

**Opencast mining of  
Pit 36W at the Anglo  
American Platinum  
Amandelbult  
Complex, Limpopo  
Province**

Addendum to Environmental  
Management Programme

**Anglo American Platinum (Pty)  
Ltd**

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09 June 2017

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<sup>1</sup> Appendix numbering were kept consistent with that of the Consultation Basic Assessment Report for Pit 62E, available for review with this report.

Locality Map

## Appendix B.2

General Layout

## Appendix B.4

Landcover

## Appendix B.5

Critical Biodiversity Area 2

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**mineral resources**

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

## **ADDENDUM TO ENVIRONMENTAL MANAGEMENT PROGRAMME**

### **PROPOSED OPENCAST PIT 36W AT ANGLO AMERICAN PLATINUM'S AMANDELBULT MINE, LIMPOPO**

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

**NAME OF APPLICANT:** Anglo American Platinum (Pty) Ltd

**TEL NO:** +27 (0) 14 784 1001

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**POSTAL ADDRESS:** PO Box 02, Chromite, 0362

**PHYSICAL ADDRESS:** Rustenburg Platinum Mines Limited, Amandelbult Section, Dishaba Mine, Thabazimbi

**DMR REFERENCE NO.:** LP 30/5/1/2/3/2/1 (12767) EM

# 1 Important Notice

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

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (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 considered 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 (EAP) 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.

# Part A

## Scope of Assessment for Environmental Management Programme Report Addendum

## 2 Environmental Assessment Practitioner

The Anglo American Platinum (Pty) Ltd (henceforth, Anglo) Amandelbult Complex has existing mining authorisations, initially granted in 1997 under the then Minerals Act, 1991 (Act No. 50 of 1991). This Act was replaced by the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002 – MPRDA). Additional Environmental Management Programmes (EMPrs) were obtained for the farms Middellaagte (in 1998) and Elandsfontein. The EMPrs that were approved in 1997 and 1998, remained valid under the MPRDA and now, continue to remain valid under the “One Environmental Management System<sup>2</sup>” (OEMS) in terms of NEMA. Although a consolidated EMPr was submitted to the Department of Mineral Resources (DMR) in 2013, the Department of Mineral Resources (DMR) has not yet approved this EMPr. This EMPr was compiled in November 2013 by Prime Resources.

Anglo appointed Aurecon South Africa (Pty) Ltd (henceforth, Aurecon) as an independent Environmental Assessment Practitioner (EAP) to compile an addendum to the 2013 EMPr for the opencast mining of its so-called Open Pit 36W at the Amandelbult Complex.

The requirement for independence of the environmental consultant is aimed at reducing the potential for bias in the environmental process. Neither Aurecon nor any of its sub-consultants are subsidiaries of Anglo, nor is Anglo a subsidiary to Aurecon. Furthermore, Aurecon does not have any interests in secondary or downstream developments that may arise from of the authorisation of the proposed Open Pit 36 W project.

### 2.1 Contact person and correspondence address of the EAP

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<sup>2</sup> Put in place through the Environmental Impact Assessment Regulations, 2014 (Government Notices No. 982 – 985 of 2014).

## 2.2 Expertise of the EAP

### 2.2.1 Qualifications of the EAP

**Johan Goosen** holds a Bachelor in Landscape Architecture, which he obtained from the University of Pretoria (UP) in 1998, and completed a Graduate Diploma in Environmental Engineering from the Witwatersrand University (WITS) in 2014. Copies of his qualifications are attached in **Appendix A.1** of the Consultation Basic Assessment Report (CBAR) for Pit 62E, undertaken simultaneously to this report.

### 2.2.2 Summary of the EAP's experience

Johan Goosen is employed as an environmental planner and landscape architect at Aurecon. He has more than 15 years' experience in landscape architecture and environmental planning in a wide variety of sectors. His experience in the mining sector includes end land use planning for mining and waste facilities and brownfields site redevelopment. He has further been involved in numerous projects requiring environmental screening, impact assessment/permitting, construction monitoring and visual impact assessment (VIA) for rail, road, bulk water infrastructure, urban and rural land development. He has also been the co-writer and examiner of the environmental section of the SACLAP professional exam from 2009 to 2015, and regularly acts as external examiner for UP landscape architecture on environmental engineering aspects.

His experience in the mining and metals sector includes various clients:

- EIA/EMPr for Dragline Relocation Project of AngloCoal's Landau Colliery;
- Waste Licensing for hazardous waste sorting facility at Grootegeeluk Coal Mine (Exxaro);
- EIA/EMPr (Anglo, Lonmin, Zululand Anthracite Colliery, Khutala Colliery);
- Visual Impact Assessment (Samancor, PMC, De Beers, Vanchem);
- Waste Buffer Zone Analysis (Cape Gate Vanderbijl);
- End Land Use Plans as part of Closure Plans (De Beers, Exxaro);
- Waste Licensing (Exxaro)
- EIA for relocation of services (Glencore)

His Curriculum Vitae (CV) is attached in **Appendix A.2** of the CBAR for Pit 62E.

## 2.3 Description of the Property

The site for the proposed opencast mining of Open Pit 36W is located on the remaining portion (portion 0) of the farm Elandsfontein 386 KQ, on the south-western part of the Amandelbult Complex. The 21-digit Surveyor General (SG) Code of the property on which Open Pit 36W is proposed is shown in Table 1. The proposed activity will take place on the Amandelbult Mining Right area. The area around the proposed site is dominated by mining activities.

Table 1 | 21-digit SG Code of the cadastral land parcel for the proposed project

Item	Description
Farm name	Portion 0 of the farm Elandsfontein, 386 KQ
Application area (ha)	5
Magisterial district	Waterberg District Municipality, Thabazimbi Local Municipality
Distance and direction from nearest town	14 km north of Northam
21-digit SG Code for each farm portion	T0KQ00000000038600000



### 3 Locality Map

The site is located approximately 15 km west of Middeldrift (a small mine-related settlement, also known as Setaria), approximately 14 km north of Northam, and 28 km southwest of Thabazimbi in the Thabazimbi Local Municipality (TLM), within the Waterberg District Municipality in the Limpopo Province. The R510 is located approximately 4.6 km east of the project site. Northam (nearest town) and the region's topography, at a scale of 1:250 000, are shown in Figure 1 and is attached in **Appendix B.1** of this report. The general layout of the main project components is shown in Figure 2 and provided in **Appendix B.2** of this report.

The land use within the project-area is mainly disturbed and undulating, mainly associated with three quarries. One of the quarries was converted to a drinking hole for animals. Other sources of disturbance include a shooting range on the far eastern end of the study area and infrastructure development (a gravel road cutting along the northern end and a gravel road to the west of the pit, as well as powerlines).

The site is situated on the northern boundary of the Madeleine Robinson Nature Reserve, with a small section of its eastern end located within this nature reserve (PGS Heritage, 2017).

Small undisturbed sections of the study area comprise grassland and thorn trees.

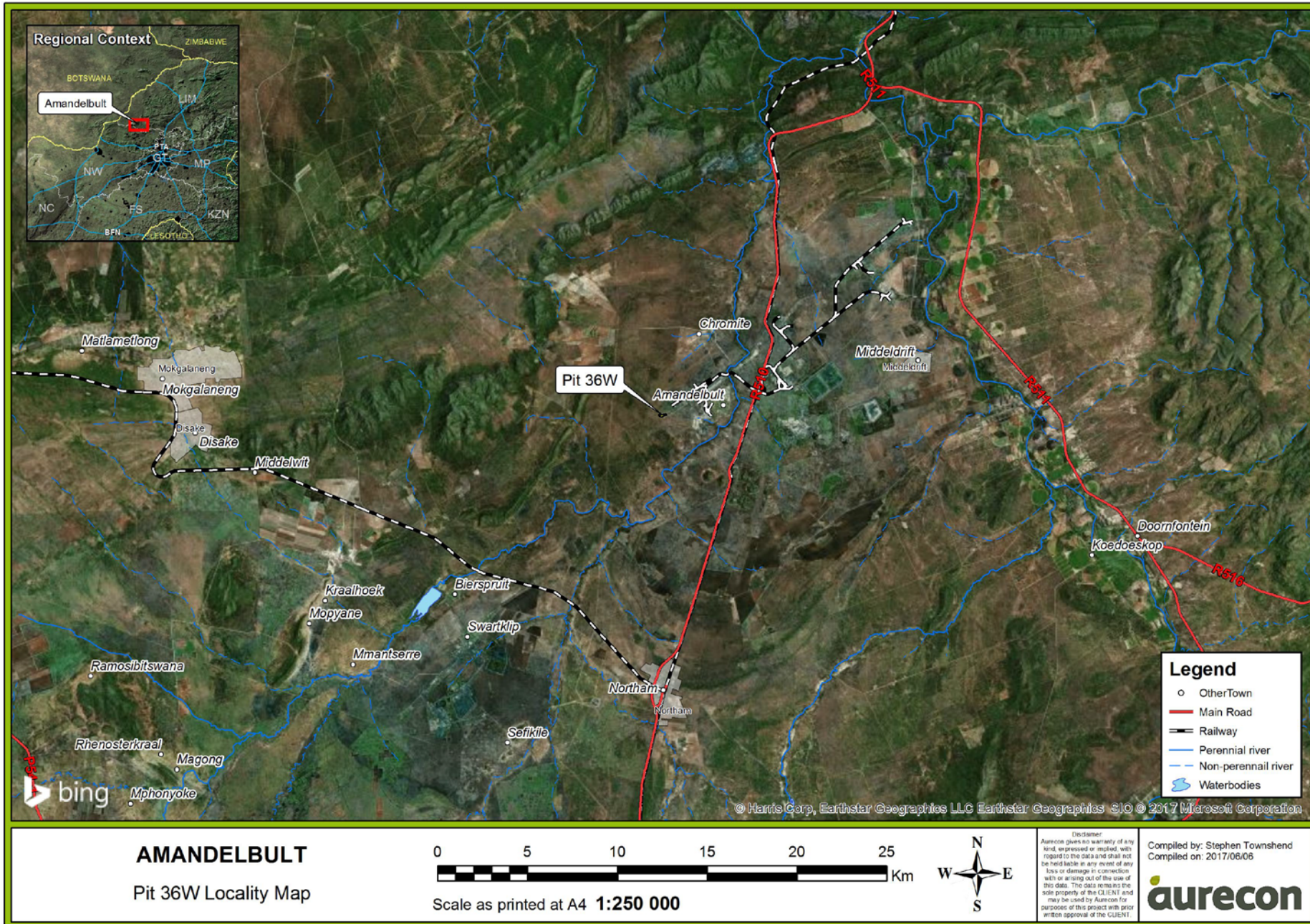


Figure 1 | Open Pit 36W locality map showing Northam to the south, with smaller mine-related settlements to the east (Middeldrift and Amandelbult mine town).



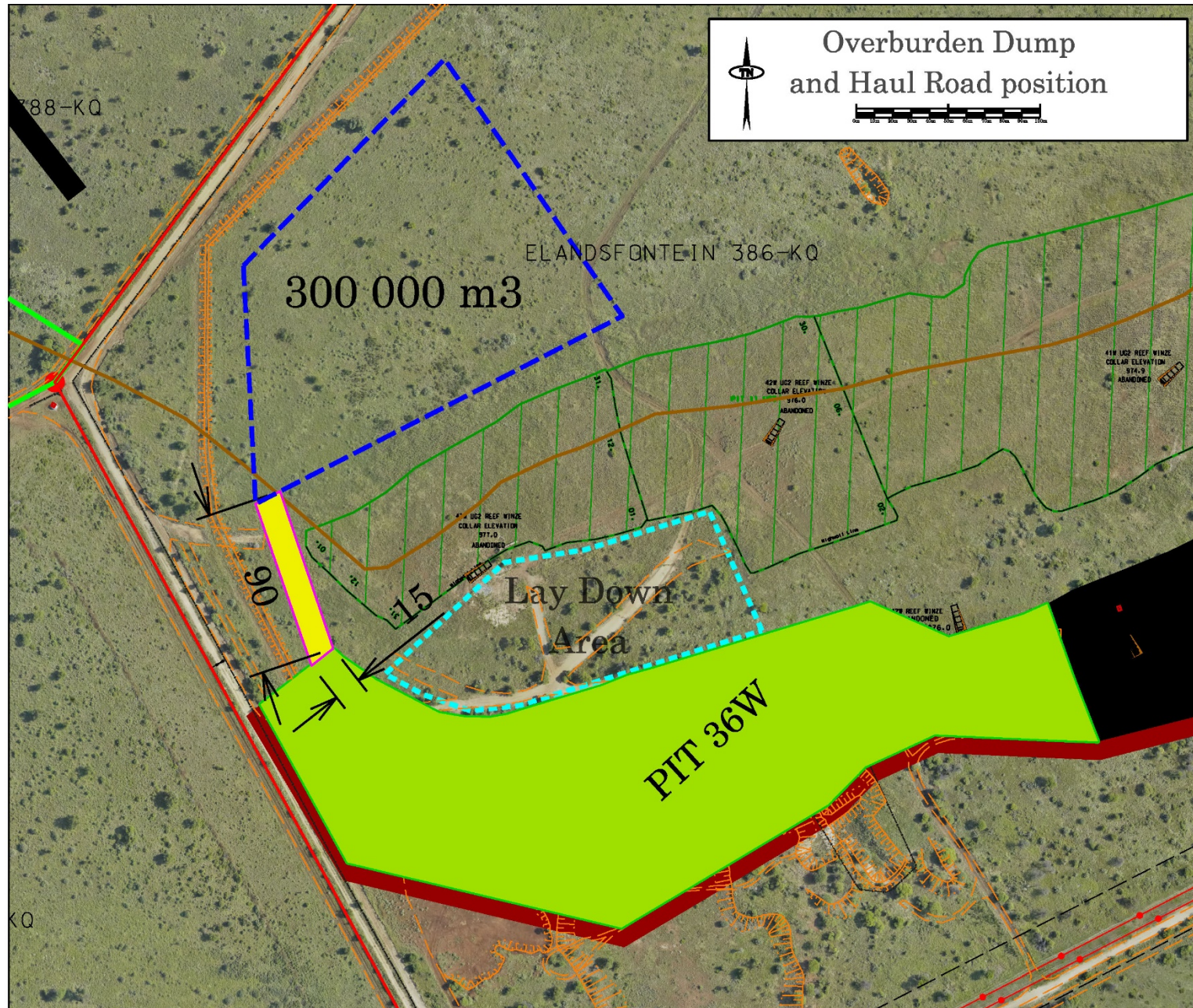


Figure 2 | General layout of the proposed site layout for Open Pit 36W, showing the pit, proposed overburden and topsoil stockpile locations, a gravel haul road, and contractor laydown area.



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

It is envisaged that opencast mining for Platinum Group Metals (PGMs) will take place through truck and shovel operations as follows:

1. Clear vegetation, grub, strip and stockpile topsoil.
2. The base cut of weathered material is taken to 2-m depth and the pit floor is prepared for blast-hole drilling.
3. The blast block is drilled out starting 10 m from the outcrop across to the high wall position.
4. Blast-holes are drilled until contact is made with the top reef.
5. The overburden package is then blasted, and reef extraction proceeds down the dip and along the strike as mining deepens. Articulated dump trucks (ADTs) will be loaded daily (the fleet composition will be finalised in the detailed planning phase prior to construction).
6. Front-end loaders will load crushed ore onto the train at the crushing facility, at regular intervals, to transport it to the Amandelbult Concentrator.
7. The pit will be backfilled to specified post mining landform levels upon cessation of mining activities.
8. The pit will be covered to the specified depth with topsoil and revegetated

Overburden material will be placed on a designated ~3-ha area to the north of the pit. An internal network of existing railway lines mostly used for the transportation of ore connects various locations at the complex with the Amandelbult Concentrator Plant. The railway line located approximately 0.6 km northeast of the pit will be used to transport ore to the Amandelbult Concentrator Plant.

Site establishment is envisaged to take place for ~22 days, mining for ~176 days, and rehabilitation for ~79 days.

Activities at Open Pit 36W will operate from 6AM to 4PM and 4PM to 2AM. No mining will take place between 2AM and 6AM. Blasting activities take place during the daytime, with no blasting occurring 30 minutes prior to dawn and 30 minutes prior to dusk. No blasting will take place on Sundays.

The proposed mining sequence is shown in Figure 3 and Figure 4.

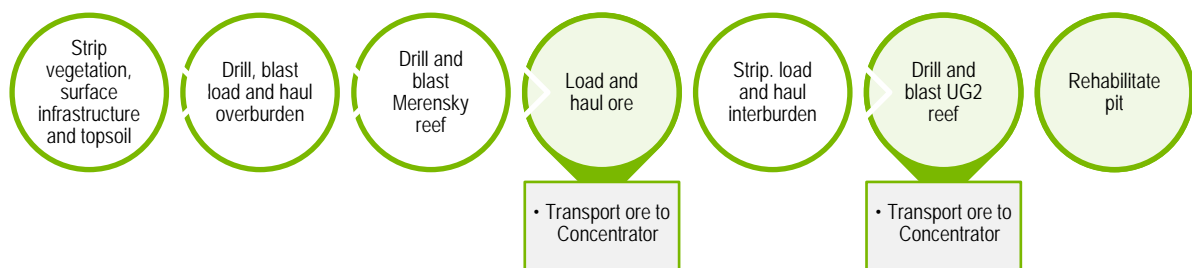


Figure 3 | Proposed mining sequence

The loading conditions are expected to correspond closely to a small scale open pit site, with a maximum pit depth of 60 m envisaged. The pit is proposed at approximately 416 m in length, 128 m in width, and 60 m in depth. The pit surface area is approximately 4.1 ha. The dip of the reef horizon ranges from 21° to 30°. Pit polygons have been adjusted to accommodate a 20-m crown pillar above underground workings.

The scope of this project is limited to the following main project components:

- Blasting and extraction of ore in an opencast pit;
- Placement of overburden on a designated area;
- The creation of haul-/service roads along the pit and between the pit and overburden dump area, if required;
- Rehabilitation of the pit;
- Chemical toilets for use by personnel; and
- Potable water tanks for use by personnel.

Therefore, the application excludes processing of minerals, as this will take place at the existing Amandelbult Concentrator Plant.

## 4.1 Repairs, maintenance, and refuelling

The contractor's Articulated Dump Trucks (ADT) undergo scheduled maintenance at the Central Workshops or similar existing formal infrastructure of the Complex. Minimal (mostly emergency) maintenance will be done in the pit area. No fuel storage takes place at any of the opencast pit, as a central diesel depot is available at the Central Workshops from which the contractor fills diesel bowsers as necessary directly to the fleet at the pit. No explosives will be stored on site.

## 4.2 Mine residue management

Overburden and topsoil stockpiles will occupy approximately 3 hectares to the north of the pit.

- Overburden material will be stockpiled at their natural repose angles.
- The overburden dump will progress by tipping from a higher level and progressively pushing the material out with a dozer.

## 4.3 Waste

A dedicated, approved (registered) waste contractor is appointed at the mine to manage non-mining waste. At the established Amandelbult Complex (i.e. Dishaba, Tumela and Concentrator), only food and polystyrene containers go to Thabazimbi landfill via a contractor.

Industrial waste, such as tyres, scrap metal, wood, hoses, conveyor belts, bricks or concrete is salvaged for reuse, recycling, resale, or disposal as appropriate. All hazardous waste is collected by suitably qualified contractors and disposed of or recycled at appropriately licenced facilities.

Therefore, no landfill site will be established for Open Pit 36W.

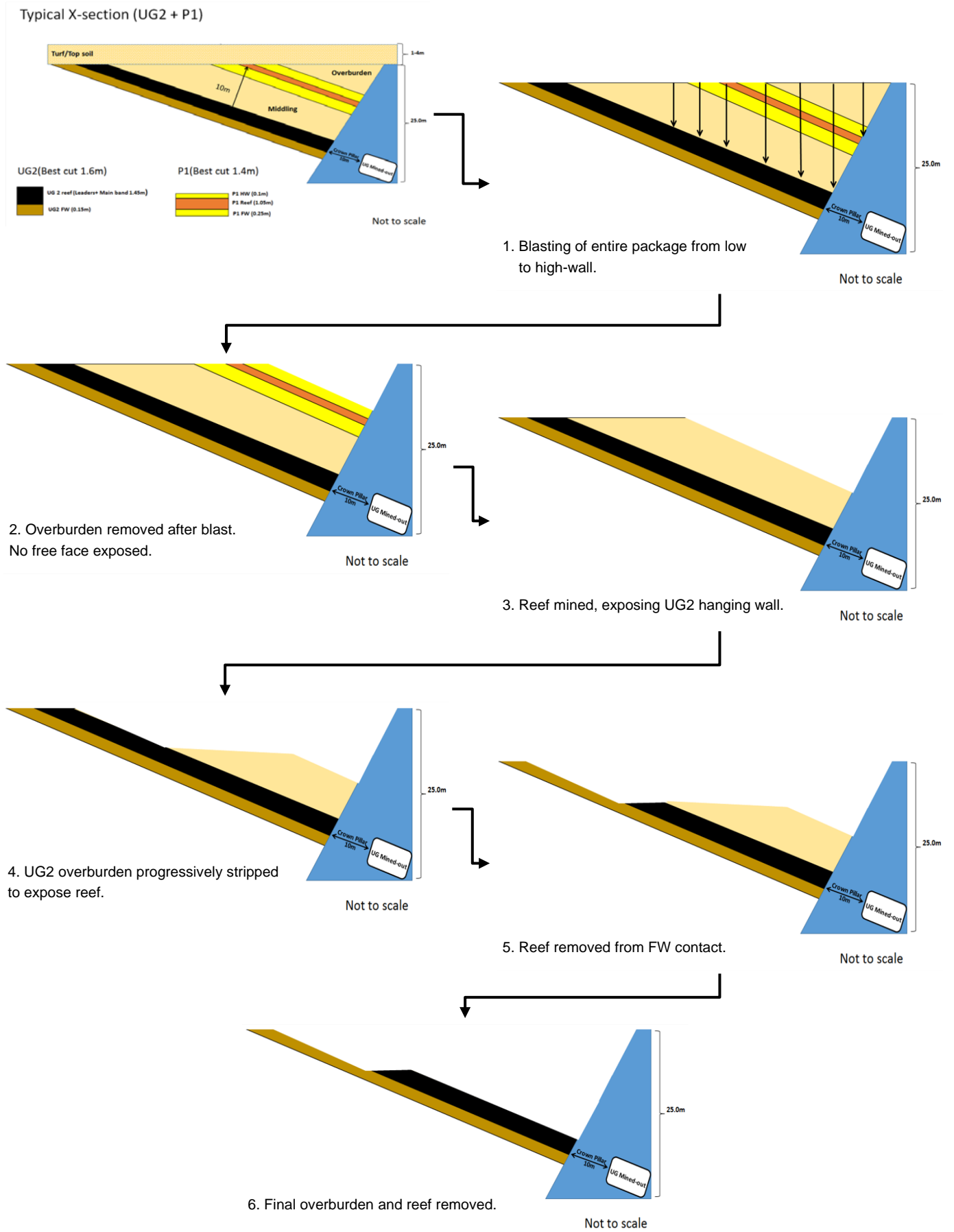


Figure 4 | Proposed opencast mining process

# 5 Policy and Legislative Context

The main legal and policy frameworks that require compliance and which are applicable to this activity are shown in Table 2.

Table 2 | Legislation and policies applicable to Open Pit 36W

Applicable legislation and guidelines used to compile report	Reference where applied	How does the development comply with and respond to the legislation and policy context?
<p><u>The Constitution of South Africa, Act No. 108 of 1996:</u></p> <p>Anglo will be required to adhere to the Environmental Management Programme (EMPr) requirements to ensure that social and environmental management considerations are considered and implemented throughout the lifecycle of the project.</p> <p>As per Section 25 the Constitution, a public participation process (PPP) will be undertaken as this is an essential mechanism for informing stakeholders of their rights and obligations in terms of the project.</p>	EMPr addendum process, section 8	An EMPr is included in this report as Part B. The condition that the EMPr must be adhered to is listed as a required condition to be included in the Environmental Authorisation (EA). A PPP is conducted during the BA-process.
<p><u>Mineral and Petroleum Resources Development Act (MPRDA), as amended, Act No. 28 of 2002:</u></p> <p>Existing mining authorisations granted under the then Minerals Act, 1991 (Act No. 50 of 1991), replaced by the MPRDA were converted to valid EMPr through the OEMS in terms of NEMA (see below).</p>	EMPr addendum	Anglo is in possession of mining authorisations which remain valid under the OEMS. This report serves as an addendum to a consolidated 2013-EMPr.
<p><u>National Environmental Management Act (NEMA), as amended, Act No. 107 of 1998; NEMA: EIA Regulations, GN No. R. 982-985 of 4 December 2014, as amended:</u></p> <p>Several listed activities as per GN 983 and GN 985 are applicable, but are authorised as described above.</p>	EMPr addendum	This addendum serves to supplement the existing EMPr for undertaking short-term opencast mining of a pit. The baseline environmental and potential environmental and socio-economic impacts have been assessed.
<p><u>National Environmental Management Laws Amendment Act (NEMLAA), Act No. 25 of 2014:</u></p> <p>The OEMS was introduced on 8 December 2014 by the enactment of NEMLAA.</p> <p>Under the OES EMPr reports are submitted to the DMR who is the lead agent for any mining and related activities.</p>	EMPr addendum	This EMPr addendum of opencast mining activities at Open Pit 36W will be submitted to the Department of Mineral Resources who, as the competent authority, should approve it.
<p><u>National Environmental Management: Waste Act (NEM: WA): Act No. 59 of 2008; National Environmental Management Act: Waste Amendment Act (WAA), Act No. 26 of 2014; NEMWA: Waste Management Activities, GN No. 921 of 29 November 2013; NEMWA: Waste Classification and Management Regulations, GN No. 634 of 23 August 2013:</u></p> <p>Overburden dumps require a waste management licence (WML). In particular, in terms of WAA Schedule 3, Category A (Hazardous Waste): “A <i>“residue stockpile”</i> means any debris, discard, tailings, slimes, screening, slurry, <i>waste rock, foundry sand, mineral processing plant</i></p>	EMPr addendum	The activity of temporarily disposing overburden waste generated at Open Pit 36W included in this addendum to residue disposal activities currently authorised on the farm Elandsfontein 386 KQ.

Applicable legislation and guidelines used to compile report	Reference where applied	How does the development comply with and respond to the legislation and policy context?
<p><i>waste, ash or any other product derived from or incidental to a mining operation and which is <u>stockpiled</u>, stored or accumulated within the mining area for <u>potential re-use</u>, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act.”</i></p>		
<p><u>NEMA: Biodiversity Act (NEMBA), Act No. 10 of 2004:</u> An ecological baseline and impact assessment (floral and faunal) was undertaken to determine if any protected species are located on the proposed site.</p>	Ecological specialist report	An ecological impact assessment has been undertaken to determine the impact that the proposed activities could have on biodiversity at the proposed site. The report is attached as <b>Appendix E.1</b> of the CBAR for Pit 62E.
<p><u>National Heritage Resources Act (NHRA), Act No. 25 of 1999:</u> A Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) were conducted to identify important cultural heritage and palaeontological resources in the proposed mining area. SAHRA will review the assessments and provide comments, which would be considered by the DMR in their final environmental decision.</p>	HIA and PIA	The HIA and PIA reports conducted for this project will be submitted to SAHRA during the public comment period. The reports are attached as <b>Appendix E.2</b> and <b>E.3</b> of the CBAR for Pit 62E, respectively.
<p>Limpopo Environmental Management Act (LEMA), Act No. 7 of 2003</p>	EMPr addendum	The LEMA has been considered in the finalisation of this report.
<p>National List of Threatened Terrestrial Ecosystems for South Africa, 2011</p>	Ecological specialist report	This list has been considered by the ecological specialist in the preparation of the ecological impact assessment.
<p>Limpopo Conservation Plan Version 2, 2013</p>	Ecological specialist report	The Limpopo C-Plan has been considered in the determination of the environmental baseline and the compilation of mitigation measures.
<p>Waterberg Spatial Development Framework</p>	Section 9.2.2	This framework was considered in the determination of the environmental baseline of the study area.
<p>Thabazimbi Spatial Development Framework</p>	Section 9.2.1	This framework was considered in the determination of the environmental baseline of the study area.
<p>Waterberg Environmental Management Framework</p>	Section 9.1.8	This framework was considered in the determination of the environmental baseline of the study area.



# 6 Need and Desirability of the Proposed Activities

## 6.1 Economic Benefit

Opencast mining opportunities exist at the Amandelbult Complex via the potential short-term mining of shallow PGM resources. Considering this, the Open Pit 36W project has been initiated to economically extract PGM-containing UG2 and MER reef remnants while commodity prices are low.

Various portions along the strike length of the Amandelbult Lease Area have been exploited through shallow opencast mining. The total Amandelbult mining area has a strike extent of ~20 km. Most shallow opencast resources along this extent of the reefs have already been mined. However, several potential opencast blocks of ground were not mined due to infrastructural constraints or a lack of surface rights. The proposed mining activities are in such an area.

The mining sector is a major contributor to the growth of the South African economy. The expansion of opencast operations to extract resources at a relatively low cost would contribute to the security of employment for mine workers. The subcontractor undertaking proposed mining activities will be determined upon project finalisation, which will unlock local procurement opportunities. The proposed activities' products will be processed at the existing Amandelbult Concentrator, meaning that the project scope / battery limits will be comparatively small.

In addition to the quantifiable economic benefits that will result from this development, there are also several qualitative benefits that should be considered. These benefits include:

- **Technology:** Technology used on the mine will work towards improving knowledge on available technologies and skills in using such technology.
- **Local procurement and Small, Medium and Micro-size Enterprise (SMME) opportunities:** Local communities will be provided with opportunities and capacity to participate in contracts that would become available during the construction and operational phases.

## 6.2 Social and Labour Plan

Anglo is committed to the optimisation of opportunities in local communities through the implementation of its Social and Labour Plan (SLP). The SLP for the entire Amandelbult Section will apply to Open Pit 36W, and is in the process of being updated.

### 6.2.1 Workforce development

As part of the Anglo SLP, a comprehensive workforce development plan is being implemented through adult basic education and training (ABET), the provision of various learnerships, bursaries, internships, and a graduate development scheme, technical, services and portable skills training, management and leadership development, most of which will occur at on-site training facilities. The Open Pit 36W workforce will fall under the same SLP and can take advantage of various programmes including:

- **ABET:** the Amandelbult Complex offers illiterate employees, inclusive of contractors and community members the opportunity to be functionally literate and numerate after completing ABET.
- **Learnerships:** Amandelbult Complex provides mainly mining and engineering learnerships to its employees and contractors. Engineering learners, artisans and technicians are sent to the Engineering Skills Training Centre (ESTC), based in Randfontein. Mining learnerships are also conducted at Amandelbult Complex.

- **Technical training and development for lower level employees:** a culture of lifelong learning is encouraged and sustained in lower level employees through training in mining and engineering disciplines, complemented by mentoring throughout.
- **Services training and development:** training opportunities are offered to lower level employees in the finance and human resource development disciplines.
- **Management and leadership development:** high potential candidates are identified from the talent pool and given the opportunity to attend further leadership programmes.
- **Portable skills training:** the Amandelbult Complex endeavours to provide portable skills for employees so that when they exit the mining industry, they can enter other sectors such as building, construction, tourism and manufacturing.

## 6.2.2 Community development

Anglo has also committed, through its SLP, to start up and sustain infrastructure and poverty eradication projects through measures addressing housing and living conditions and nutrition of mine employees. A plan is also in place to provide Historically Disadvantaged South Africans' (HDSA) companies with opportunities to supply to the mining operations. Various focus areas have been identified:

- **Job creation and poverty alleviation:** enterprise development, arts and crafts, agriculture and rural development, brick making project, Mantserre Youth Development Centre, and Mansterre clothing manufacturing.
- **Basic infrastructure:** multi-purpose community centre, traditional offices, provision of high mast lights, renovation of a soccer stadium, Schilpadnest overload station, provision of water infrastructure, provision of sanitation facilities at Schilpadnest, construction of a computer centre at Schilpadnest, water and sanitation at Regorogile, and agricultural cooperatives.
- **Community education and skills development:** education support programme, construction of a secondary school, construction of additional classrooms in Schilpadnest, community portable skills training programme, and community ABET.
- **Community safety, health and welfare:** construction of a clinic at Schilpadnest, construction of early learning centres, community peer education, and orphans and vulnerable children support.

## 7 Motivation for the Preferred Site, Activities and Technology Alternative

Infrastructure to support Open Pit 36W has been laid out and engineered to best suit the topography and mining pit layout, as well as the relatively small area available for overburden stockpiling.

Mining can only be undertaken in areas where economically mineable resources occur, which determines where the pit is located. This area was established through extensive prospecting and geological modelling.

Selection of a mining method is always dictated by the ore-body or resource. In the case of Open Pit 36W, the opencast method of extraction is the most economical, feasible and safe method of extraction. Underground mining was not considered feasible, as a large portion of the resource will be lost due to the safety risks associated with mining of shallow resources from underground. Additionally, underground mining is not economically viable considering current PGM prices. From an environmental perspective, extraction by underground method would limit the surface disturbance and impact on the biodiversity of the area, but poses a safety risk.

## 7.1 No-go Alternative

The option of not implementing the activity was investigated. The current mining operations will continue, with no opencast mining operations taking place through Open Pit 36W. The opportunity to develop a high quality mineral resource, which has the potential for economic benefits on local level in terms of employment, and a sizeable contribution to PGM resources, will be lost.

## 8 Details of Public Participation Process followed

Consultation with the public forms an integral component environmental impact assessment and authorisation process. This process enables Interested and Affected Parties (I&APs), e.g. directly affected and neighbouring landowners, national, provincial and local authorities, and local communities, to raise concerns and comment on the proposed activities, which they feel should be addressed in the EMPr addendum. The PPP has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents, and to voice any issues or concern.

The objectives of public participation are to provide information to the public, identify key issues and concerns at an early stage, respond to the issues and concerns raised, provide a review opportunity, and document the process. The PPP is being managed to meet these objectives throughout the report compilation. The PPP to date is summarised in Table 3. Note that the PPP is undertaken simultaneously to a Basic Assessment for opencast pit, Open Pit 62E.

The PPP is conducted in accordance with Chapter 6 of the EIA Regulations, 2014 published in GN No. 982 of 4 December 2014.

The following guideline documents published by the DEA were also used to inform the PPP approach:

- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010); and
- Public Participation Guidelines, Guideline Document 4 (DEA, 2006).

Table 3 | Details of the PPP to date

Task	Details	Date
<b>I&amp;AP identification</b>	An I&AP database was developed for the project by establishing the jurisdiction of organisations, individuals and businesses in proximity to the project site or with an interest in the proposed development. The database of I&APs includes the landowner, the adjacent landowners, tenants, relevant district and local municipal officials, and relevant national and provincial government officials. This database is being augmented via chain referral during the EIA process and will be continually updated as new I&APs are identified throughout the project lifecycle.  A copy of the I&AP database is included in <b>Appendix C.1</b> of the consultation BAR for Pit 62E.	May 2017
<b>Background Information Document distribution</b>	Background Information Documents (BIDs) were distributed to the identified I&APs at the commencement of the public comment period for perusal and comment. The BID serves to provide a condensed set of information on the proposed project, what their role is, and how they can get involved.	June 2017

Task	Details	Date
	A copy of the BID is included in <b>Appendix C.2</b> of the consultation BAR for Pit 62E.	
<b>Site Notices</b>	<p>Site notices with a size of 600 mm x 420 mm, in English and Setswana, were put up to inform the public of the proposed project and the PPP. These notices were placed at:</p> <ul style="list-style-type: none"> <li>■ The site;</li> <li>■ Thabazimbi municipality or Thabazimbi Mall community wall;</li> <li>■ Setaria Spar; and</li> <li>■ Tumela Main Office.</li> </ul> <p>Proof of the site notices' placement will be appended to the EMPPr addendum.</p> <p>Copies of the site notice-content as printed are included in <b>Appendix C.3</b> of the consultation BAR for Pit 62E.</p>	9 June 2017
<b>Written I&amp;AP and authority / Organs of State notification</b>	<p>All potential I&amp;APs were informed of the availability of the EMPPr addendum by means of email or registered post, records of which will be attached in the final EMPPr.</p> <p>Copies of the letters sent to I&amp;APs and authorities are included in <b>Appendix C.4</b> of the consultation BAR for Pit 62E.</p> <p>Copies of the report were sent to the DMR, Limpopo Department of Economic Development, Environment and Tourism (LEDET), and uploaded onto the South African Heritage Resources Agency (SAHRA) for comment.</p> <p>I&amp;APs and stakeholders were given 30 calendar days within which to submit comments or raise any issues or concerns they have regarding the proposed project.</p> <p>The report was left at the following locations:</p> <ul style="list-style-type: none"> <li>■ Thabazimbi Municipality;</li> <li>■ Northam Shoprite Centre Post Office;</li> <li>■ Tumela Main Office; and</li> <li>■ Setaria Spar.</li> </ul> <p>Furthermore, a digital version of the EMPPr addendum was uploaded onto the Aurecon website for perusal and download. Online registration was required to access these documents.</p> <p>Electronic copies of the report will also be made available upon request (on a CD).</p>	9 June to 10 July 2017
<b>Newspaper advertisements</b>	Two advertisements were placed in the Platinum Bushveld (in English and Setswana) at the commencement of the comment period as notification of the availability of the EMPPr Addendum. Copies of the advertisements are included in <b>Appendix C.3</b> of the consultation BAR for Pit 62E.	9 June 2017
<b>Comments and responses (CRR) and report</b>	All comments received on the EMPPr addendum will be collated into the CRR, along with responses to these comments from the applicant and the EAP. The CRR will be appended to the final submission to the DMR.	July 2017
<b>Decision</b>	The decision by the DMR will be communicated to I&APs and stakeholders.	November 2017

## 8.1 Summary of issues raised by I&APs

Comments or issues raised by stakeholders, I&APs, or authorities are shown in Table 4.

Table 4 | Summary of comments and issues raised by I&APs to date

I&AP	Date comments received	Issues raised	EAPs response to issues as mandated by applicant	Section and paragraph reference
<i>No comments have been received thus far.</i>				

## 9 Environmental Attributes Associated with Alternatives

This section describes the environmental characteristics of the proposed project site and potential receptors of the anticipated impacts associated with project activities.

### 9.1 Type of Environment Affected by Proposed Activity

Please note that much of the following descriptions of the environment affected by the proposed activity was extracted from the consolidated EMPr covering the entire Amandelbult Mining Complex (Prime Resources, 2013). The biodiversity and heritage components were extracted from dedicated specialist studies, which focus on the Open Pit 36W project site.

#### 9.1.1 Climate

The climate is semi-arid and hot in the Limpopo- and Olifants River basins, but cooler with a higher humidity on the Waterberg plateau and Soutpansberg. Temperatures in the Thabazimbi region are generally warm to hot in the summer months. The highest temperatures occur in December and January, while winter months are very dry. The highest rainfall occurs from November to March. Rainfall is generally low between May and September. Most the rainfall occurs as thunderstorms and heavy showers, sometimes accompanied by hail. The mean annual evaporation at Thabazimbi is 2017 mm, which exceeds the Mean Annual Precipitation (MAP) of 550 mm to 600 mm. The area is prone to extreme weather events, such as droughts and floods. Winds are light to moderate and predominantly in a north-westerly direction during the summer months, with westerly winds occurring frequently in the winter.

#### 9.1.2 Topography

The area is relatively flat, dipping gently to the east. The topography consists of an expansive flat area ringed by several low, rocky, hill ranges. The overall elevation decreases in an easterly direction from 980 m above mean sea level (mamsl) in the south-western boundary of the Complex to 920 mamsl in the north-east.

#### 9.1.3 Geology

The project area is primarily underlain by the Bushveld Igneous Complex (BIC), one of the largest layered mafic intrusions in the world. The BIC is a world-class repository for several ore bodies, yielding a range of mineral commodities including chrome, vanadium, titaniferous magnetite and PGMs. The BIC extends approximately 350 km east to the west and 250 km north to the south. The complex is saucer-shaped, with the edges dipping inwards towards the centre. At the rim of the 'saucer', pyroxenites, norites, gabbros and Chromitites are found interlayered in a variety of



combinations. Unique to the BIC is the presence of two stratiform deposits, known as the Merensky Reef and the UG2 Reef, containing economically exploitable PGM-resources. These reefs serve as the primary source of PGM reserves exploited by Anglo. Apart from the platinum-bearing Merensky and UG2 Reefs, the area's geology consists of gabbro, norite and pyroxenite rocks of the BIC.

Most the surface exposures are covered by either weathered norites, which, in conjunction with the climate has given rise to a landscape where the flat areas are dominated by dark, heavy vertisols with marked shrink-swell properties. The ore bodies dip towards the southeast. The dip of the ore bodies varies between 18° towards the south west of the property to 22° towards the northeast. The Merensky Reef comprises feldspathic pegmatoidal pyroxenite, bounded by thin Chromitite bands. The reef thickness varies from 10 cm to 300 cm. The UG2 Chromitite, which underlies the Merensky Reef by 35 m to 50 m, is 150 cm wide. Faults of various sizes occur throughout the mining right area, and include major north-west trending faults with associated throws of up to 500 m.

#### **9.1.4 Soil**

The dominant soil form across the mine right area is the Arcadia Form, representative of the typical catena for the greater Rustenburg area. The Arcadia Form occurs up to depths ranging from 0.8 to 1.5 m below ground level (BGL). The underlying geology undoubtedly controls the thickness of the cover material. The Arcadia soil form is characterised by a deep (<1 m) Vertic A Horizon with a calcareous B Horizon lens, characteristic of the Rustenburg region. The presence of hydrophilic, expansive 2:1 montmorillonite clay results in seasonal soil heave, hence the classification as Vertic. The clayey soil is dark in colour and black when slightly moist to saturated, with a granular surface structure when dry. Desiccated material forms deep, hexagonal desiccation cracks at the surface during the dry season which indicates the presence of these swelling clays. At depth, the soil is increasingly firm and, when excessively dry or excessively moist, is impenetrable with a hand auger. Such soils usually develop slicken-slides (movement planes) caused by regular seasonal heave. Soils are mostly clayey with limited silt and sand contents.

The site is situated at the interface between dark vertic soils and deep, red strongly structured pedocutanic soils (see Figure 6, Figure 7, Figure 8 and Figure 9). Even though the soils are red-brown, there are vertic characteristics such as deep cracks indicating shrink-swell properties (as shown in Figure 5) and slumping or self-sloping (Figure 9). The soils are deep, strongly structured, well-drained and clay-rich. The topography is stable, and soil erosion and export from the site is not a consideration.

#### **Chemical characteristics**

The soil is characteristically high in macro-element nutrients (P, K, Ca and Mg). Macro elements are essential for plants to grow, and an abundance of these nutrients may result in moderate to high fertility. The low exchangeable sodium potential (less than 2%) of the mine area indicates that the soil is non-sodic implying high soil fertility and good soil structure. The soil is characterised by a high Cation Exchange Capacity (CEC) which ( $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$  and  $\text{Al}^{3+}$ ). However,  $\text{Al}^{3+}$  is an aggressive, acid-forming cation common to the chemical composition of montmorillonitic clays. The presence of  $\text{Al}^{3+}$  in the soil results in a low reserve acidity. The pH of the soil is 6.8 to 6.9 which is within the necessary range for most crops, including wheat, maize and vegetables.

#### **Land capability (agricultural potential)**

Despite the high fertility of the soil caused by high macro-nutrient concentrations, the Vertic A horizon has a high clay content (>40%). The extremely hydrophilic nature of the clayey soil increasing with depth, likely compete with and overwhelm root absorption of soil moisture. Root penetration into the soil is very low, and it is likely that moisture uptake is retarded by the stronger adsorption of moisture onto clay particle surfaces than root absorption. The soil is non-saline and non-sodic, with low exchangeable sodium resulting in low erodibility. Erodibility is further reduced by hydrophilic montmorillonite clay particles binding to one another. Despite low salinity, sodicity and erodibility, high soil moisture retention (poor drainage) impacts negatively on overall agricultural potential.

The soil across the mining right area is considered to have a relatively high buffer capacity to industrial activities. Adverse chemical influences imposed on the soils, such as irrigation with acidic or saline effluent, will thus be buffered to a certain degree and the soil would be considered suitable for rehabilitation purposes.





Figure 5 | Soil cracks at Open Pit 36W



Figure 6 | Recolonised area with red soils



Figure 7 | Recolonised earthworks by secondary grasses and red soils at Open Pit 36W



Figure 8 | Extensive earthworks at Open Pit 36W



Figure 9 | Slumping, red soils, and evidence of earthworks avoiding trees



Figure 10 | Rock dumped at Open Pit 36W, recolonised by secondary grasses

### 9.1.5 Groundwater

Information on groundwater was obtained from the WSP groundwater report (2006) for the Amandelbult Complex.

The study showed that during dry seasons, deep desiccation cracks in the montmorillonitic “black turf” cover extend down to 1.5 m below ground level. This may allow surface contamination to reach shallow, perched water tables during heavy rains following a dry season and before the desiccated



clays become hydrated. The hydrophilic nature of the clays may reduce surface infiltration during wet months, possibly forming temporary, seasonally perched aquifers within the black turf horizon.

Under normal conditions, slow downward infiltration through the thick clayey cover should result in contaminant attenuation due to clay chemistry (high buffer capacity). Therefore, groundwater moves slowly and receives limited recharge through the black clays associated with norite weathering. The groundwater flow direction is predominantly from south to north across the mine right area, with an average seepage velocity estimated between 0.1 and 20 m/annum. This implies that shallow groundwater may not migrate as far as deeper subsurface fissure flow. Recharge to the groundwater regime is estimated at 3% of MAP across the area and between 5 and 7 percent of MAP within the drainage lines.

Due to the layered nature of the geology, less resistant rock units may undergo preferential weathering, resulting in increased vertical heterogeneity and distinct and separate hydraulic zones. Although these structures may increase groundwater movement along their flanks, they generally do not allow the lateral flow of groundwater. Thus, the groundwater regime of the mining right area is divided into four distinct sub-compartments. However, where faults or shear zones cut across diabase intrusions, aquicludes can be locally connected.

### **Groundwater levels and quality**

Groundwater levels resemble the local topography, i.e. regional groundwater drainage takes place in a north-westerly, northerly and north-easterly direction, although locally, drainage may take place towards surface drainage features. At least three different intrusions by dolerite dykes sub-compartmentalise the study area, but they appear not to influence groundwater levels significantly i.e. the depth to groundwater level seems to be almost the same from west to east.

Per the approved 16W UG2 EMPr Amendment, 2004, background groundwater quality for the mining right area is generally poor. The electrical conductivity (EC) of the groundwater varies between 127 mS/m and 264 mS/m and averages around 210 mS/m. The groundwater contains excessive concentrations of calcium (156 mg/l), magnesium (152 mg/l), sodium (between 139 mg/l and 158 mg/l), chloride (351 mg/l to 456 mg/l), nitrate (between 34 mg/l and 42 mg/l) and sulphate (between 146 mg/l and 178 mg/l).

#### **9.1.6 Surface Water**

The proposed project area falls within the A24F catchment area, in which the Bierspruit River flows in a northerly direction to eventually meet the Crocodile River far north of the Amandelbult Complex.

Per 2016 annual surface water quality monitoring results, the average water quality profile is neutral to alkaline (Aquatico 2016). The average total dissolved solids (TDS) was very saline and the total hardness varied between very hard and extremely hard.

The average physical and chemical composition of several process water monitoring localities exceeded the target values specified in the Water Use Licence (WUL) Waste Water Discharge in terms of EC, Na, Cl and NO<sub>3</sub> concentrations. The General Limit was exceeded by the average EC levels, NO<sub>3</sub> and suspended solids (SS) Concentrations.

While qualities for process water may exceed, risk is low as water is maintained in a closed system and no individuals are expected to consume water directly.

The water quality of the receiving environment at Dishaba shaft was in general neutral, saline and hard.

The average physical and chemical composition of the receiving environment water quality exceeded the WUL Surface Water Resource limits in terms of EC, Total Alkalinity, sodium adsorption ration (SAR), SS turbidity and Dissolved Oxygen (DO). Low impact on the Bierspruit was recorded.

### 9.1.7 Ecology

A site visit was conducted by Doug McCulloch, an ecological specialist, in May 2017.

#### Background

The Anglo Platinum Amandelbult Mine is situated in the Dwaalboom Thornveld (SVcb1) a vegetation type that tends to be low in species diversity and endemic species (Mucina and Rutherford, 2006).

The vegetation is typically open savanna. The tree component is dominated by *Acacia* species, which are strongly related to the clay content of the upper soil horizons. In areas where the clay content exceeds 55%, the shrink-swell nature of the turf soils excludes the growth of trees. Otherwise, the dominant tree species are *Acacia nilotica*, *Acacia tortilis* and *Ziziphus mucronata*. Dominant grass species are *Aristida bipartita*, *Digitaria eriantha*, *Bothriochloa insculpta*, and *Panicum maximum*.

The ecostatus of the Dwaalboom Thornveld is Least Threatened. The conservation target is 19%, and to date approximately 6% of this has been achieved. However, approximately 86% of the vegetation type remains intact under a dominant land-use of cattle grazing. The remainder has been transformed mainly by crop cultivation and to a lesser extent mining. The areas degraded by erosion, and the prevailing erosion risk, is low to very low due to the flat topography. Little evidence of direct soil erosion was observed during the site visit, although areas of localised soil borrowing are evident.

#### Critical Biodiversity Area

The pit is entirely located (Figure 11) within a Critical Biodiversity Area 2 (CBA2) as defined in Version 2 of the Limpopo Conservation Plan (CPlan) (2013). The Limpopo CPlan has been adopted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET) as a bioregional plan applicable to the EIA Regulations. CBAs are areas that have been selected to meet biodiversity pattern and or ecological process targets. The categories defined in the Limpopo CPlan are described in Table 5.

Table 5 | Descriptions of conservation-important area classifications according the Limpopo CPlan (2013)

Category	Subcategory
<b>Critical Biodiversity Area (CBA)</b>	CBA 1: Irreplaceable areas required to meet biodiversity targets
	<b>CBA 2: Areas that will assist in meeting biodiversity pattern and/or ecological process targets</b>
<b>Ecological Support Area (ESA)</b>	ESA 1: Intact natural areas supporting CBAs
	ESA 2: Areas with no natural habitat that are important for supporting ecological processes

Mining is ostensibly an incompatible land-use with achieving the strategic conservation objectives for the CBA2 as recognised by the Limpopo C-Plan. However, this should be viewed in the following context:

- The CBA2 classification acknowledges that these are of lower priority than CBA1 areas, and that there may be other areas that provide the same biodiversity value and will achieve the same goals; and allows for the identification of alternatives;
- The CBA classification is undertaken at a landscape scale, and considers large areas of intact vegetation. Small transformed areas within the larger intact matrix require site-specific considerations in terms of their overall impact on the attainment of conservation goals;
- The small size of the development (4.1 ha) in relation to the large contiguous blocks of this vegetation type that remain intact;
- The proximity of the development to the periphery of permanently transformed land to the east;
- The development is superimposed on historical disturbance, and will not involve the transformation and subsequent fragmentation of intact vegetation;
- The CBA2 is situated directly adjacent to a large block of land classified as 'other natural area' in the C-Plan. There is no reason why this cannot contribute to the functioning of the CBA;
- The development is not permanent, and any infrastructure may be considered temporary;
- The environmental conditions within the site are expected to lend themselves to a high potential for effective rehabilitation in the short- to medium-term. The topsoils tend to be deep, relatively homogenous and base-rich. The low, strongly seasonal and highly variable rainfall regime has influenced the life history strategies of the dominant herbaceous plant species. To persist, plants have invested more resources into the production of large quantities of viable seed at the expense of biomass production and the ability to resprout following defoliation. This allows them to bridge drought periods by having viable seeds lying dormant long after the adult plants have perished. The ecological consequence of this is that the vegetation is resilient (has a low ecological sensitivity), and ecologically equipped to recover following dieback. It can be restored following disturbance. It is uncertain whether in practice this applies to the extensive pedo-turbation associated with opencast mining, but the ecology of the dominant terrestrial system suggests that the potential is higher than in more mesic ecosystems.

### **Mining and Biodiversity Guideline**

The project area is located within an area that is legally protected and in which mining is prohibited according to the Mining and Biodiversity Guideline (Figure 12), confirmed by field investigations as the Madeleine Robinson Nature Reserve. However, the reader is referred to the ecological specialist's comments on the state of the project area in terms of existing disturbance. Therefore, the groundtruthing exercise revealed that the project area is not crucial to sustain the ecological quality of the area. It is recommended that the applicant clearly and stably cordon the area to ensure that animals are not endangered by mining activities.



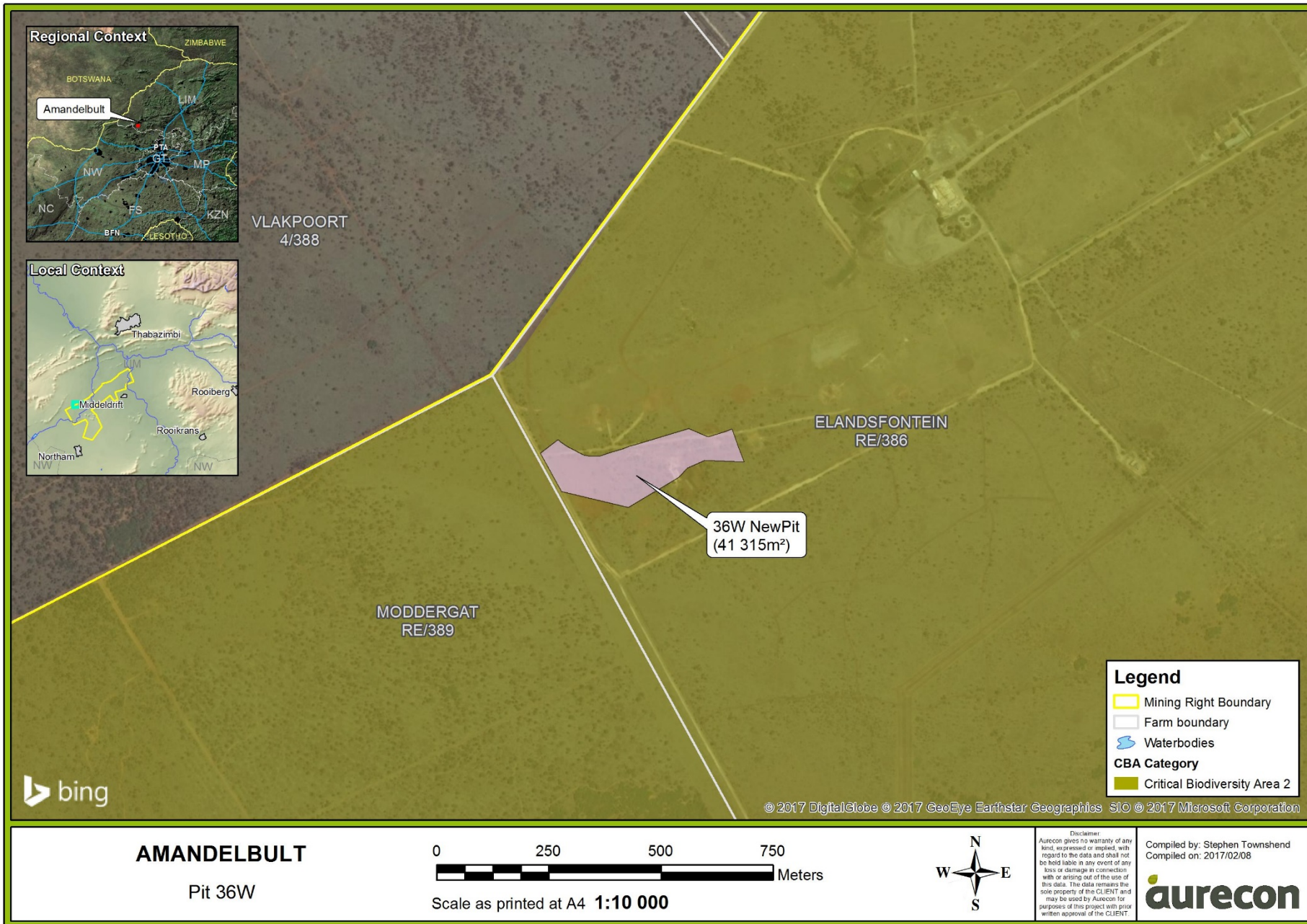


Figure 11 | Open Pit 36W's location within a Critical Biodiversity Area (Class 2)



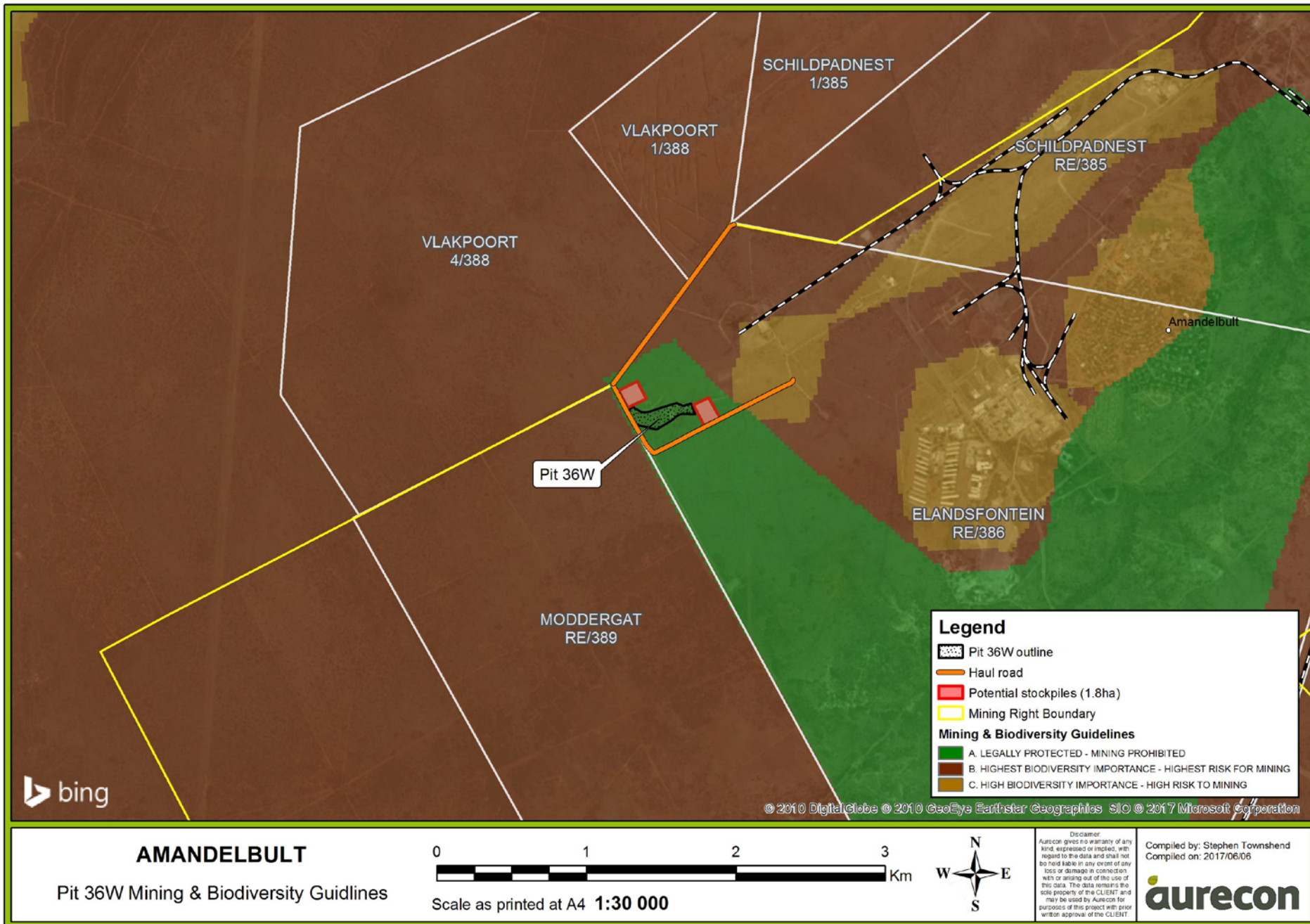


Figure 12 | Pit 36 W location according to the Mining and Biodiversity Guidelines

## Onsite Vegetation

While there are vestiges of natural vegetation remaining, most of the natural vegetation within the site has been removed, and then recolonised by secondary vegetation communities. It should be noted that this ecosystem is accustomed to widespread vegetation dieback due to drought and elephant activity, and the vegetation is resilient. There is little difference in species composition and richness between primary and secondary communities. The disturbances have generally avoided the trees, although most of the herbaceous growth is secondary (based on the shape of the terrain). Many of the earthworks have been colonised by *Acacia mellifera* and *A. tortilis* trees. These are mature, providing an indication of the period since the disturbance occurred. The dominant trees within the site are *Acacia tortilis*, *Acacia nilotica*, *Acacia mellifera* and *Ziziphus mucronata*. The shrub component is dominated by *Grewia flavescens*, *Euclea undulata* and *Diospyros lycoides*. The grasses that make up the bulk of the herbaceous cover are *Digitaria eriantha*, *Panicum maximum*, *Dichanthium annulatum*, *Cymbopogon pospischilii*, *Andropogon chinensis* and *Setaria incrassata*. Encroachment by alien plants is low, although *Lantana camara* was recorded.

## Potential of Site to Support Fauna and Flora of Conservation Significance

The potential for the site to support species of conservation significance is rated as Low to Moderate. The site is isolated, with a low prevailing disturbance regime. This is conducive to animals moving into and through the site, before being flushed by intermittent events such as shooting practice on the firing range. The degree of disturbance sustained and the modification to the micro-topography of the site renders it unlikely to support plant and animal species that are not found in the large blocks of undisturbed and intact vegetation to the west, north and south of the site (Figure 13). These areas would support biota dislodged by future mining activities. No indications were found of plants of conservation importance, although the site visit was a once-off, and occurred towards the end of the growing season.



Figure 13 | Map of Open Pit 36W location, showing the high degree of disturbance sustained relative to the surrounding landscape



### 9.1.8 Waterberg Environmental Management Framework

According to the Waterberg District Environmental Management Framework of 2010, the proposed project area falls appropriately within Zone 4: Mining Focus Areas (Waterberg District Municipality 2010). The Environmental Management Zones of the Waterberg District are shown in Figure 13 for the Thabazimbi region, where the project is proposed.

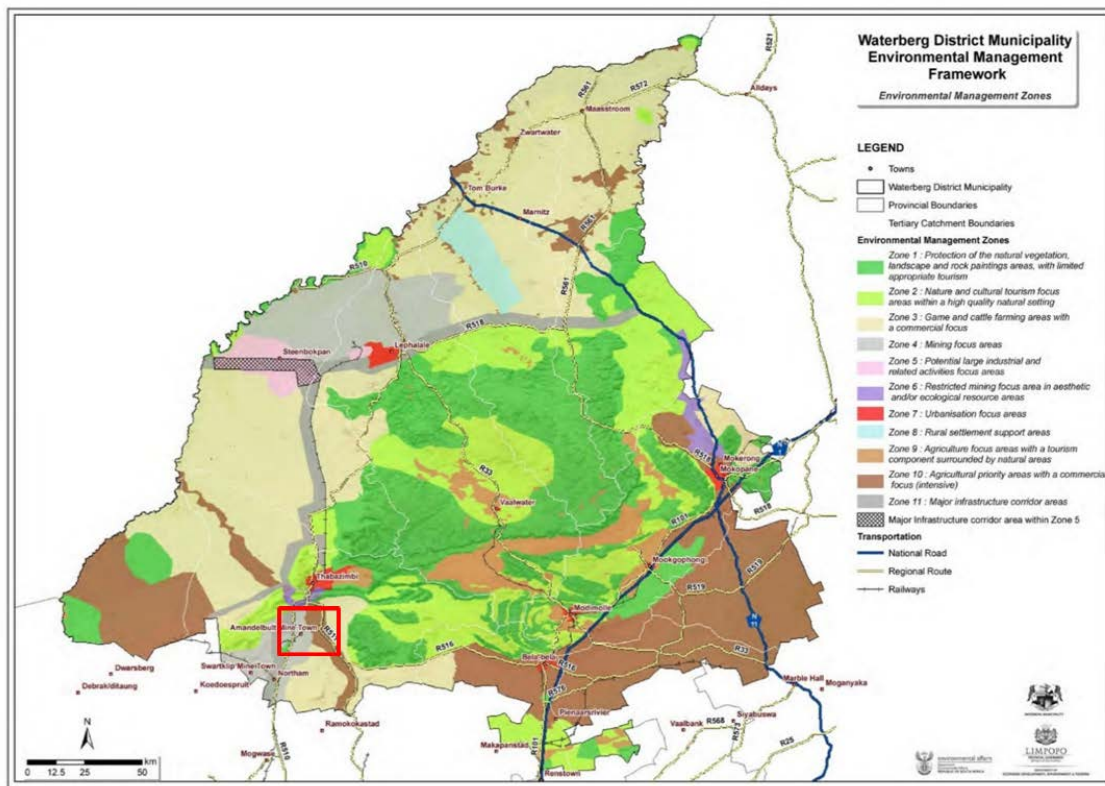


Figure 14 | Waterberg District Environmental Management Framework: Environmental Management Zones, showing the general project location (Waterberg District Municipality 2010)

### 9.1.9 Heritage

#### Archival and historical maps

An assessment of available archival and historical maps was undertaken to establish a historic layering for the study area (PGS Heritage, 2017). These archival and historical maps are also very valuable in identifying heritage sites and features.

Open Pit 36W is located on the 2427CD Topographical Sheet. The first, second and third editions of this topographic map sheet will be discussed in more detail below.

#### First Edition of the 2427CD Topographical Sheet

Figure 14 depicts sections of the First Edition of the 2427CD Topographical Sheet. This edition of the sheet was based on aerial photography undertaken in 1963. This map sheet was surveyed in 1967 and printed in 1968 by the Trigonometrical Survey Office.

The following observations can be made from the map:

- No heritage sites are depicted within the study area or its surrounding landscape. A track is shown approximately 740 m east of the proposed pit.
- At the time, the study area was located within a landscape which, for the most part, appears to have comprised undisturbed veld.

- No evidence for mining activities can be seen within the study area or its surroundings.

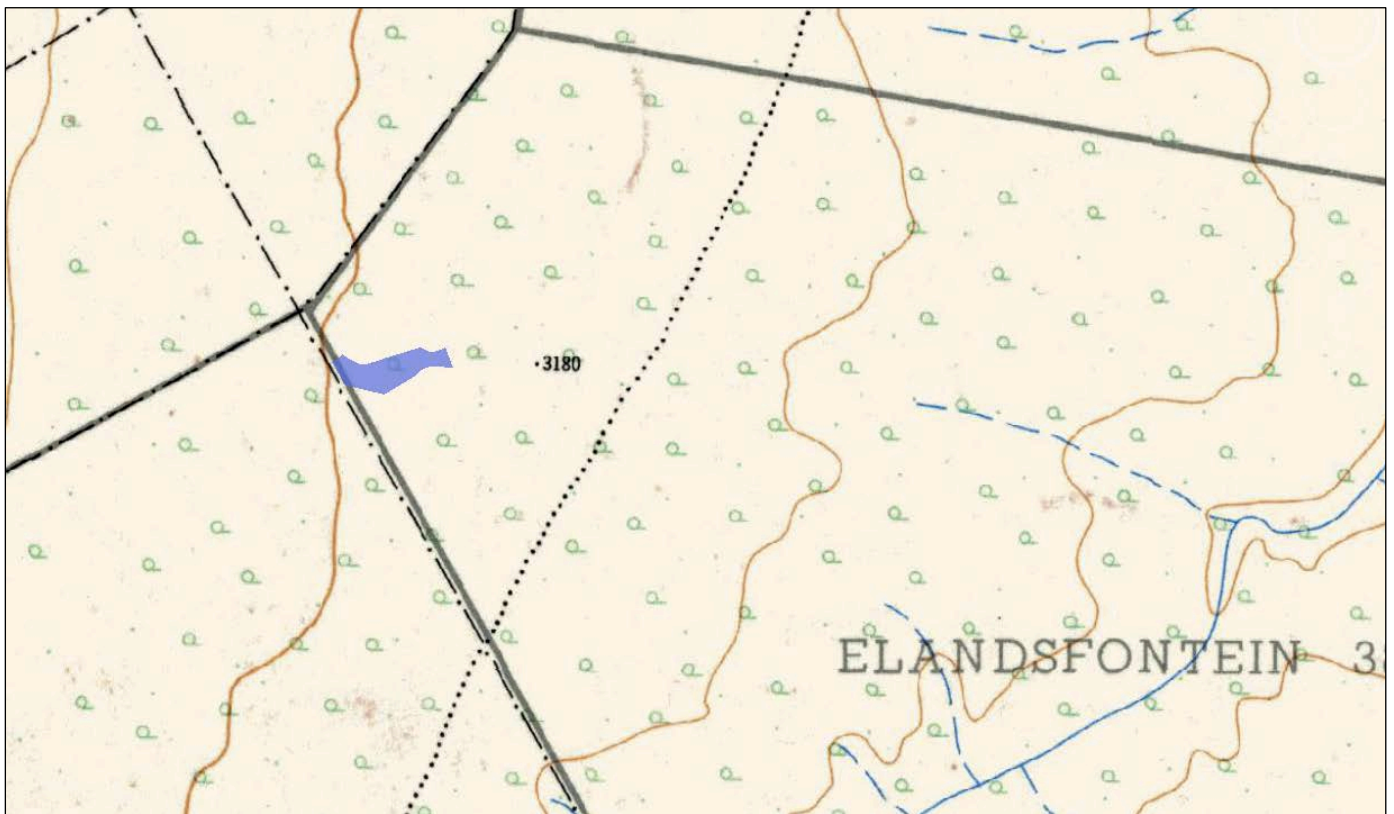


Figure 15 | A view of a section of the first edition of the 2427CD Topographical Sheet surveyed in 1967. Open Pit 36W is shown as a purple polygon.

### Second Edition of the 2427CB Topographical Sheet

Figure 15 depicts a section of the Second Edition of the 2427CD Topographical Sheet. This edition of the sheet was surveyed in 1980 and published by the Chief Directorate: Surveys and Land Information in 1985.

The following observations can be made from the map:

- No heritage sites are depicted within the study area.
- A road is shown for the first time cutting across the northern end of this component of the study area.
- A quarry is shown immediately south of the proposed pit area. A track is also shown linking the above-mentioned road to the quarry.
- The period between 1968 (when the previous map sheet was surveyed) and 1980 has evidently seen extensive mining development on the farm Elandsfontein 386 KQ. Apart from the features mentioned above, none of the mining development depicted on this map is located within the study area or its immediate surroundings.





Figure 16 | Section of the Second Edition of the 2427CD Topographical Sheet that was surveyed in 1980 showing increased mining activity since 1967.

### Third Edition of the 2427CB Topographical Sheet

Figure 16 depicts a section of the Third Edition of the 2427CD Topographical Sheet. This edition of the sheet was surveyed in 2005 and published by the Chief Directorate: National Geo-Spatial Information in 2009.

The following observations can be made from the map:

- No heritage sites are depicted within the study area.
- Three quarries are shown within the study area.
- A small section on the eastern end of the proposed 36W opencast pit area is depicted within the boundaries of the Madeleine Robinson Nature Reserve. The depiction of this nature reserve on the 2005 edition of the topographical sheet, suggests that this nature reserve was established between 1980 and 2005.
- Mining development continued during the period between 1980 and 2005. In the general surroundings of the study area, this mining development includes roads, a conveyor belt, reservoirs and buildings. None of these are located within the Open Pit 36W area.



Figure 17 | A section of the Third Edition of the 2427CD Topographical Sheet that was surveyed in 2005.

### Previous Heritage Studies

No archaeological or heritage sites had been identified in proximity of the proposed pit on the farm Elandsfontein 386 KQ. This said, previous heritage studies identified many Late Iron Age stonewalled sites west of the R510 between Thabazimbi and Northam. However, these were identified primarily near rocky outcrops and in proximity to the Bierspruit.

### Fieldwork Investigation

A walkthrough of the Open Pit 36W project area was conducted by PGS Heritage on 24 April 2017 as shown in Figure 17.

Fieldwork revealed that the site is not located anywhere near any rocky outcrops, and is some distance from the Bierspruit. The fieldwork also found that the site had been extensively utilised for quarrying activities, with one depression from a quarry also turned into a watering hole for animals. These fieldwork observations confirmed the findings of the desktop study, which revealed that since the 1980s, this property had been used for quarrying activities and by 2005 at least three extensive quarries were located here. On the eastern end of the site a shooting range, enclosed by security fencing, is located.

No archaeological or heritage sites were identified within the proposed Open Pit 36W area.

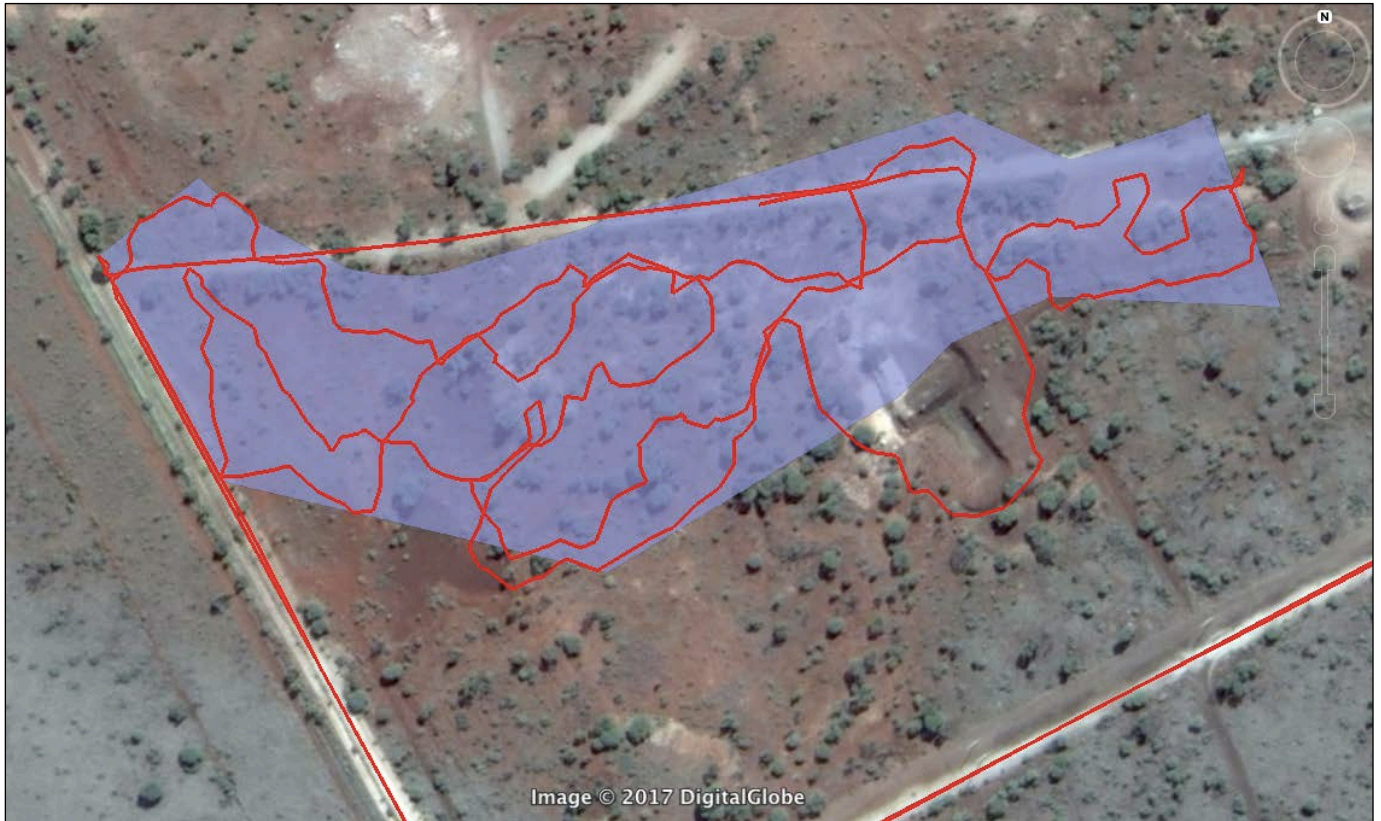


Figure 18 | Recorded track logs in red of the Open Pit 36W study area.

### 9.1.10 Palaeontology

A desktop Palaeontological Desktop Assessment of the proposed study area was undertaken by Banzai Environmental (2017). Open Pit 36W is completely underlain by the Rustenburg Layered Suite of the Bushveld Igneous Complex and Quaternary sediments overlying the igneous bedrock Figure 18.

#### Bushveld Igneous Complex

The Rustenburg Layered Suite is Vaalian in age (2,100 – 1,920 Million years old) and consists of an igneous intrusion with anorthosite, hybrid gabbro, gabbro, diabase, epidiorite, pyroxenite, and norite rocks. These intrusive igneous rocks of the Rustenburg Layered Suite are completely unfossiliferous. This layer in the proposed development site is of no significance in terms of local palaeontological heritage.

#### Quaternary sediments

Quaternary superficial deposits of Late Caenozoic (Miocene to Pliocene to Recent) age occur throughout the Karoo Basin (Partridge et al. 2006). They include pedocretes (for example calcretes), colluvial slope deposits, down wasted surface gravels, river alluvium, wind-blown sands and spring and pan sediments. Hill slopes are frequently mantled with a layer of colluvium or slope deposits (e.g. sandstone and dolerite scree). In palaeontological terms the Quaternary superficial deposits have been relatively neglected. They may sometimes contain important fossil biotas, e.g. bones, teeth and horn cores of mammals as well as remains of reptiles like tortoises. Non-marine molluscs (bivalves, gastropods), ostrich egg shells, trace fossils (e.g. calcretised termitaria and coprolites), and plant remains such as peats or palynomorphs (pollens, spores) could occur in organic-rich alluvial horizons. Siliceous diatoms in pan sediments have also been found. These fossil



assemblages are rare, low in diversity, and occur over a wide geographic area, and thus the palaeontological sensitivity of the Quaternary deposits in the study region is rated as low.

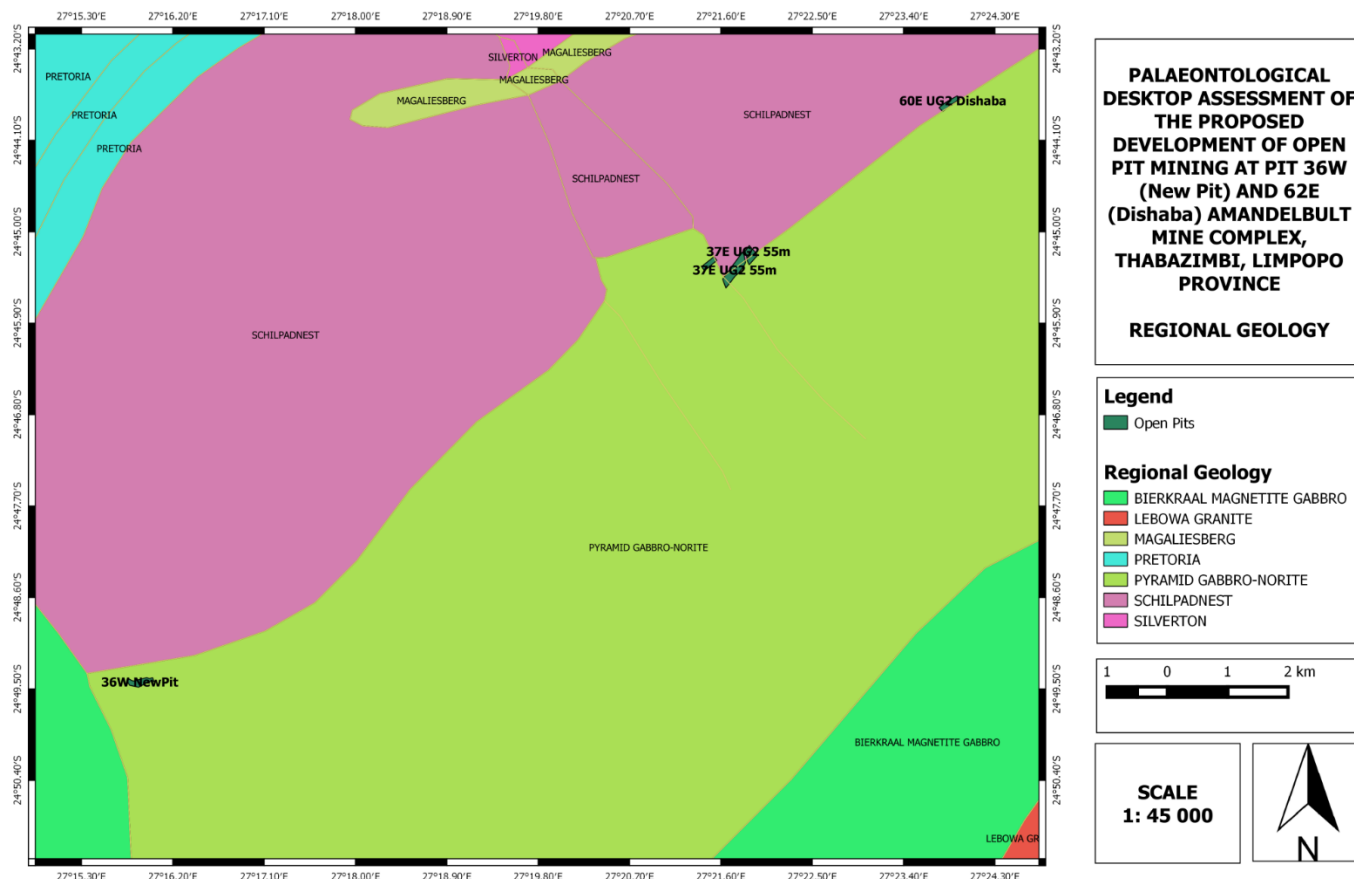


Figure 19 | The surface geology of the proposed new mining operations (indicated in dark green) are shown to be completely underlain by the Rustenburg Layered Suite of the Bushveld Igneous Complex and Quaternary sediments overlying the igneous bedrock (Banzai Environmental, 2017).

### 9.1.11 Air Quality

The mining right area is dry and has high evaporation rates. Therefore, environmental dust is an inherent property of the natural environment without anthropogenic activities such as mining and transportation. There are currently eleven dust-fallout monitoring sites across the Tumela and Dishaba Mines, the Amandelbult Concentrator Plant and the services supporting each of these sections. Nine of the sites are classified as industrial and two of the sites are classified as residential. All monitoring sites recorded dust fallout rates within the recognised limits (SANS 1929: 2005) for the residential and industrial sites. The results indicate that dust emissions from the current mining activities do not significantly increase ambient dust levels.

### 9.1.12 Noise

Ambient noise levels at the Tumela Mine and the Amandelbult Concentrator Plant Section are characterised by noise emissions from existing mining operations, as well as community noise.

### 9.1.13 Socio-economic Baseline

The proposed project is located within the Thabazimbi Local Municipality (TLM). The population of TLM consists of 85 234 people, with an annual population growth rate of approximately 2.63% (StatsSA, 2011).



The age profile of a population provides valuable insight into the composition of the market population and will help establish the Potential Economically Active (PEA) population. The PEA refers to the population that falls within the working age group (aged between 15 and 64). It does not mean that this entire portion of the population is prepared, willing or able to be employed, i.e. some prefer to stay at home as housekeepers, others are disabled and some are fulltime students, or have stopped looking for work. They do, however, form part of the potential labour pool. In TLM, 76.4% of the population is classified as PEA.

Approximately 2.4% of the population is over the age of 65 and approximately 21.1% is under the age of 14. The dependency ratio indicates the number of individuals that is younger than 15 and older than 64, who are dependent on the PEA population. In TLM, 30.8% of the population is dependent on the PEA population (StatsSA, 2011).

The TLM is dominated by a black African population (84.3%), with a smaller representation of white people (14.4%) and other population groups (1.2%). Gender and age are important variables in terms of the labour-sending capacity of an area. As shown in Table 6, the male population per age category within the TLM exceeds that of the female population for the same age category. The predominance of males can partially be attributed to the historical in-migration of males as result of the local platinum mining industry and farm employment.

The language predominantly spoken in the TLM is Setswana (38%), followed by Afrikaans (14.5%) and IsiXhosa (11.4%). The remaining languages spoken in TLM and their distributions are provided in Table 7.

Table 6 | Gender and age distribution for Thabazimbi Local Municipality (StatsSA, 2011)

Age distribution	Gender	
	Males	Females
0-4	4.7%	4.8%
5-9	3.2%	3.1%
10-14	2.7%	2.7%
15-19	3%	2.9%
20-24	6.4%	4.5%
25-29	8.6%	5.2%
30-34	7.4%	4.2%
35-39	5.9%	3.5%
40-44	4.3%	3%
45-49	4.3%	4.3%
50-54	3.6%	1.9%
55-59	2.3%	1.2%
60-64	1%	0.7%
65-69	0.5%	0.5%
70-74	0.3%	0.3%
75-79	0.2%	0.2%
80-84	0.1%	0.1%
85+	0.1%	0.1%
<b>Total</b>	<b>41.5%</b>	<b>58.5%</b>

Table 7 | Languages spoken by the population in Thabazimbi Local Municipality (StatsSA, 2011)

Language	Percentage of population
Afrikaans	14.5%
English	3.3%
IsiNdebele	0.9%
IsiXhosa	11.4%

IsiZulu	2%
Sepedi	7.3%
Sesotho	3.6%
Setswana	38%
Sign Language	0.3%
SiSwati	0.7%
Tshivenda	1.2%
Xitsonga	6.8%
Other	2.1%
Not Applicable	7.8%

## Education

A critical factor affecting quality of life is the standard of education within a community. The level of education of a population is used as an indicator of human capital. It is measured by the percentage distribution of the population older than 20 years and the highest level of schooling attained. The 2011 Census data provided by StatsSA (2011) indicates that only approximately 14.2% of the population attained a matric level of education, with only 1.6% of the population having completed a higher education. Table 8 contains a summary of the education level of the all ages of the population within the TLM.

Table 8 | Education level of the population in Thabazimbi Local Municipality (StatsSA, 2011)

Level of Education	Percentage of population in TLM (all ages)
No Schooling	5.6%
Some Primary	36.3%
Completed Primary	6.4%
Some Secondary	33.4%
Completed Secondary	14.2%
Higher Education	1.6%
Not Applicable	2.5%

## Employment and Earnings

Of the total working age population of approximately 76.4% in the TLM, 20.6% are unemployed. The unemployment and youth unemployment rates (26.9%) are the lowest in the district. Table 9 provides an overall summary of the employment status within the TLM for those aged 15 to 64.

Table 9 | Employment status of the working age population in the Thabazimbi Local Municipality (StatsSA, 2011)

Employment status	Number
Employed	32 918
Unemployed	8 562
Discouraged Work Seeker	1 236
Not Economically Active	22 438

The ability of people to afford basic services (such as water, sanitation and health care), is often indicated through income levels. As shown in Table 10, households with an income of between R 38 201 and R 76 400 form the largest single group (20%) in the municipality. Most of the population (69.5%) earns an annual income of less than R 76 400. Note that the average household size is 2.8 people.

Table 10 | Annual income distribution of households within the Thabazimbi Local Municipality (StatsSA, 2011)

Average household income	Percentage
No income	14%
R1 - R4 800	2.7%
R4 801 - R9 600	4.1%
R9 601 - R19 600	12.6%
R19 601 - R38 200	16.1%
R38 201 - R76 400	20%
R76 401 - R153 800	14%
R153 801 - R307 600	9.9%
R307 601 - R614 400	4.6%
R614 001 - R1 228 800	1.2%
R1 228 801 - R2 457 600	0.4%
R2 457 601+	0.2%

## Living Conditions

Of the 25 080 households in the TLM, 47.3% have piped water inside their dwelling, 23.9% have piped water inside the yard, and 12.7% have access to piped water less than 200 m from their dwellings. Only 6.2% of households have no access to piped water. The various water sources in TLM are listed in Table 11. Most of the TLM population live in urban settings, and the remainder on farms, with 70.7% of the population residing in formal dwellings. Only 63.1% of households have access to toilets connected to a sewerage system, but 76.8% of households have access to electricity for lighting. Refuse is removed by a local authority or private company for 62.2% of households, while 31% of households dispose of refuse in dumps themselves. Additional details on housing, water and sanitation facilities, energy sources, and refuse disposal are provided in Table 11.

Table 11 | Living condition-details for the Thabazimbi Local Municipality (StatsSA, 2011)

Facility	Percentage of households
<b>Housing</b>	
Urban	82.2%
Tribal/Traditional	0%
Farm	17.8%
<b>Source of water</b>	
Regional/Local water scheme (operated by municipality or another water services provider)	63.9%
Borehole	17.4%
Spring	0.2%
Rain water tank	0.3%
Dam / Pool / Stagnant water	0.3%
River/Stream	0.2%
Water vendor	1.2%

<b>Water tanker</b>	14.8%		
<b>Other</b>	1.7%		
<b>Toilet facility</b>			
<b>None</b>	6.3%		
<b>Flush toilet (connected to sewerage system)</b>	63.1%		
<b>Flush toilet (with septic tank)</b>	4.9%		
<b>Chemical toilet</b>	0.7%		
<b>Pit toilet with ventilation</b>	2.6%		
<b>Pit toilet without ventilation</b>	18.4%		
<b>Bucket toilet</b>	0.8%		
<b>Other</b>	3.3%		
<b>Energy source</b>	<b>Cooking</b>	<b>Heating</b>	<b>Lighting</b>
<b>Electricity</b>	73.1%	68%	76.8%
<b>Gas</b>	1.7%	1.2%	0,2%
<b>Paraffin</b>	16.1%	8%	4.4%
<b>Solar</b>	0.1%	0.2%	0,3%
<b>Candles</b>	0%	0%	17.9%
<b>Wood</b>	8.7%	14%	0%
<b>Coal</b>	0.1%	0.1%	0%
<b>Animal Dung</b>	0%	0.1%	0%
<b>Other</b>	0%	0%	0%
<b>None</b>	0.2%	8.2%	0.4%
<b>Refuse Disposal</b>			
<b>Removed by local authority / private company at least once a week</b>	60.4%		
<b>Removed by local authority / private company less often</b>	1.8%		
<b>Communal refuse dump</b>	2.2%		
<b>Own refuse dump</b>	28.8%		
<b>No rubbish disposal</b>	5.5%		
<b>Other</b>	1.3%		

## 9.2 Description of the current land uses

The TLM is dominated by open bush vegetation, a few scattered patches of low shrubland vegetation, and large portions of degraded vegetation and cultivated areas. Various mines are near the proposed project, together with associated communities, such as the Chromite mine settlement to the west of the Amandelbult Complex.

The project area's landcover is a mixture of low intact shrubland, degraded vegetation, and previous mining activities (Figure 20)

### 9.2.1 Thabazimbi Spatial Development Framework (TSDF)

The proposed project will occur within an area regarded as having a mining land use. Therefore, it will not negatively influence the spatial development of future developments such as game farming, irrigation agriculture, dry-land farming, cattle farming or urban development in the Thabazimbi Municipal Area (Thabazimbi Municipality 2007). Mining is one of the primary economic activities in the TLM. The proposed project does not take place within any of the areas identified as Environmentally Sensitive Areas (mountainous areas, area between Thabazimbi and the Marakele National Park, the riparian zone of the Crocodile River, and various other nature reserves) identified in the Integrated Environmental Programme (IEP) compiled together with the Thabazimbi Spatial Development Framework (TSDF, 2007).



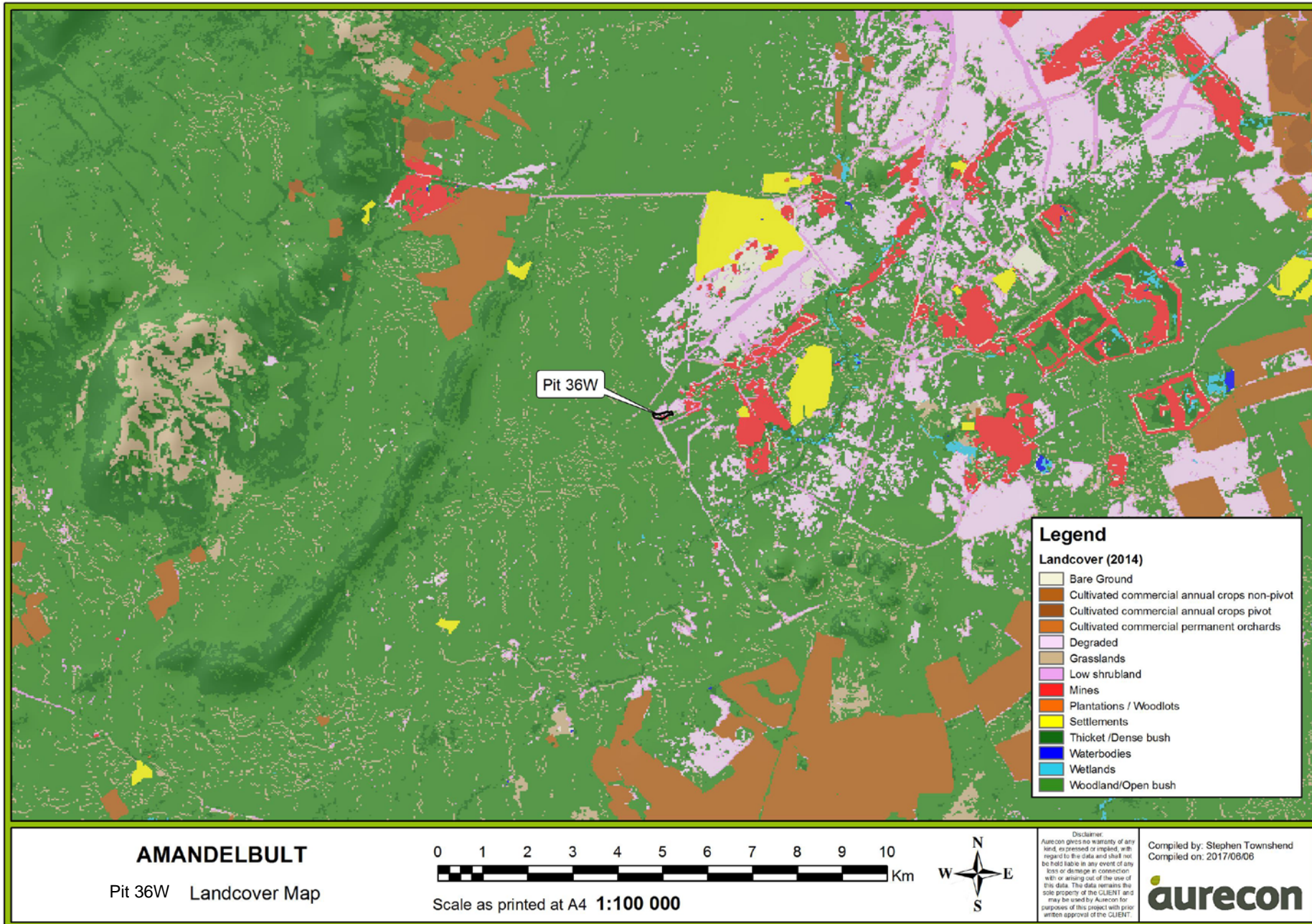


Figure 20 | Pit 36W landcover, showing previous mining-related disturbance.

## 9.2.2 Waterberg Spatial Development Framework (WSDF)

Mining is not considered to conflict with urban development in the Waterberg District Municipality (Waterberg Municipality 2009). Open Pit 36W is in an area that is considered a currently active mine with existing mining activity and platinum potential. Open Pit 36W will be rehabilitated at cessation of mineral extraction.

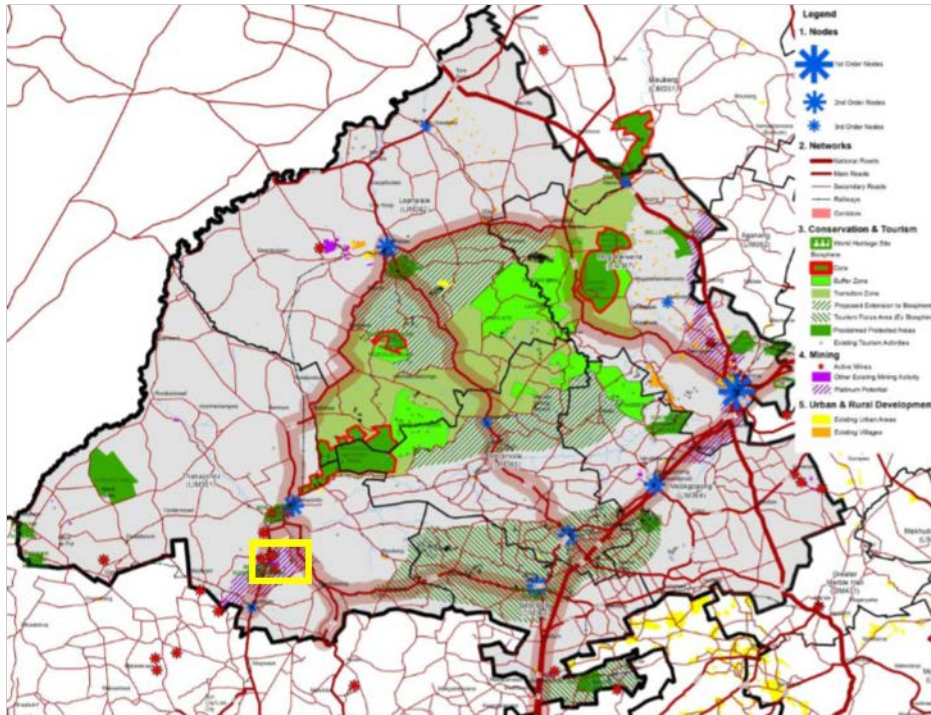


Figure 21 | Mining within the Waterberg Spatial Development Framework, indicating the general project location within an active mining area (WSDF, 2009)

## 9.2.3 Land Uses in the Study Area

Only semi-natural vegetation remains present within the study area. These comprise small pockets of grassland and thorn trees.

## 9.3 Impacts and risks identified

The anticipated impacts of the proposed project during construction (Table 12 and Table 13), operation (Table 14 and Table 15), and decommissioning (Table 16 and Table 17) phases are shown in the tables below, before and after mitigation. The decommissioning phase includes the replacement of material to the pit, topsoiling, grading and revegetation of the pit, and decommissioning of ancillary infrastructure, if present.

The impacts listed here are based on typical known impacts of the proposed activity, and will be amended per issues and concerns received from affected parties, in the Final EMP addendum to be submitted to the DMR.

Impacts and risks identified are provided in terms of the extent to which they can be reversed, may cause irreplaceable loss of resources, can be avoided, managed or mitigated by showing their significance levels in two tables per phase as anticipated pre-mitigation and post-mitigation.



### 9.3.1 Construction Phase Impacts

The environmental and social impacts anticipated during the construction phase are provided in Table 12 and Table 13, along with the anticipated duration, extent, intensity, consequential rating, probability, and significance prior to and after mitigation measures have been implemented. The construction phase consists of site and laydown areas as required, vegetation clearing, and topsoil stripping and stockpiling.

Table 12 | Construction phase impacts prior to mitigation

Code	Impact	Pre-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes.	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
2.	Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
3.	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
4.	Compaction and decline in topsoil structure during stockpiling	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
5.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
6.	Loss of topsoil through erosion at stockpiles	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
7.	Cessation of current land use at pit, stockpiles and infrastructure footprints during mine construction and operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
8.	Loss of floral & faunal habitat	Short-term	Site-specific	Moderate - negative	Slightly detrimental	Very likely	Low - negative
9.	Loss of floral & faunal SCC	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low

10.	Sensory disturbances to fauna	Short-term	Local	Moderate - negative	Slightly detrimental	Fairly likely	Low - negative
11.	Direct faunal mortality	Medium-term	Local	Moderate - negative	Moderately detrimental	Fairly likely	Low - negative
12.	Natural resource harvesting	Short-term	Site-specific	Negligible	Negligible	Unlikely	Very low
13.	Invasion of alien and invasive species	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
14.	Water quality deterioration due to pollutant discharge or dirty water runoff	Short-term	Local	Negligible	Negligible	Unlikely	Very low
15.	Dust emissions due to soil clearing	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
16.	Dust emissions due to vehicle movement	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
17.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
18.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
19.	Night-time noise caused by vehicle & equipment operation	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
20.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
21.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
22.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
23.	Visual impact from dust	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
24.	Safety & security impacts	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low



Table 13 | Construction phase impacts after mitigation

Code	Impact	Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes.	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
2.	Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
3.	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
4.	Compaction and decline in topsoil structure during stockpiling	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
5.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
6.	Loss of topsoil through erosion at stockpiles	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
7.	Cessation of current land use at pit, stockpiles and infrastructure footprints during mine construction and operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
8.	Loss of floral & faunal habitat	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low
9.	Loss of floral & faunal SCC	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
10.	Sensory disturbances to fauna	Short-term	Local	Moderate - negative	Slightly detrimental	Unlikely	Very low
11.	Direct faunal mortality	Medium-term	Site-specific	Moderate - negative	Moderately detrimental	Unlikely	Very low
12.	Natural resource harvesting	Short-term	Site-specific	Negligible	Negligible	Very unlikely	Very low
13.	Invasion by alien and invasive species	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
14.	Water quality deterioration due to pollutant discharge or dirty water runoff	Short-term	Local	Negligible	Negligible	Unlikely	Very low
15.	Dust emissions due to soil clearing	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low

16.	Dust emissions due to vehicle movement	Short-term	Local	Negligible	Negligible	Very likely	Very low
17.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Local	Negligible	Negligible	Very likely	Very low
18.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
19.	Night-time noise caused by vehicle & equipment operation	Short-term	Local	Low - negative	Slightly detrimental	Unlikely	Very low
20.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
21.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
22.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
23.	Visual impact from dust	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
24.	Safety & security impacts	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low

### 9.3.2 Operation Phase Impacts

The environmental and social impacts anticipated during the operation phase are provided in Table 14 and Table 15, along with the anticipated duration, extent, intensity, consequential rating, probability, and significance prior to and after mitigation measures have been implemented. The operation phase consists of blasting, removal, and placement of overburden material, ore extraction and transportation.

Table 14 | Operation phase impacts prior to mitigation

Code	Impact	Pre-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations	Medium-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
2.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
3.	Loss of topsoil through erosion at stockpiles & pit edges	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
4.	Cessation of current land use at pit, dumps, stockpiles and infrastructure footprints	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low

5.	Sensory disturbances to fauna	Short-term	Local	Low - negative	Slightly detrimental	Fairly likely	Low - negative
6.	Direct faunal mortality	Medium-term	Local	Moderate - negative	Moderately detrimental	Fairly likely	Low - negative
7.	Water quality deterioration due to pollutant discharge or dirty water runoff	Short-term	Local	Low - negative	Slightly detrimental	Unlikely	Very low
8.	Dust emissions due to loading and hauling	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
9.	Dust emissions due to vehicle movement	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
10.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
11.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
12.	Night-time noise caused by vehicle & equipment operation	Short-term	Local	Low - negative	Slightly detrimental	Very likely	Low - negative
13.	Ground vibration caused by blasting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
14.	Air blast caused by blasting	Short-term	Local	Low - negative	Slightly detrimental	Fairly likely	Low - negative
15.	Fly rock caused by blasting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
16.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
17.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
18.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low
19.	Visual impact from dust	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
20.	Contribution to employment retention at mine	Short-term	Local	Moderate - positive	Slightly beneficial	Very likely	Low - positive
21.	Contribution to PGM resources at mine	Short-term	Local	Moderate - positive	Slightly beneficial	Certain	Moderate - positive

Table 15 | Operational phase impacts after mitigation measures have been implemented

Code	Impact	Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations	Medium-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
2.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
3.	Loss of topsoil through erosion at stockpiles & pit edges	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
4.	Cessation of current land use at pit, dumps, stockpiles and infrastructure footprints	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
5.	Sensory disturbances to fauna	Short-term	Local	Low - negative	Slightly detrimental	Unlikely	Very low
6.	Direct faunal mortality	Medium-term	Local	Low - negative	Moderately detrimental	Unlikely	Very low
7.	Water quality deterioration due to pollutant discharge or dirty water runoff	Short-term	Local	Low - negative	Slightly detrimental	Unlikely	Very low
8.	Dust emissions due to loading and hauling	Short-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Very low
9.	Dust emissions due to vehicle movement	Short-term	Local	Low - negative	Slightly detrimental	Unlikely	Very low
10.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Local	Negligible	Negligible	Very likely	Very low
11.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
12.	Night-time noise caused by vehicle & equipment operation	Short-term	Site-specific	Low - negative	Slightly detrimental	Very likely	Very low
13.	Ground vibration caused by blasting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
14.	Air blast caused by blasting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
15.	Fly rock caused by blasting	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
16.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Very unlikely	Very low
17.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low



18.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low
19.	Visual impact from dust	Short-term	Site-specific	Negligible	Negligible	Very likely	Very low
20.	Contribution to employment retention at mine	Short-term	Local	Moderate - positive	Slightly beneficial	Very likely	Low - positive
21.	Contribution to PGM resources at mine	Short-term	Local	Moderate - positive	Slightly beneficial	Certain	Moderate - positive

### 9.3.3 Decommissioning Phase Impacts

The environmental and social impacts anticipated during the operation phase are provided in Table 16 and Table 17, along with the anticipated duration, extent, intensity, consequential rating, probability, and significance prior to and after mitigation measures have been implemented. The decommissioning phase consists of the replacement of overburden material to the pit, topsoil replacement and revegetation.

Table 16 | Decommissioning impacts prior to mitigation

Code	Impact	Pre-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes.	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
2.	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types	Long-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
3.	Compaction and decline in topsoil structure during topsoil replacement	Medium-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
4.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Medium-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
5.	Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas	Medium-term	Site-specific	Low - negative	Slightly detrimental	Fairly likely	Low - negative
6.	Reconstructed topography	Long-term	Site-specific	Moderate - negative	Moderately detrimental	Very likely	Moderate - negative
7.	Replacement of floral & faunal habitat	Long-term	Local	Moderate - positive	Moderately beneficial	Very likely	Moderate - positive

8.	Invasion by alien and invasive species	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
9.	Dust emissions due to topsoil handling	Short-term	Site-specific	Low - positive	Negligible	Very likely	Very low
10.	Dust emissions due to vehicle movement	Short-term	Site-specific	Low - positive	Negligible	Very likely	Very low
11.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low
12.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Fairly likely	Very low
13.	Night-time noise caused by vehicle & equipment operation	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
14.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
15.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
16.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
17.	Visual impact from dust	Short-term	Site-specific	Negligible	Negligible	Unlikely	Very low

Table 17 | Decommissioning impacts after mitigation

Code	Impact	Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1.	Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes.	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
2.	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types	Long-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
3.	Compaction and decline in topsoil structure during topsoil replacement	Medium-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
4.	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Medium-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low

5.	Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas	Medium-term	Site-specific	Low - negative	Slightly detrimental	Unlikely	Very low
6.	Reconstructed topography	Long-term	Site-specific	Low - negative	Slightly detrimental	Very likely	Low - negative
7.	Replacement of floral & faunal habitat	Long-term	Local	Moderate - positive	Moderately beneficial	Very likely	Moderate positive
8.	Invasion by alien and invasive species	Short-term	Site-specific	Low - negative	Negligible	Fairly likely	Very low
9.	Dust emissions due to topsoil handling	Short-term	Site-specific	Low - positive	Negligible	Unlikely	Very low
10.	Dust emissions due to vehicle movement	Short-term	Site-specific	Low - positive	Negligible	Unlikely	Very low
11.	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Short-term	Site-specific	Low - negative	Negligible	Very likely	Very low
12.	Daytime noise caused by vehicle & equipment operation	Short-term	Site-specific	Negligible	Negligible	Fairly likely	Very low
13.	Night-time noise caused by vehicle & equipment operation	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
14.	Chance heritage finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
15.	Chance fossil finds	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
16.	Visual impact from night-time lighting	Short-term	Site-specific	Low - negative	Negligible	Unlikely	Very low
17.	Visual impact from dust	Short-term	Site-specific	Negligible	Negligible	Unlikely	Very low

## 9.4 Methodology Used in Impact Assessment

For each predicted impact, criteria are applied to establish the significance of the impact based on likelihood (probability) and consequence, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.

The criteria that contribute to the consequence of the impact are INTENSITY (the degree to which pre-development conditions are changed); the DURATION (length of time that the impact will continue); and the EXTENT (spatial scale) of the impact. The sensitivity of the receiving environment and/or sensitive receptors is incorporated into the consideration of consequence by appropriately adjusting the thresholds or scales of the intensity, duration and extent criteria, based on expert knowledge. For each impact, the specialist applies professional judgement to ascribe a numerical rating for each criterion per the ratings provided.

The consequence is then established using the formula:

$$\text{Consequence} = \text{intensity (duration + extent)}$$

### Duration

Rating	Criteria
2	Long-term: The impact will continue for 6-15 years.
1	Medium-term: The impact will continue for 2-5 years.
0	Short-term: The impact will continue for between 1 month and 2 years.

### Extent

Rating	Criteria
2	Regional: The impact will affect the entire region
1	Local: The impact will extend across the site and to nearby properties.
0	Site specific: The impact will be limited to the site or immediate area.

### Intensity

Rating	Criteria	
	Negative impacts (Type of impact = -1)	Positive impacts (Type of impact = +1)
Very high (-/+ 4)	Very high degree of damage to natural or social systems or resources. These processes or resources may restore to their pre-project condition over very long periods of time (more than a typical human life time).	Great improvement to ecosystem or social processes and services or resources.
High (-/+ 3)	High degree damage to natural or social system components, species or resources.	Intense positive benefits for natural or social systems or resources.
Moderate (-/+ 2)	Moderate damage to natural or social system components, species or resources.	Average, on-going positive benefits for natural or social systems or resources.
Low (-/+ 1)	Minor damage to natural or social system components, species or resources. Likely to recover over time. Ecosystems and valuable social processes not affected.	Low positive impacts on natural or social systems or resources.
Negligible (0)	Negligible damage to individual components of natural or social systems or resources, such that it is hardly noticeable.	Limited low-level benefits to natural or social systems or resources.

Depending on the numerical result of this calculation, the impact's consequence would be classified as one of the following:



Range	Consequence rating
-8	Extremely detrimental
-7 to -6	Highly detrimental
-5 to -4	Moderately detrimental
-3 to -2	Slightly detrimental
-1 to 1	Negligible
2 to 3	Slightly beneficial
4 to 5	Moderately beneficial
6 to 7	Highly beneficial
8	Extremely beneficial

To determine the significance of an impact, the probability (or likelihood) of that impact occurring is also considered. In assigning probability, the likelihood of occurrence and the degree of uncertainty and detectability of the impact are considered.

Significance is calculated with the following formula:

$$\text{Significance} = \text{consequence} \times \text{probability}$$

#### Probability

Rating	Criteria
4	Certain/ Definite: There are sound scientific reasons to expect that the impact will definitely occur.
3	Very likely: It is most likely that the impact will occur.
2	Fairly likely: This impact has occurred numerous times here or elsewhere in a similar environment and with a similar type of development and could very conceivably occur.
1	Unlikely: This impact has not happened yet but could happen.
0	Very unlikely: The impact is expected never to happen or has a very low chance of occurring.

Depending on the numerical result of this calculation, the impact would fall into a significance category of one of the following:

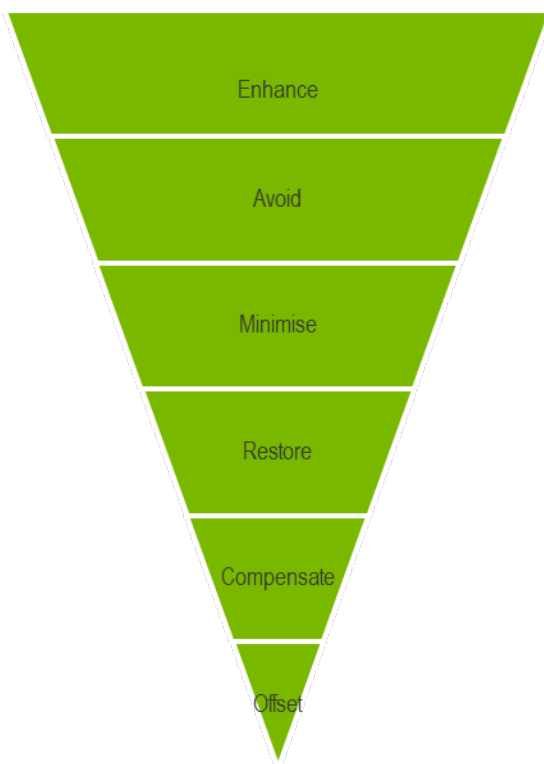
Rating	Significance rating	Colour code
-4	Very high - negative	
-3	High - negative	
-2	Moderate - negative	
-1	Low - negative	
0	Very low	
1	Low - positive	
2	Moderate - positive	
3	High - positive	
4	Very high - positive	

#### 9.4.1 Methodology for Identification of Mitigation Measures

The mitigation hierarchy below illustrates the actions which can be undertaken to respond to negative impacts and the preference given to mitigation measures. The topmost measures are preferred, and the preference for mitigation measures decreases the further one moves down the hierarchy.

For each impact assessed, mitigation measures have been proposed to reduce and / or avoid negative impacts and enhance positive impacts. The mitigation measures identified by the specialists have been reviewed for feasibility and incorporated into the EMPr to ensure that they are implemented throughout the lifecycle of the proposed project. The EMPr would become a legally binding document should this project receive an EA.

The potential impacts identified, as well as the intensity, significance, consequences, extent, duration and probability, is provided in this report as well as in **Appendix D** of this report. Affected parties are encouraged to peruse these sheets and raise comments, issues and concerns therewith. These comments will be considered upon finalisation of the Open Pit 36W site layout.



**Impact avoidance:** This step is most effective when applied at an early stage of project planning. It can be achieved by:

- Not undertaking certain projects or elements that could result in adverse impacts;
- Avoiding areas that are environmentally sensitive; and
- Putting in place preventative measures to stop adverse impacts from occurring.

**Impact minimisation:** This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- Scaling down or relocating the proposal;
- Redesigning elements of the project; and
- Taking supplementary measures to manage the impacts.

**Impact compensation:** This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- Example, by habitat enhancement;
- Restoration of the affected site or environment to its previous state or better; and
- Replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide

The mitigation described in the above diagram represents the full range of plausible and pragmatic measures that can be implemented to mitigate identified impacts.

## 9.5 Positive and Negative Impacts

It is important to note that the proposed activity will take place on existing an existing mining area. No communities will be affected as none are in the area, apart from a few farm residents on neighbouring properties. Nevertheless, any issues with the current preferred site layout, as raised by I&APs, will be addressed in the final EMPr addendum.

Table 18 | Positive and negative impacts that the proposed Open Pit 36W project may have on the environment and potentially affected communities

Positive Impact	Negative Impact
<b>Alternative 1</b>	
The extraction of PGMs from Open Pit 36W would be made possible. The positive knock-on impacts of increased resource extraction at the Amandelbult mine are described in more detail in Section 6, and includes, <i>inter alia</i> , continued contribution of the mine to platinum	Increased disturbance (including vegetation clearing, vehicle activity, material stockpiling etc.) will likely take place in an area which, although mostly disturbed, is bordered by partially natural surroundings.

resources extracted, as well as continuation of job provision to mine employees.

#### **No-Go Alternative**

No additional disturbance (from vegetation clearing, vehicle activity, material stockpiling etc.) will take place in an area which, although mostly disturbed, is bordered by partially natural surroundings.

The mine will not be able to contribute further platinum-resources, nor sustain the same number of jobs as present.

## **9.6 Possible Mitigation Measures**

No issues have yet been raised by interested and affected parties. See Part B, section 5 for a discussion on mitigation measures of each impact, as well as the residual impact post-mitigation. No mitigation measures are considered to have significant risks associated with them.

Although unlikely, sub-surface remains of heritage sites or fossils could still be encountered during the project's construction phase. Such sites would offer no surface indication of their presence due to the high state of alterations in some areas, as well as heavy plant cover in other areas. The following indicators of unmarked sub-surface sites could be encountered:

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);
- Bone concentrations, either animal or human;
- Ceramic fragments such as pottery shards either historic or pre-contact;
- Stone concentrations of any formal nature.

The following recommendations are given, should any sub-surface remains of heritage sites be identified:

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered;
- All construction in the immediate vicinity (50-m radius of the site) should cease;
- The heritage practitioner should be informed as soon as possible;
- In the event of obvious human remains, the South African Police Services (SAPS) should be notified;
- Mitigation measures (such as refilling etc.) should not be attempted;
- The area in a 50-m radius of the find should be cordoned off with hazard tape;
- Public access should be limited;
- The area should be placed under guard; and
- No media statements should be released until the heritage practitioner has had sufficient time to analyse the finds.

## **9.7 Motivation Where No Alternative Sites were Considered**

Additional pit location alternatives were not considered. Mining can only be undertaken in areas where economically mineable resources occur, which determines where the pit is located. This area was established through extensive prospecting and geological modelling.

Selection of a mining method is always dictated by the ore-body or resource. In the case of the Open Pit 36W, the opencast method of extraction is the most economical, feasible and safe method

of extraction. Underground mining was not considered feasible, as a large portion of the resource will be lost due to the safety risks associated with mining of shallow resources from underground. Additionally, underground mining is not economically viable considering current PGM prices. From an environmental perspective, extraction by underground method would limit the surface disturbance and impact on the biodiversity of the area, but remains a safety risk.

## 9.8 Statement Motivating Location

Please refer to section 9.7.

# 10 Full Description of Process Undertaken to Identify and Assess Impacts

The EAP, a heritage specialist, and an ecological specialist conducted field assessments (with mine personnel) to identify and determine the environmental attributes and associated impacts during the proposed activity. By understanding the necessity of the proposed project, and the context of the project in the greater socio-economic and environmental context of the mining operations, the EAP could rank or rate the impacts potentially caused by the project.

Complete lists of the impacts anticipated during all phases of the project are provided in Table 12, Table 13, Table 14, Table 15, Table 16, and Table 17. Impacts are ranked per their ratings obtained in these tables (the methodology for rating project activity impacts are discussed in section 9.4), and are further discussed below.

## 10.1 Construction Phase

### Low – negative impacts

- 1) *“Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes”*

Even though the footprint of the Open Pit 36W project is not regarded as having high agricultural value, it remains imperative to preserve topsoil of all disturbed areas, as it holds a seedbank supporting the ecology of the area. Upon closure of the Amandelbult Complex, the areas that have been disturbed should be enabled to become part of the habitat it once supported and, without the necessary topsoil conservation measures employed, it may fail to support the same level of biodiversity. Some topsoil will always be lost during the stripping thereof, but the negative impacts thereof can be reduced by strictly adhering to topsoil stripping and storage guidelines. The applicant possesses such a guideline and, in addition, another has been developed by a soil specialist for the Haakdoorndrift Opencast Project proposed nearby.

- 2) *“Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types”*

During the topsoil stripping process, it should be ensured that these horizons are stripped and stored separately to preserve the natural soil structure.

- 3) *“Loss of topsoil through erosion at stockpiles”*

For such a short project, it cannot be reasonably recommended that the stockpiles should be vegetated with indigenous flora, as would be a sound mitigation measure for long-term



projects of more than 12 months. However, to mitigate the potential impact of stockpile erosion, it should be ensured that the soil is handled as infrequently as possible, and is stripped and transported during windless days or seasons if possible. In addition, topsoil should be stored in stockpiles no higher than 2 m, and should not be spread out across too wide a surface area. The use of erosion control fabric, grass seeding, or berms should also be considered to prevent the topsoil from washing away during rainy periods.

4) *“Loss of floral and faunal habitat”*

The vegetation type occurring in the project area is considered least threatened, but is considered a category 2 CBA. The general disturbance inherently related to a project as proposed will remove some of the floral and faunal habitat. The impact can be reduced by limiting vegetation clearing to the pit are itself.

5) *“Sensory disturbances to fauna”*

The presence of vehicles, heavy machinery, and lighting might disturb fauna occurring in the project area and surroundings. Avoiding night-time construction activities would further limit the impact.

6) *“Direct faunal mortality”*

Although unlikely, the potential presence of animals or nests in the project area could lead to direct faunal mortality during construction activities. To avoid the impact, a walkdown of the project area can be done prior to the commencement of activities to remove any nests.

7) *“Dust emissions due to soil clearing”*

Vegetation clearing will expose the soil surface, increasing the site’s susceptibility to dust generation, especially during dry winter months. The impact can be mitigated by clearing vegetation out of dry winter months or, at least, not on windy days.

8) *“Dust emissions due to vehicle movement”*

Similarly, the movement of vehicles used for vegetation clearing and topsoil transportation will cause dust. This impact can be mitigated by applying a dust suppressant to roads (as is standard practice at the mine). Loading vehicles with topsoil below capacity would also ensure that dust deposition is reduced.

9) *“PM<sub>10</sub> emissions due to vehicle and equipment (e.g. generators) operation”*

Air pollution from vehicles and equipment using fuel cannot be avoided, but can be mitigated by ensuring that the machinery is in a good condition and switched off when not in use.

10) *“Night-time noise caused by vehicle and equipment operation”*

This impact is not considered negligible as sound travels further at night than during daytime, and some households could be located close to the project site. It is recommended that construction activities take place during the day, as it will likely be overshadowed by other noisy activities originating from the other routine mining activities or nearby farming activities.

These impacts are typically associated with the initial phases of opencast mining. The **Low (-)** ratings result mostly from the fact that that the disturbance footprint is small, the construction phase will be short, and the area to be impacted is not regarded as sensitive in terms of receptors or the biophysical environment. Through the application of the recommended mitigation measures, all the impacts can be mitigated to a **Very Low (-)** level.

## Very Low – negative impacts

- 1) *“Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations”*

It is considered unlikely that topsoil will be placed on an area with the potential to contaminate it. It will probably be placed on an area that has been previously used for stockpiling of overburden material or a rehabilitated open pit area. These areas are vegetated and unlikely contain any materials that could contaminate topsoil.

- 2) *“Compaction and decline in topsoil structure during stockpiling”*

It is expected that very little topsoil will be stripped from the pit area, which limits the risk of compaction. This impact can be avoided by not driving over topsoil, and not stripping topsoil during wet periods.

- 3) *“Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment”*

Vehicle movement, storage of potential leaking equipment, or incorrect waste disposal could contaminate topsoil. By separately storing waste (especially oily rags or other materials containing hydrocarbons) and avoiding any activity whatsoever on topsoil stockpiles will avoid this impact.

- 4) *“Cessation of current land use at pit, stockpiles and infrastructure footprints during mine construction and operation”*

A powerline and gravel roads running across and next to the pit are the only noteworthy “land uses” that will be impacted by the proposed activity, apart from the potential use of the remaining natural areas by fauna. This impact is not considered high, as the positive impacts of moving these infrastructures will outweigh the minimal effort it requires.

- 5) *“Loss of floral and faunal species of conservation concern (SCC)”*

No SCC were identified by the ecologist during his site visit and the chance of any SCC occurring on the project site is very low. Furthermore, per the vegetation type’s expanse, the destruction of single or few specimens of a SCC, is unlikely to lead to serious impacts on the entire species or CBA.

- 6) *“Natural resource harvesting”*

It is highly unlikely that any natural resources, such as medicinal plants are in the project area and, more so that any harvesting thereof will occur in the short project time.

- 7) *“Invasion by alien and invasive species”*

The proliferation of alien and invasive species will not have a severe impact on the vegetation type, as it is considered to have low to moderate potential for supporting flora and fauna of conservation significance. Invasive species can be removed easily as part of the rehabilitation phase on this small project area.

- 8) *“Water quality deterioration due to pollutant discharge or dirty water runoff”*

The closest waterbody, the Bierspruit River, is located 3 km to the east of the project site. Any dirty water runoff originating from the project area is unlikely to reach the Bierspruit River. Nevertheless, any hazardous chemicals or contaminated materials or wash water should be contained and disposed of as hazardous waste.

9) *“Daytime noise caused by vehicle and equipment operation”*

Noise caused by construction activities will likely be minimal in comparison to other noise sources in the area during the day, such as other mining activities.

10) *“Chance heritage finds”*

PGS Heritage (2017) confirmed that no heritage resources were located during their site visit or by other heritage specialists who previously visited the site, apart from rocky outcrops close to the Bierspruit River. However, a chance finds procedure is included in the EMPr if any resources are indeed located during the proposed activities.

11) *“Chance fossil finds”*

As the construction phase is considered to entail above-surface activities, the chances of finding fossiliferous resources is regarded very unlikely. However, a chance finds procedure is included in the EMPr if any resources are indeed located during the proposed activities.

12) *“Visual impact from night-time lighting”*

The project is located approximately 3 km from the closest homestead. Night-time lighting (if any) is not expected to disturb nearby homesteads.

13) *“Visual impact from dust”*

Dust will likely be created by the project activities, but, considering the distance to the nearest farm steads, the visual impact associated with construction activities are considered very low.

The impacts listed above are rated **Very Low (-)** mostly because they are unlikely to occur. If they are likely to occur (such as noise and dust generated by vehicles on site) their low impact ratings result from their site-specific nature and the fact that they would have a low intensity, due to the small project size.

## 10.2 Operation Phase

### Low – negative impacts

1) *“Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment”*

Vehicle movement, storage of potential leaking equipment, or incorrect waste disposal could contaminate topsoil. By separately storing waste (especially oily rags or other materials containing hydrocarbons) and avoiding any activity whatsoever on topsoil stockpiles will avoid this impact.

2) *“Loss of topsoil through erosion at stockpiles and pit edges”*

Topsoil could be eroded from pit edges or stockpile areas. The use and maintenance of erosion control fabric, grass seeding, or berms could prevent topsoil from washing away during rainy periods.

3) *“Sensory disturbances to fauna”*

The presence of vehicles, heavy machinery, and lighting might disturb avifauna occurring in the project area and surroundings. However, the severity of the impact is limited by the presence of various mining activities close-by and the preceding construction activities. Limiting night-time construction activities would further limit the impact.

4) *“Direct faunal mortality”*

Although unlikely, the potential presence of fauna in the project area could lead to direct faunal mortality through vehicle movement.

5) *“Dust emissions due to loading and hauling”*

Loading vehicles with topsoil below capacity would ensure that dust deposition is reduced.

6) *“Dust emissions due to vehicle movement”*

The movement of vehicles used for overburden and ore material or staff transportation will cause dust. This impact can be mitigated by applying a dust suppressant to roads (as is standard practice at the mine).

7) *“PM<sub>10</sub> emissions due to vehicle and equipment (e.g. generators) operation”*

Air pollution from vehicles and equipment using fuel cannot be avoided, but can be mitigated by ensuring that the machinery is in a good condition and switched off when not in use.

8) *“Night-time noise caused by vehicle and equipment operation”*

This impact is not considered negligible as sound travels further at night than during daytime. It is recommended that construction activities take place during the day, as it will likely be overshadowed by other noisy activities originating from the other routine mining activities or nearby farming activities

9) *“Air blast caused by blasting”*

Air blast, although not an impact that causes structural damage, can cause nuisance if felt by residents nearby. The impact can be mitigated by warning residents well in advance of planned blasting activities.

The **Low (-)** ratings result mostly from the fact that the disturbance footprint is small, the operational phase will be short (approximately six months), and the area to be impacted is not regarded as sensitive in terms of receptors or the biophysical environment. Through the application of the recommended mitigation measures, all the impacts can be mitigated to a **Very Low (-)** level.

**Very Low – negative impacts**

1) *“Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations”*

In the unlikely event that topsoil is contaminated from underlying subsoil, the impact will continue throughout the operation phase, or for the duration of topsoil being stockpiled. The impact can be avoided by placing topsoil (once-off at construction phase) on an area that is not contaminated.

2) *“Cessation of current land use at pit, dumps, stockpiles and infrastructure footprints”*

A powerline and gravel roads running across and next to the pit are the only noteworthy “land uses” that will be impacted by the proposed activity, apart from the potential use of the remaining natural areas by fauna. This impact is not considered high, as the positive impacts of moving these infrastructures will outweigh the minimal effort it requires.

3) *“Water quality deterioration due to pollutant discharge or dirty water runoff”*

The closest waterbody, the Bierspruit River, is located 3 km to the east of the project site. Any dirty water runoff originating from the project area is unlikely to reach the Bierspruit River.



Nevertheless, any hazardous chemicals or contaminated materials or wash water should be contained and disposed of as hazardous waste.

4) *“Daytime noise caused by vehicle and equipment operation”*

Noise caused by drilling, blasting, loading and hauling activities will likely be minimal in comparison to other noise sources in the area during the day, such as routine mining and farming activities.

5) *“Ground vibration caused by blasting”*

Ground vibration caused by blasting could cause structural damage. However, this impact is regarded as unlikely considering the 3 km-distance to the nearest homestead.

6) *“Fly rock caused by blasting”*

Fly rock resulting from blasting is unlikely to impact nearby homes or structures due to their distances from the pit.

7) *“Chance heritage finds”*

The chance finds procedure for heritage resources should be implemented if archaeological, cultural or heritage resources or graves are located during excavations.

8) *“Chance fossil finds”*

The chance finds procedure for heritage resources should be implemented if fossil resources are located during excavations. It is more likely that fossils could be discovered underground than aboveground.

9) *“Visual impact from night-time lighting”*

The project is located approximately 3 km from the closest homestead. Night-time lighting (if any) is not expected to disturb nearby homesteads.

10) *“Visual impact from dust”*

Dust will likely be created by the project activities, but, considering the distance to the nearest farm steads, the visual impact associated with operation activities are considered very low.

The impacts listed above are rated as **Very Low (-)** based on their negligible intensity in the context of the environment they would occur. Noise and blasting impacts occur currently as part of existing mining operations, and are very low as is.

#### *Low – positive impact*

*“Contribution to employment retention at mine”*

The impact is rated as **Low (+)** due to the short time in which it will take place.

#### *Moderate – positive impact*

*“Contribution to PGM-resources at mine”*

The **Moderate (+)** impact of the PGM-resources extracted will contribute to the mine’s operations.

## **10.3 Decommissioning Phase**

#### *Moderate – negative impact*

*“Reconstructed topography”*

This **Moderate (-)** impact is ascribed to the unavoidable impact that opencast mining has on the pit area's topography. The impact can be mitigated to a **Low (-)** level if rehabilitation takes place in such a manner that overburden is replaced such that it blends with the current surface, and that topsoiling and further rehabilitation activities take place in line with prescribed Anglo guidelines.

#### Low – negative impacts

- 1) *“Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil for construction purposes”*

Negligent topsoil stripping at the construction stage will cause a loss of topsoil available for replacement at rehabilitation stage. Topsoil should be handled as little as possible during replacement.

- 2) *“Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types”*

Topsoil should be replaced in their naturally occurring strata to ensure that the structure remains.

- 3) *“Compaction and decline in topsoil structure during topsoil replacement”*

This impact can be mitigated by ensuring that topsoil is not compacted during handling or replacement.

- 4) *“Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment”*

No vehicles should, at any point, be allowed to drive over topsoil stockpiles or after it has been replaced.

- 5) *“Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas”*

To mitigate this impact, it is recommended that topsoil be handled as infrequently as possible.

All impacts can be mitigated to a **Very Low (-)** level.

#### Very low – negative impacts

- 1) *“Invasion by alien and invasive species”*

The disturbance caused to the area and topsoil could allow alien and invasive plant species to establish in the project area. All such species must be removed of and disposed of appropriately during the rehabilitation phase.

- 2) *“Dust emissions due to topsoil handling”*

Loading vehicles with topsoil below capacity would ensure that dust deposition is reduced.

- 3) *“Dust emissions due to vehicle movement”*

Dust suppression should be carried out on gravel roads.

- 4) *“PM<sub>10</sub> emissions due to vehicle and equipment (e.g. generators) operation”*

All vehicles and machinery should be switched off when not in use.

- 5) *“Daytime noise caused by vehicle and equipment operation”*

Noise caused by material handling activities will likely be minimal in comparison to other noise sources in the area during the day, such as routine mining and farming activities.

6) *“Night-time noise caused by vehicle and equipment operation”*

This impact is not considered negligible as sound travels further at night than during daytime, and some households are located close to the project site. It is recommended that rehabilitation activities take place during the day, as it will likely be overshadowed by other noisy activities originating from the other routine mining activities.

7) *“Chance heritage finds”*

The chance finds procedure for heritage resources should be implemented if archaeological, cultural or heritage resources or graves are located during soil replacement.

8) *“Chance fossil finds”*

The chance finds procedure for heritage resources should be implemented if fossil resources are located during material and soil replacement.

9) *“Visual impact from night-time lighting”*

The project is located approximately 3 km from the closest homestead. Night-time lighting (if any) is not expected to disturb homesteads.

10) *“Visual impact from dust”*

Dust will be likely be created by the project activities, but, considering the distance to the nearest farm steads, the visual impact associated with rehabilitation activities are considered very low.

**Moderate – positive impact**

*“Replacement of floral and faunal habitat”*

Through the correct topsoil replacement, reseeding, and monitoring, the floral and faunal habitat could be reinstated.

# 11 Assessment of Each Identified Potentially Significant Impact and Risk

Table 19 | Impact levels associated with project activities with and without mitigation

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
Project design	Cessation of current land use at pit, stockpiles and infrastructure footprints during mine construction and operation	Infrastructure	All	Very low (-)	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Assimilate requirements of the EMPr into the mine and rehabilitation plan.</li> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>Conduct a first order volumetric assessment to define expected overburden, topsoil and ore volumes.</li> <li>Site plans of the construction laydown area must be provided indicating waste-, storage-, and workshop- and ablution areas.</li> </ul>	Very low (-)
	Loss of floral & faunal habitat	Ecological structure	Construction Operation	Low (-)		Very low (-)
Personnel conduct	Water quality deterioration due to pollutant discharge or dirty water runoff	Water quality	All	Very low (-)	Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.	Very low (-)
	Socio-cultural pathologies	Safety & Security	All	Very low (-)	<ul style="list-style-type: none"> <li>Anglo induction and/or environmental awareness training must be attended by all parties involved in project activities.</li> <li>Such training must include the requirements of the EMPr as well as the location of sensitive areas of which the workers must be aware. A signed register of attendance must be kept as proof.</li> <li>Toolbox talks should include aspects of the EMPr.</li> <li>All environmental incidents should be reported to the ECO, investigated, documented and kept on file.</li> <li>Labourers associated with the contractor must be easily recognisable (i.e. company issued overalls with company name/logo etc.)</li> </ul>	Very low (-)
	Natural resource harvesting	Ecological structure	All	Very low (-)		Very low (-)



Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>• Basic firefighting equipment must be available on site.</li> <li>• Adjacent households should be consulted and notified of any mining activities that could lead to excessive noise levels in advance.</li> <li>• The mine should join and actively participate in local community / farm security and policing fora.</li> <li>• Site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce moves onto site.</li> <li>• All temporary structures must be soundly built and not pose a danger to workers.</li> </ul>	
<b>Establishment of site, laydown area &amp; chemical toilets</b>	Water quality deterioration due to pollutant discharge or dirty water runoff	Water quality	Construction	Very low (-)	<ul style="list-style-type: none"> <li>• Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>• Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>• The contractor shall supply waste collection bins and all solid waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• A certificate/record of safe disposal shall be obtained by the contractor and kept on file.</li> <li>• A method statement is required from the contractor after appointment, for the management of ablution facilities and any other components of the laydown area.</li> <li>• Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>• Site plans of the construction laydown area must be provided indicating waste-, storage-, and ablution areas.</li> <li>• The contractor shall ensure the necessary ablution facilities are provided as chemical toilets.</li> </ul>	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>• The contractor shall inform all site staff to use the supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</li> <li>• Where possible and practical, all maintenance of vehicles and equipment shall take place in an approved and designated laydown area.</li> <li>• Leaking equipment shall be repaired immediately or removed from site to facilitate repair.</li> <li>• A suitable drip tray shall be used where leakages are observed to prevent spills, especially where emergency repairs are conducted outside workshop areas.</li> <li>• A suitable area for emergency repairs must be approved by the ECO.</li> <li>• All hazardous and non-degradable waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the ECO.</li> <li>• A method statement is required from the contractor for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillage.</li> <li>• The contractor shall be in possession of emergency spill kits that must be complete and always available on site.</li> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>• All contaminated soil shall be removed and be placed in containers for further disposal.</li> <li>• Hazardous waste may only be stored on site for a maximum period of 90 days before it must</li> </ul>	

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>be disposed of at a registered hazardous waste site.</li> <li>Contaminated material can be taken to one central point where bio-remediation can be carried out.</li> <li>Smaller spills can be treated on site;</li> <li>A specialist contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site.</li> <li>All major spills of hazardous substances constituting a Section 30 Environmental Incident (per the NEMA) must be reported to the ECO and relevant authorities within 14 days of the incident occurring.</li> <li>No storage of vehicles or equipment should be allowed outside of the designated area.</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and plant showing evidence of leaking hydrocarbons.</li> </ul>	
	Loss of floral & faunal habitat	Ecological structure	Construction	Low (-)	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> </ul>	Very low (-)
	Loss of floral and faunal SCC	Ecological structure	Construction	Very low (-)	If found, any protected floral and faunal species will require permits for destruction/translocation.	Very low (-)
	Dust emissions due to vehicle movement	Air	Construction	Low (-)	<ul style="list-style-type: none"> <li>Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>A speed limit of 20 km/h shall be adhered to in "transitions", i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> </ul>	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where necessary. This must be done in agreement with the affected landowner if applicable.</li> </ul>	
<b>Vegetation clearing, grubbing &amp; topsoil stripping</b>	<ul style="list-style-type: none"> <li>Loss of floral &amp; faunal habitat</li> <li>Direct faunal mortality</li> </ul>	Ecological structure	Construction	Low (-)	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>The contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests, and that refuse bins are scavenger proof.</li> <li>The contractor must report problem-animals or vermin to the ECO. The possibility exists that domestic animals from neighbouring communities could scavenge the site.</li> <li>Ensure that domesticated animals and livestock belonging to the local community are kept away from project area.</li> <li>The contractor may only make use of pesticide or poison to control unwanted animals through the appointment of a registered pest control operator.</li> <li>Workers should be educated so as not to kill any fauna found on site.</li> <li>Hunting or trapping is strictly prohibited. Anyone found guilty of such an act shall be penalised.</li> </ul>	Very low (-)
	Loss of floral and faunal SCC	Ecological structure	Construction	Very low (-)	If found, any protected floral and faunal species will require permits for destruction/translocation.	Very low (-)
	Loss of topsoil due to negligent stripping procedures	Soil	Construction	Low (-)	<ul style="list-style-type: none"> <li>Avoid any further stripping/excavation and stockpiling of in-situ soils, as far as possible, to ensure that the soils remain in their natural horizon sequence.</li> <li>All non-invasive vegetation should be left on the topsoil stockpiles so that they colonise the area after topsoil replacement.</li> </ul>	Very low (-)



Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>Topsoil shall not be buried or rendered in any other way unsuitable for further use, and precautions shall be taken to prevent unnecessary handling and compaction.</li> </ul>	
	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types	Soil	Construction	Low (-)	<ul style="list-style-type: none"> <li>Separate stripping, stockpiling and replacing of soil horizons (A and B-horizon) in the original natural sequence should take place to combat hard setting, compaction and to maintain soil fertility.</li> <li>The A-horizon should be removed to a depth of 200-300 mm and stored as a berm along haul roads. This can be achieved by using graders or dozers. The aim (on the long term) is to leave the B-horizon undisturbed and later replace the A-horizon in its original position, which implies a reconstruction of the original soil horizon sequences and subsequent less deterioration from pre-mining to post-mining land capability.</li> </ul>	Very low (-)
	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Soil	Construction	Very low (-)	<ul style="list-style-type: none"> <li>Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> <li>Vehicles and equipment shall not be permitted to traverse stockpile areas, and no stockpiles may be used as loading ramps.</li> </ul>	Very low (-)
<b>Topsoil handling &amp; stockpiling</b>	Loss of topsoil due to negligent stockpiling procedures	Soil	Construction	Low (-)	<ul style="list-style-type: none"> <li>The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>A photographic record must be kept of the topsoil stockpiles.</li> <li>Alien vegetation growing on stockpiles must be eradicated.</li> <li>The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and engineer, which shall detail:</li> </ul>	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>○ Stockpile sizes, laydown areas and form.</li> <li>○ Means of erosion (wind and water) prevention for stockpiles.</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile.</li> <li>● Herbicides shall not be used to remove alien vegetation unless approved by the ECO and the PM and in accordance with legal prescriptions.</li> <li>● It must be ensured that topsoil stockpiles are located outside of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances, such as fuel storage areas. If any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site.</li> <li>● Stockpiles shall be formed such that no ponding of surface water forms on the surface of the stockpile, and shall be so placed to occupy the minimum area compatible with the natural angle of repose of the material.</li> <li>● Measures should be taken to prevent the stockpiled soil material from being spread over too wide a surface.</li> </ul>	
	Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations	Soil	Construction Operation	Very low (-)	Topsoil stockpiles must be placed on disturbed soil. Should no such area be available, the ECO is to advise on the laydown area for the stockpiles.	Very low (-)
	Compaction and decline in topsoil structure during stockpiling	Soil	Construction	Very low (-)	Topsoil stripping should occur during the dry season, to avoid compaction.	Very low (-)
	Loss of topsoil through erosion at stockpiles	Soil	Construction Operation	Low (-)	The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					considered to prevent the topsoil from washing away during rainy periods.	
<b>Drilling, blasting &amp; loading overburden &amp; ore material</b>	Dust emissions due to loading and hauling	Air	Operation	Low (-)	<ul style="list-style-type: none"> <li>Dust deposition and PM<sub>10</sub> emissions should be monitored through the monitoring network of the Complex to ensure compliance to regulated air quality standards.</li> <li>Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>A speed limit of 20 km/h shall be adhered to in "transitions", i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>The contractor is to take appropriate measures to minimise the generation of dust caused by of soil stripping and overburden removal works. Such measures include frequent spraying of water during low rainfall.</li> <li>Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>Revegetate disturbed areas as soon as possible after disturbance.</li> <li>When feasible, shut down idling construction machinery.</li> <li>Tighten gate seals on dump trucks.</li> </ul>	Very low (-)
	Dust emissions due to vehicle movement	Air	Operation	Low (-)		Very low (-)
	PM <sub>10</sub> emissions due to vehicle & equipment (e.g. generators) operation	Air	Operation	Low (-)		Very low (-)
	Daytime noise caused by vehicle & equipment operation	Ambient noise	Operation	Very low (-)	<ul style="list-style-type: none"> <li>Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.</li> <li>Noise levels should be measured at locations where reasonable and valid noise complaints are registered.</li> <li>If night-time construction activities are required, do not operate closer than 900m (mobile equipment) from any receptors (prevent noise impact of medium or higher significance).</li> </ul>	Very low (-)
	Night-time noise caused by vehicle & equipment operation	Ambient noise	Operation	Low (-)		Very low (-)
	Ground vibration caused by blasting	Structural integrity	Operation	Very low (-)		Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
	Air blast caused by blasting	Society	Operation	Low (-)	Ground vibration, air blast and fly rock should be monitored whenever blasting takes place to ensure conformance to the recommended levels.	Very low (-)
	Fly rock caused by blasting	Structural integrity	Operation	Very low (-)		Very low (-)
	Chance heritage finds	Heritage	Operation	Very low (-)	Should any graves, heritage resources, archaeological sites or palaeontological finds (fossils) be uncovered during construction, construction within the immediate vicinity must be stopped, and reported to Anglo immediately, after which a heritage specialist should investigate the find.	Very low (-)
	Chance fossil finds	Palaeontology	Operation	Very low (-)	<ul style="list-style-type: none"> <li>If fossils are found on the development site, the palaeontologist involved would require a collection permit from SAHRA.</li> <li>Mitigation may take place prior to construction or, even more successfully, during the construction phase when new, potentially fossiliferous bedrock is still exposed and available for study. Mitigation entails careful sampling, collection and recording of fossils, as well as relevant data concerning the surrounding sedimentary matrix.</li> <li>Fossil material must be curated in an approved collection (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.</li> </ul> <p>Chance find Procedure</p> <ul style="list-style-type: none"> <li>If a chance find is made the person responsible for the find must immediately stop all work near the find.</li> <li>The site must be secured to protect it from any further damage</li> <li>The person who made the find must immediately report the find to his/her direct supervisor, per reporting protocols instituted by the Mine. The supervisor must report the find to</li> </ul>	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<p>his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist.</p> <ul style="list-style-type: none"> <li>The ECO must make sure that a relevant palaeontologist is engaged to investigate the chance find and site and assess its context, age and possibility of the find representing a more extensive site.</li> <li>Both ECO and palaeontological specialist must ensure that accurate records and documentation are kept. Documentation must start with the initial find report, and include records of all actions taken, persons involved and contacted, comments received and findings.</li> <li>Documentation and records will be essential to request authorizations and permits from the relevant Authorities to continue work on site</li> <li>The palaeontologist will submit a report, which will include all records kept by the ECO to SAHRA.</li> <li>The report will include recommendations for additional specialist work that may be necessary, or request approval to continue with the development.</li> <li>Once the necessary approvals have been issued, the Mine may carry on with the development.</li> <li>The ECO will be in charge to close off the chance find procedure and could require implementing or integrating any requirements issued by any Authority into operational management plans</li> </ul>	
	Visual impact from night-time lighting	Society	Operation	Very low (-)	<ul style="list-style-type: none"> <li>Night-time lighting should be limited as far as possible.</li> <li>Lights should be pointed downwards and yellow instead of white.</li> </ul>	Very low (-)
	Visual impact from dust	Society	Operation	Very low (-)	<ul style="list-style-type: none"> <li>Dust deposition and PM<sub>10</sub> emissions should be monitored through the monitoring network of</li> </ul>	Very low (-)



Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<p>the Complex to ensure compliance to regulated air quality standards.</p> <ul style="list-style-type: none"> <li>• Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>• A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>• The contractor is to take appropriate measures to minimise the generation of dust caused by of soil stripping and overburden removal works. Such measures include frequent spraying of water during low rainfall.</li> <li>• Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>• Revegetate disturbed areas as soon as possible after disturbance.</li> <li>• Tighten gate seals on dump trucks.</li> </ul>	
<b>Handling &amp; storage of hazardous chemicals &amp; waste</b>	Water quality deterioration due to pollutant discharge or dirty water runoff	Water quality	Operation	Very low (-)	<ul style="list-style-type: none"> <li>• The contractor is required to the National Environmental Management: Waste Act (Act No. 59 of 2008) to determine whether any substance (new or waste) stored on site is subject to controls contained within the Act.</li> <li>• Any oil spillage should be excavated to a depth determined between the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO.</li> </ul>	Very low (-)
<b>Overburden &amp; topsoil replacement</b>	Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil	Soil	Decommissioning	Low (-)	Prior to topsoil placement and reseedling, any deficiencies in topsoil fertility should be determined.	Very low (-)
	Decline in topsoil fertility due to mixing of soil's A and B horizons (upper	Soil	Decommissioning	Low (-)	After rehabilitation, annual replenishment of essential plant macronutrients, particularly nitrogen	Very low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
	and lower horizons) and due to possible mixing of different soil types				(N), phosphorus (P), and potassium (K), is recommended.	
	Compaction and decline in topsoil structure during topsoil replacement	Soil	Decommissioning	Low (-)	<ul style="list-style-type: none"> <li>All soils compacted by construction and operational activities should be ripped and profiled.</li> <li>Soil compaction must be alleviated by ripping the soils to approximately 60 cm below ground surface to physically loosen the soil, using appropriate tillage implements.</li> <li>Ripping of soils should occur prior to spreading of topsoil and reseeded, as per Anglo American Rehabilitation Guidelines.</li> <li>Soils should be tilled to at least 1350 kg/m<sup>3</sup> to improve infiltration and nutrient uptake following rehabilitation;</li> </ul>	Very low (-)
	Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment	Soil	Decommissioning	Low (-)	No material shall be left on site that could be of harm to humans and animals.	Very low (-)
	Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas	Soil	Decommissioning	Low (-)	The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be considered to prevent the topsoil from washing away during rainy periods.	Very low (-)
	Reconstructed topography	Topography	Decommissioning	Moderate (-)	<ul style="list-style-type: none"> <li>The removal of all construction facilities, materials, and waste will be required, and rehabilitation thereof carried out. This includes the removal of fuel storage tanks and chemical toilets.</li> <li>All access roads constructed for the project which are no longer required shall be rehabilitated.</li> <li>Rehabilitation must be carried out as soon as possible after mining of the pit is completed. All rehabilitation is to be done with approval of Anglo environmental management department.</li> </ul>	Low (-)

Activity	Potential Impact	Aspects Affected	Phase	Significance if Not Mitigated	Mitigation Type	Significance if Mitigated
					<ul style="list-style-type: none"> <li>No material shall be left on site that could be of harm to humans and animals.</li> </ul>	
<b>Revegetation &amp; monitoring</b>	Replacement of floral & faunal habitat	Ecological structure	Decommissioning	Moderate (+)	<ul style="list-style-type: none"> <li>Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface.</li> <li>Maintenance of re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75% ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing and weeding as well as preventing the development of erosion channels.</li> </ul>	Moderate (+)
	Invasion by alien and invasive species	Ecological structure	Decommissioning	Very low (-)	Alien and invasive vegetation control should take place for a period of two years after rehabilitation;	Very low (-)

The supporting impact assessment conducted by the EAP is attached as **Appendix D** of this report.

## 12 Summary of Specialist Reports

Table 20 | Summary of specialist studies undertaken for Open Pit 36W, and their incorporation into this EMPR addendum

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations in EMPr addendum	Reference to Applicable Section
<b>Heritage Impact Assessment</b>	On the condition that the open mining pit areas as proposed do not change, no mitigation measures are required to mitigate the impact of the proposed development on non-palaeontological heritage.	X	Section 11
<b>Palaeontological Impact Assessment</b>	Should fossil remains be discovered during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for these developments should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the ECO should alert SAHRA (South African Heritage Research Agency) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.  The specialist involved would require a collection permit from SAHRA. Fossil material must be curated in an approved collection (e.g. museum or university collection) and all fieldwork and	X	Section 11

	reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.		
<b>Baseline Vegetation and Vertebrate Survey</b>	The platinum seam is relatively confined across the Amandelbult Complex property, and the proposed new pits and their stockpiles have a small footprint (less than 10 ha) relative to the size of the CBA and the adjacent natural area.	X	Section 9.1.7

Copies of the specialist reports are attached as **Appendix E** of the CBAR for Pit 62E.

# 13 Environmental Impact Statement

## 13.1 Summary of Key Findings

The proposed pit will be located on a partially disturbed area, influenced by grading, vehicle movement and previous mining activities.

With regards to the biophysical environment, all potential negative impacts related to the proposed project have been assessed to be of acceptably low significance after the implementation of mitigation measures. Conversely, the positive socio-economic impacts (employment opportunities and local economic empowerment) will be of low to moderate, positive significance. With the implementation of the recommended mitigation measures, no long-term cumulative negative impacts are expected. All recommended mitigation measures are deemed feasible for implementation.

## 13.2 Final Site Map

Please refer to Figure 2.

## 13.3 Summary of Positive and Negative Impacts

Please refer to section 9.5.

# 14 Impact Management Objectives & Impact Management Outcomes for EMPr

## 14.1 Impact Management Objectives

The objective of impact management will be to manage all the significant environmental aspects associated with the project with a view to address, manage and control the environmental impacts of the project, to ensure continuous monitoring of environmental performance, and continual improvement in environmental performance throughout the duration of the project through:

- Implementing the EMPr with its requirements to manage significant aspects;
- Measuring, controlling and monitoring relevant construction activities, significant aspects and mitigation measures;
- Prevention, minimisation and control of pollution and environmental degradation, and
- Regular compliance and efficiency auditing and management review for continual improvement.

## 14.2 Impact Management Outcomes

The key impact management outcomes would be the efficient and environmentally responsible extraction of PGM resources from Open Pit 36W, and efficient resource utilisation. With the successful implementation of the recommended mitigation measures, the operation of Open Pit 36W could produce an overall positive impact on the socio-economy of the Amandelbult Complex, by contributing to PGM resources produced at the mine.



In addition to the site-specific EMPr of Open Pit 36W (Part B of this report), the operation of Open Pit 36W should adhere to the relevant policies and operating procedures of the Complex.

## 15 Aspects for Inclusion as Authorisation Conditions

The following aspects are to be made conditions of the Environmental Authorisation:

- Any changes to, or deviations from the project description set out in this application must be approved, in writing, by the competent authority before such deviations may be effected.
- A suitably qualified Environmental Officer (EO) must monitor compliance with specifications of the EMPr for the duration of Open Pit 36W activities. An internal EO could play this role, due to the small project size and limited environmental impacts.
- The Madeline Robinson should be fenced in such that no animals are harmed during the Pit 36W activities.

## 16 Assumptions, Uncertainties and Gaps in Knowledge

This EMPR addendum is based on the following assumption(s):

- The information provided by the applicant is accurate, sufficient and unbiased, and no information that could change the outcome of the authorisation process has been withheld.
- The information obtained from the specialist baseline studies undertaken for the approved mine EMPr, as well as the Heritage, Palaeontology and Ecology specialist assessments conducted for this project, is accurate and unbiased.
- The proposed project description obtained from the applicant will not deviate significantly from the description that has been assessed by the EAP.
- Anglo will follow the conditions of the EA and applicable legislation for the duration of the project.

## 17 Reasoned Opinion as to Whether the Proposed Activity Should be Authorised or Not

### 17.1 Reasons the Activity should be Authorised or Not

The proposed opencast mining of Open Pit 36W will provide economically extracted PGMs, while commodity prices are low. This will contribute to the economic survival of the complex.

The mining sector is a major contributor to the growth of the South African economy. The expansion of opencast operations to extract resources at a relatively low cost would contribute to the security of employment for mine workers. The subcontractor undertaking proposed mining activities will be determined upon project finalisation, which will unlock local procurement opportunities. The proposed activities' products will be processed at the existing concentrator at Amandelbult, meaning that the project scope / battery limits will be comparatively small.

Mining affects the smallest portion of land (0.4%) in the TLM, while being one of the major economic contributors in the TLM (Integrated Development Plan, 2014). The TLM-economy is dependent on the mining, agriculture and tourism sectors. Fortunately, the proposed project in no way threatens the latter two sectors.

In addition to the quantifiable economic benefits that will result from this development, there are also several qualitative benefits that should be considered. These benefits could include:

- **Technology:** Technology used on the mine will work towards improving knowledge on available technologies and skills in using such technology.
- **Local procurement and SMME opportunities:** Local communities will be provided with opportunities and capacity to participate in contracts that would become available during construction and operation.

Considering these considerations, it is recommended that the proposed activities for Open Pit 36W be authorised as part of the mine's 2013 consolidated EMPr.

## 17.2 Conditions to be Included in the Authorisation

- Any changes to, or deviations from the project description set out in this application must be approved, in writing, by the competent authority before such deviations may be effected.
- A suitably qualified Environmental Officer (EO) must be appointed to monitor compliance with specifications of the EMPr for the duration of the mining activities.

## 18 Period for which Environmental Authorisation is Required

It is anticipated that the mining of Open Pit 36W will take place within three years of issue of the EA, and will last for 12 months in total, including six months for site preparation and mining, and six months for rehabilitation activities.

## 19 Undertaking

The undertaking required to meet the requirements of this section are provided at the end of this report and apply to the full content of both Part A and B of this report.

## 20 Financial Provision

The financial provision amount for the closure of Pit 36W activities will be provided in the final submission to the commenting authority.

### 20.1 Explain how the Aforesaid Amount was Derived

The approach to calculating the closure quantum as specified in the DMR Guideline which was utilised in this assessment is as summarised as follows:

- **Step 1:** Determine the Mineral Mined
  - In the first step the mineral mined has been identified in the tables provided in the DMR Guideline (Table B.12) as “Platinum”.
- **Step 2A:** Determine Primary Risk Class
  - The class has been determined from Table B.12 as “B (Medium Risk)”.
- **Step 2B:** Revision of Primary Risk Class
  - The class can be revised based on sellable by-products of required. However, this is not applicable for this project.
- **Step 3:** Determine Environmental Sensitivity

- The sensitivity has been determined by reference to Table B.4 of the DMR Guideline as “High”.
  - **Step 4:** Determination of weighting factors
    - Weighting Factor 1: The nature of the terrain where the operation is located is flat.
    - Weighting Factor 2: The proximity of the operation to an urban centre is considered peri-urban.
- The liability was calculated from the generic closure activities considered in the DMR Guideline.

## 20.2 Confirm that this Amount can be Provided from Operating Expenditure

The financial provision for closure of the Open Pit 36W project will be made available to the DMR in the form of a financial guarantee.

# 21 Specific Information Required by the Competent Authority

## 21.1 Impact on Socio-economic Conditions of Any Directly Affected Person

The affected land is owned by Rustenburg Platinum Mines, which also holds the Mining Right for the area on which Open Pit 36W is proposed. Please refer to Section 8 for details on the Public Participation Process followed to date to investigate, assess, and evaluate the impact of the proposed project on any directly affected persons.

Potential negative socio-economic impacts that will influence directly affected persons include the following:

- Visual impacts may arise from the aesthetic environment which may be altered through the temporary visual intrusion of the mining and overburden stockpiling site;
- Increase of noise on the site during opencast operations;
- Dust caused by loading and hauling activities could cause nuisance to nearby occupiers of land; and
- Blasting operations could cause annoyance during the day.

It is not expected that these impacts would have a major influence on nearby stakeholders or I&APs, as the proposed project is located on an area that is already affected and surrounded by mine-related infrastructure.

Potential positive socio-economic impacts include the following:

- **Local employment opportunities:** the indirect impact of mining through Open Pit 36W may allow current employees to retain their employment.
- **Local economy opportunities and economic empowerment:** the indirect impact of continuation of mining through Open Pit 36W will have positive impacts on the local economy.

## 21.2 Impact on any National Estate referred to in Section 3 (2) of the National Heritage Resources Act

Not applicable.

## **21.3 Other Matters Required in Terms of Section 24 (4) (a) and (b) of the Act**

Not applicable.

# Part B

## Environmental Management Programme Report



# 1 Details of the EAP

The details of the EAP are provided in Part A, section 2.

## 2 Description of Aspects of Activity

A description of the activities and associated aspects to be undertaken are included in Part A.

## 3 Composite Map

Please refer to **Appendix B.2** of this report for a preliminary layout map.

## 4 Description of Impact Management Objectives

### 4.1 Determination of Closure Objectives

The rehabilitation of the proposed facility will be subject to conditions in the existing closure plan of the Amandelbult Complex, in which provision is made for the decommissioning of facilities such as the proposed one. The current closure liability assessment for the Amandelbult Complex has the following closure objectives:

- The rehabilitation of land to the satisfaction of the Regional Director and to leave the area in the best possible state for continuous use of land by future generations
- Revegetated areas will be monitored and maintained until vegetation cover has been established and can be shown to be self-sustaining.
- Measures to control erosion of soil, such as contour drains and other erosion control structures, will be installed and maintained during the decommissioning phase and up to closure.
- Grass will be monitored and maintained until suitable cover has been achieved and a closure certificate can be issued.

The following environmental management measures are proposed for Mine Infrastructure in the Closure Liability Assessment (SRK, 2012):

- Mine surface infrastructure will either be demolished or an alternative use will be decided on.
- Foundations will either be removed to a depth of at least 500 mm below surface or be suitably covered.
- Building rubble will be disposed of at a nearby suitable site.
- All areas cleared of surface infrastructure will be rehabilitated by placement of topsoil and then revegetated.
- All roads that will not be utilised by the local population in the post mining scenario will be ripped and vegetated.

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

No water will be required for this project.

### 4.3 Has a water use licence been applied for?

No.

## 5 Impacts to be Mitigated in their Respective Phases

Table 21 | Impacts to be mitigated per phase of Open Pit 36W

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
<b>Project design</b>	All	5 ha	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Assimilate requirements of the EMPr into the mine and rehabilitation plan.</li> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>Conduct a first order volumetric assessment to define expected overburden, topsoil and ore volumes.</li> <li>Site plans of the construction laydown area must be provided indicating waste-, storage-, and workshop- and ablution areas.</li> <li>Ensure that the use of machines do not disrupt any services (e.g. electricity, water supply, and telephone lines).</li> </ul>	EMPr	12 months
<b>Personnel conduct</b>	All	-	<ul style="list-style-type: none"> <li>Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>Anglo induction and/or environmental awareness training must be attended by all parties involved in project activities.</li> <li>Such training must include the requirements of the EMPr as well as the location of sensitive areas of which the workers must be aware. A signed register of attendance must be kept as proof.</li> <li>Toolbox talks should include aspects of the EMPr.</li> <li>All environmental incidents should be reported to the ECO, investigated, documented and kept on file.</li> <li>Labourers associated with the contractor must be easily recognisable (i.e. company issued overalls with company name/logo etc.)</li> <li>Basic firefighting equipment must be available on site.</li> <li>Adjacent households should be consulted and notified of any mining activities that could lead to excessive noise levels in advance.</li> <li>The mine should join and actively participate in local community / farm security and policing fora.</li> </ul>	EMPr	12 months

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>• Site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce moves onto site.</li> <li>• All temporary structures must be soundly built and not pose a danger to workers.</li> <li>• Compliance with local by-laws and regulations regarding noise, hours of operation, and speed limits shall be adhered to.</li> </ul>		
<b>Establishment of site, laydown area &amp; chemical toilets</b>	Construction	100 m <sup>2</sup>	<ul style="list-style-type: none"> <li>• Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>• Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>• The contractor shall supply waste collection bins and all solid waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• A certificate/record of safe disposal shall be obtained by the contractor and kept on file.</li> <li>• A method statement is required from the contractor after appointment, for the management of ablution facilities and any other components of the laydown area.</li> <li>• Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>• Site plans of the construction laydown area must be provided indicating waste-, storage-, and ablution areas.</li> <li>• The contractor shall ensure the necessary ablution facilities are provided as chemical toilets.</li> <li>• The contractor shall inform all site staff to use the supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</li> <li>• Where possible and practical, all maintenance of vehicles and equipment shall take place in an approved and designated laydown area.</li> <li>• Leaking equipment shall be repaired immediately or removed from site to facilitate repair.</li> <li>• A suitable drip tray shall be used where leakages are observed to prevent spills, especially where emergency repairs are conducted outside workshop areas.</li> </ul>	<ul style="list-style-type: none"> <li>• EMPr</li> <li>• NEM: WA</li> </ul>	1 month

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>• A suitable area for emergency repairs must be approved by the ECO.</li> <li>• All hazardous and non-degradable waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the ECO.</li> <li>• A method statement is required from the contractor for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillage.</li> <li>• The contractor shall be in possession of emergency spill kits that must be complete and always available on site.</li> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>• All contaminated soil shall be removed and be placed in containers for further disposal.</li> <li>• Hazardous waste may only be stored on site for a maximum period of 90 days before it must be disposed of at a registered hazardous waste site.</li> <li>• Contaminated material can be taken to one central point where bio-remediation can be carried out.</li> <li>• Smaller spills can be treated on site;</li> <li>• A specialist contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site.</li> <li>• All major spills of hazardous substances constituting a Section 30 Environmental Incident (per the NEMA) must be reported to the ECO and relevant authorities within 14 days of the incident occurring.</li> <li>• No storage of vehicles or equipment should be allowed outside of the designated area.</li> <li>• Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and plant showing evidence of leaking hydrocarbons.</li> <li>• All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>• Keep stockpile and dumps footprint areas as small as possible.</li> </ul>		

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>• If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>• Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>• Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>• A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>• Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where necessary. This must be done in agreement with the affected landowner if applicable.</li> </ul>		
<b>Vegetation clearing, grubbing &amp; topsoil stripping</b>	Construction	4.1 ha	<ul style="list-style-type: none"> <li>• All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>• Keep stockpile and dumps footprint areas as small as possible.</li> <li>• The contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests, and that refuse bins are scavenger proof.</li> <li>• The contractor must report problem-animals or vermin to the ECO. The possibility exists that domestic animals from neighbouring communities could scavenge the site.</li> <li>• Ensure that domesticated animals and livestock belonging to the local community are kept away from project area.</li> <li>• The contractor may only make use of pesticide or poison to control unwanted animals through the appointment of a registered pest control operator.</li> <li>• Workers should be educated so as not to kill any fauna found on site.</li> <li>• Hunting or trapping is strictly prohibited. Anyone found guilty of such an act shall be penalised.</li> <li>• If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>• Avoid any further stripping/excavation and stockpiling of in-situ soils, as far as possible, to ensure that the soils remain in their natural horizon sequence.</li> <li>• All non-invasive vegetation should be left on the topsoil stockpiles so that they colonise the area after topsoil replacement.</li> </ul>	EMPr Anglo American Topsoil Guideline	2 months



Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>• The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>• Topsoil shall not be buried or rendered in any other way unsuitable for further use, and precautions shall be taken to prevent unnecessary handling and compaction.</li> <li>• Separate stripping, stockpiling and replacing of soil horizons (A and B-horizon) in the original natural sequence should take place to combat hard setting, compaction and to maintain soil fertility.</li> <li>• The A-horizon should be removed to a depth of 200-300 mm and stored as a berm along haul roads. This can be achieved by using graders or dozers. The aim (on the long term) is to leave the B-horizon undisturbed and later replace the A-horizon in its original position, which implies a reconstruction of the original soil horizon sequences and subsequent less deterioration from pre-mining to post-mining land capability.</li> <li>• Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> <li>• Vehicles and equipment shall not be permitted to traverse stockpile areas, and no stockpiles may be used as loading ramps.</li> </ul>		
<b>Topsoil handling &amp; stockpiling</b>	Construction	4.1 ha	<ul style="list-style-type: none"> <li>• The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>• A photographic record must be kept of the topsoil stockpiles.</li> <li>• Alien vegetation growing on stockpiles must be eradicated.</li> <li>• The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and engineer, which shall detail: <ul style="list-style-type: none"> <li>○ Stockpile sizes, laydown areas and form.</li> <li>○ Means of erosion (wind and water) prevention for stockpiles.</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile.</li> </ul> </li> <li>• Herbicides shall not be used to remove alien vegetation unless approved by the ECO and the PM and in accordance with legal prescriptions.</li> </ul>	EMPr Anglo American Topsoil Guideline	2 months

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>It must be ensured that topsoil stockpiles are located outside of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances, such as fuel storage areas. If any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site.</li> <li>Stockpiles shall be formed such that no ponding of surface water forms on the surface of the stockpile, and shall be so placed to occupy the minimum area compatible with the natural angle of repose of the material.</li> <li>Measures should be taken to prevent the stockpiled soil material from being spread over too wide a surface.</li> <li>Topsoil stockpiles must be placed on disturbed soil. Should no such area be available, the ECO is to advise on the laydown area for the stockpiles.</li> <li>Topsoil stripping should occur during the dry season, to avoid compaction.</li> <li>The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be considered to prevent the topsoil from washing away during rainy periods.</li> </ul>		
<b>Drilling, blasting &amp; loading of overburden and ore material</b>	Operation	4.1 ha	<ul style="list-style-type: none"> <li>Dust deposition and PM<sub>10</sub> emissions should be monitored through the monitoring network of the Complex to ensure compliance to regulated air quality standards.</li> <li>Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>The contractor is to take appropriate measures to minimise the generation of dust caused by of soil stripping and overburden removal works. Such measures include frequent spraying of water during low rainfall.</li> <li>Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>Revegetate disturbed areas as soon as possible after disturbance.</li> <li>When feasible, shut down idling construction machinery.</li> <li>Tighten gate seals on dump trucks.</li> </ul>	EMPr NHRA	6 months

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>• Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.</li> <li>• Noise levels should be measured at locations where reasonable and valid noise complaints are registered.</li> <li>• If night-time construction activities are required, do not operate closer than 900m (mobile equipment) from any receptors (prevent noise impact of medium or higher significance).</li> <li>• Ground vibration, air blast and fly rock should be monitored whenever blasting takes place to ensure conformance to the recommended levels.</li> <li>• Should any graves, heritage resources, archaeological sites or palaeontological finds (fossils) be uncovered during construction, construction within the immediate vicinity must be stopped, and reported to Anglo immediately, after which a heritage specialist should investigate the find.</li> </ul> <p>Chance find Procedure</p> <ul style="list-style-type: none"> <li>• If a chance find is made the person responsible for the find must immediately stop all work near the find.</li> <li>• The site must be secured to protect it from any further damage</li> <li>• The person who made the find must immediately report the find to his/her direct supervisor, per reporting protocols instituted by the Mine. The supervisor must report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist.</li> <li>• The ECO must make sure that a relevant palaeontologist is engaged to investigate the chance find and site and assess its context, age and possibility of the find representing a more extensive site.</li> <li>• Both ECO and palaeontological specialist must ensure that accurate records and documentation are kept. Documentation must start with the initial find report, and include records of all actions taken, persons involved and contacted, comments received and findings.</li> <li>• Documentation and records will be essential to request authorizations and permits from the relevant Authorities to continue work on site</li> <li>• The palaeontologist will submit a report, which will include all records kept by the ECO to SAHRA.</li> </ul>		

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<ul style="list-style-type: none"> <li>The report will include recommendations for additional specialist work that may be necessary, or request approval to continue with the development.</li> <li>Once the necessary approvals have been issued, the Mine may carry on with the development.</li> <li>The ECO will be in charge to close off the chance find procedure and could require implementing or integrating any requirements issued by any Authority into operational management plans</li> </ul>		
<b>Handling &amp; storage of hazardous chemicals &amp; waste</b>	All	5 ha	<ul style="list-style-type: none"> <li>The contractor is required to the National Environmental Management: Waste Act (Act No. 59 of 2008) to determine whether any substance (new or waste) stored on site is subject to controls contained within the Act.</li> <li>Any oil spillage should be excavated to a depth determined between the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO.</li> </ul>	<ul style="list-style-type: none"> <li>EMPr</li> <li>NEM: WA</li> <li>Hazardous Substances Act of 1973 (Act No. 15 of 1973)</li> </ul>	Throughout all phases
<b>Overburden &amp; topsoil replacement</b>	Decommissioning	5 ha	<ul style="list-style-type: none"> <li>Prior to topsoil placement and reseedling, any deficiencies in topsoil fertility should be determined.</li> <li>After rehabilitation, annual replenishment of essential plant macronutrients, particularly nitrogen (N), phosphorus (P), and potassium (K), is recommended.</li> <li>All soils compacted by construction and operational activities should be ripped and profiled.</li> <li>Soil compaction must be alleviated by ripping the soils to approximately 60 cm below ground surface to physically loosen the soil, using appropriate tillage implements.</li> <li>Ripping of soils should occur prior to spreading of topsoil and reseedling, as per Anglo American Rehabilitation Guidelines.</li> <li>Soils should be tilled to at least 1350 kg/m<sup>3</sup> to improve infiltration and crop water and nutrient uptake following rehabilitation.</li> <li>Soil compaction monitoring should preferably for at least five years, to assess the residual effects of the proposed pit.</li> <li>No material shall be left on site that could be of harm to humans or animals.</li> <li>The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms</li> </ul>	<ul style="list-style-type: none"> <li>Anglo American Rehabilitation Guidelines</li> <li>EMPr</li> <li>Mineral and Petroleum Resources Development Act (Act. No. 28 of 2002)</li> </ul>	2 months

Activities	Phase	Size and Scale	Mitigation Measures	Compliance with Standards	Period for Implementation
			<p>should also be considered to prevent the topsoil from washing away during rainy periods.</p> <ul style="list-style-type: none"> <li>The removal of all construction facilities, materials, and waste will be required, and rehabilitation thereof carried out. This includes the removal of fuel storage tanks and chemical toilets.</li> <li>All access roads constructed for the project which are no longer required shall be rehabilitated.</li> <li>Rehabilitation must be carried out as soon as possible after mining of the pit is completed. All rehabilitation is to be done with approval of Anglo environmental management department.</li> <li>No material shall be left on site that could be of harm to humans and animals.</li> </ul>		
<b>Revegetation &amp; monitoring</b>	Decommissioning	4.1 ha	<ul style="list-style-type: none"> <li>Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface.</li> <li>Maintenance of re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75% ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing and weeding as well as preventing the development of erosion channels.</li> <li>Alien and invasive vegetation control should take place for a period of two years after rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>Anglo American Rehabilitation Guidelines</li> <li>EMPr</li> <li>Mineral and Petroleum Resources Development Act (Act. No. 28 of 2002)</li> </ul>	<ul style="list-style-type: none"> <li>2 months</li> <li>2 years' alien &amp; invasive species monitoring</li> </ul>

## 6 Impact Management Outcomes

Table 22 | Impact management outcomes envisaged for Open Pit 36W

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
<b>Project design</b>	<ul style="list-style-type: none"> <li>Cease in current land use at pit, stockpiles and infrastructure footprints during mine construction and operation</li> <li>Loss of floral &amp; faunal habitat</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure</li> <li>Ecological structure</li> </ul>	All	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Assimilate requirements of the EMPr into the mine and rehabilitation plan.</li> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> </ul>	Adherence to project footprint as approved



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>• Conduct a first order volumetric assessment to define expected overburden, topsoil and ore volumes.</li> <li>• Site plans of the construction laydown area must be provided indicating waste-, storage-, and workshop- and ablution areas.</li> <li>• Ensure that the use of machines do not disrupt any services (e.g. electricity, water supply, and telephone lines).</li> </ul>	
<b>Personnel conduct</b>	<ul style="list-style-type: none"> <li>• Water quality deterioration due to pollutant discharge or dirty water runoff</li> <li>• Socio-cultural pathologies</li> <li>• Natural resource harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality</li> <li>• Safety &amp; Security</li> <li>• Ecological structure</li> </ul>	All	<ul style="list-style-type: none"> <li>• Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>• Anglo induction and/or environmental awareness training must be attended by all parties involved in project activities.</li> <li>• Such training must include the requirements of the EMPr as well as the location of sensitive areas of which the workers must be aware. A signed register of attendance must be kept as proof.</li> <li>• Toolbox talks should include aspects of the EMPr.</li> <li>• All environmental incidents should be reported to the ECO, investigated, documented and kept on file.</li> <li>• Labourers associated with the contractor must be easily recognisable (i.e. company issued overalls with company name/logo etc.)</li> <li>• Basic firefighting equipment must be available on site.</li> <li>• Adjacent households should be consulted and notified of any mining activities that could lead to excessive noise levels in advance.</li> <li>• The mine should join and actively participate in local community / farm security and policing fora.</li> <li>• Site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce moves onto site.</li> <li>• All temporary structures must be soundly built and not pose a danger to workers.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise kept at levels safe for humans.</li> <li>• No litter on site.</li> <li>• No contaminants or litter in surface or groundwater resources.</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>Compliance with local by-laws and regulations regarding noise, hours of operation, and speed limits shall be adhered to.</li> </ul>	
<b>Establishment of site, laydown area &amp; chemical toilets</b>	<ul style="list-style-type: none"> <li>Water quality deterioration due to pollutant discharge or dirty water runoff</li> <li>Loss of floral &amp; faunal habitat</li> <li>Loss of floral and faunal SCC</li> <li>Dust deposition emissions due to vehicle movement</li> </ul>	<ul style="list-style-type: none"> <li>Water quality</li> <li>Ecological structure</li> <li>Air</li> </ul>	Construction	<ul style="list-style-type: none"> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>The contractor shall supply waste collection bins and all solid waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>A certificate/record of safe disposal shall be obtained by the contractor and kept on file.</li> <li>A method statement is required from the contractor after appointment, for the management of ablation facilities and any other components of the laydown area.</li> <li>Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>Site plans of the construction laydown area must be provided indicating waste-, storage-, and ablation areas.</li> <li>The contractor shall ensure the necessary ablation facilities are provided as chemical toilets.</li> <li>The contractor shall inform all site staff to use the supplied ablation facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</li> <li>Where possible and practical, all maintenance of vehicles and equipment shall take place in an approved and designated laydown area.</li> <li>Leaking equipment shall be repaired immediately or removed from site to facilitate repair.</li> <li>A suitable drip tray shall be used where leakages are observed to prevent spills,</li> </ul>	<ul style="list-style-type: none"> <li>No alien and invasive species established.</li> <li>No contaminants or litter in surface or groundwater resources.</li> <li>No litter on site.</li> <li>Bins/ skips not overflowing.</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<p>especially where emergency repairs are conducted outside workshop areas.</p> <ul style="list-style-type: none"> <li>• A suitable area for emergency repairs must be approved by the ECO.</li> <li>• All hazardous and non-degradable waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the ECO.</li> <li>• A method statement is required from the contractor for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillage.</li> <li>• The contractor shall be in possession of emergency spill kits that must be complete and always available on site.</li> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>• All contaminated soil shall be removed and be placed in containers for further disposal.</li> <li>• Hazardous waste may only be stored on site for a maximum period of 90 days before it must be disposed of at a registered hazardous waste site.</li> <li>• Contaminated material can be taken to one central point where bio-remediation can be carried out.</li> <li>• Smaller spills can be treated on site.</li> <li>• A specialist contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site.</li> <li>• All major spills of hazardous substances constituting a Section 30 Environmental Incident (per the NEMA) must be reported to the ECO and relevant authorities within 14 days of the incident occurring.</li> </ul>	

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>No storage of vehicles or equipment should be allowed outside of the designated area.</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and plant showing evidence of leaking hydrocarbons.</li> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>A speed limit of 20 km/h shall be adhered to in "transitions", i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where necessary. This must be done in agreement with the affected landowner if applicable.</li> </ul>	
<b>Vegetation clearing, grubbing &amp; topsoil stripping</b>	<ul style="list-style-type: none"> <li>Loss of floral &amp; faunal habitat</li> <li>Direct faunal mortality</li> <li>Loss of floral and faunal SCC</li> <li>Loss of topsoil due to negligent stripping procedures</li> <li>Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to</li> </ul>	<ul style="list-style-type: none"> <li>Ecological structure</li> <li>Soil</li> </ul>	Construction	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>The contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests, and that refuse bins are scavenger proof.</li> <li>The contractor must report problem-animals or vermin to the ECO. The possibility exists that domestic animals from neighbouring communities could scavenge the site.</li> </ul>	<ul style="list-style-type: none"> <li>No excessive soil erosion during construction.</li> <li>No excessive dust nuisance or complaints.</li> <li>No loss of topsoil or seedbank.</li> <li>Noise kept at levels safe for humans.</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	<p>possible mixing of different soil types</p> <ul style="list-style-type: none"> <li>• Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment</li> </ul>			<ul style="list-style-type: none"> <li>• Ensure that domesticated animals and livestock belonging to the local community are kept away from project area.</li> <li>• The contractor may only make use of pesticide or poison to control unwanted animals through the appointment of a registered pest control operator.</li> <li>• Workers should be educated so as not to kill any fauna found on site.</li> <li>• Hunting or trapping is strictly prohibited. Anyone found guilty of such an act shall be penalised.</li> <li>• If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>• Avoid any further stripping/excavation and stockpiling of in-situ soils, as far as possible, to ensure that the soils remain in their natural horizon sequence.</li> <li>• All non-invasive vegetation should be left on the topsoil stockpiles so that they colonise the area after topsoil replacement.</li> <li>• The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>• Topsoil shall not be buried or rendered in any other way unsuitable for further use, and precautions shall be taken to prevent unnecessary handling and compaction.</li> <li>• Separate stripping, stockpiling and replacing of soil horizons (A and B-horizon) in the original natural sequence should take place to combat hard setting, compaction and to maintain soil fertility.</li> <li>• The A-horizon should be removed to a depth of 200-300 mm and stored as a berm along haul roads. This can be achieved by using graders or dozers. The aim (on the long term) is to leave the B-horizon undisturbed and later replace the A-horizon in its original position, which implies a reconstruction of the original soil horizon sequences and subsequent less deterioration from pre-mining to post-mining land capability.</li> </ul>	



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>• Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> <li>• Vehicles and equipment shall not be permitted to traverse stockpile areas, and no stockpiles may be used as loading ramps.</li> </ul>	
<b>Topsoil handling &amp; stockpiling</b>	<ul style="list-style-type: none"> <li>• Loss of topsoil due to negligent stockpiling procedures</li> <li>• Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations</li> <li>• Compaction and decline in topsoil structure during stockpiling</li> <li>• Loss of topsoil through erosion at stockpiles</li> </ul>	Soil	Construction Operation	<ul style="list-style-type: none"> <li>• The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>• A photographic record must be kept of the topsoil stockpiles.</li> <li>• Alien vegetation growing on stockpiles must be eradicated.</li> <li>• The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and engineer, which shall detail: <ul style="list-style-type: none"> <li>○ Stockpile sizes, laydown areas and form.</li> <li>○ Means of erosion (wind and water) prevention for stockpiles.</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile.</li> </ul> </li> <li>• Herbicides shall not be used to remove alien vegetation unless approved by the ECO and the PM and in accordance with legal prescriptions.</li> <li>• It must be ensured that topsoil stockpiles are located outside of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances, such as fuel storage areas. If any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site.</li> <li>• Stockpiles shall be formed such that no ponding of surface water forms on the surface of the stockpile, and shall be so placed to occupy the minimum area compatible with the natural angle of repose of the material.</li> </ul>	<ul style="list-style-type: none"> <li>• No excessive soil erosion during construction.</li> <li>• No excessive dust nuisance or complaints.</li> <li>• No loss of topsoil or seedbank.</li> <li>• No soil contamination through accidents, spillage or leakage.</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>Measures should be taken to prevent the stockpiled soil material from being spread over too wide a surface.</li> <li>Topsoil stockpiles must be placed on disturbed soil. Should no such area be available, the ECO is to advise on the laydown area for the stockpiles.</li> <li>Topsoil stripping should occur during the dry season, to avoid compaction.</li> <li>The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be considered to prevent the topsoil from washing away during rainy periods.</li> </ul>	
<b>Drilling, blasting &amp; loading of overburden and ore material</b>	<ul style="list-style-type: none"> <li>Dust deposition due to loading and hauling</li> <li>Dust deposition emissions due to vehicle movement</li> <li>PM<sub>10</sub> emissions due to vehicle &amp; equipment (e.g. generators) operation</li> <li>Daytime noise caused by vehicle &amp; equipment operation</li> <li>Night-time noise caused by vehicle &amp; equipment operation</li> <li>Ground vibration caused by blasting</li> <li>Air blast caused by blasting</li> <li>Fly rock caused by blasting</li> <li>Chance heritage finds</li> <li>Chance fossil finds</li> <li>Visual impact from night-time lighting</li> <li>Visual impact from dust</li> </ul>	<ul style="list-style-type: none"> <li>Air</li> <li>Ambient noise</li> <li>Structural integrity</li> <li>Society</li> <li>Structural integrity</li> <li>Heritage</li> <li>Palaeontology</li> </ul>	Operation	<ul style="list-style-type: none"> <li>Dust deposition and PM<sub>10</sub> emissions should be monitored through the monitoring network of the Complex to ensure compliance to regulated air quality standards.</li> <li>Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>The contractor is to take appropriate measures to minimise the generation of dust caused by soil stripping and overburden removal works. Such measures include frequent spraying of water during low rainfall.</li> <li>Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>Revegetate disturbed areas as soon as possible after disturbance.</li> <li>When feasible, shut down idling construction machinery.</li> <li>Tighten gate seals on dump trucks.</li> <li>Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.</li> </ul>	<ul style="list-style-type: none"> <li>No excessive dust nuisance or complaints.</li> <li>Air pollution standards and local bylaws adhered to.</li> <li>No excessive air pollution nuisance or complaints of odours or emissions.</li> <li>Noise kept at levels safe for humans.</li> </ul>

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<ul style="list-style-type: none"> <li>• Noise levels should be measured at locations where reasonable and valid noise complaints are registered.</li> <li>• If night-time construction activities are required, do not operate closer than 900m (mobile equipment) from any receptors (prevent noise impact of medium or higher significance).</li> <li>• Ground vibration, air blast and fly rock should be monitored whenever blasting takes place to ensure conformance to the recommended levels.</li> <li>• Should any graves, heritage resources, archaeological sites or palaeontological finds (fossils) be uncovered during construction, construction within the immediate vicinity must be stopped, and reported to Anglo immediately, after which a heritage specialist should investigate the find.</li> </ul> <p>Chance find Procedure</p> <ul style="list-style-type: none"> <li>• If a chance find is made the person responsible for the find must immediately stop all work near the find.</li> <li>• The site must be secured to protect it from any further damage</li> <li>• The person who made the find must immediately report the find to his/her direct supervisor, per reporting protocols instituted by the Mine. The supervisor must report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist.</li> <li>• The ECO must make sure that a relevant palaeontologist is engaged to investigate the chance find and site and assess its context, age and possibility of the find representing a more extensive site.</li> <li>• Both ECO and palaeontological specialist must ensure that accurate records and documentation are kept. Documentation must start with the initial find report, and include records of all</li> </ul>	

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				<p>actions taken, persons involved and contacted, comments received and findings.</p> <ul style="list-style-type: none"> <li>Documentation and records will be essential to request authorizations and permits from the relevant Authorities to continue work on site</li> <li>The palaeontologist will submit a report, which will include all records kept by the ECO to SAHRA.</li> <li>The report will include recommendations for additional specialist work that may be necessary, or request approval to continue with the development.</li> <li>Once the necessary approvals have been issued, the Mine may carry on with the development.</li> <li>The ECO will be in charge to close off the chance find procedure and could require implementing or integrating any requirements issued by any Authority into operational management plans</li> </ul>	
<b>Handling &amp; storage of hazardous chemicals &amp; waste</b>	Water quality deterioration due to pollutant discharge or dirty water runoff	Water quality	Operation	<ul style="list-style-type: none"> <li>The contractor is required to the National Environmental Management: Waste Act (Act No. 59 of 2008) to determine whether any substance (new or waste) stored on site is subject to controls contained within the Act.</li> <li>Any oil spillage should be excavated to a depth determined between the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO.</li> </ul>	<ul style="list-style-type: none"> <li>No loss of topsoil or seedbank.</li> <li>No soil contamination through accidents, spillage or leakage.</li> <li>No contaminants or litter in surface or groundwater resources.</li> </ul>
<b>Overburden &amp; topsoil replacement</b>	<ul style="list-style-type: none"> <li>Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil</li> <li>Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower</li> </ul>	<ul style="list-style-type: none"> <li>Soil</li> <li>Topography</li> </ul>	Decommissioning	<ul style="list-style-type: none"> <li>Prior to topsoil placement and reseeding, any deficiencies in topsoil fertility should be determined.</li> <li>After rehabilitation, annual replenishment of essential plant macronutrients, particularly nitrogen (N), phosphorus (P), and potassium (K), is recommended.</li> </ul>	No loss of topsoil or seedbank.

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	<p>horizons) and due to possible mixing of different soil types</p> <ul style="list-style-type: none"> <li>• Compaction and decline in topsoil structure during topsoil replacement</li> <li>• Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment</li> <li>• Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas</li> <li>• Reconstructed topography</li> </ul>			<ul style="list-style-type: none"> <li>• All soils compacted by construction and operational activities should be ripped and profiled.</li> <li>• Soil compaction must be alleviated by ripping the soils to approximately 60 cm below ground surface to physically loosen the soil, using appropriate tillage implements.</li> <li>• Ripping of soils should occur prior to spreading of topsoil and reseeded, as per Anglo American Rehabilitation Guidelines.</li> <li>• Soils should be tilled to at least 1350 kg/m<sup>3</sup> to improve infiltration and nutrient uptake following rehabilitation.</li> <li>• Soil compaction monitoring should preferably be correlated with annual crop yield monitoring for at least five years.</li> <li>• No material shall be left on site that could be of harm to humans and animals.</li> <li>• The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be considered to prevent the topsoil from washing away during rainy periods.</li> <li>• The removal of all construction facilities, materials, and waste will be required, and rehabilitation thereof carried out. This includes the removal of fuel storage tanks and chemical toilets.</li> <li>• All access roads constructed for the project which are no longer required shall be rehabilitated.</li> <li>• Rehabilitation must be carried out as soon as possible after mining of the pit is completed. All rehabilitation is to be done with approval of Anglo environmental management department.</li> </ul> <p>No material shall be left on site that could be of harm to humans and animals.</p>	
<b>Revegetation &amp; monitoring</b>	<ul style="list-style-type: none"> <li>• Replacement of floral &amp; faunal habitat</li> </ul>	Ecological structure	Decommissioning	<ul style="list-style-type: none"> <li>• Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface.</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation cover is similar to pre-project condition</li> </ul>



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	<ul style="list-style-type: none"> <li>Alien and invasive species</li> </ul>			<ul style="list-style-type: none"> <li>Maintenance of re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75% ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing and weeding as well as preventing the development of erosion channels.</li> <li>Alien and invasive vegetation control should take place for a period of two years after rehabilitation.</li> </ul>	<p>after the project is completed.</p> <ul style="list-style-type: none"> <li>No alien and invasive species established.</li> <li>No loss of soil. No signs of soil erosion (gullies, rills, etc.)</li> <li>Floral and faunal habitat restored within appropriate period after rehabilitation.</li> </ul>

## 7 Impact Management Actions

Table 23 | Impact management actions for Open Pit 36W

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
<b>Project design</b>	<ul style="list-style-type: none"> <li>Cease in current land use at pit, stockpiles and infrastructure footprints during mine construction and operation</li> <li>Loss of floral &amp; faunal habitat</li> </ul>	<ul style="list-style-type: none"> <li>All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>Assimilate requirements of the EMPr into the mine and rehabilitation plan.</li> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Keep stockpile and dumps footprint areas as small as possible.</li> <li>Conduct a first order volumetric assessment to define expected overburden, topsoil and ore volumes.</li> <li>Site plans of the construction laydown area must be provided indicating waste-, storage-, and workshop- and ablution areas.</li> <li>Ensure that the use of machines do not disrupt any services (e.g. electricity, water supply, and telephone lines).</li> </ul>	12 months	Adherence to project footprint as approved
<b>Personnel conduct</b>	<ul style="list-style-type: none"> <li>Water quality deterioration due to pollutant discharge or dirty water runoff</li> <li>Socio-cultural pathologies</li> </ul>	<ul style="list-style-type: none"> <li>Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> </ul>	12 months	<ul style="list-style-type: none"> <li>Noise kept at levels safe for humans.</li> <li>No litter on site.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> <li>Natural resource harvesting</li> </ul>	<ul style="list-style-type: none"> <li>Anglo induction and/or environmental awareness training must be attended by all parties involved in project activities.</li> <li>Such training must include the requirements of the EMPr as well as the location of sensitive areas of which the workers must be aware. A signed register of attendance must be kept as proof.</li> <li>Toolbox talks should include aspects of the EMPr.</li> <li>All environmental incidents should be reported to the ECO, investigated, documented and kept on file.</li> <li>Labourers associated with the contractor must be easily recognisable (i.e. company issued overalls with company name/logo etc.)</li> <li>Basic firefighting equipment must be available on site.</li> <li>Adjacent households should be consulted and notified of any mining activities that could lead to excessive noise levels in advance.</li> <li>The mine should join and actively participate in local community / farm security and policing fora.</li> <li>Site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce moves onto site.</li> <li>All temporary structures must be soundly built and not pose a danger to workers.</li> <li>Compliance with local by-laws and regulations regarding noise, hours of operation, and speed limits shall be adhered to.</li> </ul>		<ul style="list-style-type: none"> <li>No contaminants or litter in surface or groundwater resources.</li> </ul>
<b>Establishment of site, laydown area &amp; chemical toilets</b>	<ul style="list-style-type: none"> <li>Water quality deterioration due to pollutant discharge or dirty water runoff</li> <li>Loss of floral &amp; faunal habitat</li> <li>Loss of floral and faunal SCC</li> <li>Dust deposition emissions due to vehicle movement</li> </ul>	<ul style="list-style-type: none"> <li>Erosion berms are to be put in place where there is a high risk of erosion.</li> <li>Chemical toilets must be emptied / serviced on a regular basis to prevent overflowing. Proof of this service must be provided to the ECO.</li> <li>The contractor shall supply waste collection bins and all solid waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>A certificate/record of safe disposal shall be obtained by the contractor and kept on file.</li> <li>A method statement is required from the contractor after appointment, for the management of ablation facilities and any other components of the laydown area.</li> </ul>	1 month	<ul style="list-style-type: none"> <li>No contaminants or litter in surface or groundwater resources.</li> <li>No litter on site.</li> <li>Bins/ skips not overflowing.</li> <li>No alien and invasive species established.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
		<ul style="list-style-type: none"> <li>• Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>• Site plans of the construction laydown area must be provided indicating waste-, storage-, and ablution areas.</li> <li>• The contractor shall ensure the necessary ablution facilities are provided as chemical toilets.</li> <li>• The contractor shall inform all site staff to use the supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</li> <li>• Where possible and practical, all maintenance of vehicles and equipment shall take place in an approved and designated laydown area.</li> <li>• Leaking equipment shall be repaired immediately or removed from site to facilitate repair.</li> <li>• A suitable drip tray shall be used where leakages are observed to prevent spills, especially where emergency repairs are conducted outside workshop areas.</li> <li>• A suitable area for emergency repairs must be approved by the ECO.</li> <li>• All hazardous and non-degradable waste shall be collected and sorted at the appropriate waste recycling facility on the mine or disposed of at a registered landfill site.</li> <li>• Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the ECO.</li> <li>• A method statement is required from the contractor for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillage.</li> <li>• The contractor shall be in possession of emergency spill kits that must be complete and always available on site.</li> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>• All contaminated soil shall be removed and be placed in containers for further disposal.</li> <li>• Hazardous waste may only be stored on site for a maximum period of 90 days before it must be disposed of at a registered hazardous waste site.</li> <li>• Contaminated material can be taken to one central point where bio-remediation can be carried out.</li> </ul>		

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
		<ul style="list-style-type: none"> <li>• Smaller spills can be treated on site.</li> <li>• A specialist contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site.</li> <li>• All major spills of hazardous substances constituting a Section 30 Environmental Incident (per the NEMA) must be reported to the ECO and relevant authorities within 14 days of the incident occurring.</li> <li>• No storage of vehicles or equipment should be allowed outside of the designated area.</li> <li>• Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and plant showing evidence of leaking hydrocarbons.</li> <li>• All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>• Keep stockpile and dumps footprint areas as small as possible.</li> <li>• If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>• Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>• Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>• A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>• Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where necessary. This must be done in agreement with the affected landowner if applicable.</li> </ul>		
<b>Vegetation clearing, grubbing &amp; topsoil stripping</b>	<ul style="list-style-type: none"> <li>• Loss of floral &amp; faunal habitat</li> <li>• Direct faunal mortality</li> <li>• Loss of floral and faunal SCC</li> <li>• Loss of topsoil due to negligent stripping procedures</li> </ul>	<ul style="list-style-type: none"> <li>• All project activities are to be restricted to the footprint applied for, which should be fenced in.</li> <li>• Keep stockpile and dumps footprint areas as small as possible.</li> <li>• The contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests, and that refuse bins are scavenger proof.</li> </ul>	2 month	<ul style="list-style-type: none"> <li>• No excessive soil erosion during construction.</li> <li>• No excessive dust nuisance or complaints.</li> <li>• No loss of topsoil or seedbank.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> <li>Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types</li> <li>Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment</li> </ul>	<ul style="list-style-type: none"> <li>The contractor must report problem-animals or vermin to the ECO. The possibility exists that domestic animals from neighbouring communities could scavenge the site.</li> <li>Ensure that domesticated animals and livestock belonging to the local community are kept away from project area.</li> <li>The contractor may only make use of pesticide or poison to control unwanted animals through the appointment of a registered pest control operator.</li> <li>Workers should be educated so as not to kill any fauna found on site.</li> <li>Hunting or trapping is strictly prohibited. Anyone found guilty of such an act shall be penalised.</li> <li>If found, any protected floral and faunal species will require permits for destruction/translocation.</li> <li>Avoid any further stripping/excavation and stockpiling of in-situ soils, as far as possible, to ensure that the soils remain in their natural horizon sequence.</li> <li>All non-invasive vegetation should be left on the topsoil stockpiles so that they colonise the area after topsoil replacement.</li> <li>The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>Topsoil shall not be buried or rendered in any other way unsuitable for further use, and precautions shall be taken to prevent unnecessary handling and compaction.</li> <li>Separate stripping, stockpiling and replacing of soil horizons (A and B-horizon) in the original natural sequence should take place to combat hard setting, compaction and to maintain soil fertility.</li> <li>The A-horizon should be removed to a depth of 200-300 mm and stored as a berm along haul roads. This can be achieved by using graders or dozers. The aim (on the long term) is to leave the B-horizon undisturbed and later replace the A-horizon in its original position, which implies a reconstruction of the original soil horizon sequences and subsequent less deterioration from pre-mining to post-mining land capability.</li> <li>Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> </ul>		<ul style="list-style-type: none"> <li>Noise kept at levels safe for humans.</li> </ul>



Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
<p><b>Topsoil handling &amp; stockpiling</b></p>	<ul style="list-style-type: none"> <li>• Loss of topsoil due to negligent stockpiling procedures</li> <li>• Deterioration of topsoil quality due to contamination with underlying subsoil layers or rock formations</li> <li>• Compaction and decline in topsoil structure during stockpiling</li> <li>• Loss of topsoil through erosion at stockpiles</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicles and equipment shall not be permitted to traverse stockpile areas, and no stockpiles may be used as loading ramps.</li> <li>• The location of topsoil stockpiles should be selected strategically such that minimal re-handling is required during rehabilitation.</li> <li>• A photographic record must be kept of the topsoil stockpiles.</li> <li>• Alien vegetation growing on stockpiles must be eradicated.</li> <li>• The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and engineer, which shall detail: <ul style="list-style-type: none"> <li>○ Stockpile sizes, laydown areas and form.</li> <li>○ Means of erosion (wind and water) prevention for stockpiles.</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile.</li> </ul> </li> <li>• Herbicides shall not be used to remove alien vegetation unless approved by the ECO and the PM and in accordance with legal prescriptions.</li> <li>• It must be ensured that topsoil stockpiles are located outside of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances, such as fuel storage areas. If any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site.</li> <li>• Stockpiles shall be formed such that no ponding of surface water forms on the surface of the stockpile, and shall be so placed to occupy the minimum area compatible with the natural angle of repose of the material.</li> <li>• Measures should be taken to prevent the stockpiled soil material from being spread over too wide a surface.</li> <li>• Topsoil stockpiles must be placed on disturbed soil. Should no such area be available, the ECO is to advise on the laydown area for the stockpiles.</li> <li>• Topsoil stripping should occur during the dry season, to avoid compaction.</li> <li>• The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms</li> </ul>	<p>2 months</p>	<ul style="list-style-type: none"> <li>• No excessive soil erosion during construction.</li> <li>• No excessive dust nuisance or complaints.</li> <li>• No loss of topsoil or seedbank.</li> <li>• No soil contamination through accidents, spillage or leakage.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
<b>Drilling, blasting &amp; loading of overburden and ore material</b>	<ul style="list-style-type: none"> <li>• Dust deposition due to loading and hauling</li> <li>• Dust deposition emissions due to vehicle movement</li> <li>• PM<sub>10</sub> emissions due to vehicle &amp; equipment (e.g. generators) operation</li> <li>• Daytime noise caused by vehicle &amp; equipment operation</li> <li>• Night-time noise caused by vehicle &amp; equipment operation</li> <li>• Ground vibration caused by blasting</li> <li>• Air blast caused by blasting</li> <li>• Fly rock caused by blasting</li> <li>• Chance heritage finds</li> <li>• Chance fossil finds</li> <li>• Visual impact from night-time lighting</li> <li>• Visual impact from dust</li> </ul>	<p>should also be considered to prevent the topsoil from washing away during rainy periods.</p> <ul style="list-style-type: none"> <li>• Dust deposition and PM<sub>10</sub> emissions should be monitored through the monitoring network of the Complex to ensure compliance to regulated air quality standards.</li> <li>• Vehicle speeds shall be restricted to 40 km/h on all roads for construction and motor vehicles.</li> <li>• A speed limit of 20 km/h shall be adhered to in “transitions”, i.e. areas where vehicles move from dedicated roads to open areas such as open stockpile areas.</li> <li>• The contractor is to take appropriate measures to minimise the generation of dust caused by of soil stripping and overburden removal works. Such measures include frequent spraying of water during low rainfall.</li> <li>• Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>• Revegetate disturbed areas as soon as possible after disturbance.</li> <li>• When feasible, shut down idling construction machinery.</li> <li>• Tighten gate seals on dump trucks.</li> <li>• Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.</li> <li>• Noise levels should be measured at locations where reasonable and valid noise complaints are registered.</li> <li>• If night-time construction activities are required, do not operate closer than 900m (mobile equipment) from any receptors (prevent noise impact of medium or higher significance).</li> <li>• Ground vibration, air blast and fly rock should be monitored whenever blasting takes place to ensure conformance to the recommended levels.</li> <li>• Should any graves, heritage resources, archaeological sites or palaeontological finds (fossils) be uncovered during construction, construction within the immediate vicinity must be stopped, and reported to Anglo immediately, after which a heritage specialist should investigate the find.</li> </ul> <p>Chance Finds Procedure:</p> <ul style="list-style-type: none"> <li>• If a chance find is made the person responsible for the find must immediately stop all work near the find.</li> </ul>	<p>6 months</p>	<ul style="list-style-type: none"> <li>• No excessive dust nuisance or complaints.</li> <li>• Air pollution standards and local bylaws adhered to.</li> <li>• No excessive air pollution nuisance or complaints of odours or emissions.</li> <li>• Noise kept at levels safe for humans.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
		<ul style="list-style-type: none"> <li>The site must be secured to protect it from any further damage</li> <li>The person who made the find must immediately report the find to his/her direct supervisor, per reporting protocols instituted by the Mine. The supervisor must report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist.</li> <li>The ECO must make sure that a relevant palaeontologist is engaged to investigate the chance find and site and assess its context, age and possibility of the find representing a more extensive site.</li> <li>Both ECO and palaeontological specialist must ensure that accurate records and documentation are kept. Documentation must start with the initial find report, and include records of all actions taken, persons involved and contacted, comments received and findings.</li> <li>Documentation and records will be essential to request authorizations and permits from the relevant Authorities to continue work on site</li> <li>The palaeontologist will submit a report, which will include all records kept by the ECO to SAHRA.</li> <li>The report will include recommendations for additional specialist work that may be necessary, or request approval to continue with the development.</li> <li>Once the necessary approvals have been issued, the Mine may carry on with the development.</li> <li>The ECO will be in charge to close off the chance find procedure and could require implementing or integrating any requirements issued by any Authority into operational management plans</li> </ul>		
<b>Handling &amp; storage of hazardous chemicals &amp; waste</b>	Water quality deterioration due to pollutant discharge or dirty water runoff	<ul style="list-style-type: none"> <li>The contractor is required to the National Environmental Management: Waste Act (Act No. 59 of 2008) to determine whether any substance (new or waste) stored on site is subject to controls contained within the Act.</li> <li>Any oil spillage should be excavated to a depth determined between the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO.</li> </ul>	Throughout all phases	<ul style="list-style-type: none"> <li>No loss of topsoil or seedbank.</li> <li>No soil contamination through accidents, spillage or leakage.</li> <li>No contaminants or litter in surface or groundwater resources.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
<b>Overburden &amp; topsoil replacement</b>	<ul style="list-style-type: none"> <li>Loss of topsoil due to negligent stripping and stockpiling procedures at open pit and due to use of topsoil</li> <li>Decline in topsoil fertility due to mixing of soil's A and B horizons (upper and lower horizons) and due to possible mixing of different soil types</li> <li>Compaction and decline in topsoil structure during topsoil replacement</li> <li>Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment</li> <li>Loss of topsoil through erosion at stockpiles, pit edges and rehabilitated areas</li> <li>Reconstructed topography</li> </ul>	<ul style="list-style-type: none"> <li>Prior to topsoil placement and reseeded, any deficiencies in topsoil fertility should be determined.</li> <li>After rehabilitation, annual replenishment of essential plant macronutrients, particularly nitrogen (N), phosphorus (P), and potassium (K), is recommended.</li> <li>All soils compacted by construction and operational activities should be ripped and profiled.</li> <li>Soil compaction must be alleviated by ripping the soils to approximately 60 cm below ground surface to physically loosen the soil, using appropriate tillage implements.</li> <li>Ripping of soils should occur prior to spreading of topsoil and reseeded, as per Anglo American Rehabilitation Guidelines.</li> <li>Soils should be tilled to at least 1350 kg/m<sup>3</sup> to improve infiltration and crop water and nutrient uptake following rehabilitation;</li> <li>Soil compaction monitoring should preferably be correlated with annual crop yield monitoring for at least five years.</li> <li>No material shall be left on site that could be of harm to humans and animals.</li> <li>The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms should also be considered to prevent the topsoil from washing away during rainy periods.</li> <li>The removal of all construction facilities, materials, and waste will be required, and rehabilitation thereof carried out. This includes the removal of fuel storage tanks and chemical toilets.</li> <li>All access roads constructed for the project which are no longer required shall be rehabilitated.</li> <li>Rehabilitation must be carried out as soon as possible after mining of the pit is completed. All rehabilitation is to be done with approval of Anglo environmental management department.</li> <li>No material shall be left on site that could be of harm to humans and animals.</li> </ul>	2 months	No loss of topsoil or seedbank.
<b>Revegetation &amp; monitoring</b>	<ul style="list-style-type: none"> <li>Replacement of floral &amp; faunal habitat</li> <li>Alien and invasive species</li> </ul>	<ul style="list-style-type: none"> <li>Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface.</li> <li>Maintenance of re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75%</li> </ul>	<ul style="list-style-type: none"> <li>2 months</li> <li>2 years' alien &amp; invasive</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation cover is similar to pre-project condition after the project is completed.</li> </ul>

Activity	Potential Impact	Mitigation Type	Period for Implementation	Compliance with Standards
		<p>ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing and weeding as well as preventing the development of erosion channels.</p> <ul style="list-style-type: none"> <li>• Alien and invasive vegetation control should take place for a period of two years after rehabilitation.</li> </ul>	species monitoring	<ul style="list-style-type: none"> <li>• No alien and invasive species established.</li> <li>• No loss of soil. No signs of soil erosion (gullies, rills, etc.)</li> <li>• Floral and faunal habitat restored within appropriate period after rehabilitation.</li> </ul>



## 8 Financial Provision

### 8.1 Closure Objectives & Alignment to Baseline Environment

Rehabilitation measures have been designed to meet closure objectives. The main closure objective is to ensure that the site is left as close as possible to the pre-mining state after decommissioning activities. The following rehabilitation specifications have been designed to meet the closure objectives:

- Surface infrastructure will be demolished;
- Foundations will be removed;
- Building rubble will be used as backfill or disposed of at a nearby suitable site;
- All areas cleared of surface infrastructure will be rehabilitated by placement of topsoil and revegetated;
- All roads that will not be used by the local population in the post-mining scenario will be ripped and vegetated; and
- Any soil contamination will be removed during demolition activities prior to topsoil replacement and revegetation.

### 8.2 Closure Objectives I&AP Consultation

The affected property is wholly owned by Rustenburg Platinum Mines. Further comments on the rehabilitation measures and closure objectives are expected after review of this EMPr amendment during the PPP. If any issues are raised on closure objectives, they will be addressed and included in the final EMPr amendment document.

### 8.3 Rehabilitation Plan

Financial provision for the activity's decommissioning will be made provided as a financial guarantee to the DMR.

### 8.4 Compatibility of Rehabilitation Plan with Closure Objectives

The main closure objective is to ensure that the area is restored as close as possible to the pre-extraction state in terms of shaping and spreading of topsoil to allow for the establishment of natural vegetation over time. The rehabilitation measures are deemed to be compatible with the main closure objective as it would ensure that facility is restored to such a state. This would allow natural ecosystems to re-establish, such that the surrounding area is not severely affected by the rehabilitated pit's presence.

### 8.5 Confirm Financial Provision

Anglo will arrange to provide the financial guarantee for the rehabilitation costs to DMR as part of the mine's closure liability assessment.

# 9 Mechanisms for Monitoring Compliance with EMPr

Table 24 | Monitoring Programme for Open Pit 36W

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency & Period for Impact Management Actions
<p><b>All mining activities</b></p>	<p>All environmental impacts potentially occurring during the project as set out in Section 5.</p>	<p>An Environmental Officer (EO) should be appointed by Anglo. An external EO appointment can be waived due to the small spatial and temporal scale of the project.</p>	<p><u>Environmental Officer</u>                      The EO is responsible for monitoring the compliance with and implementation of the EMPr. The EO will report to Anglo and the Department of Mineral Resources (DMR). The EO has the authority to stop any works if, in his/her opinion, there is or may be a serious threat to or impact on the environment; caused directly by Anglo or its Contractors' actions or activities during all phases of the proposed project. In all such work stoppage situations, the EO is to inform Anglo or the Contractor of the reasons for the stoppage within 24 hours.                      Upon failure by Anglo or the Contractor, or their employees, to show adequate consideration to the EMPr, the EO may recommend to Anglo or the Contractor to have their representative(s) or any employee(s) removed from the site, or work suspended until the matter is resolved.</p> <p><u>Engineer (Anglo)</u>                      Oversee the overall implementation of the project compliance to the EMPr and incorporation of any potential environmental aspects mentioned, into designs.</p> <p><u>Anglo and the Contractor</u>                      As part of being responsible for the construction, operation, and decommissioning of the proposed activities, Anglo or the Contractor will be responsible for the overall implementation of the EMPr. The Contractor will nominate a representative on site as his environmental representative, known as the Contractor's Environmental Control Officer (CECO). The</p>	<p>Construction, operation and decommissioning activities shall be monitored and recorded by the EO and audited against the EMPr monthly. A report must be submitted at the end of each month prior to progress meetings, where they will form part of the agenda. The report shall be submitted to the Project Manager.                      The target is to achieve 100% compliance with the EMPr.                      Impact management actions shall be implemented as prescribed in Section 7, or as advised by the EO.                      More frequent or less frequent inspections shall occur as per contractor method statement requirements.</p>

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency & Period for Impact Management Actions
			<p>Contractor must issue site instructions to rectify any environmental noncompliance, based on the CECO's findings. The Anglo Site Manager can also issue site instructions.</p> <p><u>Contractor's Environmental Control Officer</u> The CECO will be responsible, on behalf of the Contractor, to ensure that the EMP is implemented and complied with onsite daily. The CECO will liaise with the EO in all matters relating to the implementation of the EMP. The CECO needs at least one year's mining environmental management experience.</p>	

## 9.1 Frequency of Submission of Performance Assessment or Environmental Audit Report

Performance Assessment Reports, as required by the NEMA EIA Regulations 2014, should be prepared and submitted to the DMR every two years or as often as requested by DMR. In addition, the appointed EO would undertake monthly site audits. Monthly reports shall be submitted to the Project Manager. Copies of the site audits reports should be submitted to DMR if requested.

## 9.2 Environmental Awareness Plan

### 9.2.1 Way Applicant Will Inform Employees of Environmental Risk Associated with their Work

Before the commencement of any activities, the appointed Contractor's site management staff should familiarise themselves with the EMPr. All site on staff must regularly undergo regular awareness training and / or toolbox talks to understand the requirements of the EMPr.

### 9.2.2 Way Risks Will Be Dealt with To Avoid Pollution or Degradation of the Environment

The following documents will be used as reference for identifying and managing impacts:

- Approved EMPr;
- Approved EA; and
- Anglo's Environmental Management System.

Anglo and its contractors will be responsible for the implementation of the required mitigation measures to avoid pollution or degradation of the environment. Appropriate implementation of the recommended mitigation measures specified in the EMPr will be monitored through regular site audits by an EO.

## 9.3 Specific Information Required by Competent Authority

The financial provision will be reviewed on an annual basis or as requested by DMR. Any other information requested by the competent authority during the comment period will be included in the final EMPr amendment document.

# 10 Undertaking

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports, where relevant; and

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



Signature of the environmental assessment practitioner

Aurecon South Africa (Pty) Ltd

Name of company

9 June 2017

Date

## 11 References

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