

**Anglo American Platinum Limited: Mogalakwena Mine:  
Application for Environmental Authorisation for the  
construction of a new fuel depot and decommissioning  
of an existing fuel depot**

**Draft Scoping Report (for Public Comment)**

Report date: December 2018  
DMR Reference: 50 MR

**SHANGONI**  
*Management Services (Pty) Ltd*



## mineral resources

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

### Draft Scoping Report

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS 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).

<b>Name of Applicant</b>	Anglo American Platinum Limited: Mogalakwena Mine
<b>Project</b>	Application for Environmental Authorisation for the construction of a new fuel depot and decommissioning of an existing fuel depot
<b>Document</b>	Draft Scoping Report (for Public Comment)
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<b>Physical Address</b>	Mogalakwena Mine, Steilloop Road, N11 Groblers Bridge Road, Mokopane
<b>Reference No</b>	50 MR



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## Important Notice

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

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

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

## Objective of the Scoping Process

The objective of the scoping process is to, through a consultative process-

- a) identify the relevant policies and legislation relevant to the activity;
- b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- e) identify the key issues to be addressed in the assessment phase;
- f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.



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## References

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Consolidated Environmental Management Programme for Anglo American Platinum – Mogalakwena Mine DMR Reference Numbers: LP30/5/1/2/2/50 MR Report Number 462905.

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Mogalakwena Local Municipality, 2018/19 Integrated Development Plan Review.

Stormwater management plan, October 2018. Compiled by Shangoni Management Services.





# 1. Details and expertise of the EAP

## 1.1. Details of the EAP

Name of EAP:	Shangoni Management Services: Minnette Le Roux
Tel No:	(012) 807 7036
Fax No:	(012) 807 1014
e-mail Address	minnette@shangoni.co.za

## 1.2. Expertise of the EAP

Table 1: The qualifications of the EAP

Name	Qualifications
Brian Hayes	Professional Engineer. M.Sc.: Environmental Engineering
Minnette Le Roux	Pri.Sci.Nat. BSc (Hons) – Environmental Science

Table 2: Summary of the EAP's experience

Name	Summary of Experience
Brian Hayes	Brian is a registered professional engineer (Chemical) with a master's degree in Environmental Engineering from the University of Nottingham. Brian has 25 years' experience in environmental management and environmental engineering.
Minnette Le Roux	<p>Minnette is a senior environmental consultant in the Mining Department with over 10 years consulting experience. She obtained her B.Sc. Hons degree from the University of Pretoria and is a registered Pr.Sci.Nat. She has been project manager and coordinator on a number of large environmental authorisations for predominantly industrial and mining clients.</p> <p>Minnette has extensive integrated environmental management experience, including amongst other; Environmental Impact Assessments, Scoping Reports, Basic Assessments, Environmental Management Plans, Environmental Management Programmes, Integrated Water Use Licence Applications, Integrated Water and Waste Management Plans, Waste Tyre Abatement plans, Biodiversity Action Plans, Screening Reports and Gap-Analysis, Waste Management Licence Applications, Mining and Prospecting Right Applications and various other Application Forms as part of the Environmental Application Process.</p> <p>She also has experience in Environmental Management Programme Report Performance Assessments and Environmental Authorisation Compliance Audits, Legal Compliance Audits, Water Use Licence Compliance Audits, Regulation GN 704 Audits and Environmental Management Systems Audits (ISO 14001) for the mining sector.</p>



## 2. Description of the property

The Mining Rights area for Mogalakwena Mine is located on the farms Overysel 815 LR, Zwartfontein 818 LR, Vaalkop 819 LR, Blinkwater 820 LR and Sandsloot 236 KR.

Mogalakwena Mine currently mines under the Mining Right LP30/5/1/2/2/50 MR. Mogalakwena Mine is located on the farms Overysel 815 LR, Zwartfontein 818 LR, Vaalkop 819 LR, Blinkwater 820 LR and Sandsloot 236 KR.

The location of the existing fuel depot to be decommissioned and the location for the construction of the new fuel depot are both located on Portion 3 of the farm Zwartfontein 818 LR.

For a description of the properties applicable to this application refer to Table 3 and Figure 1.

*Table 3: Description of the properties applicable to this application*

<b>Fame Name</b>	Existing fuel depot that is to be decommissioned: Portion 3 of the farm Zwartfontein 818 LR.  Proposed new fuel depot that is to be constructed: Portion 3 of the farm Zwartfontein 818 LR.
<b>Application Area (Ha)</b>	The application area for the existing fuel depot that is to be decommissioned is 6 hectares.  The application area for the proposed new fuel depot that is to be constructed is 6 hectares.
<b>Magisterial District</b>	Mogalakwena Mine is located within the jurisdiction of the Mogalakwena Local Municipality, which is one of six local municipalities that form part of the greater Waterberg District Municipality, in the Limpopo Province.
<b>Distance and Direction From Nearest Town</b>	Anglo American Platinum Limited – Mogalakwena Mine, is situated approximately 30 km northwest of the town of Mokopane (formerly Potgietersrus) within the Mogalakwena Local Municipality, which forms part of the greater Waterberg District Municipality of the Limpopo Province.
<b>21-digit Surveyor General Code for each farm portion</b>	The existing fuel depot that is to be decommissioned: TOLR0000000081800003.  Proposed new fuel depot that is to be constructed: TOLR0000000081800003.



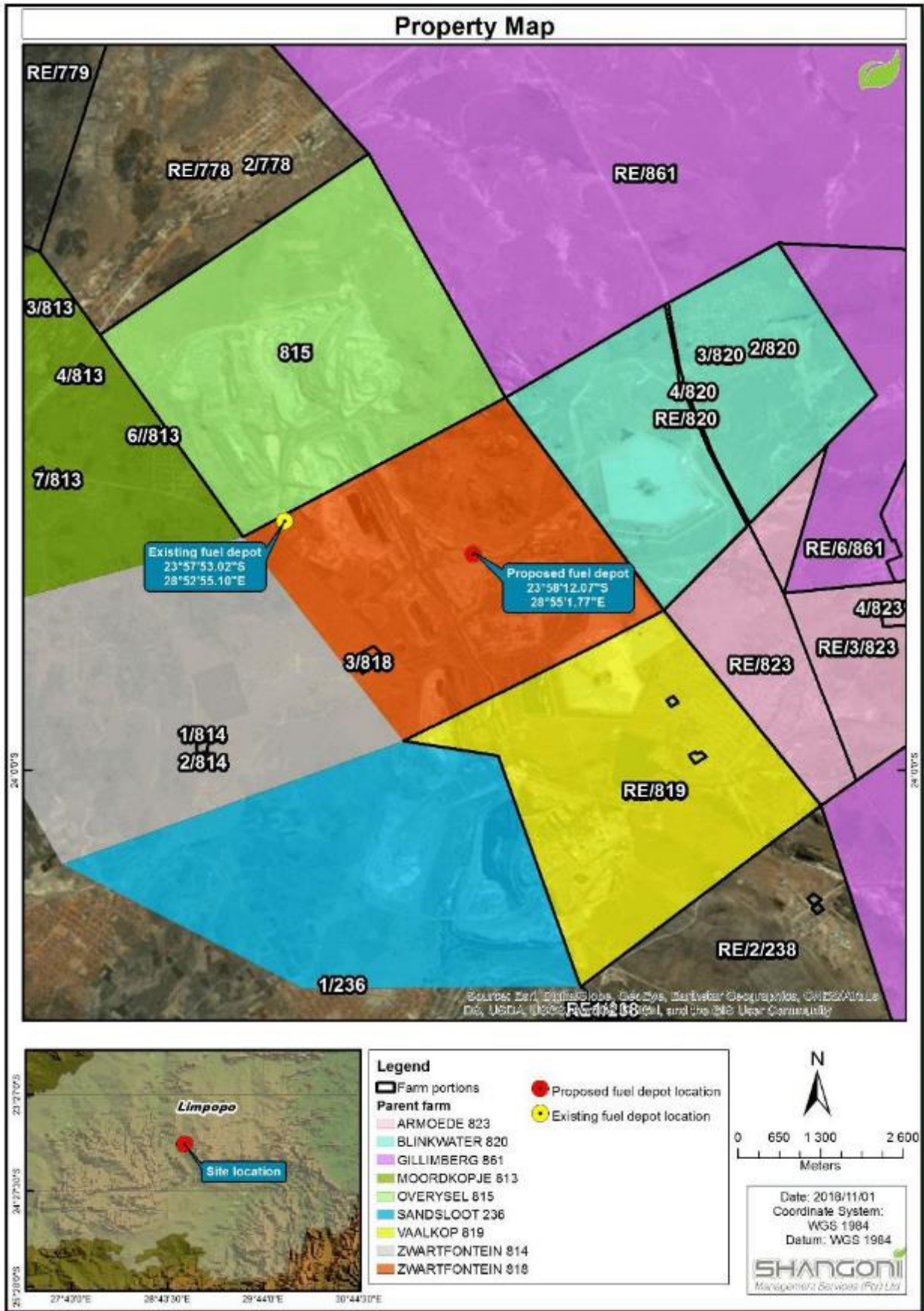


Figure 1: Property map



## 3. Locality map

### 3.1. Magisterial district and administrative boundaries

Mogalakwena Mine falls within the administrative boundaries presented in Table 4. The Mogalakwena Mine falls within wards 14 and 18, refer to Figure 2.

Table 4: Administrative boundaries

<b>Province</b>	Limpopo
<b>District Municipality</b>	Greater Waterberg District Municipality
<b>Local Municipality</b>	Mogalakwena Local Municipality
<b>Ward</b>	14 & 18
<b>Department of Mineral Resources (DMR) Local Office</b>	DMR (Polokwane)
<b>Department of Water and Sanitation (DWS) Local Office</b>	DWS (Polokwane)
<b>Department of Environmental Affairs Local Office</b>	LEDET (Polokwane)
<b>Catchment Zone</b>	Limpopo River catchment
<b>Quaternary catchment</b>	A61G
<b>Water Management Area</b>	Limpopo

### 3.2. Location of the mine

Anglo American Platinum Limited - Mogalakwena Mine, is situated approximately 30 km northwest of the town of Mokopane (formerly Potgietersrus) within the Mogalakwena Local Municipality, which forms part of the greater Waterberg District Municipality of the Limpopo Province refer to Figure 3. Mogalakwena Mine is situated in the Limpopo River catchment in quaternary catchment A61G. Mogalakwena Mine is situated in wards 14 and 18.

### 3.3. Location of the proposed activities

The location of the existing fuel depot that is to be decommissioned is on Portion 3 of the farm Zwartfontein 818 LR. The proposed new fuel depot that is to be constructed is situated on Portion 3 of the farm Zwartfontein 818 LR. The location of the proposed activities applied for is indicated in Figure 4.



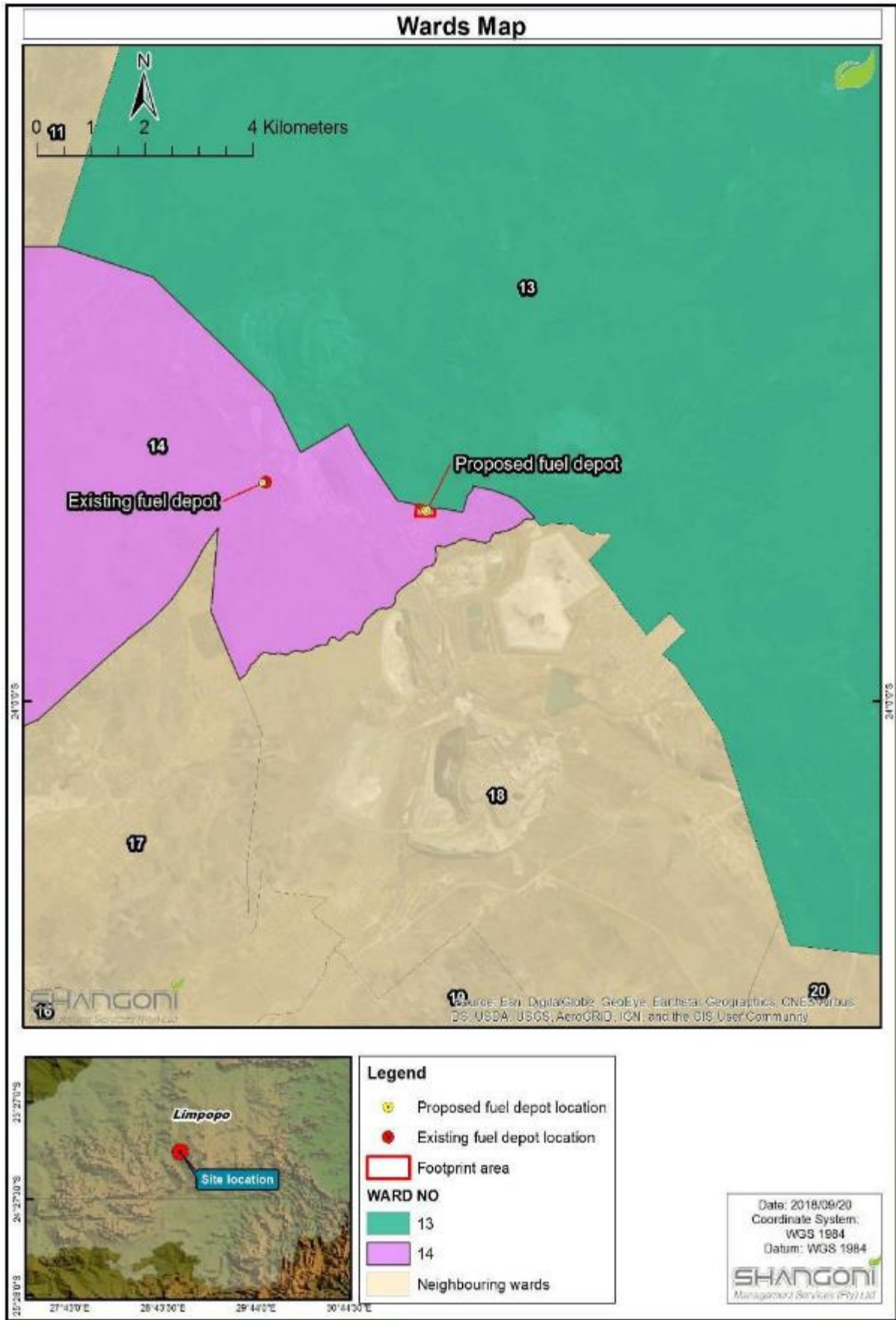


Figure 2: Wards



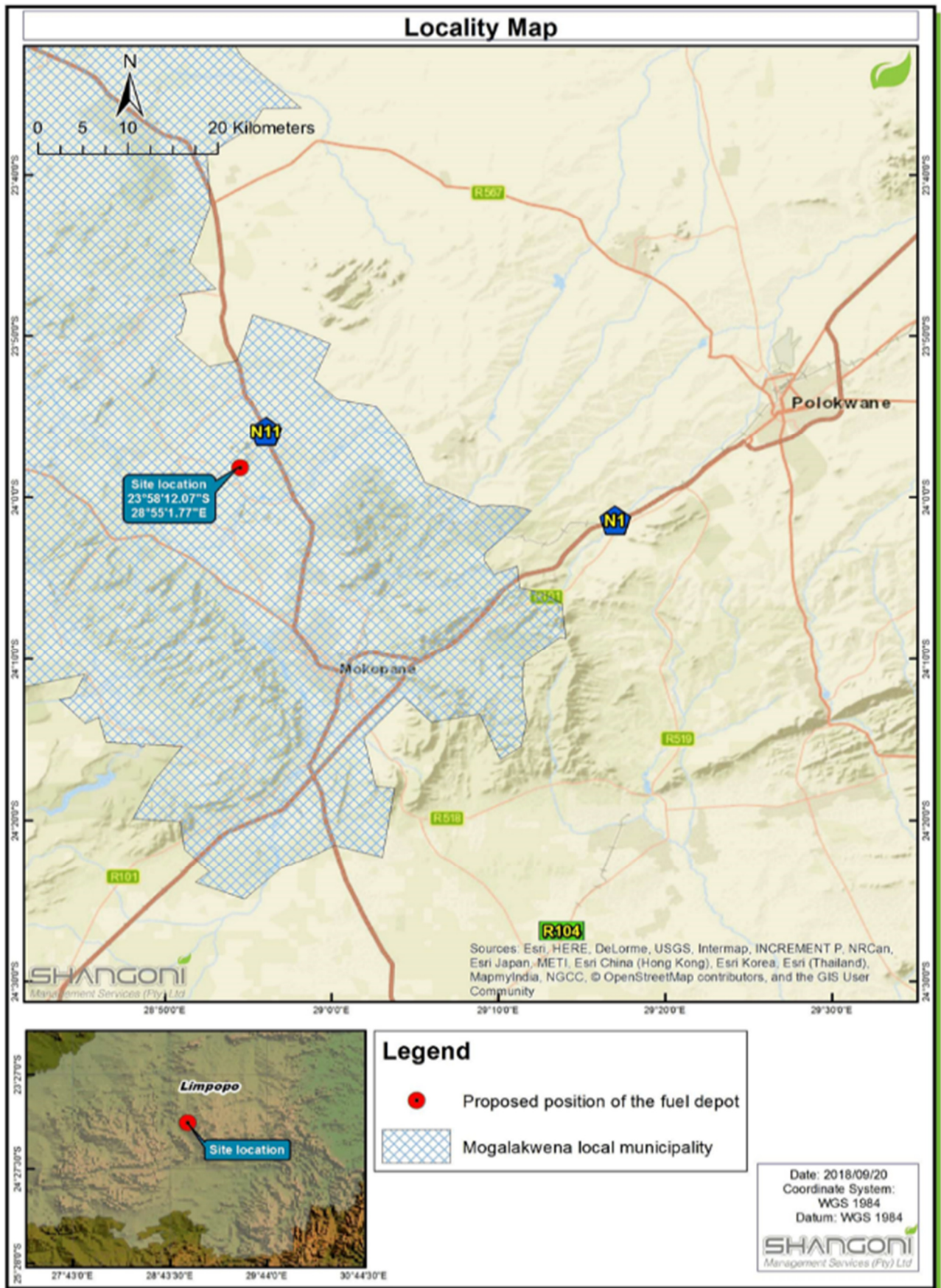


Figure 3: Locality map



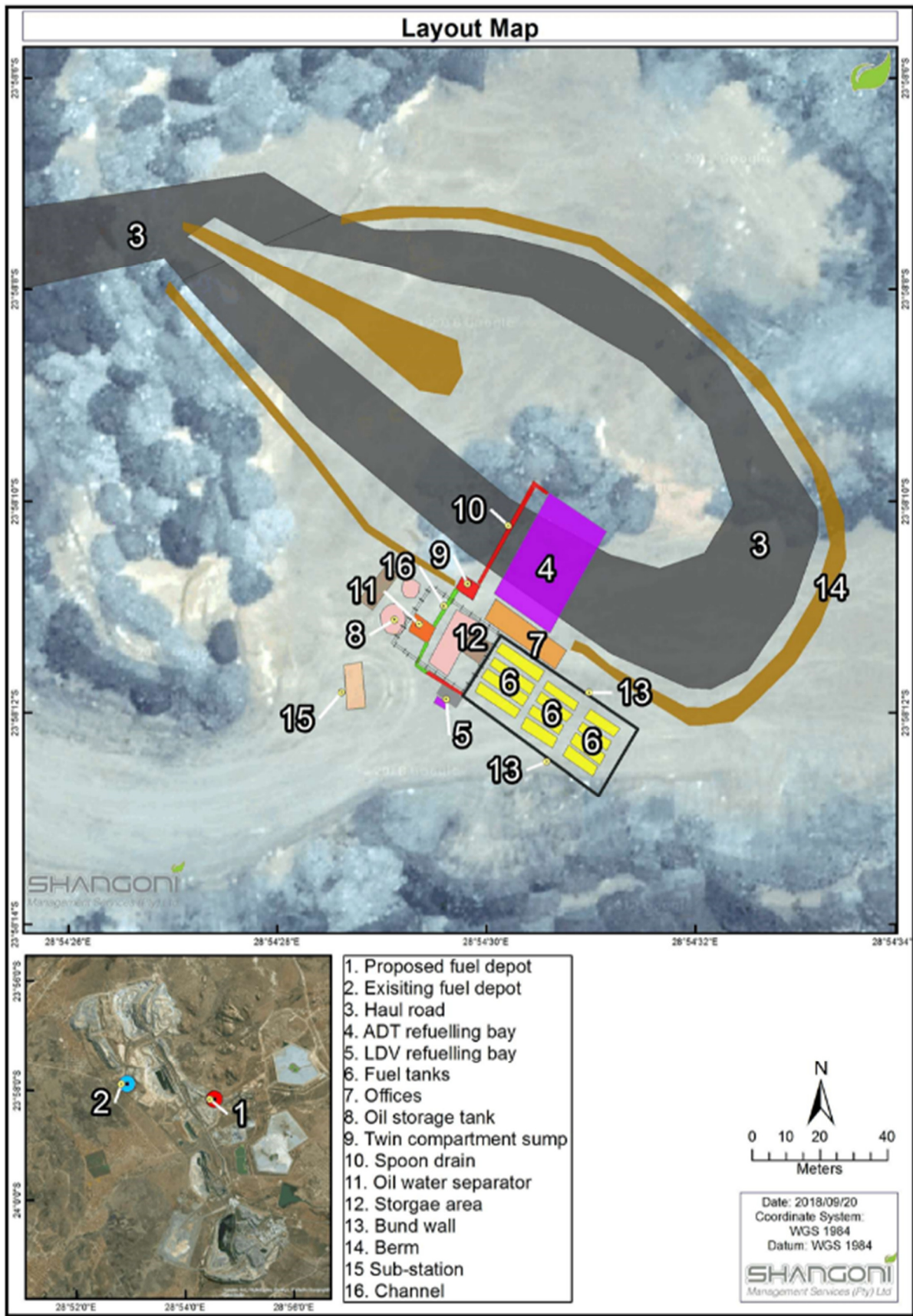


Figure 4: Location of activities

## 4. Description of the scope of the proposed overall activity

### 4.1. Listed and specified activities

Table 5: Activities and listed activities associated with the development

Activity no	Name of Activity	Arial Extent of Activity Ha or m <sup>2</sup>	Listed Activity (Mark with X)	Applicable Listing Notice (GN R983, GN R984, GN R985)	Waste Management Authorisation (Mark with X)
<b>Decommissioning activities within 6 hectares</b>					
Activity 1	Removal of the fencing and signage.	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 2	The decommissioning of the existing fuel tanks.	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 3	Decommissioning of the cement foundations. Removed to a depth of 500 mm below the surface.	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 4	Dismantle the sump	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 5	Dismantle the oil separator	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 6	Dismantle the connecting pipes	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 7	Decommissioning of the workshop	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1	N/A





Activity no	Name of Activity	Arial Extent of Activity Ha or m <sup>2</sup>	Listed Activity (Mark with X)	Applicable Listing Notice (GN R983, GN R984, GN R985)	Waste Management Authorisation (Mark with X)
	area and associated infrastructure			(GNR 983 of GG 40772 of 7 April 2017).	
Activity 8	Decommissioning of the parking area	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 9	Dismantle all steel structures.	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 10	Dismantling of water tanks (for fire, grey and potable water)	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 11	Dismantle of substation and associated powerlines.	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
Activity 12	Dismantling of office block and ablution facility (septic tank).	6 Ha	X	Activity 31 (i) & (v) of Listing Notice 1 (GNR 983 of GG 40772 of 7 April 2017).	N/A
<b>Construction activities within 6 hectares</b>					
Activity 13	The construction of a fuel depot for storage of dangerous goods with a combined capacity of 864m <sup>3</sup> (identical to the existing fuel depot).	6 Ha	X	Activity 4 of Listing Notice 2 (GNR 984 of GG 40772 of 7 April 2017).	N/A
Activity 14	Construction of low level berm up slope of ADT refuelling bay to	6 Ha	X	Not applicable	N/A



Activity no	Name of Activity	Arial Extent of Activity Ha or m <sup>2</sup>	Listed Activity (Mark with X)	Applicable Listing Notice (GN R983, GN R984, GN R985)	Waste Management Authorisation (Mark with X)
	prevent any runoff water flowing across the area.				
Activity 15	Construction of diversion wall along the northern side of the ADT refuelling bay to direct all runoff water away from this area.	6 Ha	X	Not applicable	N/A
Activity 16	Construction of a spoon drain and low level berm in front of ADT refuelling bay.	6 Ha	X	Not applicable	N/A
Activity 17	Construction of a low level berm up slope of LDV refuelling bay to prevent runoff water flowing across the area.	6 Ha	X	Not applicable	N/A
Activity 18	Construction of a sump at the ADT refuelling bay to contain all affected water.	6 Ha	X	Activity 6 of Listing Notice 2 (GNR 984 of GG 40772 of 7 April 2017).	N/A
Activity 19	Construction of an oil separator.	6 Ha	X	Not applicable	N/A
Activity 20	Construct channels to convey affected water from the sump to the oil water separator.	6 Ha	X	Not applicable	N/A
Activity 21	Construction of a substation on an impermeable surface surrounded by a berm to divert any	6 Ha	X	Not applicable	N/A



Activity no	Name of Activity	Arial Extent of Activity Ha or m <sup>2</sup>	Listed Activity (Mark with X)	Applicable Listing Notice (GN R983, GN R984, GN R985)	Waste Management Authorisation (Mark with X)
	runoff away from the substation and prevent flood damage.				
Activity 22	Construction of diversion berms around the site to divert runoff from upslope and away from the fuel depot.	6 Ha	X	Not applicable	N/A
Activity 23	Establishment of a laydown area for temporary storage	6 Ha	X	Not applicable	N/A
Activity 24	Construction of workshop, wash bay area.	6 Ha	X	Not applicable	N/A

## 4.2. Description of the proposed activities to be undertaken

*The proposed project is to decommission the existing fuel depot (brownfield area), refer to **Error! Reference source not found.**, as is currently situated very close to a mining pit that will be extended. The fuel depot will be relocated and constructed on a waste rock dump also a (brownfield area ), refer to*

Table 7. The proposed development footprint will be identical to the existing footprint. Refer to the figure below for the conceptual designs of the proposed fuel depot.

The decommissioning activities include:

- Activity 1: Removal of the fencing and signage.
- Activity 2: The decommissioning of the existing fuel tanks.
- Activity 3: Decommissioning of the cement foundations. Removed to a depth of 500 mm below the surface.
- Activity 4: Dismantle the sump.
- Activity 5: Dismantle the oil separator.
- Activity 6: Dismantle the connecting pipes.
- Activity 7: Decommissioning of the workshop area and associated infrastructure.
- Activity 8: Decommissioning of the parking area.



- Activity 9: Dismantle all steel structures.
- Activity 10: Dismantling of water tanks (for fire, grey and potable water).
- Activity 11: Dismantle of substation and associated powerlines.
- Activity 12: Dismantling of office block and ablution facility (septic tank).

The construction activities include the following:

- Activity 13: The construction of a fuel depot for storage of dangerous goods with a combined capacity of 864m<sup>3</sup> (identical to the existing fuel depot).
- Activity 14: Construction of low level berm up slope of ADT refuelling bay to prevent any runoff water flowing across the area.
- Activity 15: Construction of diversion wall along the northern side of the ADT refuelling bay to direct all runoff water away from this area.
- Activity 16: Construction of a spoon drain and low level berm in front of ADT refuelling bay.
- Activity 17: Construction of a low level berm up slope of LDV refuelling bay to prevent runoff water flowing across the area.
- Activity 18: Construction of a sump at the ADT refuelling bay to contain all affected water.
- Activity 19: Construction of an oil separator.
- Activity 20: Construct channels to convey affected water from the sump to the oil water separator.
- Activity 21: Construction of a substation on an impermeable surface surrounded by a berm to divert any runoff away from the substation and prevent flood damage.
- Activity 22: Construction of diversion berms around the site to divert runoff from upslope and away from the fuel depot.
- Activity 23: Establishment of a laydown area for temporary storage.
- Activity 24: Construction of workshop and wash bay area.



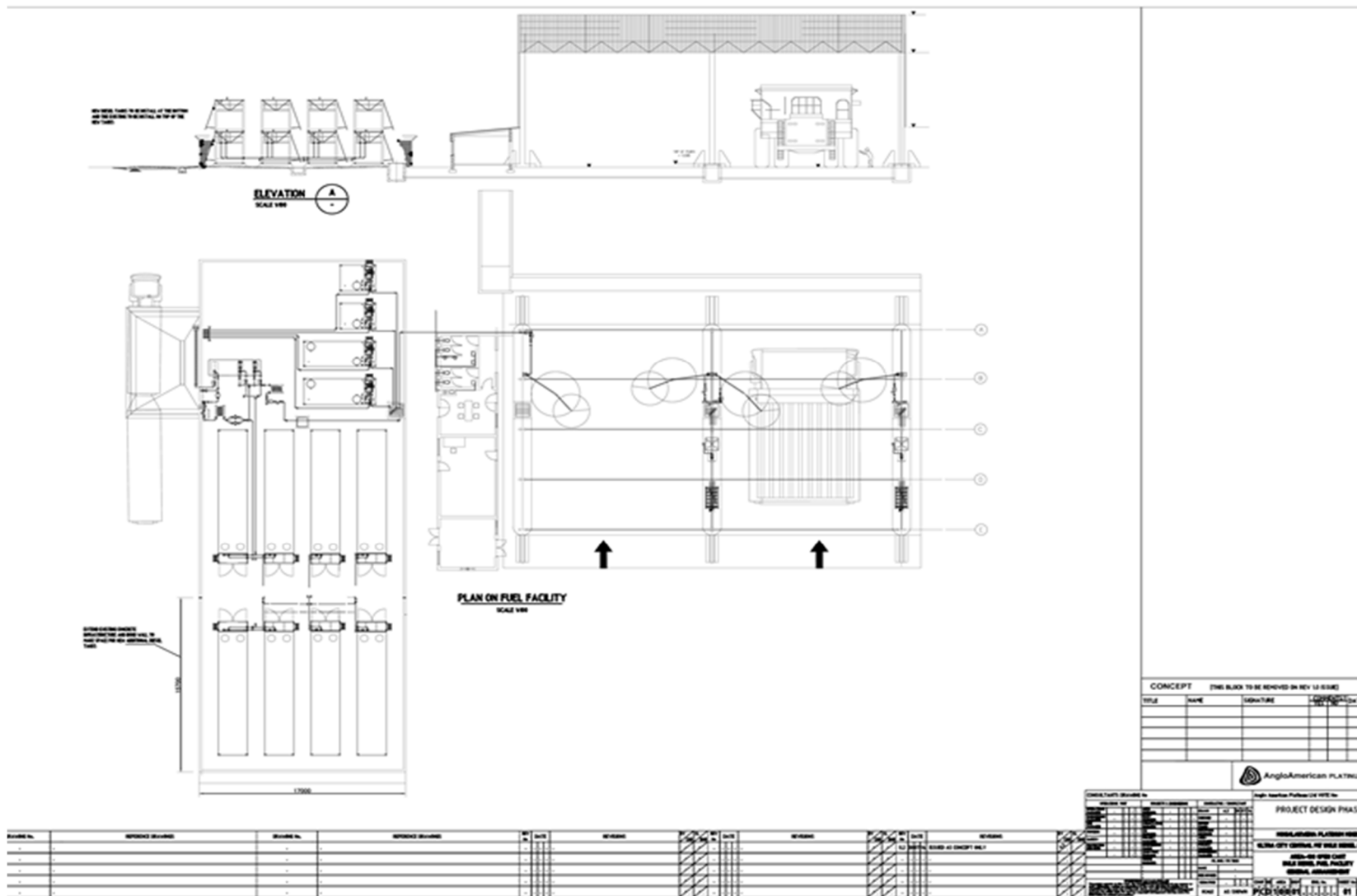


Figure 5: Designs for the Proposed Fuel Depot



Table 6: Photos taken at the existing fuel depot.

**Existing fuel depot to be decommissioned**



**Existing fuel depot to be decommissioned**



Table 7: Photos of the proposed site for the new fuel depot

Proposed site for the new fuel depot (waste rock dump)		
		
		





## 5. Policy and legislative context

The following table is a summary of the policy and legislative context applicable to the proposed development.

Table 8: Policy and legislative context

<b>Applicable Legislation and Guidelines used to compile the Report</b> (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	<b>Reference where applied</b> (i.e. Where in this document has it been explained how the development complies with and responds to the legislative and policy context)
The Constitution of the Republic of South Africa, 1996.	Throughout this Scoping Report.
The Mineral and Petroleum Resources Development Act (Act No. 28 of 2002, as amended).	
The Mineral and Petroleum Resources Development Regulations (GN R527 dated 2004).	
The National Environmental Management Act (Act No. 107 of 1998 as amended).	
The Environmental Impact Assessment Regulations (GN R982 dated 2014, as amended).	
The Environmental Impact Assessment Regulation. Listing Notice 2. (GN R984 dated 2014, as amended).	Part 4.1 of this Scoping Report.
Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017).	Part 6 of this Scoping Report.
Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector.	Chapters E, F and L of Part 8.4.1; and Part 8.4.4 of this Scoping Report.
The National Water Act (Act No. 36 of 1998, as amended).	Chapter G and H of Part 8.4.1 of this Scoping Report.
Regulations on use of water for mining and related activities aimed at the protection of water resources published in terms of the National Water Act under Government Notice 704 of 4 June 1999 (GN R704).	Part 9.9 and Chapter G of Part 8.4.1 of this Scoping Report.



<b>Applicable Legislation and Guidelines used to compile the Report</b> (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	<b>Reference where applied</b> (i.e. Where in this document has it been explained how the development complies with and responds to the legislative and policy context)
The National Environmental Management: Biodiversity (Act 10 of 2004, as amended).	Chapter E, F and L of Part 8.4.1 of this Scoping Report.
National Forests Act (Act No.84 of 1998).	
Alien and Invasive Species Regulations (GN R598 dated 2014).	
Conservation of Agricultural Resources (Act 43 of 1983).	
The National Environmental Management: Air Quality (Act 39 of 2004, as amended).	Chapter I of Part 8.4.1 of this Scoping Report.
SABS Code of Practice 0103 of 2008: The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.  SABS Code of Practice 0328 of 2008: Environmental Noise Impact Assessments.	Chapter J of Part 8.4.1 of this Scoping Report.
National Environmental Management: Waste Act (Act No. 59 of 2008, as amended).	Part 9.9 of this Scoping Report.
National Heritage Resources Act (Act No. 25 of 1999, as amended).	Chapter K of Part 8.4.1 of this Scoping Report.
DMR Guideline for Consultation with communities and Interested and Affected Parties. As required in terms of Sections 16(4)(b) or 27(5)(b) of the MPRDA, and in accordance with the standard directive for the compilation thereof as published on the official website of the Department of Mineral Resources.	Part 8.2 and 9.7 of this Scoping Report.
Integrated Environmental Management Information Series. Criteria for determining alternatives in EIA.	Part 8.7 and Part 9.1 of this Scoping Report.



## 6. Need and desirability of the proposed activities

### 6.1. Need and desirability in terms of the Guideline on Need and Desirability, 2017

In 2017, the Department of Environmental Affairs published an Integrated Environmental Management Guideline, the Guideline on Need and Desirability. The following table indicates on how the guideline requirements were considered in this Scoping Report.

Table 9: Need and Desirability of the project

Requirement	Part where requirement is addressed/response
<b>1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?<sup>1</sup></b>	
1.1 How were the following ecological integrity considerations taken into account?	
1.1.1 <i>Threatened Ecosystems<sup>2</sup></i>	It should be noted that this application relates to the decommissioning of the existing fuel depot and the proposed relocation to a new site. Both areas are brownfield areas. The proposed new site is on a waste rock dump, therefore, there will be minimal impact on the ecological integrity of the area.  Refer to Chapters E, F and L of Part 8.4.1 of this Scoping Report and Part 8.5 for potential impacts.
1.1.2 <i>Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure<sup>3</sup></i>	
1.1.3 <i>Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").</i>	
1.1.4 <i>Conservation targets</i>	
1.1.5 <i>Ecological drivers of the ecosystem.</i>	
1.1.6 <i>Environmental Management Framework.</i>	The Environmental Framework and Spatial Development Framework for Mogalakwena Local Municipality forms part of the Integrated Development Plan 2018/19 which indicates that that mining, finance and wholesale are the major role-players in terms of promoting growth and development within the municipality.
1.1.7 <i>Spatial Development Framework.</i>	

<sup>1</sup> Section 24 of the Constitution and section 2(4)(a)(vi) of NEMA refer.

<sup>2</sup> Must consider the latest information including the notice published on 9 December 2011 (Government Notice No. 1002 in Government Gazette No. 34809 of 9 December 2011 refers) listing threatened ecosystems in terms of Section 52 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

<sup>3</sup> Section 2(4)(r) of NEMA refers.



Requirement	Part where requirement is addressed/response
1.1.8 <i>Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)</i> <sup>4</sup>	Although the proposed project area is located in the Waterberg Bonjala Priority Area, the activities applied for relate to the decommissioning and relocation of the fuel depot, therefore, have a minimal impact on the air quality in the area.
1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts? <sup>5</sup>	The preliminary potential impacts that have been identified and may occur as a result of the proposed activity have been discussed in Part 8.5 of this document. The impacts will be further discussed and assessed in greater detail as part of the EIAR / EMPr phase.
1.3 How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts? <sup>6</sup>	
1.4 What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste? <sup>7</sup>	Cement and infrastructure waste that cannot be reused at the new site will be generated as a result of the decommissioning of the old site. All waste will be managed and disposed of in accordance to the waste procedure of the mine. Building rubble will be disposed onto the Waste Rock Dumps.
1.5 How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and	No landscapes and/or sites that constitute the nation's cultural heritage will be affected by the proposed activities, as the areas on which the activities will take place are existing disturbed areas.  Dr Julius CC Pistorius conducted a heritage survey in 2012. The decommissioning of the existing fuel depot and construction of the new fuel depot will not

<sup>4</sup> Section 2(4)(n) of NEMA refers

<sup>5</sup> Section 24 of the Constitution and Sections 2(4)(a)(i) and 2(4)(b) of NEMA refer.

<sup>6</sup> Section 24 of the Constitution and Sections 2(4)(a)(ii) and 2(4)(b) of NEMA refer

<sup>7</sup> Section 24 of the Constitution and Sections 2(4)(a)(iv) and 2(4)(b) of NEMA refer



Requirement	Part where requirement is addressed/response
remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts? <sup>8</sup>	have an impact on the heritage of the mine as the activities will take place on the waste rock dump.
1.6 How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts? <sup>9</sup>	No impact to non-renewable resources will occur as a result of the proposed decommissioning and construction activities.
1.7 How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? <sup>10</sup>	The potential impacts that may occur as a result of the proposed activities have been preliminarily identified and discussed in Part 8.5. The impacts will be described and assessed in detail as part of the EIAR / EMPr phase.
1.7.1 <i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste</i>	The Environmental Framework and Spatial Development Framework for Mogalakwena Local Municipality forms part of the Integrated Development Plan 2018/19, which indicates that mining, finance and wholesale are the major role-players in terms of promoting growth and development within the municipality.

<sup>8</sup> Section 24 of the Constitution and Sections 2(4)(a)(iii) and 2(4)(b) of NEMA refer.

<sup>9</sup> Section 24 of the Constitution and Sections 2(4)(a)(v) and 2(4)(b) of NEMA refer

<sup>10</sup> Section 24 of the Constitution and Sections 2(4)(a)(vi) and 2(4)(b) of NEMA refer



Requirement	Part where requirement is addressed/response
<i>they generate, without compromising their quest to improve their quality of life)</i>	By relocating the existing fuel depot the mine can expand their mining pit area. This will maximise the utilisation of resources within the mining right boundary.
1.7.2 Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)	
1.7.3 Do the proposed location, type and scale of development promote a reduced dependency on resources?	
1.8 How were a risk-averse and cautious approach applied in terms of ecological impacts? <sup>11</sup>	Refer to Chapters E, F and L of Part 8.4.1 of this Scoping Report and Part 8.5 for potential impacts.  A conservative approach will be followed in terms of the identification and assessing of environmental impacts associated with the proposed project during the EIAR / EMPr phase.
1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer also to Part 8.6.2 of this Scoping Report.
1.8.2 What is the level of risk associated with the limits of current knowledge?	The level of risk associated with the limits of current knowledge (during the Scoping Phase) can be considered low. The potential risks have been identified in Part 8.5 and will be further assessed in detail as part of the EIAR / EMPr phase.
1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
1.9 How will the ecological impacts resulting from this development impact on people's environmental right in terms following: <sup>12</sup>	All potential negative and positive impacts associated with the proposed activity have been preliminarily identified and discussed in Part 8.5 below. These impacts will be discussed, assessed and the significance determined during the EIAR / EMPr phase.
1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	

<sup>11</sup> Section 24 of the Constitution and Section 2(4)(a)(vii) of NEMA refer.

<sup>12</sup> Section 24 of the Constitution and Sections 2(4)(a)(viii) and 2(4)(b) of NEMA refer



Requirement	Part where requirement is addressed/response
1.9.2 <i>Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</i>	
1.10 Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	
1.11 Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	
1.12 Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations? <sup>13</sup>	Refer to Part 8.1 of this report for an assessment of the alternatives identified.
1.13 Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area? <sup>14</sup>	A preliminary determination of the potential impacts associated with the proposed activity has been included in Part 8.5 of this document. These impacts (including the residual and cumulative impacts) will be described and assessed in detail and the significance determined as part of the EIAR / EMPr phase of the project.
<b>2. "Promoting justifiable economic and social development"<sup>15</sup></b>	
2.1 What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1 <i>The IDP (and its sector plans' vision, objectives, strategies, indicators and</i>	The Environmental Framework and Spatial Development Framework for Mogalakwena Local

<sup>13</sup> Section 2(4)(b) of NEMA refer

<sup>14</sup> Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer

<sup>15</sup> Section 24 of the Constitution refers.



Requirement	Part where requirement is addressed/response
<i>targets) and any other strategic plans, frameworks of policies applicable to the area,</i>	Municipality forms part of the Integrated Development Plan 2018/19, which indicates that that mining, finance and wholesale are the major role-players in terms of promoting growth and development within the municipality.
2.1.2 <i>Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</i>	This application relates to the decommissioning of the existing fuel depot and relocation to a new site. This is due to the pit expansion as the existing fuel depot is within 500 m of the Blast Radius. If the fuel depot is relocated, the mine will continue to contribute to the Socio Economy in the area.
2.1.3 <i>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</i>	
2.1.4 <i>Municipal Economic Development Strategy ("LED Strategy").</i>	
2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	
2.2.1 <i>Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</i>	
2.3 How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities? <sup>16</sup>	The development will continue to contribute to the Socio Economy in the area, as the mining activities will continue (pit expansion) and temporary job creation will be created during the decommissioning and construction activities.
2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? <sup>17</sup> Will the impact be socially and economically sustainable in the short- and long-term?	This application relates to the decommissioning of the existing fuel depot and relocation to a new site. This is due to the pit expansion and will continue to contribute to the Socio Economy in the area, as a result of the mining activities.
In terms of location, describe how the placement of the proposed development will: <sup>18</sup>	
2.4.1 <i>result in the creation of residential and employment opportunities in close</i>	This application relates to the decommissioning of the existing fuel depot and relocation to a new site.

<sup>16</sup> Section 2(2) of NEMA refers

<sup>17</sup> Sections 2(2) and 2(4)(c) of NEMA refers.

<sup>18</sup> Section 3 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) ("DFA") and the National Development Plan refer





Requirement	Part where requirement is addressed/response
<i>proximity to or integrated with each other,</i>	This is due to the pit expansion and will continue to contribute to the Socio Economy in the area, as the mining activities will continue (pit expansion) and temporary job creation will be created during the decommissioning and construction activities.
2.4.2 <i>reduce the need for transport of people and goods,</i>	
2.4.3 <i>result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</i>	
2.4.4 <i>compliment other uses in the area,</i>	
2.4.5 <i>be in line with the planning for the area,</i>	
2.4.6 <i>for urban related development, make use of underutilised land available with the urban edge,</i>	
2.4.7 <i>optimise the use of existing resources and infrastructure,</i>	
2.4.8 <i>opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</i>	
2.4.9 <i>discourage "urban sprawl" and contribute to compaction/densification,</i>	
2.4.10 <i>contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</i>	
2.4.1 <i>encourage environmentally sustainable land development practices and processes,</i>	Refer to Part 9.9. Detailed management and mitigation measures will be included in the EIAR / EMPr phase.
2.4.12 <i>take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</i>	The reason for relocation of the fuel depot is to expand the mining pit area. The site where the fuel depot will be relocated to is a waste rock dump. This area is the most ideal due to space limitations on the mine.
2.4.13 <i>the investment in the settlement or area in question will generate the highest</i>	As mentioned previously, this application relates to the decommissioning of the existing fuel depot and



Requirement	Part where requirement is addressed/response
<i>socio-economic returns (i.e. an area with high economic potential),</i>	relocation to a new site. This is due to the pit expansion and will continue to contribute to the Socio Economy in the area. Both sites are already disturbed areas and no changes to the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area will take place.
2.4.14 <i>impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</i>	
2.4.15 <i>in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</i>	A conservative approach will be followed in terms of the identification and assessing of environmental impacts associated with the proposed project during the EIA / EMPr phase.
2.5 How were a risk-averse and cautious approach applied in terms of socio-economic impacts? <sup>19</sup>	
2.5.1 <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?<sup>20</sup></i>	Since the project is still in the scoping phase, the level of risk associated with the limits of current knowledge is considered to be low.
2.5.2 <i>What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</i>	
2.5.3 <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i>	
2.6 How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following	As mentioned previously, this application relates to the decommissioning of the existing fuel depot and relocation to a new site. This is due to the pit expansion and will continue to contribute to the socio economy in the area. Refer to Part 8.7 of this report for an identification of the negative impacts.
2.6.1 <i>Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i>	
2.6.2 <i>Positive impacts. What measures were taken to enhance positive impacts?</i>	
2.7 Considering the linkages and dependencies between human wellbeing,	The preliminarily identified impacts of the proposed activities are presented in Part 8.5 of this document.

<sup>19</sup> Section 2(4)(a)(vii) of NEMA refers<sup>20</sup> Section 24(4) of NEMA refers

Requirement	Part where requirement is addressed/response
<p>livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</p>	
<p>2.8 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?<sup>21</sup></p>	
<p>2.9 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?<sup>22</sup> Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?</p>	<p>Refer to Part 8.1 of this report for an assessment of the alternatives identified and their potential impacts on the social environment .</p>
<p>2.10 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?<sup>23</sup></p>	<p>Refer to point 2.6 (of this table) above.</p>
<p>2.11 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?<sup>24</sup></p>	<p>The identification of the potential impacts has been presented in Part 8.5 below. The potential impacts will be further described and assessed in detail and the significance determined as part of the EIAR / EMPr phase of the project. Mitigation measures will also be provided for each potential impact that may occur.</p>

<sup>21</sup> Section 2(4)(b) of NEMA refers.

<sup>22</sup> Section 2(4)(c) of NEMA refers.

<sup>23</sup> Section 2(4)(d) of NEMA refers.

<sup>24</sup> Section 2(4)(e) of NEMA refers.



Requirement	Part where requirement is addressed/response
2.12 What measures were taken to:	
<i>2.12.1 ensure the participation of all interested and affected parties,</i>	
<i>2.12.2 provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,<sup>26</sup></i>	
<i>2.12.3 ensure participation by vulnerable and disadvantaged persons,<sup>27</sup></i>	
<i>2.12.4 promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,<sup>28</sup></i>	Refer to the Public Participation Report attached hereto as Annexure E. <sup>25</sup>
<i>2.12.5 ensure openness and transparency, and access to information in terms of the process,<sup>29</sup></i>	
<i>2.12.6 ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge<sup>30</sup>, and</i>	
<i>2.12.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?<sup>31</sup></i>	Refer to the Public Participation Report attached hereto as Annexure E. The Public Participation Report <sup>32</sup> presents the details of all Interested and Affected Parties (“I&APs”) that were identified, how the I&APs were notified and involved in the process, any issues and concerns raised by the I&APs and the final results of the Public Participation Process.
2.13 Considering the interests, needs and values of all the interested and affected	This application relates to the decommissioning of the existing fuel depot and relocation to a new site.

<sup>25</sup> PP Report will be attached to the final scoping report for submission.

<sup>26</sup> Section 2(4)(f) of NEMA refers

<sup>27</sup> Section 2(4)(f) of NEMA refers.

<sup>28</sup> Section 2(4)(h) of NEMA refers.

<sup>29</sup> Section 2(4)(k) of NEMA refers.

<sup>30</sup> Section 2(4)(g) of NEMA refers.

<sup>31</sup> Section 2(4)(q) of NEMA refers.

<sup>32</sup> PP Report will be attached to the final scoping report for submission.



Requirement	Part where requirement is addressed/response
parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)? <sup>33</sup>	This is due to the pit expansion and will continue to contribute to the socio economy in the area, . as the mining activities will continue (pit expansion) and temporary job creation will be created during the decommissioning and construction activities.
2.14 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected? <sup>34</sup>	All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated.
2.15 Describe how the development will impact on job creation in terms of, amongst other aspects	
2.15.1 <i>the number of temporary versus permanent jobs that will be created,</i>	The development will continue to contribute to the socio economy in the area, as the mining activities will continue (pit expansion) and temporary job creation will be created during the decommissioning and construction activities.
2.15.2 <i>whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</i>	
2.15.3 <i>the distance from where labourers will have to travel,</i>	
2.15.4 <i>the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</i>	
2.15.5 <i>the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</i>	
2.16 What measures were taken to ensure:	
2.16.1 <i>that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</i>	Refer to the Public Participation Report <sup>35</sup> attached hereto as Annexure E Other government departments are included on the list of I&APs and stakeholders and received the notifications of the

<sup>33</sup> Section 2(4)(g) of NEMA refers.

<sup>34</sup> Section 2(4)(j) of NEMA refers

<sup>35</sup> PP Report will be attached to the final scoping report for submission.



Requirement	Part where requirement is addressed/response
2.16.2 <i>that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</i>	proposed activity as well as notifications on the availability of the report for review.  All applicable environmental legislation was considered during the Scoping process.
2.17 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage? <sup>36</sup>	During the initial Public Participation Process, all issues and concerns raised by the I&APs, stakeholders and the Organs of State are taken into account and responses provided.
2.18 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left? <sup>37</sup>	Mitigation measures for each of the identified impacts will be described in detail in the EIAR / EMPr phase. The proposed mitigation measures will be realistic to protect both the bio-physical and socio-economic environment in both the short- and long-term.
2.19 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment? <sup>38</sup>	The applicant will be responsible for the costs of any remediation of pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects.  The Financial Provisioning Report for the proposed project will be included and discussed in the EIAR / EMPr phase.
2.20 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations? <sup>39</sup>	The alternatives for the proposed project are described in Part 8.1 below and assessed in terms of the following four categories: <ul style="list-style-type: none"> <li>• Environmental;</li> <li>• Technical/Engineering;</li> <li>• Economical; and</li> <li>• Social.</li> </ul> The alternatives will be further assessed in greater detail in the EIAR / EMPr phase
2.21 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to	The preliminarily identified impacts have been presented in Part 8.5 below. The impacts will be further described and assessed and the significance determined as part of the EIAR / EMPr phase of

<sup>36</sup> Section 2(4)(o) of NEMA refers.

<sup>37</sup> Section 240(1)(b)(iii) of NEMA and the National Development Plan refer.

<sup>38</sup> Section 2(4)(p) of NEMA refers.

<sup>39</sup> Section 2(4)(b) of NEMA refers.



Requirement	Part where requirement is addressed/response
its location and other planned developments in the area? <sup>40</sup>	project. All residual and cumulative impacts will also be described and assessed in the EIAR / EMPr.

## 7. Period for which environmental authorisation is required

The Mogalakwena Mine Life of Mine (LOM) extends beyond 2060. Therefore, the period for which environmental authorisation is required is at least 10 years (from the date of approval provided by the DMR).

## 8. Description of the process followed to reach the proposed preferred site

### 8.1. Details of alternatives considered

The following activity alternatives have been identified as part of the proposed project and will be further be assessed in the EIAR/EMPr.

#### 8.1.1 Activity Alternative 1 (Preferred alternative)

The activity alternative refers to the decommissioning of the existing fuel depot and construction of the new fuel depot.

#### 8.1.2 Activity Alternative 2

This activity alternative refers to the decommissioning of the existing fuel depot and no construction of the new fuel depot (trucking of fuel to site).

#### 8.1.3 Activity Alternative 3 (No-go option)

This activity alternative refers to no decommissioning of the existing fuel dept and no constructing the proposed fuel depot.

### 8.2. Details of the public participation process followed

A detailed public participation process was undertaken as part of the initial application- and scoping phase for the proposed project. The following has been conducted as part of the Environmental Authorisation Application (proof hereof will be included in the final Public Participation Report to be submitted to the DMR along with the Final Scoping Report) (will be attached as Annexure E to this report):

- Advertisements.

<sup>40</sup> Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.



- A Newspaper advertisements was placed in the Bosveld Newspaper on 07 December 2018.
- Site notices.
  - Five (5) site notices were placed around the proposed project site as well as at the existing Mine.
- Written notices.
  - Written notices (including BIDs) were distributed to Interested and Affected Parties (I&APs).
- Availability of Scoping Report for public review
  - This Scoping Report will be made available for public and stakeholder review for a period of more than 30 days (from 07 December 2018 to 31 January 2019). Notices providing the detail of the public viewing station and review period, were sent to registered I&APs via e-mail. This notification also formed part of the above-mentioned advertisement and site notices.

### **8.3. Summary of issues raised by I&APs**

Table 10 below will be completed when the final Scoping Report is compiled and will provide a summary of the comments and issues raised and reaction to those responses.





Table 10: Summary of the issues raised by the I&amp;APs

Interested and Affected Parties	Date Comments Received	Issues Raised	EAPs Response to Issues as Mandated by the Applicant	Section and Paragraph Reference in this Report Where the Issues and or Responses Were Incorporated.
To be completed upon completion of the public participation process.				



## 8.4. The environmental attributes associated with the development footprint alternatives. A baseline environment

### 8.4.1 The type of environment affected by the proposed activity

A baseline description or “*status quo*” of the of the present environmental situation is provided in this part of the document. The following attributes / aspects have been described in detail, in the following respective chapters:

- Chapter A: Geology;
- Chapter B: Climate;
- Chapter C: Topography;
- Chapter D: Soils, Land Use and Land Capability;
- Chapter E: Vegetation;
- Chapter F: Fauna;
- Chapter G: Surface water;
- Chapter H: Groundwater;
- Chapter I: Air Quality;
- Chapter J: Noise;
- Chapter K: Archaeology and cultural history;
- Chapter L: Sensitive landscapes;
- Chapter M: Visual aspects; and
- Chapter N: Regional socio-economic structure

Section 8.4.1 provides both a summary of the baseline environment as applicable to the existing mining and related activities, informed by:

- The Environmental Management Programme (EMPr) titled: Consolidated Environmental Management Programme for Anglo American Platinum – Mogalakwena Mine Reference LP30/5/1/2/2/50 MR, dated November 2013 compiled by SRK Consulting.

Various specialist studies have been undertaken as part of the previous EMPr’s and Consolidated in the EMPr mentioned above, this information was considered in the baseline descriptions provided below. Where information has since been updated, reference thereto has been made.

#### Chapter A: Geology

The regional geology of the farms Zwartfontein 818 LR and Overysel 815 LR comprises Mapele Gabbronorite, while Blinkwater 820 LR comprises mostly Hout Rivier Gneiss, which are structures of the Lower and Critical Zones of the Rustenburg Layered Suite, Bushveld Complex. The Platreef (equivalent of the Merensky reef) forms the floor of the complex. It strikes north-west, dips at angles of between 38° and 50° to the west and is almost completely masked by thick soil and sand cover.

There are a number of north east trending dykes cutting through the Platreef and strike is terminated by faults to the north and south, which have a northeast orientation. The northern part of the



Mogalakwena Mine is underlain by a footwall of Archaean Granite. Granite koppies occur to the west of the TSF complex site. This area is underlain by the Utrecht Granite, Hout River Gneiss and the harzburgites of the Zoetveld subsuite of the Rustenburg suite. Hardpan ferricrete and calcrete underlies Blinkwater, but does not appear to be laterally continuous.

## Chapter B: Climate

The regional climate is typically hot summers and cool, dry winters. The mean minimum monthly temperature is 13.0 °C and the maximum mean monthly temperature is 26.3 °C. The rainy season is from October to April.

Rainfall data is available from Weather Station W0633482 located 15 km southwest of the mine. The station has a 90-plus year record database of rainfall. The mean annual precipitation for the area in which the mine is situated has been determined as 662 mm/annum with the mean annual precipitation for weather station W0633482 being 660 mm.

During the rainy season a maximum of 8 to 12 rain days per month is typically expected, whilst in the dry season a maximum of one rainy day may be expected per month. Most rain (85 %) falls in the six month period between November and April. Only 8 % of the rainfall occurs between May and September. The rainfall is mainly in the form of thunderstorms. Hail, which is often associated with thunderstorms, does occur during the hot summer months.

## Chapter C: Topography

The Mogalakwena Mine can generally be described as flat, with granite koppies that gently slopes to the west from heights of 1 286 metres above mean sea level (mamsl) and 1 308 mamsl on the farms Overysel 815 LR and Zwartfontein 818 LR respectively. Koppies on the farm Blinkwater 820 LRn slopes to south-east from 1 274 mamsl onto undulating plains below. The region is drained by the Groot Sandsloot River which runs in a south-westerly direction draining into the Mogalakwena River. The Mogalakwena River drains into a north-westerly direction along the base of the Waterberg Mountains which rise to a maximum height of 1 746 mamsl.

## Chapter D: Soils, Land Use and Land Capability

The soils of Mogalakwena Mine are of moderate to poor quality due to their moderate natural fertility, soil structure, soil chemical properties, depth and rockiness in places. Mogalakwena Mine contains soils varying from shallow, rocky sandy loams to deep, weakly or moderately structured sandy clays. Free lime occurs throughout Mogalakwena Mine. The surface rockiness and variable depth, together with the marginal mean annual rainfall and other climatic conditions, attributes to the low agricultural potential of the soils. Natural soil erosion can be observed throughout Mogalakwena Mine and surrounding areas. Refer to Figure 6.

The land capability of Mogalakwena Mine falls into three classes: arable land with low potential which amounts to 20.0% of Mogalakwena Mine area, grazing land which comprises 48.3% of the area, wilderness land making up 11.6% the remainder of the area is occupied by villages and streambeds.



The land use of the existing fuel depot and the proposed site for the new fuel depot is mining. Refer to Figure 7 for the map illustrating the current land use.

*Table 11: Baseline land capability*

<b>Proposed affected areas</b>	<b>Arable land (ha)</b>	<b>Grazing land (ha)</b>	<b>Wilderness (ha)</b>	<b>Stream (ha)</b>	<b>Village (ha)</b>
Waste residue facility – West	192.8	144.4	0	26.9	0
Waste residue facility - East	21.6	431.4	278.3	59.1	334.5
Pit area	173.9	222.7	0	16.0	0
TSF Complex	46.7	389.3	43.9	0	0
Plant	40.0	0	0	0	0
<b>TOTAL</b>	<b>475.00</b>	<b>1 187.80</b>	<b>322.20</b>	<b>102.00</b>	<b>334.50</b>



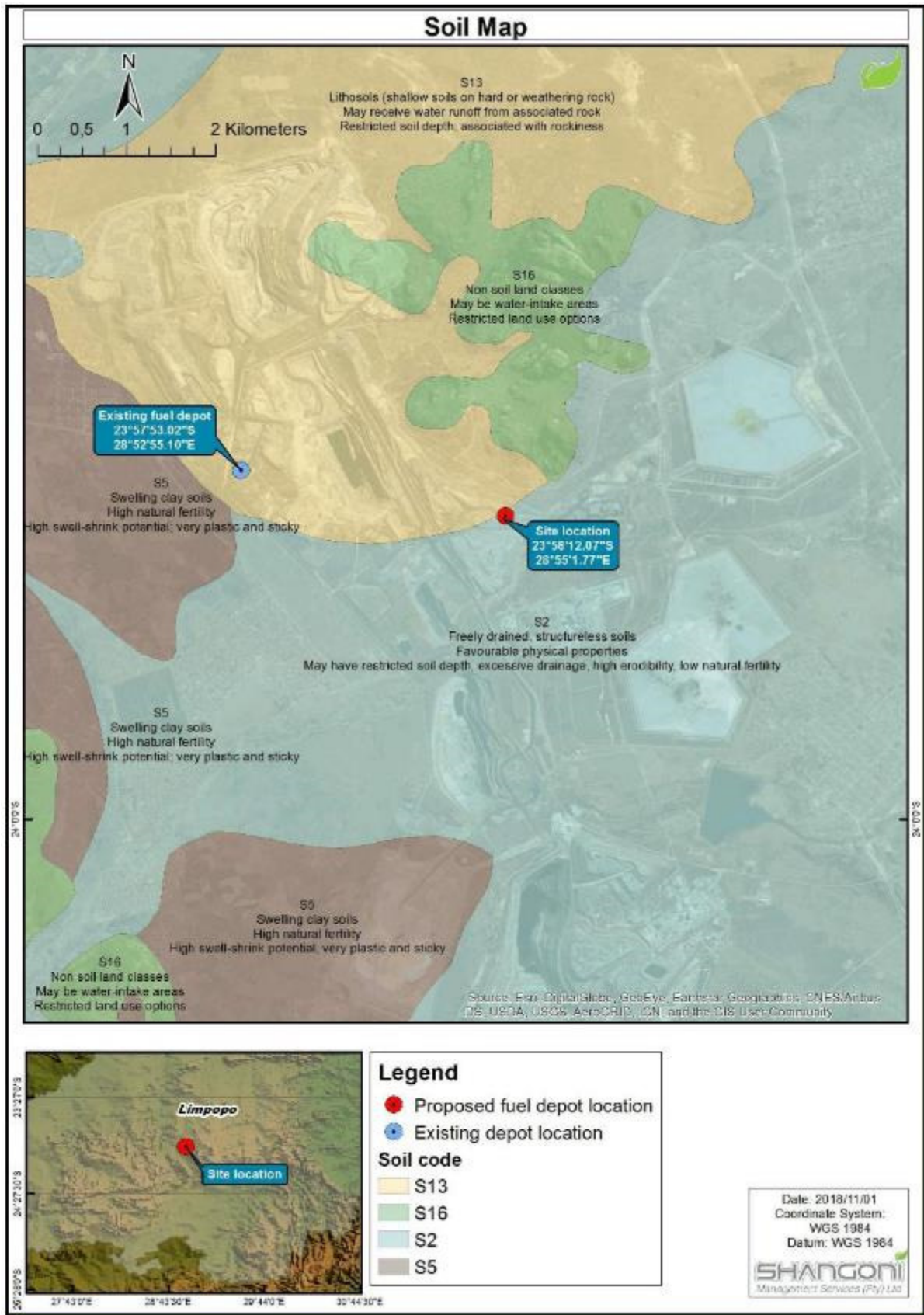


Figure 6: Soil



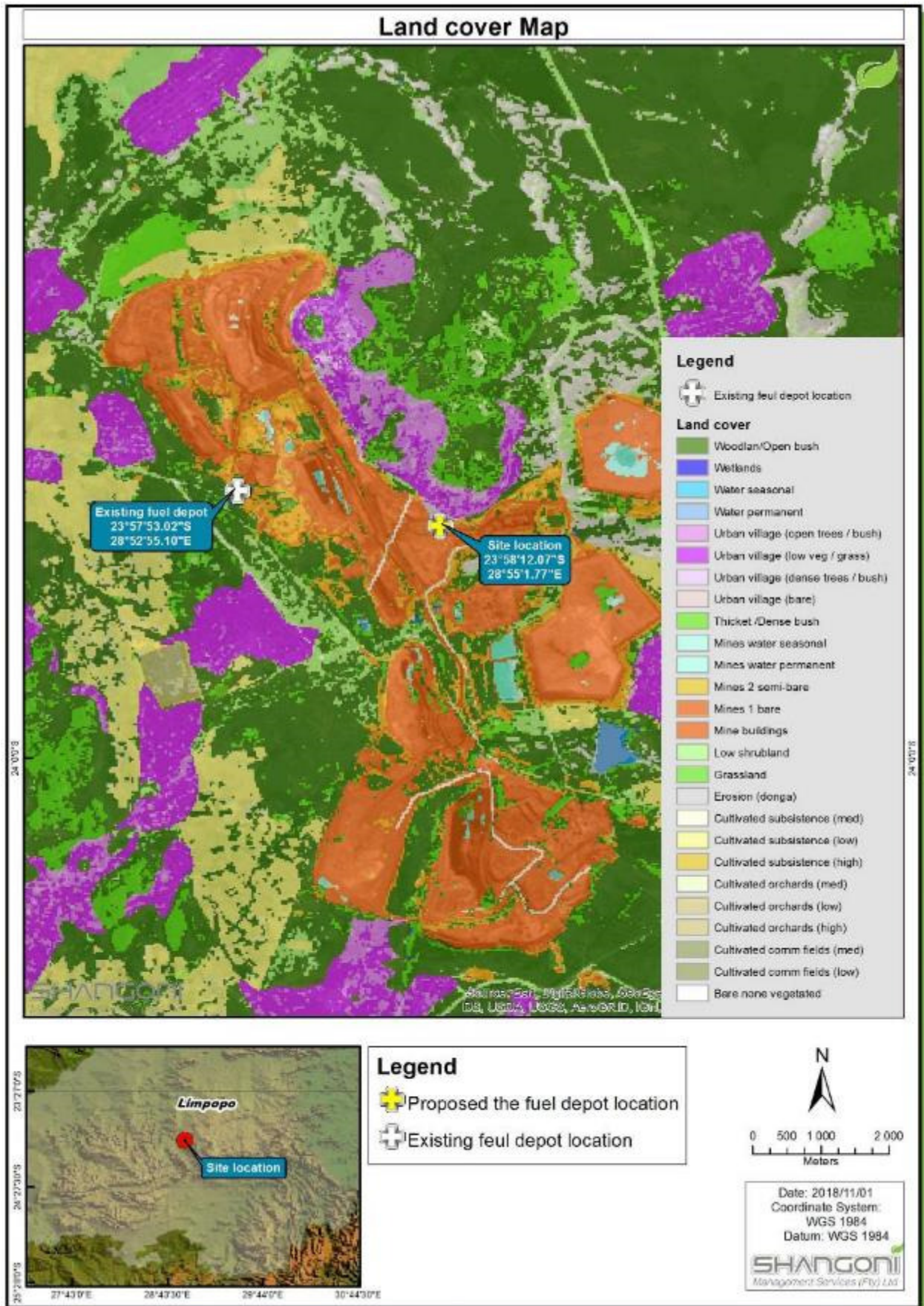


Figure 7: Land use



## Chapter E: Vegetation

According to Low and Rebelo (1996), Mogalakwena Mine falls into the Savanna Biome. Vegetation types within this biome include Mixed Bushveld and Clay Thorn Bushveld (Acocks (1953) - Springbok Flats Turf Thornveld). The Mogalakwena Mine was, at the time of the baseline assessments, already disturbed through man-made activities such as overgrazing, collecting wood for fuel purposes, trampling and dryland crop production activities. The rocky areas and stream sides were in a slightly better condition. The hills to the north of the Mogalakwena Mine show affinities with the flora of the Waterberg and Pietersburg Plateaus, while the plains were characterised by Mixed Bushveld and Clay Thorn Bushveld. Refer to Figure 8.

Certain plants in this area have adapted to cope with the soil conditions related to the ultramafics and mafics (chrome bearing rocks) of the Mogalakwena Mine. These plants do not compete well with plants in normal soils and are thus generally of very restricted occurrence. In the baseline state of the environment, these species were identified to exist in marginal habitats such as shallow soils underlain by rock or calcrete, or close to streams, where the land use is minimised.

The eight broad vegetation units identified in the baseline studies are indicated in Table 12. Due to the well-known practice of hunting undertaken by local communities, it is unlikely that the open veld areas will support any significant and/or viable wildlife populations.





Figure 8: Vegetation map





Table 12: Description of baseline vegetation units

Unit no.	Description & status	Topography & location	Structure	Dominant species	Alien invasive species	Important species
CL	<ul style="list-style-type: none"> <li>Cultivated lands (incl. old fields used for grazing)</li> <li>Degraded</li> <li>Low status &amp; value</li> </ul>	Mature plain surface (most of Mogalakwena Mine)	<ul style="list-style-type: none"> <li>Open shrubland (2m avg.)</li> <li>Sporadic trees</li> <li>Herb / grass layer</li> </ul>	<ul style="list-style-type: none"> <li><i>Acacia tortilis</i></li> <li><i>Urochloa mossambicensis</i></li> <li><i>Eragrostis barbinodis</i></li> <li><i>Dichrostachys cinerea</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Acanthospermum Hispidum</i></li> <li><i>Gomphrena celosioides</i></li> <li><i>Tagetes minuta</i></li> </ul>	<i>Sclerocarya birrea</i> ssp. <i>caffra</i>
1	<ul style="list-style-type: none"> <li>Lopholaena- Terminalia open woodland</li> <li>Degraded</li> <li>Low status &amp; value</li> </ul>	<ul style="list-style-type: none"> <li>TSF area E of Mophlotlo Hills</li> <li>Plain near hills</li> <li>Stony foot of hills</li> <li>Drainage lines</li> </ul>	Open shrubland (1 m avg.), with sparse grass layer and sporadic trees	<ul style="list-style-type: none"> <li><i>Lopholaena coriifolia</i></li> <li><i>Terminalia sericea</i></li> <li><i>Sclerocarya birrea</i></li> </ul>	<i>Zinnia peruviana</i>	<i>Sclerocarya birrea</i> ssp. <i>caffra</i>
2	<ul style="list-style-type: none"> <li>Mixed bushveld</li> <li>Status unknown</li> </ul>	<ul style="list-style-type: none"> <li>North side of Mohlosane (Klein Sandsloot) watercourse, SE of Mophlotlo hills</li> <li>Plain / basin</li> </ul>	<ul style="list-style-type: none"> <li>Trees (5 m avg.)</li> <li>Shrubs sparse</li> <li>Grass layer</li> </ul>	Unknown	Unknown	Unknown, but edaphically adapted species are predicted here.
3	<ul style="list-style-type: none"> <li>Dichrostachys – Urochloa - Acacia shrubland Encroached,</li> <li>Moderate status &amp; Potentially high value</li> </ul>	<ul style="list-style-type: none"> <li>West side of Swartfontein</li> <li>Plain</li> </ul>	Open shrubland (2 m avg.), with dense grass layer	<ul style="list-style-type: none"> <li><i>Acacia tortilis</i></li> <li><i>Dichrostachys cinerea</i></li> <li><i>Themeda triandra</i></li> <li><i>Bothriochloa insculpta</i></li> </ul>	<i>Flaveria bidentis</i>	<ul style="list-style-type: none"> <li><i>Corchorus schimperi</i> or aff.</li> <li><i>Ledebouria</i> sp.</li> <li><i>Sclerocarya birrea</i> ssp. <i>caffra</i></li> </ul>
4	<ul style="list-style-type: none"> <li>Rhus – Euphorbia - Clerodendrum woodland</li> <li>Degraded, Moderate status &amp; potentially high value</li> </ul>	<ul style="list-style-type: none"> <li>Mophlotlo hills</li> <li>Gentle slopes between granite outcrops</li> </ul>	Open to Closed woodland (3 - 4 m avg.)	<ul style="list-style-type: none"> <li><i>Rhus leptodictya</i></li> <li><i>Euphorbia ingens</i></li> <li><i>Clerodendrum glabrum</i></li> <li><i>Aloe marlothii</i> and <i>grewia vernicosa</i> sometimes dominant in disturbed areas</li> </ul>	<ul style="list-style-type: none"> <li><i>Achyranthes aspera</i></li> <li><i>Agave americana</i></li> <li><i>Agave sisalana</i></li> <li><i>Boerhavia diffusa</i></li> <li><i>Zinnia peruviana</i></li> </ul>	<ul style="list-style-type: none"> <li>cf. <i>Euphorbia griseola/louwii</i></li> <li><i>Faurea saligna</i></li> <li><i>Lithops lesliei</i> is suspected to occur in open gravelly areas.</li> </ul>



Unit no.	Description & status	Topography & location	Structure	Dominant species	Alien invasive species	Important species
				<ul style="list-style-type: none"> <li>Open, gravelly areas occur in some level sites.</li> </ul>	<ul style="list-style-type: none"> <li><i>Verbesina encelioides</i> var. <i>encelioides</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Scadoxus puniceus</i></li> <li><i>Sclerocarya birrea</i> ssp. <i>caffra</i></li> </ul>
5	<ul style="list-style-type: none"> <li><i>Albizia - Croton</i> – <i>Combretum</i> woodland</li> <li>Degraded, Moderate status &amp; potentially high value as a habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Mohlotlo hills</li> <li>Steep rocky slopes of granite outcrops</li> </ul>	Open to Closed woodland (3 - 4 m avg.)	<ul style="list-style-type: none"> <li><i>Albizia tanganyikense</i></li> <li><i>Croton gratissimus</i> var. <i>gratissimus</i></li> <li><i>Combretum molle</i></li> <li><i>Coleochloa setifera</i></li> <li><i>Englerophytum magalismsontanum</i></li> </ul>	None apparent	<ul style="list-style-type: none"> <li><i>Berchemia zeyheri</i></li> <li><i>Erythrophysa transvaalensis</i> may occur here</li> <li><i>Euphorbia malevola</i> may occur here</li> <li><i>Faurea saligna</i></li> <li><i>Scadoxus puniceus</i></li> </ul>
6	<ul style="list-style-type: none"> <li>Watercourses &amp; fringing vegetation degraded,</li> <li>Moderate status &amp; potentially high value as a habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Mohlosane and Thwathwe drainage systems</li> <li>Watercourses in hills and on plain</li> </ul>	Open shrubland (1 m avg.) with sparse grasslayer	<ul style="list-style-type: none"> <li><i>Acacia tenuispina</i></li> <li><i>Acacia luederitzii</i> var. <i>retinens</i></li> <li><i>Lycium cinereum</i></li> <li><i>Ehretia rigida</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Xanthium strumarium</i></li> <li><i>Ricinus communis</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Acacia caffra</i></li> <li><i>Acacia karroo</i></li> <li><i>Combretum erythrophyllum</i></li> <li><i>Corchorus schimperi</i> or aff.</li> <li><i>Nuxia gracilis</i> may occur here</li> <li><i>Olea europaea</i> ssp. <i>africana</i></li> <li><i>Ziziphus mucronata</i></li> </ul>
7	<ul style="list-style-type: none"> <li>Secondary woodland of old building / mining sites degraded,</li> <li>Low status and value</li> </ul>	<ul style="list-style-type: none"> <li>Swartfontein South - old mine and associated ruins</li> </ul>	Open woodland (2 –3 m avg.)	<ul style="list-style-type: none"> <li><i>Acacia tortilis</i></li> <li><i>Dichrostachys cinerea</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Agave americana</i></li> <li><i>Agave sisalana</i></li> </ul>	<i>Sclerocarya birrea</i> ssp. <i>caffra</i>



Unit no.	Description & status	Topography & location	Structure	Dominant species	Alien invasive species	Important species
		<ul style="list-style-type: none"> <li>Plain with rock rubble heaps and ruins</li> </ul>				

sp. = species; sp. nov. = species novum (previously undescribed species); sp. indet. = indeterminate, cannot be identified with the current classification; ssp., or subsp. = subspecies; var. = variety; cf. = confer (compare with); aff. = affinity (indicates closest relative)



## Chapter F: Fauna

Due to the well-known practice of hunting undertaken by local communities, it is unlikely that the open veld areas will support any significant and/or viable wildlife populations. However, the cluster of inselbergs acts as a biotic corridor between the Waterberg and Pietersburg Plateau. These inselbergs provide refuge areas for several animal species, habitat and nest sites for cliff nesting bird species and are important from a biodiversity perspective. A pair of Black Eagles has been previously observed in the area.

The Mogalakwena River, for which the Mogalakwena Mine forms an important catchment area, acts as a refuge area for fish species during periods of ephemeral flow.

## Chapter G: Surface Water

Mogalakwena Mine is situated in the Limpopo River catchment refer to Figure 9, and in quaternary catchment A61G refer to Figure 10. The Mohlosane (Klein Sandsloot), which flows between the Mogalakwena and Zwartfontein pits close to the Northern Concentrator area, and the Groot Sandsloot, which flows around the north and west of the Sandsloot pit are the main rivers draining the area refer to Figure 11. The Groot Sandsloot River and the Mohlosane River are dry most of the time and only flow during or after high rainfall events. Vaalkop Dam, situated to the east of Mogalakwena Mine in the catchment of the Groot Sandsloot, was built to supply water to a nearby irrigation scheme. The area within which the mine is located is divided into sub-catchments according to the watersheds and confluence of streams. Streams in the area are highly seasonal and only flow after larger rainfall events.

The highest point in the catchment of the Mohlosane is approximately 1280 mamsl. The average watercourse slope is about 1:100 (or 1 percent), but the upper reach of the Mohlosane (upstream of the mining activity) has a slope of in excess of 1:50 (2 percent). The catchment is characterised by steep granite koppies on the northern catchment boundary and close to the confluence with the Mogalakwena River. The total catchment area is 56.2 km<sup>2</sup>.

Land use in the catchment of the Mohlosane consists primarily of stock grazing and subsistence farming activities. Dry land cultivation of primarily maize does occur. The TSF Complex of Mogalakwena Mine is also partially situated in this catchment.

The Groot Sandsloot catchment can generally be described as flat, sloping gently to the west between the contours of 1020 metres above mean sea level (mamsl) and 1220 mamsl with an average gradient of 1:16. The river runs in a south-westerly direction draining into the Mogalakwena River which drains in a north-westerly direction along the base of the Waterberg Mountains. The Waterberg Mountains are the key topographical feature of Mogalakwena Mine rising from the flats at 1060 mamsl to a maximum height of 1746 mamsl, with an average gradient of 1:3.



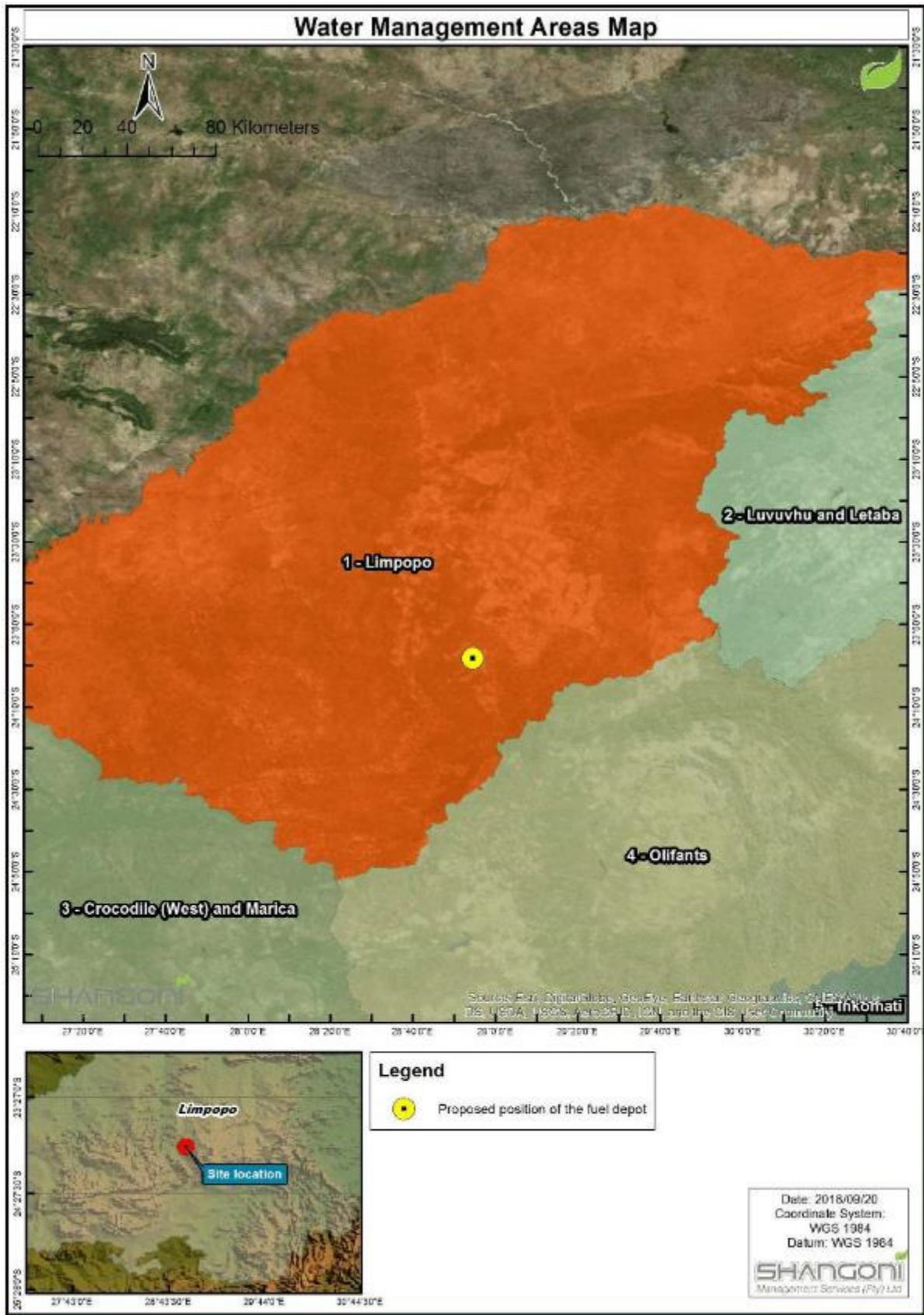


Figure 9: Water management area



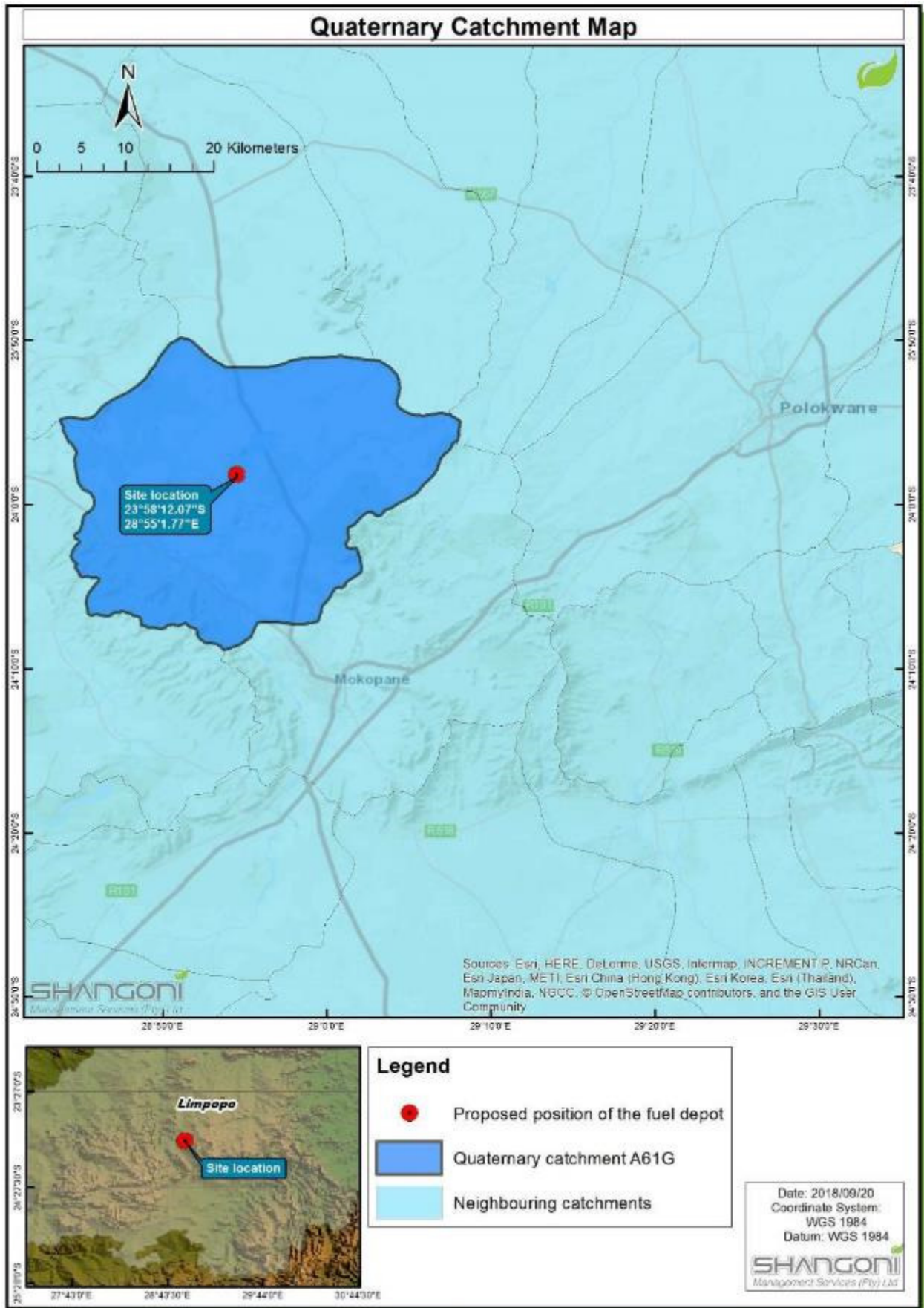


Figure 10: Quaternary catchment





Figure 11: Surface water



### Surface water monitoring

This section on surface water monitoring was sourced from: Surface and Groundwater Bi-Annual Monitoring Report for the period of (January to May 2018).

Mogalakwena Mine introduced regular surface water sampling at specific locations in January 2009. Rivers located around Mogalakwena Mine are non-perennial and therefore the number of samples submitted to the laboratory differs from month to month. An average of 26 surface water samples were taken from the different sampling locations during the bi-annual monitoring period of January to May 2018 and submitted to an independent laboratory for analysis.

Table 13 indicates a list of sampling locations. The chemical parameters to be analysed are presented in Table 14 as well as the frequency of monitoring while Table 15 indicates the different standards which the samples will be compared against. The surface water samples collected around the mine will be compared against the Identified Resource Protection (IRP) standards. The pit water samples will be compared against the Identified Resource Protection (IRP) standards and the DWS standards set out in the integrated water use license (IWUL).

*Table 13: Surface water sampling locations*

Sample location	Site name	Samples description
River water samples	MRD	Mohlosane River: Downstream
	MRDD	Mohlosane River Downstream Discharge
	MRU	Mohlosane River: Upstream
	GMB	Ga-Molekane Stream: Bridge
	SGB	Sandsloot: Bridge
	SS	Sandsloot: River south of pit
	RCU	River Below Commandodrift
	RCD	River Below Commandodrift
	B-Wet	Blinkwater Wetland
	VDW	Vaalkop Dam Wall
Pit water samples	PW-ZFT	Pit water Zwartfontein (Zwartfontein Pit)
	PW-N	Pit water – North (North Pit)
	PW-S	Pit water – South (South Pit)
	PW-SS	Pit water - Sandsloot (Sandsloot Pit)
	PW-C	Pit water – Central (Central Pit)
Storm water samples	RWD	Return Water Dam
	RWD-EXT	Return Water Dam Extension





Sample location	Site name	Samples description
	OS1	POCS Oil Sump
	OS 2	POCS Oil Sump Run-off
	SWS	Storm Water Sump
	SP	Settling Pond
	PCD-NC	Mogalakwena north concentrator storm water dam
	PCD-NN	Storm water dam referred to as "Nitrate Dam"
Waste water samples	Mok-effluent	Mokopane Effluent sample
	Pol-effluent	Polokwane effluent sample

Table 14: Chemical parameters set out by the IWUL to be analysed for in the surface water samples

Parameter	Unit	Frequency
pH	pH Units	Monthly
Electrical Conductivity as EC	mS/m	Monthly
Total Suspended Solids as TSS	mg/L	Monthly
Chloride as Cl	mg/L	Monthly
Nitrate as N	mg/L	Monthly
Sulphates as SO <sub>4</sub>	mg/L	Monthly
Calcium as Ca	mg/L	Monthly
Magnesium as Mg	mg/L	Monthly
Potassium as K	mg/L	Monthly
Sodium as Na	mg/L	Monthly
Iron as Fe	mg/L	Monthly
Chemical Oxygen Demand as COD	mg/L	Monthly
Manganese as Mn	mg/L	Monthly
Fluoride as F	mg/L	Monthly



Table 15: The water quality standards for surface water samples as set out in the IWUL, IRP and SANS

Variables	IWUL			
	Open pit water quality concentrations	Sewage effluent concentrations	Identified resource protection (IRP)	SANS 241:2015
pH	5.5-9.5	5.5-9.5	6.5 – 9.0	≥5 to ≤ 9.7
Electrical Conductivity (mS/m)	175.00	175.00	310	≤ 170
Total Dissolved Solids (mg/l)	1160	780	2000	≤ 1200
Sodium as Na (mg/l)	100.00	120.00	70	≤ 200
Magnesium as Mg (mg/l)			70	
Calcium as Ca (mg/l)			80	
Chloride as Cl (mg/l)	110.00	110.00	100	≤ 300
Sulphate as SO <sub>4</sub> (mg/l)	220.00	135.00	500	≤ 500
Nitrate as NO <sub>3</sub> (mg/l)	100.00	15.00	20	≤ 11
Nitrite as NO <sub>2</sub>				≤ 0.9
Potassium as K (mg/l)			500	
Fluoride as F (mg/l)	0.20	0.20	1.5	≤ 1.5
Iron as Fe (mg/l)			0.2	≤ 2.0
Manganese as Mn (mg/l)			0.02	≤ 0.4
Chromium as Cr (mg/l)			0.1	≤ 0.05
Suspended Solids (mg/l)		25.00	50	
Orthophosphate as P (mg/l)		1.00		
Chemical Oxygen Demand as COD (mg/l)		75		



## Surface water chemistry

This section contains the results of surface water chemistry of the samples obtained from different locations around the mine. The sample analysis included all major cations and anions as well as physical parameters; Electrical Conductivity (EC), pH and Total Dissolved Solids (TDS).

The results submitted to AEC by Mogalakwena Mine cover the sampling conducted for the period January to May 2018.

The analysis of surface water quality results for the current monitoring period will be discussed under different sections. The samples have been classified according to their source, origin and representation.

The last results (May 2018) submitted to Aqua Earth prior to the bi-annual monitoring report of January to May 2018, are reported in a table format under each section, where they are compared to the IRP standards. The pit water samples are also compared against the standards set out in the WUL.

The various sections are (for the current monitoring period) as follows:

- River samples.

The section cited above, the parameters of concern considered for discussion are Electrical Conductivity (EC), Sulphate (SO<sub>4</sub>), pH, total Iron (Fe), Nitrate as N (NO<sub>3</sub> as N), Calcium (Ca), Magnesium (Mg) and Sodium (Na).

### River samples

The results returned for samples collected from rivers located in the vicinity of the mine were compared against the Department of Water Affairs and Sanitation (DWS) standards set out as a guideline for the water resource protection in mining industry (identified resource protection standards - IRP). Where the parameters concentration exceeds IRP limits, the values are highlighted as indicated in Table 16.

The last results (November 2017) submitted to Aqua Earth prior to the 2017 annual report, are reported in a table format where they are compared to the DWS IRP standards.

When compared to the DWS IRP standards, majority of the river water samples indicated good water quality during the current monitoring period of November 2017. Results returned from Mahlosane River Downstream (MRD) and Vaalkop Dam Wall (VDW) river samples also indicated good water quality despite its slightly elevated sodium and manganese concentrations respectively. However, Mahlosane River water sample namely Mahlosane River Upstream (MRU) returned elevated sodium, magnesium, calcium, chloride, manganese and sulphate concentrations falling above the DWS IRP limits during the November 2017 monitoring period.



Table 16: River water chemistry as compared with IRP (May 2018)

Sampling point	pH	Electrical Conductivity (mS/m)	Sodium as Na (mg/l)	Magnesium as Mg (mg/l)	Calcium as Ca (mg/l)	Chloride as Cl (mg/l)	Sulphate as SO <sub>4</sub> (mg/l)	Nitrate as NO <sub>3</sub> (mg/l)	Potassium as K (mg/l)	Fluoride as F (mg/l)	Iron as Fe (mg/l)	Manganese as Mn (mg/l)	Chromium as Cr (mg/l)
BWET	6.9	47.7	72.30	13.78	11.24	51.2	24.69	<0.06	0.64	0.16	1.64	0.66	<0.01
RCU	8.9	39.1	55.14	7.19	18.76	21.9	6.44	<0.06	4.06	0.57	0.01	<0.01	<0.01
MRDD	8.5	107.9	107.82	44.64	43.17	136.9	148.72	<0.06	13.59	0.29	0.01	<0.01	<0.01
MRD	9.0	299.0	333.55	120.40	119.20	359.9	712.11	0.56	15.0	0.29	<0.01	<0.01	<0.01
MRU	8.6	260.0	312.80	108.92	121.44	318.4	650.02	<0.06	13.84	0.31	0.01	0.10	<0.01
VDW	9.1	52.6	62.03	22.39	19.23	53.6	29.22	<0.06	5.12	0.44	0.01	<0.01	<0.01
VDS	8.1	150.9	214.20	41.62	62.96	194.9	5.08	<0.06	3.44	1.10	0.01	0.18	<0.01
SS	7.7	227.4	82.16	157.52	196.16	61.7	641.27	39.0	2.44	0.24	<0.01	0.01	<0.01

Identified resource protection (IRP)

<b>IRP max limits</b>	6.5 – 9.0	310	70	70	80	100	500	20	500	1.5	0.2	0.02	0.1
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- Graphical analysis refer to

Figure 12, Figure 13 and Figure 14 of the laboratory results also revealed the following:

- The variation of sulphate over the selected time period (January to May 2018) mimics the variation of electrical conductivity. All river water samples remain within allowable limit when electrical conductivity is considered during the January to May 2018 monitoring period. However, the results indicated a significant upward electrical conductivity trend for Mohlosane River downstream discharge (MRDD) river water sample from 63.3mS/m in January to 1237.4 mS/m in February 2018. An improvement in electrical conductivity concentration was recorded for this sample from 1237.4 mS/m in February to 119.3 mS/m in March 2018. The results also indicated a slight upward electrical conductivity trend from 36.2 mS/m in March to 299 mS/m in May 2018 for the Mohlosane River Downstream (MRD) river water sample but still within limits.
- Majority of the river water samples returned sulphate concentrations falling within the DWS IRP limit during the January to May 2018 monitoring period. Mahlosane River Upstream (MRU) and Mohlosane River Downstream (MRD) river water samples returned upward sulphate trends between March to May 2018 sampling rounds. The results from Sandsloot (SS) river water sample also returned a downward trend in sulphate concentration from above limit to below limit between January and March 2018 sampling rounds. However, this sample reside above DWS IRP maximum allowable limit during the April to May 2018 sampling rounds.
- Majority of the river water samples indicate neutral to alkaline pH values during the January to May 2018 monitoring period. The ph values varies from 6.5 to 7.2 for Blinkwater Wetland (B-Wet) river sample during the monitoring period under review.
- An improvement in nitrate concentration was recorded for the Sandsloot River water sample (SS) from 37.05mg/l in January to 8.24mg/l in March 2018. However, a rising trend in nitrate concentration was also reported for this sample between March to May 2018 sampling round. The rest of the river water samples returned nitrate concentrations falling well within the DWS IRP maximum allowable limit during the January to May 2018 monitoring period.
- Majority of the river water samples returned total iron concentrations falling well within the DWS IRP acceptable limit except for Blinkwater Wetland river water sample (B-Wet) which indicate concentrations that falls above the DWS IRP limit throughout the monitoring period.
- Majority of the river water samples returned calcium and magnesium concentrations falling well within the DWS IRP acceptable limit during the January to May 2018 sampling period. The results also indicate a significant increase in calcium, magnesium and sodium concentrations from below limit in March to above limit in May 2018 for Mohlosane River Downstream (MRD) river water sample. The calcium concentrations increased from 14.94 mg/l to 119.2 mg/l, magnesium increased from 10.9 mg/l to 120.4 mg/l while sodium increased from 40.75 mg/l to 333.55 mg/l. Sandsloot (SS) river water sample also returned calcium and magnesium concentrations from below limit to above limit between the March to May 2018 sampling round. Mohlosane River Upstream (MRU) river water sample reside above limit throughout the January to May 2018 sampling period when magnesium is considered.



- Majority of the River water samples returned sodium concentrations falling above the DWS IRP maximum allowable limit during the January to May 2018 sampling period.

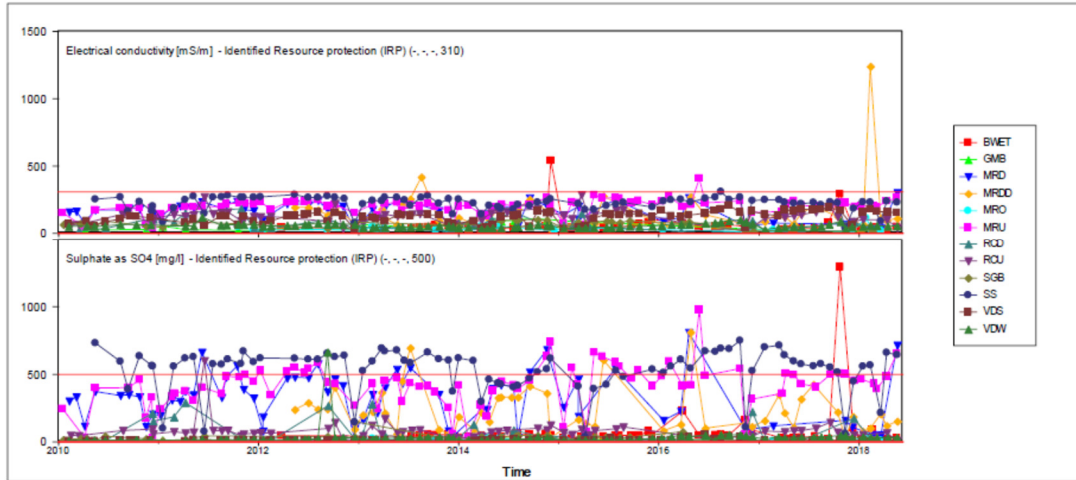


Figure 12: EC and sulphate variation in river samples



Figure 13: pH, nitrate and total iron variation in river samples

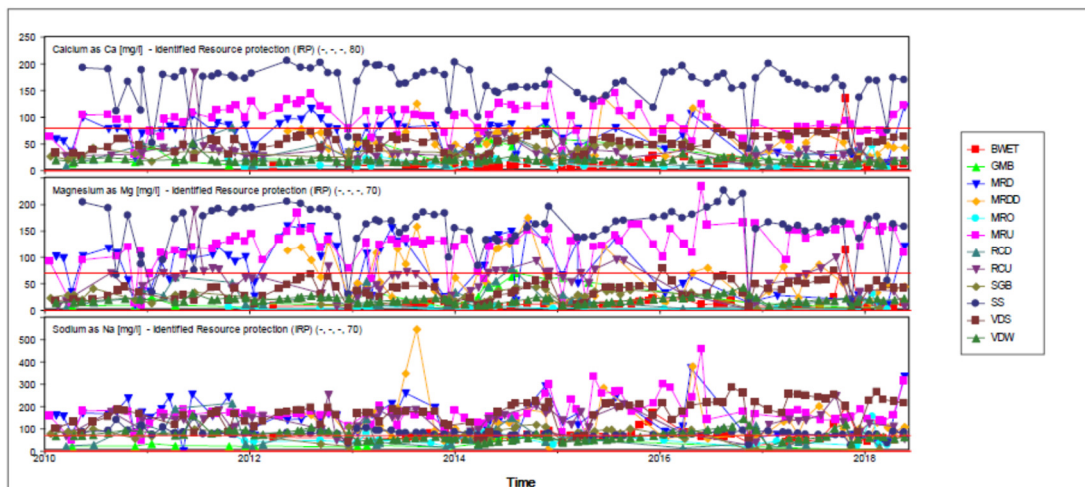


Figure 14: Calcium, magnesium and sodium variations in river samples



## Chapter H: Groundwater

This section on groundwater monitoring was sourced from: Surface and Groundwater Bi-Annual Monitoring Report for the period of (January to May 2018).

Groundwater is the primary source of water to Mogalakwena Mine and local communities are generally dependent on it for domestic purposes, including drinking, cooking and bathing, stock watering and small-scale irrigation. The local communities abstract water from boreholes situated in the villages.

There are three wellfields used to supply Mogalakwena Mine – Commandodrift, PPL and Blinkwater. Groundwater level data has indicated an overall rise from September 2010, likely due to the decrease in abstraction volumes from the PPL wellfield and a general rise in borehole water levels due to groundwater recharge.

### **Aquifer systems**

In terms of the Parsons Aquifer classification system, the aquifers in the Mogalakwena Mine area are generally sole source aquifers, i.e. they supply 50 percent or more of the domestic water in the area. The Aquifer Vulnerability Classification is therefore considered generally high. The area has a thin soil cover of black silt clay that overlies weathered and fractured norite and pyroxenite. The bedrock is weathered to a silt clay or sandy silt between 1 m and 35 m thick. Beneath pockets of weathering, at depths greater than 30 m, slightly weathered, fractured hard rocks, that may contain both the unsaturated and saturated zones, occur.

There are two aquifer systems in the greater Mogalakwena Mine area, namely:

- semi-confined, weathered zone; and
- semi-confined to confined aquifer in the fractured rocks.

### **Weathered zone, semi-confined aquifer**

This aquifer is best developed over the preferentially weathered pyroxenite to a depth of 20 m. The basal portion of the weathered zone is more permeable than the upper zone due to the presence of open fractures. Major fault blocks appear to be hydraulically connected and dolerite dykes may not confine the water due to probable deep weathering. Deep weathering is associated with the Groot Sandsloot and Mohlosane rivers and tectonic structures located within Mogalakwena Mine.

### **Unweathered, fractured rocks, semi-confined aquifer**

Unweathered norites and pyroxenites have similar hydrogeological characteristics and a low primary porosity and permeability. Ground water flow is predominantly through fractures and joints. Major shear zones would provide higher yields with the shear zone being the main storage component of the aquifer and some contribution via seepage from the overlying weathered zone.

A fractured “hybrid” zone, confined aquifer is also present. Some deeper exploration boreholes have yielded strong flows at depths between 121 m and 200 m. The major fracture zones are thought to control the groundwater flow within this aquifer that results in hydraulic continuity with areas 5 km north-west of Mogalakwena Mine.



Whilst groundwater flow takes place through the entire soil and rock profile in both the horizontal and vertical directions, local zones of more rapid flow occur in:

- coarser (more sandy) zones in shallow soils and weathered rock;
- deeply, more extensive, zones of weathering and/or fracturing; and
- geological contact zones i.e. between norite and dolerite dykes.

Occurrence and movement of groundwater is confined to open planes along layered rocks, joints, fractures and cracks in norite and pyroxenite rock formations and intrusions of dolerite and their weathered and fractured contact zones. At Mogalakwena Mine, groundwater occurs in a confined or semi-confined aquifer within the fractured rock, with a secondary porosity derived from cracks and fractures in the rock mass. Due to the porous nature of the overlying soils and rocks, the aquifer is easily contaminated and thus has a high Aquifer Vulnerability Classification.

### Groundwater quality

Groundwater quality data has been gathered since the construction phase at the Mogalakwena Mine. The collection of groundwater samples is carried out in strict accordance with sampling protocol set out by the Water Research Commission (Weaver et al., 2007). Water samples are submitted to an independent, accredited laboratory, in the minimum possible time (less than 24 hours), after collection from the monitoring locations. The laboratory has a trusted internal quality assurance and control program. Aqua Earth receives the results, analyses them and prepares the monitoring reports.

Table 17 presents the list of chemical parameters to be analysed for as well as the frequency of monitoring while Table 18 indicates standards used for groundwater quality analysis. Table 19 indicates information on the characteristics, sources and interactions of major cations and anions in natural waters.

*Table 17: List of chemical parameters set out in IWUL*

Parameter	Unit	Frequency
pH		Monthly
Electrical Conductivity	mS/m	Monthly
Total Dissolved Solids	mg/L	Monthly
Total Suspended Solids	mg/L	Monthly
Chloride as Cl	mg/L	Monthly
Fluoride as F	mg/L	Monthly
Nitrate as NO <sub>3</sub>	mg/L	Monthly
Sulphates as SO <sub>4</sub>	mg/L	Monthly
Total Inorganic Nitrogen as N	mg/L	Monthly





Parameter	Unit	Frequency
Calcium as Ca	mg/L	Monthly
Magnesium as Mg	mg/L	Monthly
Potassium as K	mg/L	Monthly
Sodium as Na	mg/L	Monthly
Iron as Fe	mg/L	Monthly
Manganese as Mn	mg/L	Monthly
Chrome Total as Cr	mg/L	Monthly
Copper as Cu	mg/L	Monthly
Cadmium as Cd	mg/L	Monthly

Table 18: The groundwater quality standards as set out in the IWUL and SANS

Variable	SANS 241: 2015 drinking water standards		
	IWUL Groundwater quality standard	Risk	Standard limits
pH	5 -9.5	Operational	≥5 to ≤ 9.7
Electrical Conductivity (mS/m)	32.00	Aesthetic	≤ 170
Total Dissolved Solids (mg/l)		Aesthetic	≤ 1200
Sodium as Na (mg/l)	146.60	Aesthetic	≤ 200
Magnesium as Mg (mg/l)	77.80	NS	
Calcium as Ca (mg/l)	56.90	NS	
Chloride as Cl (mg/l)	135.70	Aesthetic	≤ 300
Sulphate as SO <sub>4</sub> (mg/l)	51.30	Acute health	≤ 500
		Aesthetic	≤ 250
Nitrate as NO <sub>3</sub> (mg/l)	13.80	Acute health	≤ 11
Nitrite as NO <sub>2</sub> (mg/l)		Acute health	≤ 0.9
Potassium as K (mg/l)		NS	
Fluoride as F (mg/l)		Chronic health	≤ 1.5
Iron as Fe (mg/l)		Chronic health	≤ 2
		Chronic health	≤ 0.3
	NS	Not specified	



Table 19: Characteristics, sources and interactions major cations and anions in natural waters (Concentrations from Appelo and Postma, 2005)

Element	General	Source	Ion interactions	Typical Fresh water concentration in mg/l
Calcium	Most abundant alkali earth metal. Only one oxidation state	Pyroxenes, amphiboles, feldspars, Carbonate mineral, dolomite and calcite, gypsum fluoride.	Absorbed onto clay surfaces, often involved with cation exchange reactions	2 to 80
Magnesium	Alkaline earth metal. Only one oxidation state, Smaller than Na and Ca therefore more hydrated	Pyroxenes, amphiboles, micas, chlorite, olivine, serpentine, dolomite	Strongly absorbed onto clay surface, involved in exchanged reactions	1 to 50
Sodium	Most abundant of alkali earth metal. Only one oxidation state	Feldspars, clay minerals such as kaolinite, tillite, industrial wastes	Absorbed onto clay surfaces, often involved with cation exchange reactions	2 to 50
Potassium	Alkali metal, larger than Na, found in 1+ oxidation state, once in solution tends to be reincorporated in solid weathering state	K-feldspars, ash	Absorbed onto clay surfaces	0.5 to 80
Sulphur	Non-metal occurring in oxidation state, often found in high oxidation state SO <sub>4</sub> <sup>2-</sup> or reduced form S <sup>2-</sup>	Metallic sulphides and evaporates e.g. pyrite and gypsum, burning of fuels, smelting of ores.	Sulphide oxidation, often forms complexes	1 to 500 as SO <sub>4</sub> <sup>2-</sup>
Chloride	Most abundant of halogens, volatile element, Chloride ion Cl <sup>-</sup> most significant oxidation state. 75% of Cl occurs in oceans	Lower concentration in rocks compared to other rocks. Found in sedimentary rocks and evaporates.	Subdued chemical behaviour, does not take part in redox reactions, not absorbed, forms complex ions with seawater and brines at high Cl <sup>-</sup>	2 to 70
Fluoride	Lightest element of halogen group,	Fluorite, amphibole,	May substitute - OH in minerals	≤ 1



Element	General	Source	Ion interactions	Typical Fresh water concentration in mg/l
	F- is ion in solution	micas, apatite, ash	same size and charge, absorbed well onto gibbsite	
Nitrogen	In water as NO <sub>2</sub> -NO <sub>3</sub> -NH <sub>4</sub> <sup>+</sup> Crustal rocks contain 25% of Nitrogen	Humans, Fertilizer, combustion of fossil fuels, waste disposal (CN-), sewerage.	Often indicator of pollution	0.01

The results indicate marginal to poor water quality for the mine boreholes. Majority of the mine boreholes returned elevated electrical conductivity and total dissolved solid concentrations falling above the maximum allowable SANS limit during the current monitoring round of May 2018. Boreholes P143 and P144 returned elevated nitrate concentration falling above limit. Elevated chloride concentrations were also reported for boreholes P111 and P122S. The results from borehole P111 also returned elevated sulphate concentration during the current monitoring period. Four boreholes (P121, P122, DBH14 and DBH15) located around the mine returned concentrations which falls within the allowable SANS standards.

When compared to the DWS standards set out in the IWUL all mine borehole falls above maximum allowable limit refer to Table 21.



Table 20: Groundwater quality of boreholes around the mine (May 2018)

Deter minan d	pH	EC	TDS	Ca	Mg	Na	K	Cl	SO4	NO3- N	F	Fe	Mn	NO2	Cu	
	Risk	Operational	Aesthetic	Aesthetic	NS	NS	Aesthetic	NS	Aesthetic	Aesthetic	Acute health	Chronic health	Aesthetic	Aesthetic	NS	Chronic health
Unit		mS/m	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l
Main boreholes	P111	7.8	405.9	2638	45.90	507.50	54.10	5.85	342.3	1521.15	<0.06	0.33	0.01	0.01	<0.01	<0.01
	P116S	7.4	171.0	1112	79.02	119.90	114.66	2.80	194.5	116.62	0.58	0.98	<0.01	<0.01	0.01	<0.01
	P117	7.5	242.6	1577	94.24	159.44	118.96	2.80	232.5	433.40	10.20	0.94	<0.01	<0.01	<0.01	<0.01
	P121	8.4	128.1	833	39.96	79.06	131.54	3.88	112.0	60.23	4.39	0.86	<0.01	<0.01	<0.01	<0.01
	P121S	6.9	80.7	525	28.18	36.24	109.46	1.70	14.9	14.69	0.27	0.12	0.07	1.84	<0.01	<0.01
	P122	7.2	123.5	803	45.62	93.03	85.88	4.15	109.3	13.0	7.63	0.20	0.01	<0.01	<0.01	<0.01
	P122S	7.3	299.1	1944	100.70	155.50	371.90	8.15	360.3	<1.47	<0.06	0.28	0.09	0.52	<0.01	<0.01
	P127	7.3	215.4	1398	66.30	226.26	22.77	7.29	215.6	488.45	8.06	0.14	0.01	<0.01	<0.01	<0.01
	P142	7.9	260.6	1694	133.56	230.36	80.84	8.48	209.0	688.50	10.44	0.61	<0.01	0.04	2.45	0.01



Determinand	pH	EC	TDS	Ca	Mg	Na	K	Cl	SO <sub>4</sub>	NO <sub>3</sub> -N	F	Fe	Mn	NO <sub>2</sub>	Cu
Risk	Operational	Aesthetic	Aesthetic	NS	NS	Aesthetic	NS	Aesthetic	Aesthetic	Acute health	Chronic health	Aesthetic	Aesthetic	NS	Chronic health
Unit		mS/m	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l
P143	9.0	121.1	787	5.14	146.96	6.90	0.78	23.1	19.96	41.88	0.38	<0.01	<0.01	<0.01	<0.01
P144	7.3	226.6	1473	81.88	177.80	134.60	3.20	210.5	489.65	13.08	<0.10	<0.01	<0.01	0.02	<0.01
DBH14	7.6	142.5	926	76.8	55.90	164.98	14.04	114.2	83.20	8.82	0.19	<0.01	0.04	<0.01	<0.01
DBH15	7.8	136.4	887	48.3	61.68	131.56	8.48	210.1	126.18	0.76	0.68	<0.01	0.18	<0.01	<0.01

Table 21: Groundwater quality results as compared to the DWS standards as set in IWUL (May 2018)

Site name	BH	pH	EC	Ca	Mg	Na	Cl	SO <sub>4</sub>	NO <sub>3</sub> -N
Mine boreholes	P111	7.8	405.9	45.90	507.50	54.10	342.3	1521.15	<0.06
	P116S	7.4	171.0	79.02	119.90	114.66	194.5	116.62	0.58
	P117	7.5	242.6	94.24	159.44	118.96	232.5	433.40	10.20
	P121	8.4	128.1	39.96	79.06	131.54	112.0	60.23	4.39
	P121S	6.9	80.7	28.18	36.24	109.46	14.9	14.69	0.27



Site name	BH	pH	EC	Ca	Mg	Na	Cl	SO <sub>4</sub>	NO <sub>3</sub> -N
	P122	7.2	123.5	45.62	93.03	85.88	109.3	13.0	7.63
	P122S	7.3	299.1	100.70	155.50	371.90	360.3	<1.47	<0.06
	P127	7.3	215.4	66.30	226.26	22.77	215.6	488.45	8.06
	P142	7.9	260.6	133.56	230.36	80.84	209.0	688.50	10.44
	P143	9.0	121.1	5.14	146.96	6.90	23.1	19.96	41.88
	P144	7.3	226.6	81.88	177.80	134.60	210.5	489.65	13.08
	DBH14	7.6	142.5	76.8	55.90	164.98	114.2	83.20	8.82
	DBH15	7.8	136.4	48.3	61.68	131.56	210.1	126.18	0.76

PPL's DWS WULA limits									
Recommended limits	5-9.5	32	56.9	77.8	146.6	135.7	51.3	13.8	
Above limits	<5.5 - >9.5	>32	>56.9	>77.8	>146.6	>135.7	>51.3	>13.8	



## Chapter I: Air Quality

Dust fallout measurements are performed by the mine over monthly average sampling periods in accordance with procedures recommended by SANS. SANS also stipulates dust deposition rates that are permitted for residential and industrial regions, and a series of levels above which interventions or mitigation is required.

*Table 22: Dust fallout standards, target, action and alert thresholds dust deposition (SANS 1929:2005)*

Level	Dust fallout rate (mg/m <sup>2</sup> /day)	Permitted frequency of exceedances
Target	300	
Action residential	600	Three within any year, no two sequential months
Action Industrial	1200	Three within any year not sequential months
Alert threshold	2400	None -First exceedance requires remediation and compulsory report to authorities

The results of the dust monitoring are used to evaluate compliance with the SANS guideline criteria and evaluate long-term trends. Table 23 provides a list of all the dust fallout monitoring points and their location.

*Table 23: Dust fallout monitoring points*

Dust bucket monitoring ID	Location of dust bucket
P34	At P34 pump station
P46	At P46 pump station
GTS	At Ga-Tshaba school
Morgan	Morgan private house
P9	At P9 pump station
TS	Between Vaalkop tailings & Ga-Molekana village
TEXS	Between Vaalkop tailings & Ga-Molekana village
TES	Between Vaalkop tailings & N11
P21	At P21 pump station
P31	At P31 pump station
ZWNDS	At Nitrate dam
PPRN	Between soil stockpiles & provincial road



<b>Dust monitoring ID</b>	<b>Location of dust bucket</b>
GTRDS	Between WO2 & Ga-Tshaba
NB	Northern boundary
BWATER-N	Blinkwater North: East Boundary
BWATER-S	Blinkwater South: East Boundary
<b>Community dust buckets</b>	
Hans/Masenya	Mr Langa
Mesopo	Mr Manamela
Ga Chaba	Mr Mashishi
Mesopo	Unknown
Nyaatlo 020169	Unknown
Mahlanya 100068	Unknown
Matso 010290	Unknown
PUKA-444	Far East Sekhaolelo
PAPO-19	East of N11 Sekhaolelo
RAMMUTLA-95	East of N11 Rooibokfontein
MALOKA KGORO-10019	North o road by request of community
MPHELA-132	Motlotlo SW of Kopie
DOLO-20120	West of N11 N Molekana
MORUDI-10278	West of N11 Central Molekana
Kgwetsana Daycare	West Mapella
Modikwe Secondary	Mapela
<b>Multidirectional buckets</b>	
TMD(NESW)	Between Vaalkop tailings & Ga-Molekana village
GTRDMD(NESW)	Between WO2 & Ga-Tshaba
<b>PM10 monitoring</b>	
PM1	Front of pit dewatering cabin
PM2	Behind AEL (Old mining)
PM3	Behind new mining workshops





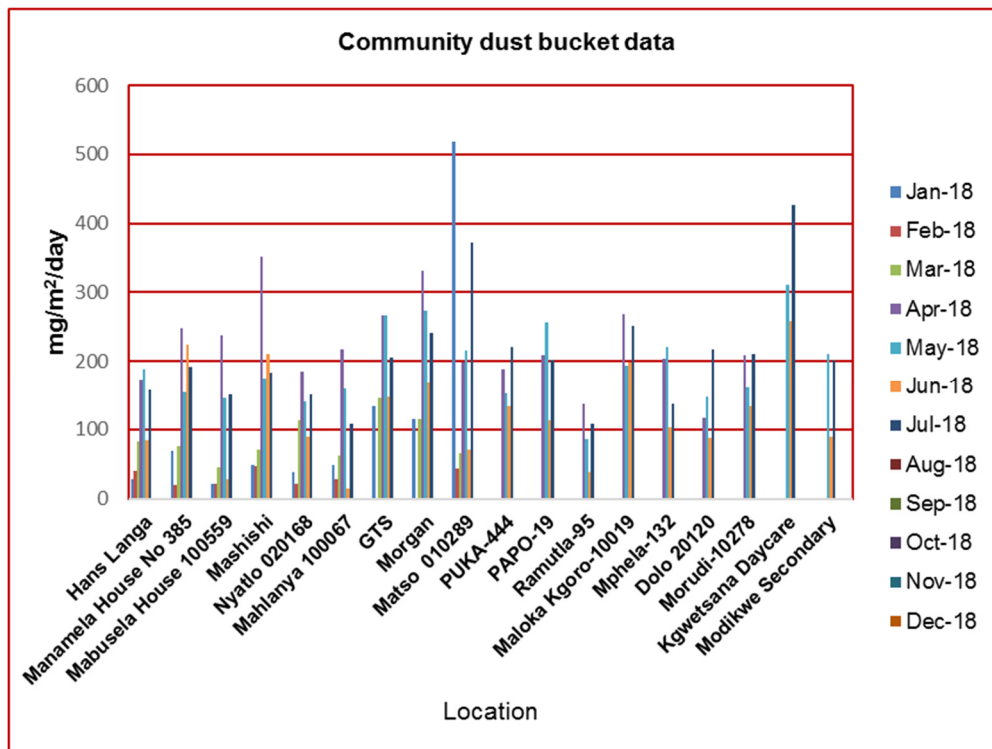


Figure 15: Community dust monitoring results for the period of January to July 2018

All existing roads to the mine are tarred, as is the main road traversing the mining infrastructure. The haul roads on the mine are untarred, but these are chemically treated when necessary to inhibit dust generation by motor vehicles and wind. The highest dust concentrations are on the untarred roads in the vicinity of Ga-Sekhaolelo and Ga-Puka, as well as to the east-north-east of the TSF Complex section located on Vaalkop. Fugitive dust emissions from the waste residue facilities are considered to be an additional source of potential dust on the mine.

## Chapter J: Noise

Prior to the development of Mogalakwena Mine, and largely still the case, the area has a definite rural character, where the major contributing noise sources to the ambient noise levels include:

- Domestic activities from local communities;
- Limited traffic on the local gravel roads;
- Agricultural noises; and
- Mining related activities.

The rural villages found within and around the Mogalakwena Mine area can all be considered as noise sensitive areas, with the following being the closest to the mine area:

- Ga-Tshaba (west of Mogalakwena Mine)
- Ga-Modipana (Ga-Mosoge) (north-west of Mogalakwena Mine)
- Ga-Masenya (south-west of Mogalakwena Mine)
- Skiming (south-west of Mogalakwena Mine)
- Ga-Puka (east of Mogalakwena Mine)



- Ga-Sekhaolelo (east of Mogalakwena Mine)
- Sekuruwe (east of Mogalakwena Mine)

The large open areas between the villages at Mogalakwena Mine, are covered with mainly low vegetation that does not provide much absorption of noise. This absorption characteristic probably increases in the rainy season with the increase in biomass. The koppies (i.e. the Mohlotlo hills) on the farms Overysel and Zwartfontein provide significant screening against the propagation of noise for areas lying further west. During 2018, the DMR gave a verbal instruction to the mine, to construct a noise attenuation berm along the western edge of the mine. The berm has almost been completed and lies on an area demarcated for rock dumps. Environmental noise surveys conducted by consultants, for a number of new developments around the mine, indicate that there is no nuisance noise to communities from these projects.

#### Chapter K: Archaeology and cultural history

Mogalakwena Mine is located within an area, which has been occupied by the Langa Ndebele community for several centuries. Very few heritage resources were identified in the overall Mogalakwena Mine operational area, however, a substantial number of graves and cemeteries are present. Several homesteads and dwellings dating from the historical period (older than sixty years) as well as the relatively recent past (not necessarily sixty years old) are located on the farms Overysel, Zwartfontein and Blinkwater. Many of these remains have been destroyed by 'normal' developmental activities and are considered to be of low archaeological significance in terms of uniqueness, aesthetic appearance, architectural design and cultural historical significance.

#### Chapter L: Sensitive landscapes

Riparian zones along drainage lines can be classified as wetlands. Due to the ephemeral nature of the watercourses in the Mogalakwena Mine's lease area, these riparian wetlands were not considered significant. A wetland has been identified on the Blinkwater farm in close proximity to the TSF complex. The Blinkwater TSF section has been re-designed to accommodate the 50 m buffer zone around the Blinkwater Wetland. The wetland is monitored monthly and an annual report submitted to DWS. River crossings are monitored yearly and reports also submitted to DWS. Water Quality is monitored for both the wetland and crossings on a monthly basis.

#### Chapter M: Visual aspects

The various land uses found in and around the mine, including open pit mining, subsistence agriculture, rural villages and fallow land all add to the visual character of the region. The Mogalakwena Mine can be described as having flat to undulating topography, with koppies rising to a maximum height of 1 376 mamsl. The Mogalakwena Mine is sparsely vegetated with grasses and low clumps of bushes and portions of the surrounding area are cultivated for subsistence agriculture.

Houses in the rural villages are a combination of traditional and modern. The northern portion of the Mogalakwena Mine has the sense of an undeveloped rural village, while to the south, the visual interaction between the villages and the mine result in a sense of incompatibility between residential



and large scale mining activities. The mine area is visible from the N11 road and from vantage points in the area, most notably the Waterberg. Visibility of the mine from the Waterberg is to some extent be limited due to distance from the mine to the Waterberg.

#### Chapter N: Regional socio-economic structure

Mogalakwena Mine is located in the Mogalakwena Local Municipality, within the Waterberg District Municipality of the Limpopo Province. The Mapela Tribal Authority that forms part of the Mogalakwena Local Municipality has jurisdiction over the farms Mogalakwena Mine is situated on. This area is largely undeveloped, and is occupied by a large 'semi-urban' and/or rural population where unemployment levels are high.

The operation of Mogalakwena Mine is associated with a number of positive economic benefits which contribute to the generation of improved economic and job opportunities at a local, regional and national scale. The mine provides both temporary and permanent employment opportunities. The mine draws part of the required labour from surrounding villages. Further opportunities exist through the employment of local contractors (using local labour) where possible as well as through the outsourcing of non-core activities during the operation phase. The population surrounding the mine has increased drastically since 2002 (150,00-400,000).

The following impacts indicate the significant long-term positive impact the mine has on local (district) socio-economic structures and public services provision, as well as on the regional economy in general (SRK report no. 305804, 2002):

- Jobs result in an increase in annual per capita and household income of workers and their families. This contributes positively towards local income stability, increased buying power and improved standards of living;
- The mine creates additional local employment through related construction and business opportunities associated with housing, services and infrastructure provision;
- Local employment at the mine contributes towards skills training and the transfer of technological know-how;
- Mogalakwena Mine makes a significant positive contribution to regional and local economic development. This manifests through contributions to the regional (and indirectly to the national) economy, including: a substantial boost to Gross Geographical and Gross Domestic Products through the creation of new jobs, increases to exports and significant contributions to tax revenue; and
- The establishment of the mine has produced a multiplier effects through new business opportunities, trade, services and physical infrastructure.

While the mine brings benefits to the area with respect to economic opportunities, there are also impacts that have a negative effect:

- Communities in the area have a direct relationship with the land. The loss of natural and/or productive assets often implies increased risk of impoverishment and this could in the longer term



negatively affect health and educational levels, as well as general community wellbeing. Where necessary communities have been relocated and compensated.

- The closure of the mine is likely to have a negative impact on the local communities. Mine closure would result in significant job losses. The effects of job losses could spill over into the informal economy, as the cash flow from mine employees is terminated. Any businesses providing services to the mine may also lose their income source with associated job losses. Mine closure could thus lead to a destabilisation of the local economy and may result in a rise in incidence of poverty.

Mining infrastructure reduces the available agricultural and grazing land in the area. The legislation governing mine closure requires the removal of as much infrastructure as possible and the rehabilitation of the land it occupied. However, land taken by the TSFs, waste residue management facilities and the open pits would be permanently lost and cannot be rehabilitated to its previous land use capability. Mogalakwena Mine has developed a Closure Plan and a Sustainable Development Plan, together with their Social and Labour Plan which guides the mine on sustainable livelihoods during operation and post closure.

## 8.5. Impacts and risks identified

Table 24 below contains preliminary potential impacts that have been identified for the activities described in the final site layout plan. A detailed risk assessment will be undertaken as part of the EIAR and EMP Phase, in which the duration, probability, magnitude and reversibility of the impacts will be determined and the significance of the impact calculated. Potential cumulative impacts have also been determined and are presented in Table 25.

Table 24: Preliminary determination of potential impacts

Environmental component (Aspects affected)	Activity	Potential Impact
Geology	No activities identified.	There are no impacts identified to Geology as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.
Topography	No activities identified.	There are no impacts identified to Topography as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.
Soils, land use and land capability	Activities 1-12	Soil contamination, Removal of potentially contaminated material.
Fauna and Flora	Activities 1-24	Proliferation and a further increase of alien and invasive grass species are expected within disturbed areas.



Environmental component (Aspects affected)	Activity	Potential Impact
Surface water	Activities 1-12 (Decommissioning of existing fuel depot)	Accidental spillages of fuel on site and incorrect storage and transport practises may impact on the surrounding clean surface water environment.
	Activities 13-24 (Construction of new fuel depot)	Spillages of hazardous materials used during the construction of the proposed fuel depot may impact on the surrounding clean water environment,  Potential spillages from concrete delivery trucks.
Groundwater	Activities 1-12 (Decommissioning of existing fuel depot)	Groundwater may become contaminated by hydrocarbon spillages during decommissioning activities.
	Activities 13-24 (Construction of new fuel depot)	Groundwater may become contaminated by hydrocarbons leaking from equipment and machinery, temporarily stored materials at the waste rock dump area (proposed site for the new fuel depot).
Sensitive landscapes	No activities identified.	There are no impacts identified to Sensitive Landscapes as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.
Air quality	Activities 1-12 (Decommissioning of existing fuel depot)	Dust generation from internal access roads and general demolition and crushing activities.  Air pollution from decommissioning and construction activities.
	Activities 13-24 (Construction of new fuel depot)	Dust generation from vehicles travelling from the decommissioning to the construction site.  Dust generation from construction activities.
Noise	Activities 1-12 (Decommissioning of existing fuel depot)	Increase in ambient noise levels by vehicles removing material and dumping building rubble in the pit area and waste rock dumps.
	Activities 13-24 (Construction of new fuel depot)	Increase in ambient noise levels by construction activities for the proposed new fuel depot.
Visual aspects	Activities 1-12 (Decommissioning of existing fuel depot)	The visual environment will alter slightly once the existing fuel depot infrastructure has been decommissioned and the associated infrastructure crushed/broken.
	Activities 13-24 (Construction of new fuel depot)	The visual environment will change once the proposed new fuel depot is constructed on the waste rock dump.



<b>Environmental component (Aspects affected)</b>	<b>Activity</b>	<b>Potential Impact</b>
Sites of cultural and archaeological importance	No activities identified.	There are no impacts identified, as no sites of archaeological and cultural importance occur at the existing fuel depot and proposed site.
Socio-economic aspects	Activities 1-24 (Decommissioning of existing fuel depot and Construction of new fuel depot)	Creation of Employment opportunities on the mine for the local communities during the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.

Table 25: Preliminary identification of potential cumulative impacts

<b>Environmental component (Aspects affected)</b>	<b>Activity</b>	<b>Potential Impact</b>
Surface water	Activities 1-24	Surface water resources may become contaminated in the event that contaminated surface water runoff from the decommissioning and construction activities enter the receiving environment, thereby contributing to impacts associated with the existing mining activities. The contribution is, however, considered low.
Groundwater quality	Activities 1-24	Groundwater resources may become contaminated from the decommissioning of the existing depot and construction activities for the new fuel depot. The contribution as a cumulative impact is, however, considered low.
Air quality	Activities 1-24	Due to the small scale of activities, no cumulative impacts are identified.
Noise	Activities 1-24	Due to the small scale of activities, no cumulative impacts are identified.
Socio-economic	Activities 1-24	Jobs will be created, providing income and, therefore, having a further impact on the regional socio-economy aspects of the area, along with other benefits arising from the Social and Labour Plan.



## 8.6. Methodology used in determining and ranking potential environmental impacts and risks

### 8.6.1 Methodology to be applied during the EIA and EMP phase

The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct or cumulative); and
- Specification of uncertainties.

After all impacts have been identified, the nature and scale of each impact can be predicted. The impact prediction will take into account physical, biological, socio-economic and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction will aim to provide a basis from which the significance of each impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to Figure 16 below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – Impact Prediction).



Figure 16: Impact prediction model

Table 26 and

Table 27 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 28 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.



Table 26: Determination of Probability of impact

Score	Frequency of Aspect / Unwanted Event	Availability of Pathway from the source to the receptor	Availability of Receptor
1	Never known to have happened, but may happen	A pathway to allow for the impact to occur is never available	The receptor is never available
2	Known to happen in industry	A pathway to allow for the impact to occur is almost never available	The receptor is almost never available
3	< once a year	A pathway to allow for the impact to occur is sometimes available	The receptor is sometimes available
4	Once per year to up to once per month	A pathway to allow for the impact to occur is almost always available	The receptor is almost always available
5	Once a month - Continuous	A pathway to allow for the impact to occur is always available	The receptor is always available

*Step 1: Determine the PROBABILITY of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor.*

Table 27: Determination of Magnitude of impact

Score	Source				Receptor	
	Duration of impact	Extent	Volume / Quantity / Intensity	Toxicity / Destruction Effect	Reversibility	Sensitivity of environmental component
1	Lasting days to a month	Effect limited to the site. (metres);	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	Non-toxic (e.g. water) / Very low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes will remain unaltered.	Current environmental component(s) are largely disturbed from the natural state.
2	Lasting 1 month to 1 year	Effect limited to the activity and its immediate surroundings. (tens of metres)	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	Receptor of low significance / sensitivity





Score	Source			Receptor		
3	Lasting 1 – 5 years	Impacts on extended area beyond site boundary (hundreds of metres)	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	Current environmental component(s) are moderately disturbed from the natural state.
4	Lasting 5 years to Life of Organisation	Impact on local scale / adjacent sites (km's)	Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha)	Toxic (e.g. diesel & Sodium Hydroxide)	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible	No environmentally sensitive components.
5	Beyond life of Organisation / Permanent impacts	Extends widely (nationally or globally)	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	Highly toxic (e.g. arsenic or TCE)	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	Current environmental component(s) are a mix of undisturbed and undisturbed areas.

*Step 2: Determine the MAGNITUDE of the impact by calculating the average of the factors above.*

*Table 28: Determination of Severity of impact*

Environmental Impact Rating / Priority					
Probability	MAGNITUDE				
	1 Minor	2 Low	3 Medium	4 High	5 Major
5 Almost Certain	Low	Medium	High	High	High
4 Likely	Low	Medium	High	High	High
3 Possible	Low	Medium	Medium	High	High
2 Unlikely	Low	Low	Medium	Medium	High
1 Rare	Low	Low	Low	Medium	Medium



*Step 3: Determine the SEVERITY of the impact by plotting the averages that were obtained above for Probability and Magnitude.*

## 8.6.2 Knowledge gaps, assumptions and limitations

The information contained in this report, have been informed by:

- The approved Environmental Management Programme (EMPr) titled: Consolidated Environmental Management Programme for Anglo American Platinum – Mogalakwena Mine Reference LP30/5/1/2/2/50 MR, dated November 2013 compiled by SRK Consulting.
- Various specialist studies have been undertaken as part of the EMPr mentioned above and this information was considered in the baseline description provided below. Where information has since been updated, reference thereto has been made.
- Stormwater management plan, 2018.

The following assumptions and limitation were made by the storm water specialist in the 2018 report:

- Flood peak calculations assume rainfall intensity is uniform throughout the duration of the storm. Analysis does not account for runoff retention or artificial acceleration within the catchment.
- Calculations are done for complete catchment areas and should be distributed where there is more than one drainage point within the same built up catchment.
- Storm water control recommendations are based on industry experience and best practice. Final designs for construction should be authorised by an approved engineer.
- Elevation data as was obtained from Google Earth and is assumed to be accurate and representative of the site and catchment areas.
- Upstream catchment activities are interpreted according to common practices and no detailed insight is available on possible storm water measures beyond the site. The assessment does not guarantee the integrity of downstream infrastructure in the event of release or discharge from site.
- The measures proposed as part of the storm water management section of the report do not impose preference as this is an operational document to assist in the complete management of clean and dirty surface water in the vicinity of the operation.
- The measures proposed in the storm water management plan section of the report do not specifically cover considerations relevant to storm water management for the purpose of safety, like mine flooding and loss of life, the primary focus being environmental management and the identification of potential environmental concerns.
- Recommendations represented in this report apply to the site conditions and features as they existed at the time of Shangoni' s investigations, and those reasonable foreseeable. The recommendations do not necessarily apply to conditions and features that may arise after the date of this storm water management plan, for which Shangoni had no prior knowledge nor had the opportunity to evaluate.



## **8.7. Positive and negatives that the proposed activity (in terms of the decommissioning and proposed construction of fuel depot) and alternatives will have on the environment and community affected**

The positive and negative implication of the proposed activity and the alternative identified have been provided below and assessed in terms of the following four categories:

- Environmental.
- Technical/Engineering.
- Economical.
- Social.

The positive and negative impacts of both the proposed activities and the preliminary identified alternatives will be further assessed as part of the EIAR and EMPr.



Table 29: Advantage and disadvantages of the proposed activities and preliminary identified alternatives

Alternative	Advantages	Disadvantages
<p><b>Alternative 1 (Preferred):</b></p> <p>The activity alternative refers to the decommissioning of the existing fuel depot and construction of the new fuel depot.</p>	<p><b>Environmental:</b> The proposed new depot is located closer to the Mogalakwena mining complex.</p> <p><b>Technical/Engineer:</b> None identified.</p> <p><b>Economical:</b> By decommissioning the existing fuel depot and relocating it, the mine can extend their mining operations and will be more economical. The selected site for the new depot, is in close proximity to the South, Central and North Pits and the East Waste Rock Dump, which minimizes the travelling distance for trucks to refuel.</p> <p><b>Social:</b> Creation of additional employment opportunities during the construction and operational phases of the project.</p>	<p><b>Environmental:</b> Possible soil, dust, surface water and/or groundwater contamination.</p> <p><b>Technical/Engineer:</b> None identified.</p> <p><b>Economical:</b> Additional capital cost required for the relocation of the fuel depot.</p> <p><b>Social:</b> None identified.</p>
<p><b>Activity Alternatives 2:</b></p> <p>This activity alternative refers to the decommissioning of the existing fuel depot and no construction of the new fuel depot (trucking of fuel to site).</p>	<p><b>Environmental:</b> The environmental impacts that would have occurred will no longer occur as the site will be decommissioned (release of volatile organic compounds).</p> <p><b>Technical/Engineer:</b> No new designs are required for the new fuel depot.</p> <p><b>Economical:</b> No costs associated with construction of new site.</p> <p><b>Social:</b> Creation of additional employment opportunities during the decommissioning activities.</p>	<p><b>Environmental:</b> Trucking of fuel resulting in increase to traffic.</p> <p><b>Technical/Engineer:</b> None identified.</p> <p><b>Economical:</b> High costs associated with the trucking of fuel to site, that may also result in delays in production activities (if none delivery).</p> <p><b>Social:</b> Risks to other users on public road increases with traffic.</p>
<p><b>Activity Alternative 3 (No-go option):</b></p> <p>This activity alternative refers to no decommissioning of the</p>	<p><b>Environmental:</b> No environmental impacts associated with new site construction.</p>	<p><b>Environmental:</b> Close proximity to storage facilities, may lead to damage thereto.</p>



Alternative	Advantages	Disadvantages
existing fuel dept and not constructing the proposed fuel depot.	<p><b>Technical/Engineer:</b> None identified.</p> <p><b>Economical:</b> None identified.</p> <p><b>Social:</b> None identified.</p>	<p><b>Technical/Engineer:</b> None identified.</p> <p><b>Economical:</b> The mine won't be able to extend their mining operations and this will have a negative impact on the mine LOM.</p> <p><b>Social:</b> No employment opportunities will be created, also jeopardising the current workforce.</p>

### 8.8. Possible mitigation measures that could be applied and the level of risk

Table 30 below provides for a summary of the issues and concerns as raised by affected parties and an assessment of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered.

After this Scoping Report has been made available for public review for a period of thirty (30) days, any comments received will be included into the below table, where after the report will be finalised and submitted to the DMR.

*Table 30: Summary of issues and concerns raised by I&Aps*

This table will be completed once the initial Public Participation Process has ended, prior to the Scoping Report being submitted to the DMR.

Concerns as raised by affected parties	Mitigation measures or site alternative

### 8.9. The outcome of the site selection matrix

No site alternatives for the fuel depot were considered, however, activity alternatives were considered.

### 8.10. Motivation where no alternative sites were considered

No alternative site locations could be considered due to the limited space available on the mine.

### 8.11. Statement motivating the preferred site

Refer to Part 8.9 and 8.10 above.



## **9. Plan of study for the environmental impact assessment process**

### **9.1. Description of alternatives**

Refer to Sections 8.1 and 8.7 above for a description of the alternatives that have been identified.

### **9.2. Description of the aspects to be assessed as part of the environmental impact assessment process**

As part of the proposed project, all aspects of the environment are considered and include (but are not limited to):

- Geology.
- Topography.
- Soil, land use and land capability.
- Fauna and flora.
- Surface water.
- Groundwater.
- Sensitive landscapes (including wetlands).
- Air quality.
- Noise.
- Visual aspects.
- Sites of cultural and archaeological importance.
- Socio-economic aspects.

### **9.3. Description of aspects to be assessed by specialists**

Section 8.4.1 provides both a summary of the baseline environment as applicable to the existing mining and related activities, informed by:

- The approved Environmental Management Programme (EMPr) titled: Consolidated Environmental Management Programme for Anglo American Platinum – Mogalakwena Mine Reference LP30/5/1/2/2/50 MR, dated November 2013 compiled by SRK Consulting.
- Specialist studies in support of the approved Environmental Management Programme (EMPr).
- Storm water management plan, October 2018. Compiled by Shangoni Management Services.

### **9.4. Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives**

#### **9.4.1 Proposed method of assessing environmental aspects**

The method for assessing the environmental aspects have been described in Part 8.6.2 above.



### 9.4.2 Proposed method of assessing alternatives

Refer to Parts 8.1 and 8.7 above for the description of alternatives identified and for the advantages and disadvantages of the identified alternatives.

## 9.5. The proposed method of assessing duration and significance

The method used in determining the significance and the duration of the impact is described above in Table 31. Duration is divided into five (5) periods. A score of between 1 and 5 is assigned to the impact based on the characteristics of the impact and the period for which the impact will occur and have an impact on the socio-economic, cultural and biophysical environment. The score assigned to the specific impact for duration is then used in determining the magnitude of the impact.

*Table 31: Determination of the duration of the impact*

Duration of impact	Score
Lasting days to a month	1
Lasting 1 month to 1 year	2
Lasting 1 – 5 years	3
Lasting 5 years to Life of Organisation	4
Beyond life of Organisation / Permanent impacts	5

## 9.6. The stages at which the Competent Authority will be consulted

The Competent Authority, in this case the Limpopo: Department of Mineral Resources (DMR) will be consulted throughout the application process.

This Scoping Report is compiled and will be made available for public and stakeholder review for a period of thirty (30) days. This Scoping Report will be submitted to the DMR, where after the DMR will have 44 days to either refuse environmental authorisation or accept the Scoping Report and inform the applicant to proceed with the tasks contemplated in the plan of study for the EIA.

The Competent Authority (the DMR) will further be involved during the EIA phase of the project. The EIAR and EMPr will also be made available for a public and stakeholder review period of thirty (30) days. Upon completion of the review period, the EIAR and EMPr will be finalised and submitted to the DMR, where after the DMR will have a period of 107 days to consider the application and, in writing, notify the applicant of the decision to grant or refuse environmental authorisation.



## 9.7. Particulars of the public participation process with regard to the impact assessment process that will be conducted

### 9.7.1 Steps to be taken to notify interested and affected parties

A detailed public participation process was undertaken as part of the initial application and scoping phase for the proposed project. The following has been conducted as part of the Mining Right and Environmental Authorisation Application (proof hereof will be included in the final Public Participation Report to be submitted to the DMR along with the Final Scoping Report) (will be attached as Annexure E to this report):

- Advertisements

A Newspaper advertisements was placed in the Bosveld Newspaper on 07 December 2018.

- Site notices

Five (5) site notices were placed around the proposed project site as well as at the existing mine.

- Written notices

Written notices (including BIDs) were distributed to Interested and Affected Parties (I&APs).

- Availability of Scoping Report for public review

This Scoping Report will be made available for public and stakeholder review for a period of more than 30 days (from 7 December 2018 to 31 January 2019). Notices providing the detail of the public viewing station and review period, were sent to registered I&APs via e-mail. This notification also formed part of the above-mentioned advertisement and site notices.

## 9.8. Description of the tasks that will be undertaken as part of the environmental impact assessment process

The Draft Environmental Impact Assessment Report (EIAR) and Environmental Management Programme Report (EMPr) will be submitted, once the Scoping Report has been accepted by the Competent Authority. The EIAR will be compiled in accordance to Appendix 3 of the EIA Regulations 2014, as amended and the Draft Environmental Management Programme Report (EMPr) will be compiled in accordance to Appendix 4 of the EIA Regulations 2014, as amended.

### Required content of Environmental Impact Assessment Report

An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-

- (a) Details of-
  - (i) The EAP who prepared the report; and
  - (ii) The expertise of the EAP, including a curriculum vitae;
- (b) The location of the activity, including:
  - (i) The 21-digit Surveyor General code of each cadastral land parcel;
  - (ii) Where available, the physical address and farm name; and





- (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.
- (c) A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-
  - (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; and
  - (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.
- (d) A description of the scope of the proposed activity, including-
  - (i) All listed and specified activities triggered and being applied for; and
  - (ii) A description of the associated structures and infrastructure related to the development.
- (e) A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- (f) A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
- (g) A motivation for the preferred development footprint within the approved site;
- (h) A full description of the process followed to reach the proposed development footprint within the approved site, including:
  - (i) Details of the development footprint alternatives considered;
  - (ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;
  - (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
  - (iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - (v) The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-
    - (aa) Can be reversed;
    - (bb) May cause irreplaceable loss of resources; and
    - (cc) Can be avoided, managed or mitigated;
  - (vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;



- (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community, that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - (viii) The possible mitigation measures that could be applied and level of residual risk;
  - (ix) If no alternative development locations for the activity were investigated, the motivation for not considering such; and
  - (x) A concluding statement indicating the preferred alternative development location within the approved site;
- (i) A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-
- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and
  - (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;
- (j) An assessment of each identified potentially significant impact and risk, including-
- (i) Cumulative impacts;
  - (ii) The nature, significance and consequences of the impact and risk;
  - (iii) The extent and duration of the impact and risk;
  - (iv) The probability of the impact and risk occurring;
  - (v) The degree to which the impact and risk can be reversed;
  - (vi) The degree to which the impact and risk may cause irreplaceable loss of resources;
  - (vii) The degree to which the impact and risk can be mitigated;
- (k) Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;
- (l) An environmental impact statement which contains-
- (i) a summary of the key findings of the environmental impact assessment;
  - (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and
  - (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives; based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
- (m) Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes



- for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
- (n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
  - (o) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation
  - (p) A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
  - (q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
  - (r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;
  - (s) An undertaking under oath or affirmation by the EAP in relation to:
    - (i) The correctness of the information provided in the reports;
    - (ii) The inclusion of comments and inputs from stakeholders and I&APs;
    - (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and
    - (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;
  - (t) Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;
  - (u) An indication of any deviation from the approved scoping report, including the plan of study, including-
    - (i) Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and
    - (ii) A motivation for the deviation;
  - (v) Any specific information that may be required by the competent authority; and
  - (w) Any other matters required in terms of section 24(4) (a) and (b) of the Act.

### Required content of EMPr

An EMPr must comply with section 24N of the Act and include-

- (a) Details of
  - (i) The EAP who prepared the EMPR; and
  - (ii) The expertise of that EAP to prepare an EMPR, including a curriculum vitae;
- (b) A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description;



- (c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
- (d) A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-
  - (i) Planning and design;
  - (ii) Pre-construction activities;
  - (iii) Construction activities;
  - (iv) Rehabilitation of the environment after construction and where applicable post closure;
  - (v) Where relevant, operation activities;
- (e) A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);
- (f) A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to –
  - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  - (ii) Comply with any prescribed environmental management standards or practices;
  - (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
  - (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation;
- (g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
- (h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
- (i) An indication of the persons who will be responsible for the implementation of the impact management actions;
- (j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
- (k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
- (l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
- (m) An environmental awareness plan describing the manner in which-
  - (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
  - (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment;
- (n) Any specific information that may be required by the competent authority.



## **9.9. Measures to avoid, reverse, mitigate, or manage identified impacts**

Table 32 below is the Risk assessment table in which preliminarily identified impacts have been identified. Mitigations measures (to avoid , reverse, mitigate, or manage identified impacts) as well as the extent to which these impacts are anticipated to result in residual risks are also provided in Table 32 below.



Table 32: Risk assessment table

Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/Control/Stop	Potential for residual risk
Geology	No activities identified.	<ul style="list-style-type: none"> <li>There are no impacts identified to Geology as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.</li> </ul>	No mitigation measures proposed.	No potential for residual risk.
Topography	No activities identified.	<ul style="list-style-type: none"> <li>There are no impacts identified to Topography as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.</li> </ul>	No mitigation measures proposed.	No potential for residual risk.
Soils, land use and land capability	Activities 1-12	<ul style="list-style-type: none"> <li>Soil contamination,</li> <li>Removal of potentially contaminated material.</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>Excavation of the contaminated material for disposal to a licensed landfill through waste classification analysis to ascertain correct disposal methods in terms of the National Norms and Standards.</li> <li>Sub surface structures to be backfilled and sealed off.</li> <li>Dry cement must be removed from the soil surface to prevent an impermeable layer forming on top of the soil. The cement must be disposed of together with any building rubble in the pits and on waste rock dumps.</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.
Fauna and Flora	Activities 1-24	<ul style="list-style-type: none"> <li>Proliferation and a further increase of alien and invasive grass species</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>All alien invasive species will be controlled in accordance to the Control of Alien Invasive</li> </ul>	Low to medium potential for residual



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
		are expected within disturbed areas.	Vegetation Procedure MS-COM-ENV-PRO-0025.	risk, if not mitigated appropriately.
Surface water	Activities 1-12 (Decommissioning of existing fuel depot)	<ul style="list-style-type: none"> <li>Accidental spillages of fuel on site and incorrect storage and transport practises may impact on the surrounding clean surface water environment.</li> </ul>	<b>Control:</b> <ul style="list-style-type: none"> <li>Ensure that the tanks and pipes are flushed and empty before transportation to the new site.</li> <li>Care must be taken when emptying tanks so that no spillages occur. Drip trays must be used where practical.</li> <li>When moving tanks, care must be taken to prevent damage to the tanks that could result in spillages.</li> <li>Empty tanks must be stored on impermeable surfaces, such as concrete foundations, and may not be stored on bare soil.</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.
	Activities 13-24 (Construction of new fuel depot)	<ul style="list-style-type: none"> <li>Spillages of hazardous materials used during the construction of the proposed fuel depot may impact on the surrounding clean water environment,</li> <li>Potential spillages from concrete delivery trucks.</li> </ul>	<b>Control:</b> <ul style="list-style-type: none"> <li>Ensure that portable chemical toilets are maintained at agreed upon intervals by an appropriate contractor.</li> <li>Washing of concrete delivering trucks and cement equipment on site as well as cement /concrete mixing outside of demarcated areas and the incorrect disposal of excess cement and concrete may impact on the surrounding clean water environment,</li> <li>Refuelling of vehicles to take place on an impermeable surface.</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
			<ul style="list-style-type: none"> <li>To contain any spillages, the refuelling area must be serviced by storm water drains that lead to a sump.</li> <li>Emergency spills kits should be available.</li> <li>Ensure that all hazardous chemicals are stored in designated, bunded areas of which access is controlled.</li> <li>The bunded area should be able to contain 110% of the storage capacity.</li> </ul>	
Groundwater	Activities 1-12 (Decommissioning of existing fuel depot)	<ul style="list-style-type: none"> <li>Groundwater may become contaminated by hydrocarbon spillages during decommissioning activities.</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>Removal of all potentially polluting infrastructure.</li> <li>Building rubble and concrete should be inspected for any contamination before disposed of in the pit or waste rock dump landfill site.</li> <li>Material stripped from the decommissioned fuel depot will be stored at the new site until construction can commence.</li> <li>Contaminated soil should be stored in skips demarcated for this purpose and disposed of by an appointed waste disposal certificated contractor to a permitted landfill site.</li> <li>Excavation of the contaminated material for disposal to a licensed landfill through waste classification analysis to ascertain correct disposal methods in terms of the National Norms and Standards.</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.





Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
			<ul style="list-style-type: none"> <li>Remove substations and surrounding contaminants,</li> <li>Where required, flush any pipelines to remove hazardous material and treat material as waste.</li> </ul>	
	Activities 13-24 (Construction of new fuel depot)	<ul style="list-style-type: none"> <li>Groundwater may become contaminated by hydrocarbons leaking from equipment and machinery, temporarily stored materials at the waste rock dump area (proposed site for the new fuel depot).</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>Proper handling, storage and disposal of hazardous chemicals. All fuels and flammable materials are to be handled safely, stored safely and clearly labelled.</li> <li>Drip trays must be used to collect spillage from equipment, vehicles and plant. These should be emptied regularly into secondary containers.</li> <li>Vehicles should regularly be inspected for leaks and should be immediately repaired.</li> <li>Fuels and flammable materials are to be handled in a safety conscious manner.</li> <li>If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> <li>All fuels and flammable materials are to be stored safely and clearly labelled.</li> <li>Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
			identification signs, are to be clearly displayed on fuel stores and tanks. <ul style="list-style-type: none"> <li>All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids and drip trays.</li> <li>Fuel and flammable materials are to be kept under lock and key at all times and are to be stored at a central, easily accessible location.</li> <li>All personnel handling fuels and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE).</li> </ul>	
Sensitive landscapes	No activities identified.	There are no impacts identified to Sensitive Landscapes as a result of the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.	No mitigation measures proposed.	No potential for residual risk.
Air quality	Activities 1-12 (Decommissioning of existing fuel depot)  Activities 13-24 (Construction of new fuel depot)	<ul style="list-style-type: none"> <li>Dust generation from internal access roads and general demolition and crushing activities.</li> <li>Air pollution from decommissioning and construction activities.</li> <li>Dust generation from vehicles travelling from the decommissioning to the construction site.</li> <li>Dust generation from construction activities.</li> </ul>	<b>Control:</b> <ul style="list-style-type: none"> <li>Vehicles should be regularly serviced to minimise atmospheric emissions.</li> <li>The Air quality monitoring programme will be continued with.</li> <li>Dust suppression of roads at regular intervals or during windy periods.</li> <li>All informal fires on the property should be prohibited.</li> </ul>	Low to medium potential for residual risk, if not mitigated appropriately.



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
Noise	Activities 1-12 (Decommissioning of existing fuel depot)	<ul style="list-style-type: none"> <li>Increase in ambient noise levels by vehicles removing material and dumping building rubble in the pit area and waste rock dumps.</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>Noise monitoring will be conducted during the decommissioning phase in order to ensure compliance with the relevant standard.</li> <li>Demolition activities are to take place during the approved work hours (7H00 – 18H00), these are to be known to and agreed upon with all contractors.</li> <li>Silencers shall be fitted to the heavy machinery where possible.</li> </ul>	Low potential for residual risk.
	Activities 13-24 (Construction of new fuel depot)	<ul style="list-style-type: none"> <li>Increase in ambient noise levels by construction activities for the proposed new fuel depot.</li> </ul>	<p><b>Control:</b></p> <ul style="list-style-type: none"> <li>The site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</li> <li>Regular maintenance of vehicles and equipment.</li> <li>All plant and machinery should be fitted with adequate silencers.</li> <li>Working procedures should be structured so as to avoid the unnecessary generation of noise.</li> <li>No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site.</li> </ul>	Low potential for residual risk.



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
			<ul style="list-style-type: none"> <li>If work is to be undertaken outside of normal work hours permission must be obtained from the ECO and the site manager.</li> <li>No noisy work is to be conducted over the weekends or on religious public holidays.</li> <li>A complaints register must be kept on site. The complaints register must record the following: date when complaint was received, name of person who reported the complaint and when and how the concern was addressed.</li> </ul>	
Visual aspects	Activities 1-12 (Decommissioning of existing fuel depot)	<ul style="list-style-type: none"> <li>The visual environment will alter slightly once the existing fuel depot infrastructure has been decommissioned and the associated infrastructure crushed/broken.</li> </ul>	No mitigation measures proposed.	Low potential for residual risk.
	Activities 13-24 (Construction of new fuel depot)	<ul style="list-style-type: none"> <li>The visual environment will change once the proposed new fuel depot is constructed on the waste rock dump.</li> </ul>	No mitigation measures proposed.	Low potential for residual risk.
Sites of cultural and	No activities identified.	<ul style="list-style-type: none"> <li>There are no impacts identified, as no sites of archaeological and</li> </ul>	No mitigation measures proposed.	No potential for residual risk.



Environmental component (Aspects affected)	Activity	Potential Impact	Mitigation type Modify/Remedy/ Control/Stop	Potential for residual risk
archaeological importance		cultural importance occur at the existing fuel depot and proposed site.		
Socio-economic aspects	Activities 1-24 (Decommissioning of existing fuel depot and Construction of new fuel depot)	<ul style="list-style-type: none"> <li>Creation of Employment opportunities on the mine for the local communities during the decommissioning of the existing fuel depot and construction of the proposed new fuel depot.</li> </ul>	<b>Control:</b> <ul style="list-style-type: none"> <li>Local companies and labour should be utilized where possible.</li> <li>The site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</li> </ul>	Low potential for residual risk.



## 10. Other information required by the Competent Authority

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

#### 10.1.1 Impact on the socio-economic conditions of any directly affected person

Table 33: Impact on the socio-economic conditions of any directly affected person

Results of investigation, assessment and evaluation of impact on any directly affected person	Reference to where mitigation is reflected
Mogalakwena Mine indicates that it strives to maintain a positive impact on the socio-economic environment during the life of mine. The mine indicates that it is actively involved in the community whereby funds are made available for the development of local infrastructure and social upliftment. Education and health have been addressed on this basis with clinics having been provided and schools uplifted.	Section 8.6.2.

#### 10.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act 25 of 1999.

Table 34: Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act 25 of 1999.

Results of investigation, assessment and evaluation of impact on any national estate	Reference to where mitigation is reflected
No impact on national estate (heritage resources) in terms of the Heritage Resources Act (Act 25 of 1999), are identified as part of the project, as the project is on brownfields areas.	Refer to Chapter K of Part 8.4.1.

## 11. Other matters required in terms of section 24(4)(a) and (b) of the Act

Section 24(4)(b) of the NEMA (1998), as amended, states that the following:

- “24(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment -*
- (b) must include, with respect to every application for an environmental authorisation and where applicable-*



- (i) *investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;"*

The positive and negative implication of the proposed activity and the alternative identified have been provided above under Section 8.7. The positive and negative implications of both the proposed activities and the preliminary identified alternatives will be further assessed as part of the EIAR and EMPr.

