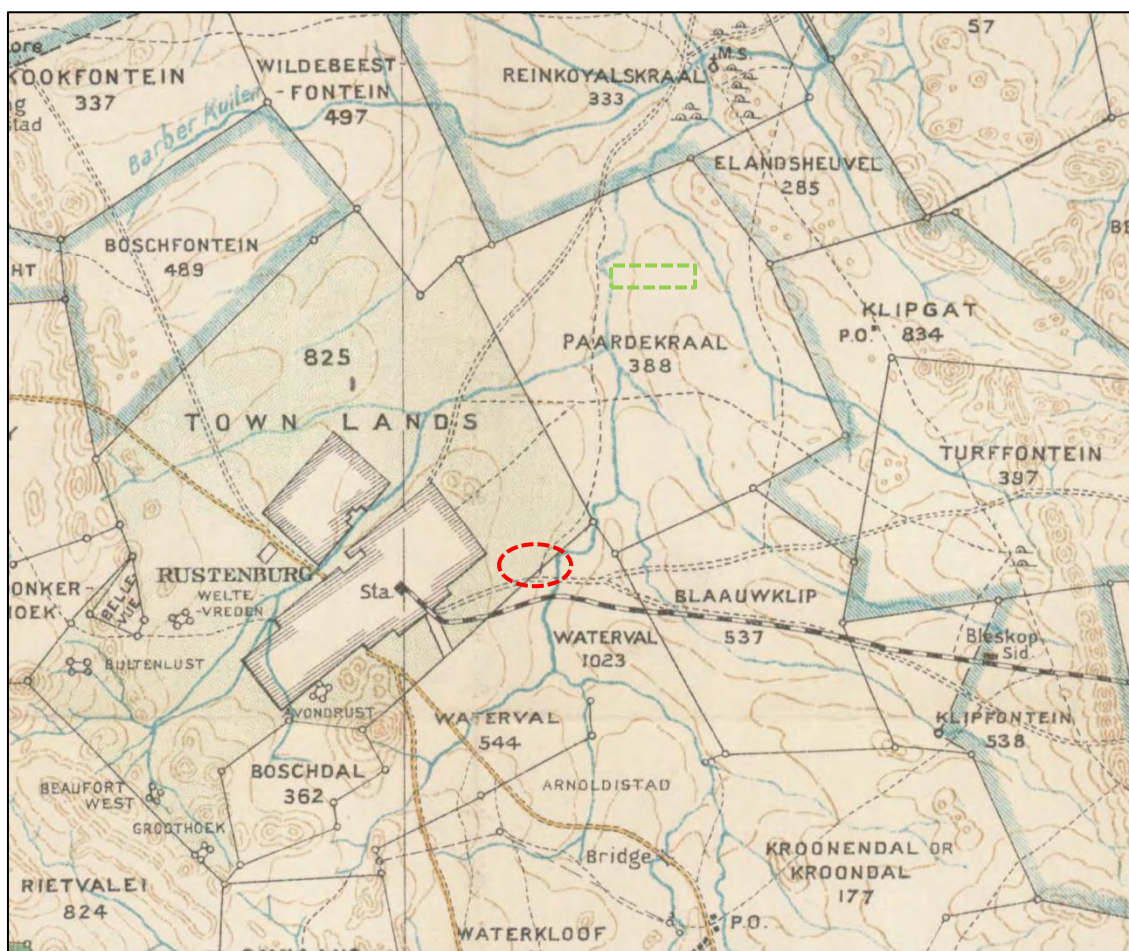
Figure 4-3: Palaeontological sensitivity of the study area



## 4.2.2 Historical period

The Waterval study area is located near historical main and secondary roads and a railway, and “Native Locations, as indicated in the 1902-1909 Rustenburg topographical depicted in Figure 4-4.

The Paardekraal study area is located near an old secondary route that ran from the old ‘Native Location’ to outskirts of the town of Rustenburg. Native Locations had been delineated by the British and the Boers from the late 1800s. They were formally established with the Native Land Act of 1913, which saw the majority of the country’s population forced into what were termed as “Homelands” (South African History Online, 2014).



**Figure 4-4: 1902-1909 map of the Waterval and Paardekraal study areas**

The Waterval site specific study area has remained mostly unchanged since 1955 based on reviewed aerial photographs. A farmhouse/werf can be seen in the north-eastern corner of the proposed Waterval site specific study area (See Figure 4-5).

The Paardekraal site specific study area however, has undergone some changes since 1955. The area was dominated by agricultural fields decreasing the potential for surface markers of sub-surface in-situ archaeological remains. Currently, a sewage treatment plant is located in the middle of the proposed Paardekraal study area.

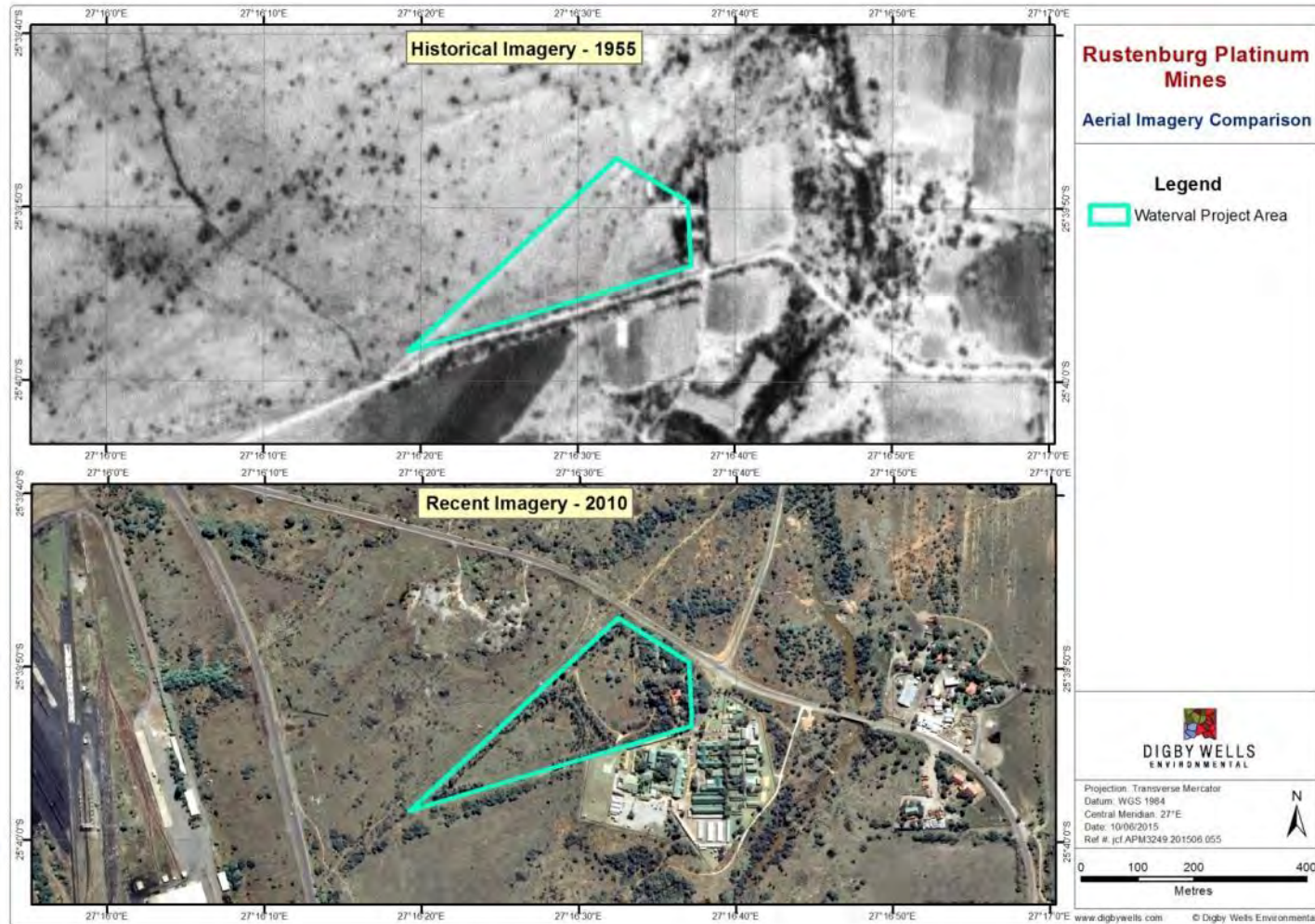


Figure 4-5: Waterval Study area historical layering

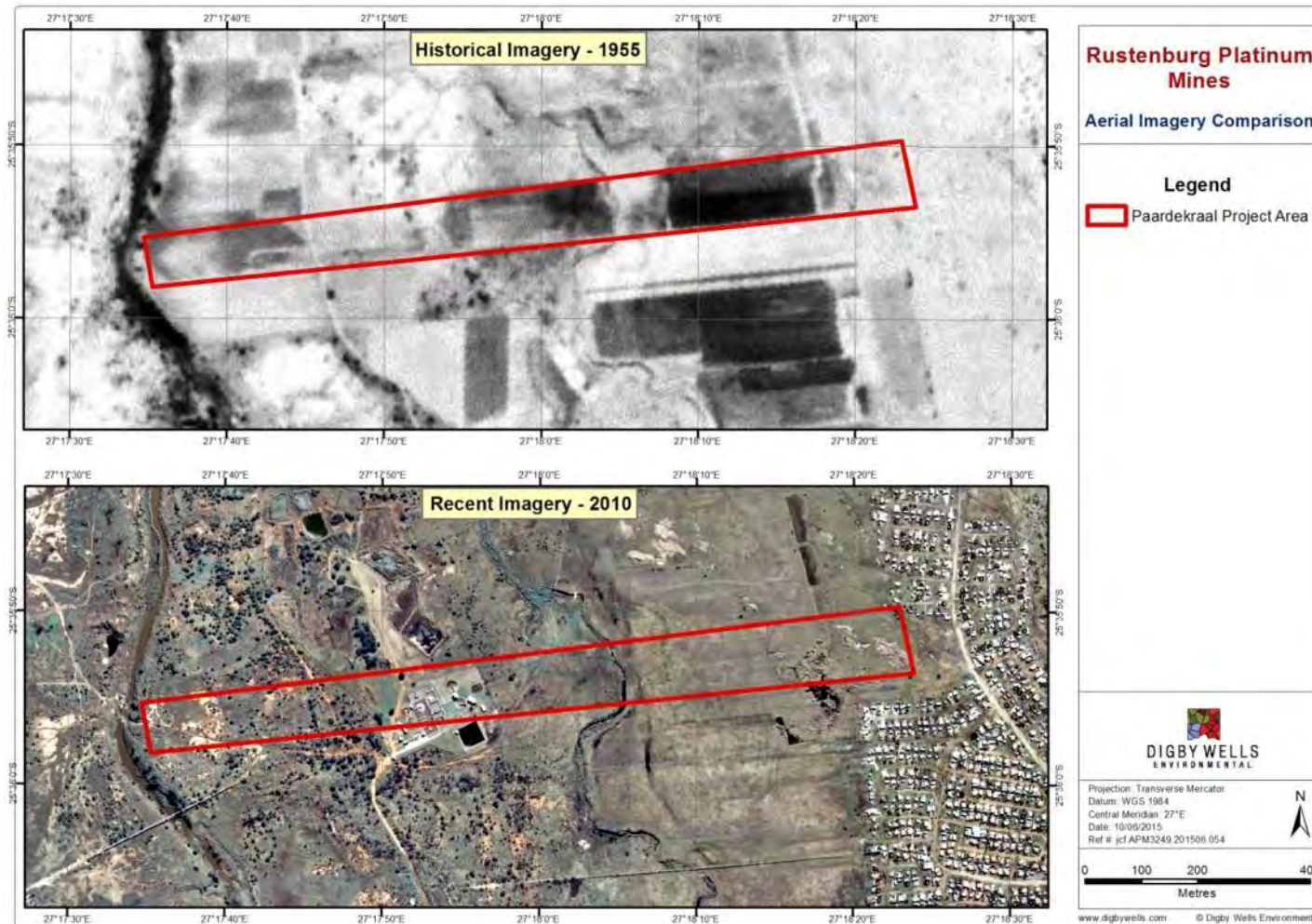


Figure 4-6: Paardekraal Study area historical layering



## 5 Results of reconnaissance and identified heritage resources

The Waterval and Paardekraal project areas were visited on the 7 July 2015 by Natasha Higgitt. The project areas were inspected, the state of the environment was documented and heritage resources recorded.

### 5.1 Waterval Project area

The Waterval Project area is located next to an Anglo American office block and open land. The project area has been severely impacted due to large amount of dumped refuse and building rubble (See Figure 5-1, top row). Pipelines have been installed within the project area and sections of the project area were inaccessible due to the dense thorny vegetation (See Figure 5-1, bottom row).



**Figure 5-1: Current state of the Waterval Project area landscape**

#### 5.1.1 Identified heritage resources

A historical farm house was identified within the Waterval Project area. This farm house appears to have been present in 1955 based on historical aerial imagery (See Figure 4-5).



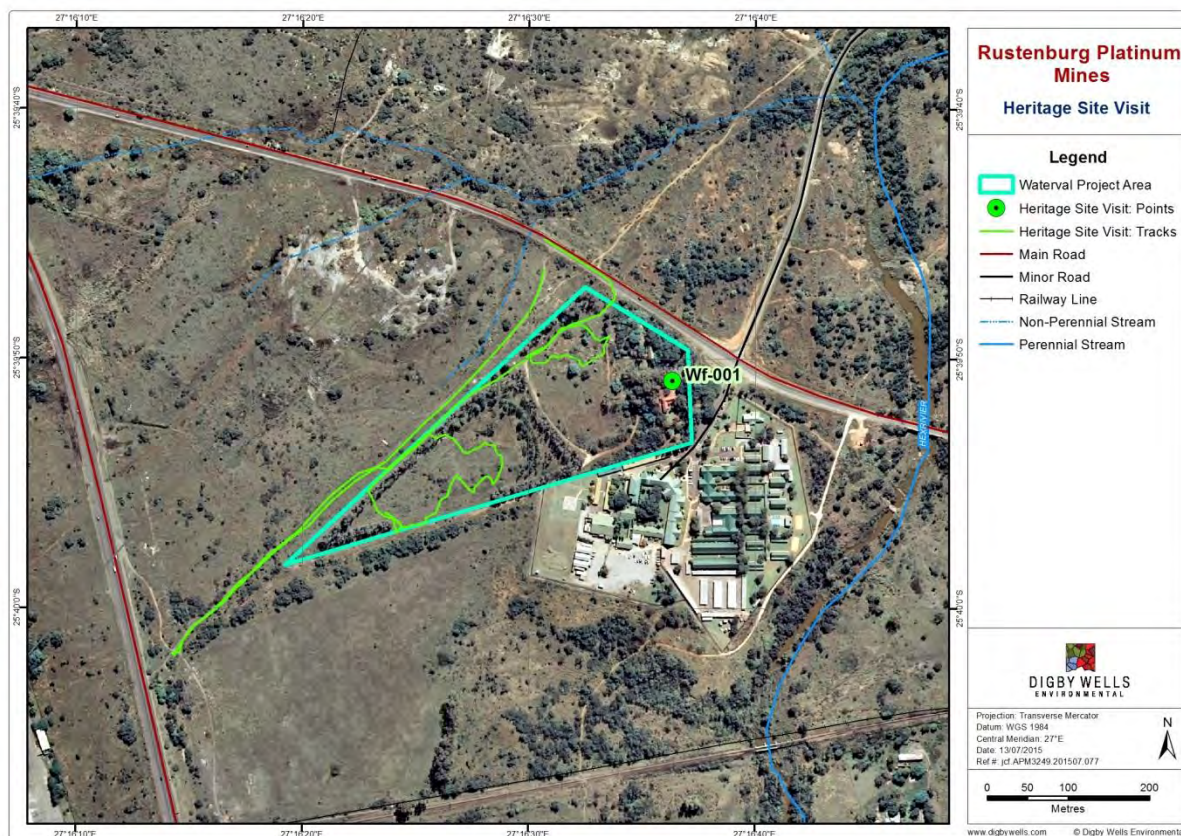
**5.1.1.1 Wf-001 / Historical Structure**

Cultural Significance: Negligible	Field Rating: Grade IV C	<b>Co-ordinates</b>	
		-25.663768	27.276434

Historical werf, currently occupied. Located within the Waterval Project area. Full access to the werf was not possible at the time of the site visit so they entire werf could not be recorded in full.



**Figure 5-2: Historical werf Wf-001**



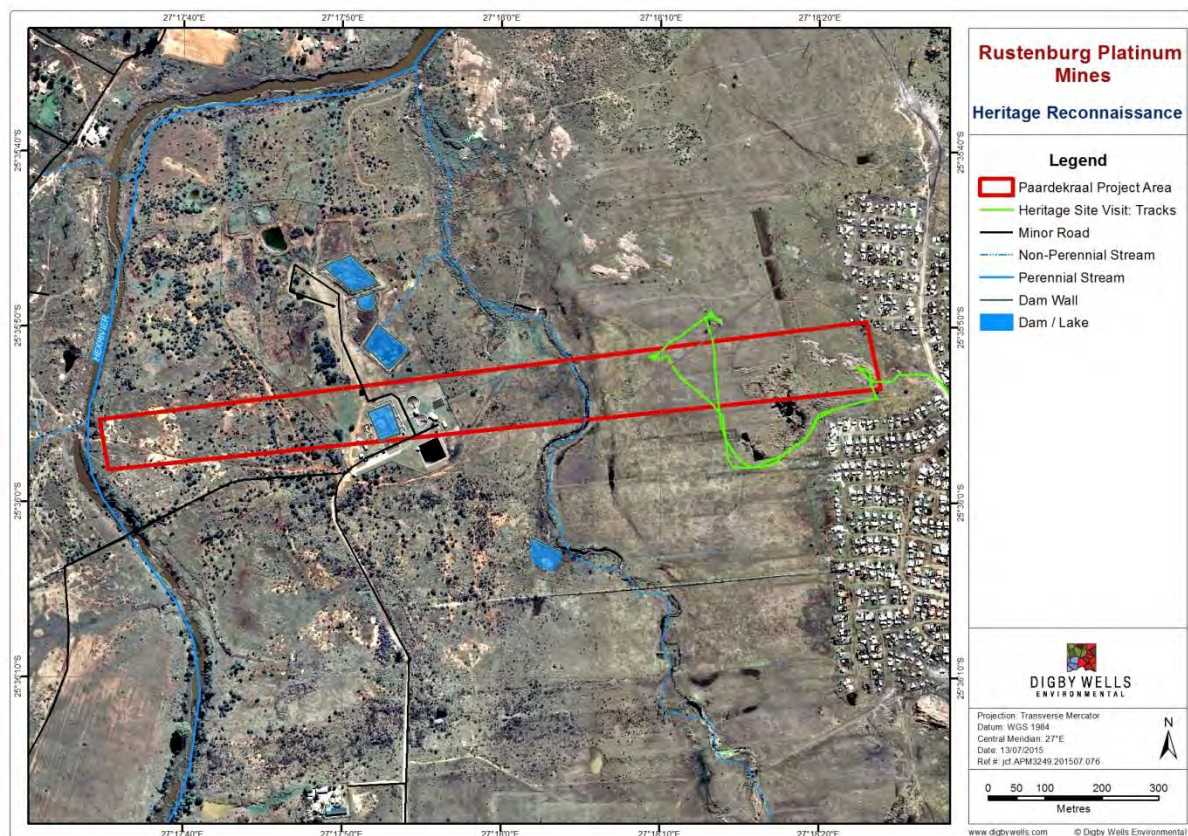
**Figure 5-3: Reconnaissance visit at the Waterval Project area**

## 5.2 Paardekraal Project area

The Paardekraal Project area was located adjacent the Boitekong village on the banks of the Hex River. The project area has previously been impacted on by agricultural activities as seen in the historical aerial imagery in Figure 4-6. The old fields are still visible on site and dumping of refuse and building rubble is evident in the eastern section of the project area (See Figure 5-4, top row). Large rocky outcrops were present in the areas that had not been impacted by previous agricultural activities (See Figure 5-4, bottom row). The outcrops were inspected for any palaeontological resources and heritage resources such as rock engravings. No palaeontological or heritage resources were identified within the project area.



**Figure 5-4: Current state of the Paardekraal Project area landscape**



**Figure 5-5: Reconnaissance visit at the Paardekraal Project area**

## 6 Heritage Impact Assessment

### 6.1 Methodology

#### 6.1.1 Evaluation of Cultural Significance

The cultural significance (CS) rating process is designed to provide a numerical rating of the cultural significance<sup>3</sup> of identified heritage resources. The evaluation was done as objectively as possible through a matrix developed by Digby Wells for this purpose. In addition, the methodology aims to allow ratings to be reproduced independently should it be required, provided that the same information sources are used.

<sup>3</sup> Cultural significance is defined in the NHRA as the intrinsic “aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance” of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.



This matrix takes into account heritage resources assessment criteria set out in subsection 3(3) of the NHRA (see Box 2), which determines the intrinsic, comparative and contextual significance of identified heritage resources. A resource's importance rating is based on information obtained through review of available credible sources and representivity or uniqueness (i.e. known examples of similar resources to exist). The final significance attributed to a resource furthermore takes into account the physical integrity of the fabric of the resource. The formula used to determine CS can be summarised in Box 3.

Dimension	Attributes considered	NHRA Ref.
Aesthetic & technical	1 Importance in aesthetic characteristics	S.3(3)(e)
	2 Degree of technical / creative skill at a particular period	S.3(3)(f)
Historical importance & associations	3 Importance to community or pattern in country's history	S.3(3)(a)
	4 Site of significance relating to history of slavery	S.3(3)(i)
	5 Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)
Information potential	6 Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)
	7 Information potential	S.3(3)(c)
	8 Importance in demonstrating principle characteristics	S.3(3)(d)
Social	9 Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)

**Box 2: NHRA section 3 criteria**

The rationale behind the heritage value matrix takes into account the fact that a heritage resource's value is a direct indication of its sensitivity to change (impacts). Value therefore needs to be determined prior to the completion of any assessment of impacts.

This matrix rates the potential, or importance, of an identified resource relative to its contribution to certain values – aesthetic, historical, scientific and social.

$$\begin{aligned}
 & \text{Value} = \text{Importance} \times \text{Integrity} \\
 & \text{where} \\
 & \text{Importance} = \text{average sum} \\
 & \text{of} \\
 & \text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}
 \end{aligned}$$

**Box 3: CS formula**

The significance of a resource is directly related to the impact on it that could result from project-related activities, as it provides minimum accepted levels of change to the resource. SAHRA has published minimum standards that include minimum required mitigation of heritage resources. These minimum requirements are integrated into the matrix to guide both assessments of impacts and recommendations for mitigation and management of resources.

The weight assigned to the various parameters for significance in the formula, significance ratings and recommended mitigation are presented in Table 6-1.

### 6.1.2 Field Rating

Although grading of heritage resources remains the responsibility of heritage resources authorities, SAHRA requires in terms of its Minimum Standards that heritage reports include Field Ratings for identified resources to comply with section 38 of the NHRA. The NHRA in terms of section 7 provides for a system of grading of heritage resources that form part of the national estate, distinguishing between three categories.



The field rating process is designed to provide a numerical rating of the recommended grading of identified heritage resources. The evaluation was done as objectively as possible by integrating the field rating into the significance matrix. Field ratings guide decision-making in terms of appropriate minimum required mitigation measures and consequent management responsibilities in accordance with section 8 of the NHRA. The formula used to determine field ratings is summarised in Box 4. The weight assigned to the various field rating parameters in the formula and the sum of the average ratings are presented in Table 6-1.

$$\text{Field Rating} = \text{average sum} \\ \text{of} \\ \text{Aesthetic} + \text{Historic} + \text{Scientific} + \text{Social}$$

**Box 4: Field rating formula**

**Table 6-1: Ratings and descriptions used in determining CS and field ratings**

Rating	IMPORTANCE <i>A heritage resource's contribution to aesthetic, historic, scientific and social value.</i>	INTEGRITY <i>The undivided or unbroken state, material wholeness, completeness or entirety of a resource or site</i>	FIELD RATING <i>Recommended grading of identified heritage resources in terms of NHRA Section 7</i>
-	Not assessed - dimension and/or attribute not considered in determining value.		Not assessed - dimension and/or attribute not considered in field rating.
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost	
1	Common, well represented throughout diverse cultural landscapes	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Negligible significance
2	Generally well represented but exhibits superior qualities in comparison to other similar examples	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with Low significance
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.	Fabric well preserved, good quality information and meaning evident, limited encroachment	Resources under general protection in terms of NHRA sections 34 to 37 with Medium to Medium-High significance
4	Rare and uncommon, value of national importance	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting	Resources under general protection in terms of NHRA sections 34 to 37 with High significance
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.		Resources under general protection in terms of NHRA sections 34 to 37 with Very High significance
6			Heritage resources under formal protection that can be considered to have special qualities which make them significant within the context of a province or a region
7			Heritage resources under formal protection that can be considered to have special qualities which make them significant within a national and / or international context.

### 6.1.3 Impact Assessment

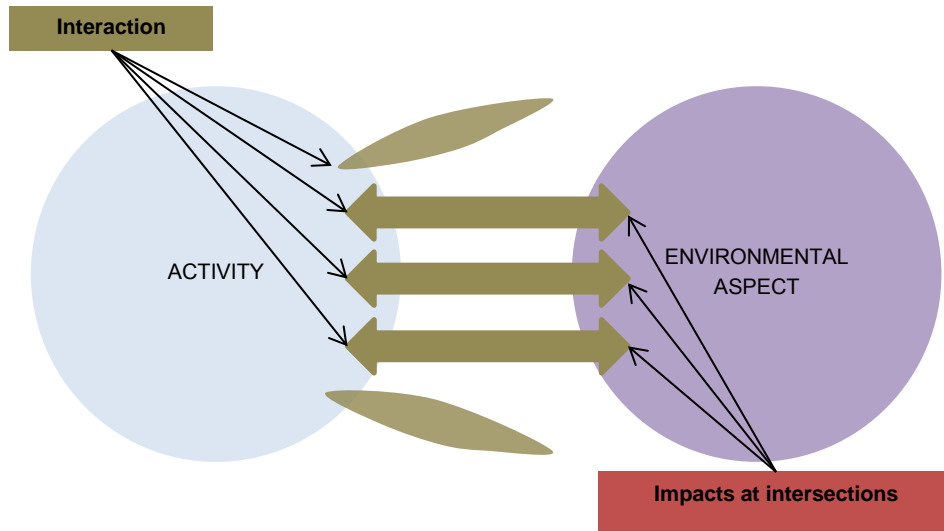
This chapter considers the potential direct impacts on heritage resources identified within the proposed prospecting area.

The impact assessment and mitigations measures chapter contains a narrative description of the sources of risk and potential impacts, and as a discussion of feasible mitigation measures to avoid and / or better negative impacts and enhance positive one.

The following are terms and definitions applicable to the EIA concept (ISO 14001):

- **Project Activity:** Activities associated with the project that result in an environmental interaction during the different phases (construction, operation and decommissioning), e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;
- **Interaction:** An “environmental interaction” is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change.
- **Environmental Aspect:** The term “environmental aspect” refers to the various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds.
- **Environmental Impact:** An “environmental impact” is a change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.





**Figure 6-1: Graphical representation of impact assessment concept**

The potential impacts were considered through an examination of the project phase and activity, the environmental aspect, the interdependencies between aspects, an assessment and classification of categories, and consideration of the potential impact on heritage resources. An example of this process is presented in Figure 6-2.

Project Activity & Interaction		Environmental Aspect		Potential Environmental Impact	
Project Phase	Activity	Aspect	Interdependencies	Issue	Potential Impact
This relates to the consideration of the relevant phase of the project. <b>Example: Construction</b>	This refers to one or more of the activities that will be undertaken during the corresponding phase of the project. <b>Example: Topsoil clearing</b>	This identifies and considers the various aspects that will be affected by the project activity. <b>Example: Heritage, Biophysical, and Social</b>	This identifies and considers the interdependencies between the various aspects and how they may be impacted upon by the relevant activity. <b>Example: Removal of topsoil will impact on flora which may have heritage and social implications</b>	The issues considers the activity in relation to the identified aspects and interdependencies. Note: Activities and Aspects can have several issues resulting in various impacts. <b>Example: Physical alteration of the land</b>	Potential impacts are a culmination of the various categories evaluated as part of the impact assessment. <b>Example: Topsoil clearing will remove medicinal plants that will erode indigenous knowledge systems and cultural significance.</b>

**Figure 6-2: Example of how potential impacts were considered.**

### **6.1.3.1 Defining Heritage Impacts**

Different heritage impacts may manifest in different geographical areas and diverse communities. For instance, heritage impacts can simultaneously affect the physical resource and have social repercussions: this is compounded when the intensity of physical impacts and social repercussions differ significantly. In addition, heritage impacts can influence the cultural significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking.
- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.
- **Cumulative heritage impacts** result from in-combination effects on heritage resources acting within a host of processes that are insignificant when seen in isolation, but which collectively have a significant effect. Cumulative effects can be:
  - **Additive:** the simple sum of all the effects, e.g. the total number of development activities that will occur within the study area.
  - **Synergistic:** effects interact to produce a total effect greater than the sum of the individual effects, e.g. the effect of each different activity on the archaeological landscape in the study area.
  - **Time crowding:** frequent, repetitive impacts on a particular resource at the same time, e.g. the effect of regular blasting activities on a nearby rock art site or protected historical building high.
  - **Neutralizing:** where the effects may counteract each other to reduce the overall effect, e.g. the effect of changes in land use could reduce the overall impact on sites within the archaeological landscape of the study area.
  - **Space crowding:** high spatial density of impacts on a heritage resource, e.g. density of new buildings resulting in suburbanisation of a historical rural landscape.

The relevance of the above distinction to defining the study areas in the HBAR arises from the fact that heritage resources do not exist in isolation to the wider natural, social, cultural



and heritage landscape: cultural significance is therefore also linked to rarity / uniqueness, physical integrity and importance to diverse communities.

In addition, the NHRA requires that heritage resources are graded in terms of national, provincial and local concern based on their importance and consequent official (i.e. State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Three 'concentric' study areas were defined for the purposes of this study and are discussed in detail in section 3.1 above.

### **6.1.3.2 Impact Assessment**

The impact rating process is designed to provide a numerical rating of the identified heritage impacts. The significance rating follows an established impact/risk assessment formula is shown in Box 5.

The weight assigned to the various parameters for positive and negative impacts in the formula is presented in Table 6-2 below.

Project-related impacts on heritage resources have taken into account the inherent value of heritage resources, described above, and only applied to resources with values above negligible. As a result, the impact assessment did not consider individual resources, but was applied to diverse resources grouped in terms of similar values.

The magnitude will then be applied to pre- and post-mitigation scenarios with the intention of removing all impacts on heritage resources. Where project related mitigation does not avoid or sufficiently reduce negative changes/impacts on heritage resources with high values, mitigation of these resources may be required.

*Significance = consequence of an event x probability of the event occurring*

*where:*

*Consequence = type of impact x (Intensity + Spatial Scale + Duration)*

*and*

*Probability = Likelihood of an impact occurring*

In the formula for calculating consequence:

**Type of impact = +1 (positive) or -1 (negative)**

**Box 5: Impact assessment formula**

This may include alteration, restoration or demolition of structures under a permit issued by the HRAs.

Impacts were rated prior to mitigation and again after consideration of the proposed mitigation measures. Impacts were then categories into one of eight categories listed in Table 6-3. The relationship between the consequence, probability and significance ratings is also graphically depicted in Table 6-3.

**Table 6-2: Description of duration, extent, intensity and probability ratings used in impact assessment**

Value	DURATION RATING - A measure of the lifespan of the impact		EXTENT RATING A measure of how wide the impact would occur		INTENSITY RATING- A measure of the degree of harm, injury or loss.		PROBABILITY RATING - A measure of the chance that consequences of that selected level of severity could occur during the exposure window.	
	Probability	Description	Exposure	Description	Intensity	Description	Probability	Description
7	<b>Permanent</b>	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)	<b>International</b>	Impacts on heritage resources will have international repercussions, issues or effects, i.e. in context of international cultural significance, legislation, associations, etc.	<b>Extremely high</b>	Major change to Heritage Resource with High-Very High Value	<b>Certain/Definite</b>	Happens frequently.  The impact will occur regardless of the implementation of any preventative or corrective actions.
6	<b>Beyond Project Life</b>	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)	<b>National</b>	Impacts on heritage resources will have national repercussions, issues or effects, i.e. in context of national cultural significance, legislation, associations, etc.	<b>Very high</b>	Moderate change to Heritage Resource with High-Very High Value	<b>High probability</b>	Happens often.  It is most likely that the impact will occur.
5	<b>Project Life</b>	The impact will cease after project life.	<b>Region</b>	Impacts on heritage resources will have provincial repercussions, issues or effects, i.e. in context of provincial cultural significance, legislation, associations, etc.	<b>High</b>	Minor change to Heritage Resource with High-Very High Value	<b>Likely</b>	Could easily happen.  The impact may occur.
4	<b>Long Term</b>	Impact will remain for >50% - Project Life	<b>Municipal area</b>	Impacts on heritage resources will have regional repercussions, issues or effects, i.e. in context of the regional study area.	<b>Moderately high</b>	Major change to Heritage Resource with Medium-Medium High Value	<b>Probable</b>	Could happen.  Has occurred here or elsewhere
3	<b>Medium Term</b>	Impact will remain for >10% - 50% of Project Life	<b>Local</b>	Impacts on heritage resources will have local repercussions, issues or effects, i.e. in context of the local study area.	<b>Moderate</b>	Moderate change to Heritage Resource with Medium - Medium High Value	<b>Unlikely / Low probability</b>	Has not happened yet, but could happen once in a lifetime of the project.  There is a possibility that the impact will occur.
2	<b>Short Term</b>	Impact will remain for <10% of Project Life	<b>Limited</b>	Impacts on heritage resources will have site specific repercussions, issues or effects, i.e. in context of the site specific study area.	<b>Low</b>	Minor change to Heritage Resource with Medium - Medium High Value	<b>Rare / Improbable</b>	Conceivable, but only in extreme circumstances.  Have not happened during the lifetime of the project, but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	<b>Transient</b>	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value.	<b>Very Limited</b>	Impacts on heritage resources will be limited to the identified resource and its immediate surroundings, i.e. in context of the specific heritage site.	<b>Very low</b>	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value	<b>Highly Unlikely /None</b>	Expected never to happen.  Impact will not occur.

**Table 6-3: Impact significance ratings, categories and relationship between consequence, probability and significance**

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the heritage resources.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the heritage resources.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the heritage resources.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the heritage resources.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the heritage resources.	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the heritage resources and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

Relationship between consequence, probability and significance ratings																																						
Probability	Significance																																					
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

## 6.2 Cultural Significance Assessment

The assessment of CS considered criteria defined in Box 2 above. The CS assigned to the identified heritage resources is summarised in Table 6-4 and presented in detail in Table 6-5.

The assessment of CS indicated that the identified heritage resources designations are negligible

**Table 6-4: Summary of identified heritage resources CS**

Summary of Identified Heritage Resources and CS	Number
<b>Negligible</b>	
<b>Werf</b>	<b>1</b>
Wf-001	1
<b>Grand Total</b>	<b>1</b>

**Table 6-5: CS of identified heritage resources**

Resource ID	Type	Description	Cultural Significance	CS Motivation	Field Rating	Field Rating Motivation	Mitigation	Latitude	Longitude
Wf-001	Werf	Historical werf comprising of large main building and several outbuildings	Negligible	The werf is still in use. The structure can be considered in particular dimensions against aesthetic, historical and social criteria, but this type of resource is common and well represented throughout diverse cultural landscapes. The fabric of the resource is preserved and the meaning is evident.	General Protection IV C	The structure is older than 60 years and is generally protected under Section 34 of the NHRA	It is recommended the project design be amended as far as is feasible to preserve the structures in situ. Where this is not possible, an application for destruction must be completed and lodged with NWPHERA for authorisation before any alteration to or destruction of the structures can take place	-26.478533	27.617049

## 6.3 Heritage Impacts

### 6.3.1 Direct impacts to Built Structures with Negligible Significance

One historical werf was identified within the Waterval Project area. A review of the CS of these historic resources against aesthetic, historical and social criteria was completed. This included:

- The degree of technical / creative skill at a particular period;
- Historical significance; and
- Association to community or group for social or cultural reasons.

The werf is a common representation of this type of resource throughout diverse cultural landscapes and is well represented. The result of this assessment indicated that the identified werf had a negligible CS, even though it has high integrity.

The construction phase i.e. site clearance has the highest likelihood for negative impacts on heritage resources; however this will be limited to the prospecting sites. Prospecting is not likely to occur within an occupied werf.

The impacts during the operational phase i.e. drilling will be limited. The impacts during the decommissioning phase i.e. rehabilitation will also be limited, however if additional topsoil is required for rehabilitation, borrowing material from outside the prospecting site may damage and/or destroy heritage resources. If the ground becomes compacted due to the drilling activities and ripping will be necessary.

**Table 6-6: Summary of the indirect impact to the historical werf**

<b>IMPACT DESCRIPTION: Direct Impact to Heritage resource of Negligible significance</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Project Life (5)	Wf-001 is located within the project area, however the impact will be limited for the duration of the prospecting	Consequence: Slightly detrimental (-7)	Significance: Negligible - negative (-7)
Extent	Very limited (1)	The impacts of the prospecting will have very limited extent.		
Intensity x type of impact	Very low - negative (-1)	Without appropriate mitigation, a very low impact will occur.		
Probability	Highly unlikely (1)	Without appropriate mitigation, project related activities related activities are improbable, as a 50m buffer will be maintained		
<b>MITIGATION:</b> A 50m buffer must be maintained from the edge of the werf to ensure no direct impact will occur Chance Finds Procedures must be developed and implemented to ensure chance finds are recorded and mitigated				
<b>POST-MITIGATION</b>				





Duration	Immediate (1)	Where mitigations are implemented, project related activities will result in negligible impacts for a very short period of time.	Consequence: Negligible (3)	Significance: Negligible - positive (3)
Extent	Very limited (1)	As for pre-mitigation		
Intensity x type of impact	Very low - positive (1)	Mitigation measures will ensure the retention and management of the tangible remains, although this will a very low positive result of negligible significance		
Probability	Highly unlikely (1)	If mitigation measures are implemented, it is still highly unlikely that negative impacts will occur		

Cumulative impacts associated with the prospecting are transient as the time spent on site conducting the drilling will be limited. The sense of place will remain the same due to the limited impact of the prospecting points, how should the prospecting results show the viability of the project, it may lead the a full scale mining operation, and the impacts associated with mining increase exponentially.

### 6.3.2 Unplanned Events and Risks

Unplanned events may occur on any project at any time. Based on the proposed project activities, potential unplanned events and the associated impacts and management measures have been identified and summarised in Table 6-7 below.

**Table 6-7: Unplanned events and their management measures**

Unplanned event	Potential impact	Mitigation/ Management/ Monitoring
Accidental exposure of unidentified heritage resources	Damage and/or destruction of heritage resources generally protected under section 35 and 36 of the NHRA	Chance Finds Procedures (CFPs) must be developed and included as a condition of authorisation that clearly describes the process and appropriate management of the exposure of previously unidentified heritage resources. The established and defined CFPs must be implemented prior to any development taking place as part of the prospecting activities

## 7 Environmental Management Plan

The objective of an Environmental Management Plan (EMP) is (a) to manage undue or reasonably avoidable adverse impacts associated with the development of a project and (b) to enhance potential positives.

Mitigation measures will sometimes be built into the base of a project and should be considered as part of the “pre-mitigation” scenario; additional mitigation must be recommended if the impact assessment indicates it is necessary.

The EMP must consider each activity and its potential (significant) impacts during the construction, operational, and decommissioning phases.



### 7.1.1 Mitigation and management measures

This section provides a summary of the proposed mitigation and management measures as relevant to the identified heritage resources within the Waterval and Paardekraal project areas. Information on the frequency of mitigation, relevant legal requirements, recommended management plans, timing of implementation, and roles and responsibilities of persons implementing the EMP are also provided

**Table 7-1: Mitigation measures**

Activities	Potential impacts	Aspects affected	Phase	Mitigation	Time period for implementation	Standard to be achieved/objective
Prospecting	Damage to and / or destruction of built structures older than 60 years	Heritage	Construction, Operational and decommissioning	A 50 m buffer must be maintained from the edge of the werf to ensure no direct impact occurs. Structures older than 60 years are protected under section 34 of the NHRA, and a Section 34 Permit Application with PHRA-G is required prior to any alterations or demolition if	Mitigation measures must be implemented prior to any development	Compliance with section 34 of the NHRA and Chapter III of the Regulations to the Act.
Prospecting	Damage to and / or destruction to sub-surface heritage resources	Heritage	Construction and decommissioning	Chance Finds Procedures (CFPs) must be developed and implemented for the Waterval and Paardekraal Prospecting areas that clearly describe the process and appropriate management of the exposure of previously unidentified heritage resources.	Mitigation measures must be implemented during the construction phase	Compliance with section 35 and 36 of the NHRA and Chapter XIII of the Regulations to the Act

## 8 Conclusion

The town of Rustenburg is located 2 km from the proposed Waterval Prospecting area and 7 km from the proposed Paardekraal Prospecting area, North-West Province. Geologically, the study area is located within the Bushveld complex and does not contain any palaeontological material.

Archaeologically, Stone Age and Farming Community sites have been recorded within the larger area under consideration here, though none of these sites have been identified within the proposed prospecting footprint.

A historical werf (Wf-001) was identified within the Waterval Prospecting area. The werf is currently still in use and is over 60 years old, as it can be identified on a historical aerial image dating to 1955. The werf was given a negligible significance rating taking into account aesthetics, historical and social aspects.

Potential impacts to heritage resources include accidental damage or destruction to heritage resources associated with the werf during site clearance for temporary road/route construction, prospecting sites and rehabilitation purposes. Additional impacts can include

the accidental exposure of unidentified heritage resources and the subsequent damage and/or destruction of these heritage resources.

Based on the findings of this report, Digby Wells recommends the following mitigation and management plans:

- Exemption from further palaeontological assessments for the proposed infrastructure footprint as the palaeo-sensitivity is insignificant.
- A 50 m buffer must be maintained around the historical werf at the Waterval Prospecting area;
- Chance Finds Procedures must be developed and implemented for both the Waterval and Paardekraal project areas as part of the EMP that clearly describe the process and appropriate management of the exposure of previously unidentified heritage resources; and
- Additionally, should the prospecting prove to be successful and a Mining Right be applied for, a full HRM process should be implemented inclusive of a Heritage Impact Assessment (HIA).

## 9 References

- Bergh, J. S., 1999. *Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies*. Pretoria: J.L. van Schaik.
- Coetzee, F. P., 2008. *Cultural Heritage Survey of the Farm Rietfontein 338 JQ, Rustenburg District, North West Province*, s.l.: s.n.
- Higgitt, N., 2015. *Lanxess Chrome Mine: Section 102 Amendment: Heritage Scoping Report (in press)*. Randburg: Digby Wells Environmental.
- Huffman, T. N. & Schoeman, M. H., 2002. *Archaeological Study for the Western Limb Tailings Re-Treatment Project, Rustenburg*, Johannesburg: Archaeological Resources Management.
- Johnson, M. R., Anhaeusser, C. R. & Thomas, R. J. eds., 2006. *The Geology of South Africa*. Johannesburg: Council for Geoscience.
- Magoma, M., 2014. *Phase 1 Archaeological Impact Assessment Specialist Study Report for the proposed construction of 400/132kV Marang B substation and 2km 400kV Powerlines looping in and out of the Bighorn-Marang, Medupi Marang or Midas Marang 400kV powerlines, Rustenburg*. Pretoria-North: Vhubvo Archaeo-Heritage Consultants.
- Raper, R. E., 1987. *Dictionary of Southern African Place Name*. Johannesburg: Lowry Publishers.
- SAHRIS, 2014. *PalaeoSensitivity Map*. [Online] Available at: <http://www.sahra.org.za/map/palaeo> [Accessed 10 November 2014].
- South African History Online, 2014. *The Natives Land Act of 1913*. [Online] Available at: <http://www.sahistory.org.za/topic/natives-land-act-1913> [Accessed 11 November 2014].
- Van Schalkwyk, J. C. C., 2003. *A survey of Cultural Resources in the Boitekong Township Development Area, Rustenburg District, North West Province*. Pretoria: National Cultural History Museum.
- Van Schalkwyk, J. & Pelsler, A., 1997. *A survey of Cultural Resources on the farm Kroondal 304JQ, East of Rustenburg*, Pretoria: National Cultural History Museum.
- van Vollenhoven, A. C. & de Bruyn, C., 2014. *A report on the updating of a previous Cultural Heritage Impact Assessment for the EMPR Alignment and Consolidation process at Anglo American Platinum: Rustenburg Platinum Mines - Rustenburg Section, Northwest Province*. Groenkloof: Archaeos.

Heritage Basic Assessment Report

Environmental Authorisation Application: Prospecting Right Application for Paardekraal 279JQ  
& Waterval 306JQ, Phase 2

APM3249



**DIGBY WELLS**  
ENVIRONMENTAL

## Appendix A: Specialist CV



DIGBY WELLS  
ENVIRONMENTAL

## NATASHA HIGGITT

Ms Natasha Higgitt  
Assistant Heritage Consultant  
Social Department  
Digby Wells Environmental

### 1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2010)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

### 2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

### 3 EMPLOYMENT

- July 2011 to Present: Assistant Heritage Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

### 4 FIELD EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape
- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape

- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

## **5 PROJECT EXPERIENCE**

- Notification of Intent to Develop for the Doornkloof Flood Remedial Measures Project, Centurion, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Oakleaf Open Cast Coal Mine, Bronkhorstspuit, Gauteng Province for Oakleaf Resources (Digby Wells Environmental)
- Notification of Intent to Develop for the Rietfontein 101IS Prospecting Project for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Impact Assessment for the Weltevreden Open Cast Coal Mine, Belfast, Mpumalanga for Northern Coal (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop for the Grootegeeluk Expansion Project, Lephalale, Limpopo Province for Exxaro Resources (Pty) Ltd (Digby Wells Environmental)
- Notification of Intent to Develop and Heritage Statement for the London Road Petrol Station, Alexandria, Gauteng for ERM Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Roodepoort Strengthening Project, Roodepoort, Gauteng for Fourth Element (Digby Wells Environmental)
- Heritage Statement for the Stoffel Park Bridge Upgrade, Mamelodi, Gauteng for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement for the Witrand Prospecting EMP, Bethal, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for the Onverwacht Prospecting EMP, Kinross, Mpumalanga for Rustenburg Platinum (Digby Wells Environmental)
- Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, south of Johannesburg, Gauteng Province for Erm Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Platreef Platinum Project, Mokopane, Limpopo for Platreef Resources (Digby Wells Environmental)
- Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, near Witbank, Mpumalanga Province for Jones and Wagner Consulting Civil Engineers (Digby Wells Environmental)



- Heritage Statement Report for the Wilgespruit Bridge Upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement Report for the Kosmosdal sewer pipe bridge upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)





- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

## **6 PROFESSIONAL AFFILIATIONS**

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association (SAMA): Member

## JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

### 1 EDUCATION

Date	Degree(s) or Diploma(s) obtained	Institution
2014	Integrated Heritage Resources Management Certificate, NQF Level 6	Rhodes University
2002	BA (Honours) (Archaeology)	University of Pretoria
2001	BA	University of Pretoria
1997	Matric with exemption	Brandwag Hoërskool

### 2 LANGUAGE SKILLS

Language	Speaking	Writing	Reading
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

### 3 EMPLOYMENT

Period	Company	Title/position
09/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
05/2010-2011	Digby Wells Environmental	Archaeologist
10/2005-05/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007	Rock Art Mapping Project	Freelance archaeologist Resident archaeologist



2002-2003	Department of Anatomy, University of Pretoria	Special assistant: Anthropology
2001-2002	Department of Anatomy, University of Pretoria	Technical assistant
1999-2001	National Cultural History Museum & Department of Anthropology and Archaeology, UP	Assistant: Mapungubwe Project,

#### 4 EXPERIENCE

Johan Nel has 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

#### 5 PROFESSIONAL REGISTRATION

Position	Professional Body	Registration Number
Council member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	095
Member	International Association of Impact Assessors (IAIA)	N/A
Member	International Council on Monuments and Sites (ICOMOS)	
Member	Society for Africanist Archaeologists (SAfA)	N/A



## 6 PUBLICATIONS AND CONFERENCE PAPERS

<b>Authors and Year</b>	<b>Title</b>	<b>Published in/presented at</b>
Nel, J. (2001)	Cycles of Initiation in Traditional South African Cultures.	South African Encyclopaedia (MWEB).
Nel, J. 2001.	Social Consultation: Networking Human Remains and a Social Consultation Case Study	Research poster presentations at the. Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists the National Museum, Cape Town
Nel, J. 2002.	Collections policy for the WG de Haas Anatomy museum and associated Collections.	Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.
Nel, J. 2004.	Research and design of exhibition for Eloff Belting and Equipment CC	Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004
Nel, J. 2004.	Ritual and Symbolism in Archaeology, Does it exist?	Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley
Nel, J & Tiley, S. 2004.	The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa.	Archaeology World Report, (1) United Kingdom p.14-22.
Nel, J. 2007.	The Railway Code: Gautrain, NZASM and Heritage.	Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.
Nel, J. 2009.	Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture.	The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
Nel, J. 2011.	'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: Mapungubwe Remembered.	University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.



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Nel, J. 2012	HIAs for EAPs.	. Paper presented at IAIA annual conference: Somerset West.
Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	. Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.

## 7 PROJECT EXPERIENCE

### 7.1 Archaeological Surveys and Impact Assessments

- 2003-2004. Freelance consulting archaeologist. Roodt & Roodt CC. RSA. Archaeological surveys. Specialist.
- 2004-2005. Resident archaeologist Rock Art Mapping Project. University of KwaZulu-Natal. Kwazulu-Natal, RSA. Rock art mapping & recording. Specialist.

### 7.2 Archaeological Mitigation

- 2007. Archaeological investigation of Old Johannesburg Fort. Johannesburg Development Agency. Gauteng, RSA. Archaeological mitigation. Project manager.
- 2008. Final consolidated report: Watching Brief on Soutpansberg Road Site for the new Head Offices of the Department of Foreign Affairs, Pretoria Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Watching Brief. Project manager.
- 2011. Sessenge archaeological site mitigation. Randgold Resources. Doko, DRC. Archaeological mitigation. Specialist.
- 2011. Mitigation of three sites, Koidu Kimberlite Project. Koidu Holdings SA. Koidu, Sierra Leone. Archaeological mitigation. Project manager.
- 2012. Boikarabelo Phase 2 Mitigation of Archaeological Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2012. Additional Archaeology Mitigation of Sites. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.
- 2013. Archaeological Excavations of Old Well, Rhodes University, Grahamstown. Rhodes University. Eastern Cape, RSA. Archaeological mitigation. Specialist.
- 2014. Archaeological Site Destruction. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Archaeological permitting and mitigation. Project manager.



### 7.3 Heritage Impact Assessments

- 2005. Final consolidated Heritage Impact Assessment report: Proposed development of high-cost housing and filling station, Portion of the farm Mooiplaats 147 JT. Go-Enviroscience. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2006. Final report: Heritage resources Scoping survey and preliminary assessment for the Transnet Freight Line EIA, Eastern Cape and Northern Cape. ERM Southern Africa (Pty) Ltd. Northern & Eastern Cape, RSA. Heritage Scoping Assessment. Project manager.
- 2007. Proposed road upgrade of existing, and construction of new roads in Burgersfort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2007. Recommendation of Exemption: Above-ground SASOL fuel storage tanks located at grain silos in localities in the Eastern Free State. Sasol Group Services (Pty) Ltd. Free State, RSA. Letter of Exemption. Project manager.
- 2008. Summary report: Old dump on premises of the new Head Offices, Department of Foreign Affairs, Pretoria, Gauteng. Imbumba-Aganang D & C Joint Venture. Gauteng, RSA. Archaeological Impact Assessment. Project manager.
- 2008. Van Reenen Eco-Agri Development Project. Go-Enviroscience. Kwazulu-Natal & Free State, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage Impact Assessment for proposed water pipeline routes, Mogalakwena District, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Phase 1 Heritage and Archaeological Impact Assessment: Proposed establishment of an access road between Sapekoe Drive and Koedoe Street, Erf 3366 (Extension 22) and the Remainder of Erf 430 (Extension 4). AGES South Africa (Polokwane). Limpopo, RSA. Heritage Impact Assessment. Project manager.
- 2008. Heritage resources scoping survey and preliminary assessment: Proposed establishment of township on Portion 28 of the farm Kennedy's Vale 362 KT, Steelpoort, Limpopo Province. AGES South Africa (Polokwane). Limpopo, RSA. Heritage Scoping Assessment. Project manager.
- 2008. Randwater Vlakfontein-Mamelodi water pipeline survey. Archaeology Africa CC. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2010. Heritage Impact Assessment for conversion of PR to MRA. Georock Environmental. Northwest, RSA. Heritage Impact Assessment. Project manager.
- 2010. Temo Coal Project. Namane Commodities (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2011. Marapong Treatment Works. Ceenex (Pty) Ltd. Limpopo, RSA. Archaeological Impact Assessment. Project manager.



- 2011. Complete Environmental Authorisation. Rhodium Reefs Ltd. Limpopo, RSA. Archaeological Impact Assessment. Specialist.
- 2011. Big 5 PV Solar Plants. Orlight (Pty) Ltd. Western and Northern Cape, RSA. Heritage Impact Assessment. Specialist.
- 2011. Heritage Impact Assessment for Koidu Diamond Mine. Koidu Holdings SA. Koidu, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. TSF and Pipeline. Gold One. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2012. Kangra Coal Heritage Screening Assessment. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Screening Assessment. Project manager.
- 2012. Environmental and Social Studies. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage specialist advice. Project manager.
- 2012. ESKOM Powerline EIA. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2012. Falea Project ESIA. Denison Mines Corp. (Rockgate Capital Corp). Falea, Mali. Heritage Impact Assessment. Specialist.
- 2012. EIA for Proposed Emergency Measures to Pump and Treat. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Specialist.
- 2012. Tonguma Baseline Studies. Koidu Holdings SA. Tonguma, Sierra Leone. Heritage Impact Assessment. Specialist.
- 2012. Vedanta IPP. Black Mountain Mining (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Boikarabelo Railway Realignment. Ledjadja Coal (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Platreef ESIA. Platreef Resources (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Roodekop EIA. Universal Coal Development 4 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2012. Kangala HIA. Universal Coal Development 1 (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment and permitting. Specialist.
- 2012. Roodepoort Strengthening. Eskom Holdings SOC Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2012. Trichardtsfontein EIA / EMP. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2012. Zandbaken EIA/EMPR. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.



- 2013. ATCOM Tweefontein NID. Jones & Wagener (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2013. Roodepoort Heritage Impact Assessment. Fourth Element Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. JHB BRT Phase 2 Heritage Impact Assessment. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kangra Coal HIA. ERM Southern Africa (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Project manager.
- 2013. Slypsteen Bulk Sample Application. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Project manager.
- 2013. Kempton Park Heritage Statement and NID. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Sasol Twistdraai CFD. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. HRS & NID - River Crossings Upgrade. Iliso Consulting (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Project manager.
- 2013. Waterberg Prospecting Right Applications. Platinum Group Metals (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Project manager.
- 2013. Landau Waste Licence Application. Anglo Operations (Pty) Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Prospecting Right Consultation Report. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Witrand Prospecting EMP. Rustenburg Platinum Mines Limited. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. EMP Amendment for CST. Copper Sunset Trading (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Maseve IFC ESHIA. Maseve Investment (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2013. Dalyshope ESIA. Anglo Operations (Pty) Limited. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Klipfontein Opencast Project. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2013. Consbrey and Harwar MPRDA EIA/EMP. Msobo Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2013. Slypsteen 102 EMP Amendment. Summer Season Trading (Pty) Limited. Northern Cape, RSA. Heritage Impact Assessment. Specialist.





- 2013. Putu Iron Ore ESIA. Atkins Limited Incorporated. Putu, Liberia. Heritage Impact Assessment. Specialist.
- 2013. Ash backfilling at Sigma Colliery. Sasol Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Specialist.
- 2013. Syferfontein Block 4 - Underground Coal Mining for Sasol. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Prospecting Right Amendment to Include Bulk Sampling. Sikhuliso Resources (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.
- 2013. Nooitgedacht EIA, EMP Amendment & Gap Analysis. Xstrata Coal South Africa. Limpopo, RSA. Heritage Impact Assessment. Specialist.
- 2014. Gold One EMP Consolidation Phase 0. Gold One. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Kilbarchan Audit and EIA. Eskom Holdings SOC Ltd. Kwazulu-Natal, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit Extension Environmental Assessment. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. Klipspruit South BECSA EIA. BHP Billiton Energy Coal South Africa Limited. Mpumalanga, RSA. Heritage Impact Assessment. Reviewer / specialist.
- 2014. EIA/EMP Soweto Cluster. DRD GOLD ERGO (Ergo Mining (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. London Road Heritage Statement. ERM Southern Africa (Pty) Ltd. Gauteng, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Grootegeluk MPRDA, NEMA and IWULA. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Notification of Intent to Develop. Reviewer / specialist.
- 2014. Kibali ESIA & EMP Update. Randgold Resources. Doko, DRC. Heritage Impact Assessment. Specialist.
- 2014. Nokuhle Colliery NEMA Process. HCI Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. HRM Process for Hendrina Wet Ashing. Lidwala Consulting Engineers (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Weltevreden NEMA. Northern Coal (Pty) Ltd. Mpumalanga, RSA. Heritage Impact Assessment. Specialist.
- 2014. Sasol Sigma Mooikraal Pipeline BA. Sasol Mining (Pty) Ltd. Mpumalanga, RSA. Notification of Intent to Develop. Specialist.



## 7.4 Burial Grounds and Graves Consultation and Relocation

- 2005. Report on exhumation, relocation and re-internment of 49 graves on Portion 10 of the farm Tygervallei 334 JR, Kungwini Municipality, Gauteng D Georgiades East Farm (Pty) Ltd. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Southstock Collieries Grave Relocation. Doves Funerals, Witbank. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2005. Social consultation for Smoky Hills Platinum Mine Grave Relocation. PGS (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2005. Social consultation for Elawini Lifestyle Estate Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zonkezizwe Grave Relocation. PGS (Pty) Ltd. Gauteng, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Motaganeng Residential Development Grave Relocation. PGS (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2006. Social consultation for Zondagskraal Coal Mine Grave (Pty) Ltd. Mpumalanga, RSA. Stakeholder consultation on burial grounds and graves. Social consultant.
- 2007. Exploratory excavation of an unknown cemetery at Du Preezhoek, Fountains Valley, Portion 383 of the farm Elandspoort 357 JR, Pretoria, Gauteng. Bombela Civil Joint Venture. Gauteng, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Final consolidated report: Phase 2 test excavations ascertaining the existence of alleged mass graves, Tlhabane West, Extension 2, Rustenburg, Northwest Province. Bigen Africa Consulting Engineers. Northwest, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2007. Repatriation of Mapungubwe Human Remains. Department of Environmental Affairs and Tourism. Limpopo, RSA. Repatriation. Project manager.
- 2008. Report on skeletal material found at Pier 30, R21 Jones Street off-ramp, Kempton Park. Bombela Civil Joint Venture. Gauteng, RSA. Heritage Scoping Assessment. Project manager.
- 2011. Kibali Grave Relocation. Randgold Resources. Doko, DRC. International grave relocation. Specialist.
- 2012. Platreef Platinum Mine Burial Grounds and Graves Census. Platreef Resources (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.

- 2013. New Liberty Grave Relocation Process. Aureus Mining Inc. Kinjor, Liberia. International grave relocation. Project manager.
- 2013. Bokoni Burial Grounds and Grave Census and Grave Relocation Plan. Bokoni Platinum Mines (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Project manager.
- 2014. Arnot Colliery Grave Relocation Project. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Project manager.
- 2014. Paardeplaats and Belfast RAPs. Exxaro Coal (Pty) Ltd. Mpumalanga, RSA. Burial grounds and graves consultation, permitting and relocation. Reviewer / specialist.
- 2014. Thabametsi EIA, EMP, IWULA, IWWMP and PPP. Exxaro Coal (Pty) Ltd. Limpopo, RSA. Stakeholder consultation on burial grounds and graves. Specialist.

## **7.5 Research Reports and Reviews**

- 2007. Research report on cultural symbols. Ministry of Intelligence Services. RSA. Research report. Project manager.
- 2007. Research report on the remains of kings Mampuru I and Nyabela. National Department of Arts and Culture. RSA. Research report. Project manager.
- 2012. Baseline Scoping and Pre-feasibility Songwe Rare Earth Element Project. Mkango Resources Limited. Songwe, Malawi. Heritage Impact Assessment. Reviewer / specialist.
- 2013. Fatal Flaw Analysis and EIA Process for AMD Man in Eastern Basin. AECOM SA (Pty) Ltd. Gauteng, RSA. Heritage Impact Assessment. Reviewer / specialist.

Heritage Basic Assessment Report

Environmental Authorisation Application: Prospecting Right Application for Paardekraal 279JQ  
& Waterval 306JQ, Phase 2

APM3249



**DIGBY WELLS**  
ENVIRONMENTAL

## Appendix B: Site list

Map ID	Site ID	Source	Time period	Type	Latitude	Longitude	Description
2527CB1	1997-SAHRA-0015/2527CB1	van Schalkwyk & Pelser, 1997	MSA	Surface scatter	-25.708667	27.357472	Surface scatter of Middle Stone Age tools
2527CB2	1997-SAHRA-0015/2527CB2	van Schalkwyk & Pelser, 1997	LFC	Stone walling	-25.712111	27.355222	Extensive LIA stone walling and recent fire places (possible initiation site)
2527CB3	1997-SAHRA-0015/2527CB3	van Schalkwyk & Pelser, 1997	LFC	Stone walling	-25.716056	27.327694	LIA stone walling and terraces
2527CB4	1997-SAHRA-0015/2527CB4	van Schalkwyk & Pelser, 1997	LFC	Stone walling	-25.701722	27.334944	LIA stone walling and potsherds found on site
Site 3/2002	2002-SAHRA-0037/Site 3	Huffman & Schoeman, 2002	MSA	Surface scatter	-25.67525	27.388167	MSA flakes, points and cores
Site 4/2002	2002-SAHRA-0037/Site 4	Huffman & Schoeman, 2002	LFC	Stone walling	-25.677417	27.387083	Well preserved LIA stone walling
Site 14/2002	2002-SAHRA-0037/Site 14	Huffman & Schoeman, 2002	MSA	Surface scatter	-25.661722	27.412167	MSA flakes, points and cores
Site 23/2002	2002-SAHRA-0037/Site 23	Huffman & Schoeman, 2002	LFC	Engraving site	-25.675972	27.406278	Iron Age Stone engravings site. The engravings appear to depict the settlement plan of early stone-walled settlements
Site 27/2002	2002-SAHRA-0037/Site 27	Huffman & Schoeman, 2002	MSA	Surface scatter	-25.675944	27.411444	MSA flakes, points and cores
Site 28/2002	2002-SAHRA-0037/Site 28	Huffman & Schoeman, 2002	LFC	Stone walling	-25.674889	27.413	Middle Iron Age stone walling site
Site 47/2002	2002-SAHRA-0037/Site 47	Huffman & Schoeman, 2002	LFC	Stone walling	-25.678611	27.384444	LIA stone walling and middens
Site 48/2002	2002-SAHRA-0037/Site 48	Huffman & Schoeman, 2002	LFC	Stone walling	-25.673056	27.385	Extensive LIA stone walling site
Site 50/2002	2002-SAHRA-0037/Site 50	Huffman & Schoeman, 2002	MSA	Surface scatter	-25.656389	27.342778	Isolated MSA flake
2527CB29	2003-SAHRA-00771/2527CB29	Van Schalkwyk, 2003	LFC	Stonewall	-25.597917	27.310056	Late Iron Age stone walled site with ash middens and large amount of material such as pottery and faunal remains.
2527CB30	2003-SAHRA-00771/2527CB30	Van Schalkwyk, 2003	LFC	Stonewall	-25.600278	27.318278	Late Iron Age stone walled site with ash middens and large amount of material such as pottery and faunal remains.
2527CB31	2003-SAHRA-00771/2527CB31	Van Schalkwyk, 2003	LFC	Stonewall	-25.603472	27.324722	Late Iron Age stone walled site with ash middens and large amount of material such as pottery and faunal remains.
Site 1	2008-SAHRA-0478/Site 1	Coetzee, 2008	LFC	Stone walling	-25.748256	27.366596	Late Iron Age (LIA) stone walled settlement consisting of six enclosures with a main enclosure (8 m in diameter), a large enclosure (25 m in diameter) with several secondary stone enclosures attached and several large packed stone heaps
Marang 0001	4758/Marang 0001	Magoma, 2014	LFC	Stone feature	-25.620528	27.352028	Pile of stones
Marang 0002	4758/Marang 0002	Magoma, 2014	LFC	Stone feature	-25.6202	27.351597	Pile of stones
Marang 0003	4758/Marang 0003	Magoma, 2014	LSA	Surface scatter	-25.613833	27.341917	Scatters of LSA material were noted. These occurred in low densities of 0 to 1 per square meter and on a disturbed landscape, also noted, are potsherds. These scatters, along with potsherds are viewed to be of low significance. No manufacturing camp or stratified sites were identified anywhere within the property that has been identified for the proposed development.
Marang 0004	4758/Marang 0004	Magoma, 2014	LSA	Stone feature	-25.614194	27.3415	Pile of stones
Marang 0005	4758/Marang 0005	Magoma, 2014	LFC	Stonewall	-25.621333	27.351972	A stone wall which extends along the edge of the hill was noted. This appears to be LFC type-sites in the area. On top of this hill, there are several sites marked by fine collection of stones.
Marang 0006	4758/Marang 0006	Magoma, 2014	LFC	Midden	-25.620111	27.334889	Large midden deposit of a LFC site was noted in the section proposed for substation 3. This midden is associated with an animal enclosure. It is difficult to evaluate these enclosures as the vegetation cover inhibits proper investigation. However, they appear to cover a wide area. Scatters of potsherds were also noted in this proposed area
2326/Site 3	2326/Site 3	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.639917	27.332028	No description given
2326/Site 4	2326/Site 4	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.639917	27.332028	No description given
2326/Site 5	2326/Site 5	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.633889	27.304306	No description given
2326/Site 6	2326/Site 6	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.628611	27.302917	No description given
2326/Site 59	2326/Site 59	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.629722	27.347222	Low frequencies of undecorated Iron Age shards were found on the surface of the site.

2326/Site 60	2326/Site 60	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.630389	27.343222	Low frequencies of undecorated Iron Age shards were found on the surface of the site
2326/Site 61	2326/Site 61	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.625722	27.341583	Low frequencies of undecorated Iron Age shards were found on the surface of the site
2326/Site 62	2326/Site 62	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.624889	27.341861	Circular and semi-circular stone walls on the site are low and collapsed
2326/Site 63	2326/Site 63	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.624361	27.340667	Undecorated and decorated shards from the Olifantspoort facies were noticed on the surface of the site
2326/Site 64	2326/Site 64	Van Vollenhoven & de Bruyn, 2014	Historic Tswana	Pottery scatter	-25.629167	27.340556	Undecorated shards were noticed on the surface of the site
2326/Site 65	2326/Site 65	Van Vollenhoven & de Bruyn, 2014	ESA	Surface scatter	-25.693611	27.309167	Stone Age artefacts such as cores and flakes were found on the slope of the on the surface of the site. Around the site a few Iron Age ceramics were also found
2326/Site 66	2326/Site 66	Van Vollenhoven & de Bruyn, 2014	Historic	Burial ground	-25.69375	27.308611	Approximately twenty graves could be seen on the site. Most of the graves are covered in stones, while a few are covered in cement. There was no fence around the grave yard
2326/Site 67	2326/Site 67	Van Vollenhoven & de Bruyn, 2014	Historic	Stonewall	-25.705694	27.393833	The stone walls found on site are low and collapsed; this might be due to weathering and disturbance from animals as well as from the mining activities
2326/Site 68	2326/Site 68	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.709444	27.394722	The stone walls found on site are low and collapsed; this might be due to weathering and disturbance from animals as well as from the mining activities
2326/Site 69	2326/Site 69	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.716944	27.395056	The stone walls found on site are low and collapsed; this might be due to weathering and disturbance from animals as well as from the mining activities
2326/Site 70	2326/Site 70	Van Vollenhoven & de Bruyn, 2014	LFC	Pottery scatter	-25.639056	27.376722	Iron Age ceramics were noticed on the surface of the site. The decorated shards are of the Olifantspoort facies which is characterised by hatching
2326/Site 71	2326/Site 71	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.638333	27.374722	Multiple collapsed and broken stone walls were noticed on the site
2326/Site 72	2326/Site 72	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.641889	27.382028	Low frequencies of undecorated shards were also noticed on the site. Furthermore one of the stone walls found on the site has been destroyed by an unpaved road
2326/Site 73	2326/Site 73	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.64	27.382778	Multiple collapsed and broken stone walls were noticed on the site
2326/Site 74	2326/Site 74	Van Vollenhoven & de Bruyn, 2014	Historic	Stonewall	-25.630556	27.360278	A low and broken stone wall was noticed on the site
2326/Site 75	2326/Site 75	Van Vollenhoven & de Bruyn, 2014	Historic	Terracing	-25.632694	27.360278	Low stone wall terraces
2326/Site 76	2326/Site 76	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.643056	27.341111	Low and collapsed stone walls as well as multiple heaps of stone were noticed on the site
2326/Site 77	2326/Site 77	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.643611	27.343056	Low and collapsed stone walls as well as multiple heaps of stone were noticed on the site
2326/Site 78	2326/Site 78	Van Vollenhoven & de Bruyn, 2014	LFC	Stonewall	-25.644167	27.344722	Extensive walling was noticed with parts of the walls being broken and low
Fv/001	6688/Fv/001	Higgitt, 2015	MSA	Surface scatter	-25.72735	27.389294	Surface scatter of MSA flakes
Fv/002	6688/Fv/002	Higgitt, 2015	LFC	Surface scatter	-25.726933	27.389259	Surface scatter of ceramic sherds (Uitkomst/Rooiberg facies)
Fv/003	6688/Fv/003	Higgitt, 2015	LFC	Stone walling	-25.72619	27.388933	Double terrace walling at the base of the hill
Fv/004	6688/Fv/004	Higgitt, 2015	LFC	Stone walling	-25.7259	27.388584	Terrace walling on the southern slope of the hill
Fv/005	6688/Fv/005	Higgitt, 2015	LFC	Stone walling	-25.72659	27.398045	Extensive Double filled-in stone walls
Fv/006	6688/Fv/006	Higgitt, 2015	LFC	Stone walling	-25.724257	27.396752	Extensive Double filled-in stone walls
Fv/007	6688/Fv/007	Higgitt, 2015	LFC	Stone walling	-25.731347	27.401548	Rough stone walling
Hill 243	2527CA 8	WITS Archaeology Site Database	LFC	Stonewall	-25.504167	27.223056	Moloko LIA stone walling
Reservoir Hill	2527CA 9	WITS Archaeology Site Database	LFC	Stonewall	-25.550556	27.218889	Moloko LIA stone walling
Kamakwe	2527CB1/CB2/CB3	WITS Archaeology Site Database	LFC	Stonewall	-25.686111	27.388056	Extensive LIA Stone walling complex (Moloko type walling)
Mafika A	2527CB 4	WITS Archaeology Site Database	LFC	Stonewall	-25.5375	27.293889	Moloko LIA stone walling
Mafika B	2527CB 5	WITS Archaeology Site Database	LFC	Stonewall	-25.540278	27.293889	Moloko LIA stone walling
Mafika C	2527CB 6	WITS Archaeology Site Database	LFC	Stonewall	-25.535278	27.288333	Moloko LIA stone walling