



global environmental solutions

# **SCOPING REPORT FOR THE PROPOSED ALEXANDER PROJECT**

**February 2016**

**SUBMITTED FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (ACT 59 OF 2008) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY AN APPLICATION IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 OF 2002) (AS AMENDED)**

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## SCOPING REPORT FOR THE PROPOSED ALEXANDER PROJECT

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**ACRONYMS AND ABBREVIATIONS**

<b>Acronyms / Abbreviations</b>	<b>Definition</b>
AAIC	Anglo American Inyosi Coal (Pty) Limited
BID	Background information document
DAFF	Department of Agriculture, Forestry and Fisheries
dBA	A-weighted decibel
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment
ELM	Emalahleni Local Municipality
EMPR	Environmental management programme report
GN	General Notice
GMLM	Govan Mbeki Local Municipality
ha	Hectares
IAPs	Interested and/or affected parties
IWWMP	Integrated water and waste management plan
Km	Kilometres
Kv	Kilovolts
m	Meters
mamsl	Metres above mean sea level
mm	Millimetres
MPRDA	Mineral and Petroleum Resources Development Act, 2002
MR	Mining Right
NEMA	National Environmental Management Act, 1998
NEM:WA	National Environmental Management: Waste Management Act, 2008
NWA	National Water Act, 1998
NGO	Non-government organisation
ROM	Run-of-mine
SACNSP	South African Council for Natural Scientific Professionals
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SMS	Short Message Service
SYNERGISTICS	Synergistics Environmental Services
WRD	Waste Rock Dump
WULA	Water Use License Application

## SCOPING REPORT FOR THE PROPOSED ALEXANDER PROJECT

### 1 INTRODUCTION

#### 1.1 INTRODUCTION TO THE PROPOSED PROJECT

Anglo American Inyosi Coal (Pty) Ltd (AAIC) is proposing to establish a new underground coal mine through the Alexander Project ('the project'). The Alexander coal resource lies within the current AAIC Kriel East and Elders Underground Extension prospecting right areas (proposed Alexander mining right area) and covers an area of approximately ~ 7,300ha. The project will involve the development of surface and underground facilities. In broad terms the proposed Alexander Project will comprise an underground mine, a waste rock dump, topsoil stockpiles, mine related facilities such as workshops, stores and various support infrastructure and services. Further to this, the proposed project will require construction of an overland conveyor to transport run-of mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery for beneficiation purposes.

The proposed project is located approximately 14 km northwest of Bethal and directly to the south and south-east of Kriel in the Mpumalanga Province. The Alexander resource lies between the R547 provincial road to the west and the R35 provincial road to the east, with the R545 provincial road bisecting the resource in a north-west to south-east direction. See Figure 1-1 for the locality of the project.

Synergistics Environmental Services (Synergistics), an SLR Group Company, has been appointed as the independent environmental assessment practitioner (EAP) responsible for undertaking the necessary environmental assessment and public participation process for the project.

#### 1.2 SUMMARY OF AUTHORISATION REQUIREMENTS

Prior to the commencement of the proposed project, environmental authorisation is required from various government departments. These include:

- A mining right and environmental authorisation in terms of the Mineral and Petroleum Resources Development Act, MPRDA which is regulated by the DMR.
- Environmental authorisation from the DMR in terms of the National Environmental Management Act, 1998 (NEMA, No. 107 of 1998). The proposed project incorporates several listed environmental activities. The applicable list of activities is provided in Section 2.3 (Table 2-2) of this report. The EIA regulations being followed for this project are Government Notice Regulation (GNR) 982, 983, 984 and 985 of 4 December 2014 (EIA Regulations).
- A waste management license from the DMR in terms of the National Environmental Management: Waste Act, 2008 (NEM:WA, No 59 of 2008). The applicable list of activities as currently set out in the

legislation (and which is possibly subject to change) is provided in Section 2.3 (Table 2-2) of this report.

A water use license from the Department of Water and Sanitation (DWS) in terms of the National Water Act, 1998 (NWA, No. 36 of 1998) will be required.

Any additional approvals/permits needed for the project will be identified during the course of the EIA process. A detailed list of such requirements will be provided in the EIA/Environmental Management Programme (EMP) report.

Other permits in terms of health/safety regulations might be required but does not form part of the environmental impact assessment process.

### **1.3 STRUCTURE OF THE REPORT**

The scoping report is structured in accordance with the DMR scoping report template and the NEMA regulations (set out in GNR 982).

### **1.4 SUMMARY OF EIA OBJECTIVES**

An Environmental Impact Assessment is conducted in two phases. The first phase is scoping and the second phase is the EIA/EMP report compilation. The objectives of these phases are briefly outlined below.

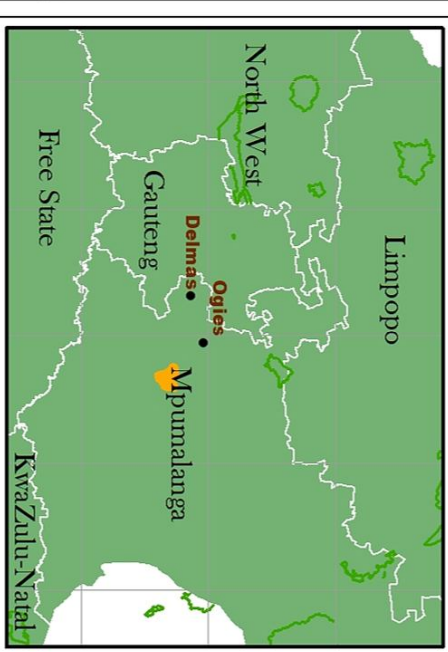
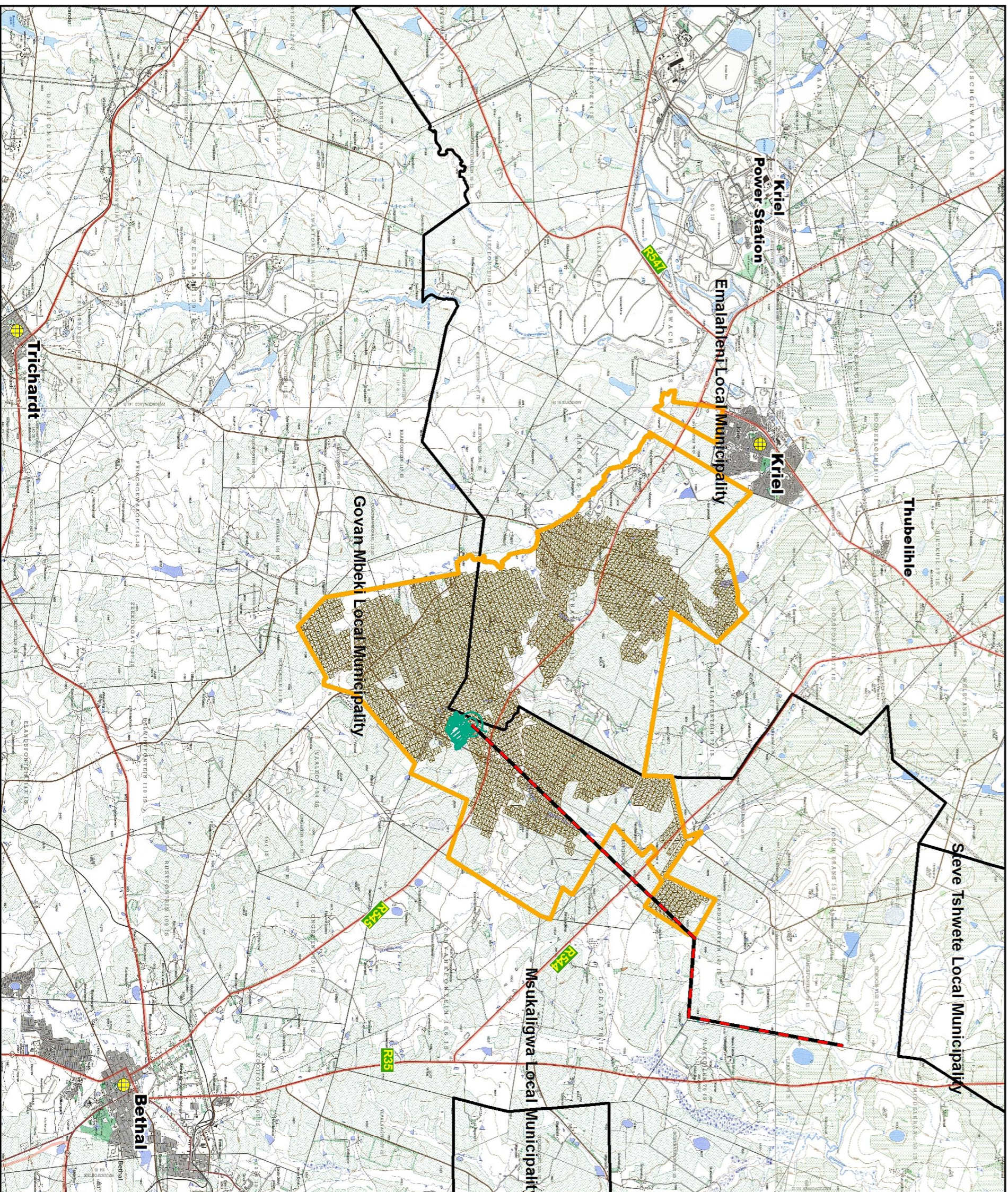
#### **1.4.1 SCOPING PHASE**

In the context of the proposed project the scoping phase activities are to: identify relevant policies and legislation; consider the need and desirability, consider alternative technologies and sites; identify the potential environmental issues; determine the level of assessment and public participation required for the EIA phase; and identify preliminary measures to avoid, mitigate or manage potential impacts.








#### **1.4.2 EIA AND EMP PHASE**

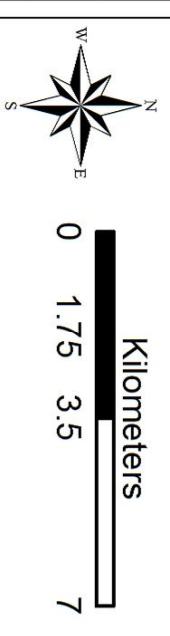
The objectives of the EIA phase are to assess the potential impacts associated with the preferred project alternatives as per the terms of reference for the assessment that are set out in the scoping report. The EIA/EMP report will document the assessment findings and will detail the measures required to avoid, mitigate and/or manage the potential impacts.





**Legend**

-  Place Names
-  Proposed Conveyor Route
-  Shaft Complex
-  Main Roads
-  Alexander Mine Plan
-  Proposed Alexander Mining Right Area
-  Local Municipalities




**SLR** Synergistcs is an SLR group company  
Environmental Services

**Figure 1-1: Locality and Conceptual Layout Map**

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Spheroid: Hartbeesthoek '94  
Coordinate System: DMS  
Central Meridian: LO29



## 1.5 DETAILS OF THE EAP

### 1.5.1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

The details of the environmental assessment practitioners (EAPs) that were involved in the preparation of this scoping report are provided in Table 1-1 below.

**TABLE 1-1: DETAILS OF THE EAP**

DETAILS	PROJECT MANAGER	REVIEWER
Name of the practitioner	Marline Medallie	Brandon Stobart
Responsibility on the project	EAP	EAP, Reviewer
Tel No.:	011 467 0945	011 467 0945
Fax No.:	011 467 0975	011 467 0975
Postal address	PO Box 1596, Cramerview, 2060	PO Box 1596, Cramerview, 2060
E-mail address	mmedallie@slrconsulting.com	-

Neither Synergistics nor any of the specialists involved in the EIA process have any interest in the project other than fair payment for consulting services rendered as part of the EIA process.

### 1.5.2 QUALIFICATIONS AND EXPERIENCE OF THE EAP

Marline Medallie holds a Masters Degree and has over 7 years of relevant experience in the assessment of impacts associated with mining operations. Brandon Stobart has over 17 years of relevant experience and is registered as an Environmental Assessment Practitioner with the interim certification board. Both Brandon and Marline have been involved in several impact assessments for large scale mining developments in South Africa. Proof of registrations of the relevant practitioners is provided in Appendix 1 and relevant curricula vitae are attached in Appendix 2.

## 2 PROJECT DESCRIPTION

### 2.1 LOCATION OF THE ACTIVITY

A description of the property on which the proposed project is located is provided in Table 2-1.

**TABLE 2-1: DESCRIPTION OF THE PROPERTY**

DESCRIPTOR	DETAIL
Farm Name	<p><b><u>Proposed Mining Right Area</u></b></p> <p>Aangewys 81 IS portion 1  Aangewys 81 IS portion 3  Aangewys 81 IS portion 4  Aangewys 81 IS portion 6  Aangewys 81 IS portion 7  Aangewys 81 IS portion 8  Aangewys 81 IS portion 16  Aangewys 81 IS portion 17  Aangewys 81 IS portion 18  Aangewys 81 IS portion 19  Aangewys 81 IS portion 21  Aangewys 81 IS portion 22  Aangewys 81 IS portion 23  Aangewys 81 IS portion 25  Aangewys 81 IS portion 26  Aangewys 81 IS portion 27  Aangewys 81 IS portion 28  Aangewys 81 IS portion 30  Aangewys 81 IS portion 31  Aangewys 81 IS portion 34  Aangewys 81 IS portion 35  Aangewys 81 IS portion 36  Aangewys 81 IS portion 37  Aangewys 81 IS portion 38  Alexander 102 IS portion 1  Alexander 102 IS portion 2  Alexander 102 IS portion 3  Alexander 102 IS portion 4  Alexander 102 IS portion 5  Alexander 102 IS portion 9  Alexander 102 IS portion 10  Alexander 102 IS portion 12  Alexander 102 IS portion 13  Alexander 102 IS portion 14  Bakenlaagte 84 IS portion 4  Bakenlaagte 84 IS portion 6  Boschmanskraal 113 IS portion 4  Brakfontein 117 IS RE  Caley 77 IS RE  Dorsfontein 71 IS RE  Dorstfontein 71 IS portion 6  Driefontein 69 IS RE  Driefontein 69 IS portion 1  Driefontein 69 IS portion 2  Driefontein 69 IS portion 3  Driefontein 69 IS portion 8  Driefontein 69 IS portion 9</p>



DESCRIPTOR	DETAIL
	Driefontein 69 IS portion 10
	Driefontein 69 IS portion 11
	Driefontein 69 IS portion 12
	Driefontein 69 IS portion 13
	Driefontein 69 IS portion 15
	Driefontein 69 IS portion 17
	Driefontein 69 IS portion 19
	Driefontein 69 IS portion 20
	Driefontein 69 IS portion 21
	Driefontein 69 IS portion 22
	Driefontein 69 IS portion 23
	Driefontein 69 IS portion 24
	Driefontein 69 IS portion 25
	Driefontein 69 IS portion 26
	Driefontein 69 IS portion 27
	Driefontein 69 IS portion 30
	Driefontein 69 IS portion 31
	Driefontein 69 IS portion 32
	Driefontein 69 IS portion 39
	Driefontein 69 IS portion 40
	Elandsfontein 75 IS portion 2
	Elandsfontein 75 IS portion 3
	Elandsfontein 75 IS portion 10
	Frischgewaagd 60 IS RE
	Frischgewaagd 60 IS portion 1
	Frischgewaagd 60 IS portion 2
	Frischgewaagd 60 IS portion 3
	Frischgewaagd 60 IS portion 5
	Frischgewaagd 60 IS portion 6
	Frischgewaagd 60 IS portion 7
	Frischgewaagd 60 IS portion 8
	Frischgewaagd 60 IS portion 13
	Geluk 226 IS portion 1
	Geluk 226 IS portion 2
	Halfgewonnen 190 IS portion 2
	Halfgewonnen 190 IS portion 3
	Halfgewonnen 190 IS portion 4
	Halfgewonnen 190 IS portion 12
	Halfgewonnen 190 IS portion 13
	Kafferstad 79 IS RE
	Kafferstad 79 IS portion 2
	Kafferstad 79 IS portion 6
	Kafferstad 79 IS portion 7
	Kafferstad 79 IS portion 8
	Kafferstad 79 IS portion 9
	Kafferstad 79 IS portion 10
	Kafferstad 79 IS portion 11
	Kafferstad 79 IS portion 14
	Kafferstad 79 IS portion 17
	Kafferstad 79 IS portion 19
	Kriel 73 IS RE
	Kriel 73 IS portion 1
	Kriel 73 IS portion 3
	Kriel 73 IS portion 4
	Kriel 73 IS portion 12
	Kriel Power Station 65 IS RE
	Kriel Town

DESCRIPTOR	DETAIL
	Legdaar 78 IS portion 5
	Legdaar 78 IS portion 6
	Legdaar 78 IS portion 7
	Legdaar 78 IS portion 16
	Legdaar 78 IS portion 17
	Matla Power Station 141 IS RE
	Middelkraal 50 IS remaining extent (RE)
	Middelkraal 50 IS portion 3
	Middelkraal 50 IS portion 5
	Middelkraal 50 IS portion 6
	Middelkraal 50 IS portion 8
	Nooitgedacht 59 IS RE
	Nooitgedacht 59 IS portion 1
	Nooitgedacht 59 IS portion 2
	Nooitgedacht 59 IS portion 3
	Nooitgedacht 59 IS portion 6
	Nooitgedacht 59 IS portion 7
	Nooitgedacht 59 IS portion 8
	Nooitgedacht 59 IS portion 10
	Onverwacht 70 IS portion 1
	Onverwacht 70 IS portion 2
	Onverwacht 70 IS portion 3
	Onverwacht 70 IS portion 4
	Onverwacht 70 IS portion 7
	Onverwacht 70 IS portion 9
	Onverwacht 70 IS portion 10
	Onverwacht 70 IS portion 11
	Onverwacht 70 IS portion 12
	Onverwacht 70 IS portion 13
	Onverwacht 70 IS portion 14
	Onverwacht 70 IS portion 15
	Onverwacht 70 IS portion 16
	Onverwacht 70 IS portion 19
	Onverwacht 70 IS portion 21
	Onverwacht 70 IS portion 23
	Rensburgshoop 74 IS portion 2
	Rensburgshoop 74 IS portion 5
	Rensburgshoop 74 IS portion 7
	Rietfontein 100 IS portion 2
	Rietfontein 100 IS portion 4
	Rietfontein 100 IS portion 5
	Rietfontein 100 IS portion 6
	Rietfontein 100 IS portion 7
	Rietfontein 100 IS portion 8
	Rietfontein 100 IS portion 10
	Rietfontein 100 IS portion 12
	Rietfontein 100 IS portion 13
	Rietfontein 100 IS portion 14
	Rietfontein 100 IS portion 15
	Rietfontein 101 IS RE
	Rietfontein 101 IS portion 1
	Rietfontein 101 IS portion 2
	Rietfontein 101 IS portion 4
	Rietfontein 101 IS portion 5
	Roodebloem 58 IS RE
	Roodebloem 58 IS portion 3
	Roodepoort 40 IS portion 2

DESCRIPTOR	DETAIL
	Roodepoort 40 IS portion 14
	Schurvekop 227 IS portion 7
	Schurvekop 227 IS portion 12
	Schurvekop 227 IS portion 13
	Schurvekop 227 IS portion 14
	Schurvekop 227 IS portion 22
	Schurvekop 227 IS portion 26
	Schurvekop 227 IS portion 27
	Schurvekop 227 IS portion 28
	Vaalpan 68 IS portion 1
	Vaalpan 68 IS portion 2
	Vaalpan 68 IS portion 3
	Vaalpan 68 IS portion 4
	Vaalpan 68 IS portion 6
	Vaalpan 68 IS portion 7
	Vaalpan 68 IS portion 8
	Vaalpan 68 IS portion 9
	Vaalpan 68 IS portion 10
	Vaalpan 68 IS portion 11
	Vierfontein 61 IS portion 4
	Vierfontein 61 IS portion 6
	Vierfontein 61 IS portion 24
	Vierfontein 61 IS portion 32
	Vierfontein 61 IS portion 39
	Vierfontein 61 IS portion 40
	Vierfontein 61 IS portion 45
	Vierfontein 61 IS portion 46
	Vierfontein 61 IS portion 47
	Vierfontein 61 IS portion 48
	Vierfontein 61 IS portion 49
	Vierfontein 61 IS portion 50
	Vlakkuijen 76 IS RE
	Vlaklaagte 83 IS portion 1
	Vlaklaagte 83 IS portion 2
	Vlaklaagte 83 IS portion 3
	Vlaklaagte 83 IS portion 4
	Vlaklaagte 83 IS portion 5
	Wilgervlei 555 IS RE
	Witbank 80 IS portion 1
	Witbank 80 IS portion 3
	Witbank 80 IS portion 4
	Witbank 80 IS portion 6
	Witbank 80 IS portion 7
	Witbank 80 IS portion 8
	Witbank 80 IS portion 10
	Witbank 80 IS portion 11
	Witbank 80 IS portion 12
	Witbank 80 IS portion 13
	Witbank 80 IS portion 14
	Witbank 80 IS portion 15
	Witbank 80 IS portion 17
	Witbank 80 IS portion 20
	Witbank 80 IS portion 21
	Witbank 80 IS portion 23
	Witbank 80 IS portion 24
	Witbank 80 IS portion 25
	Witbank 80 IS portion 26

DESCRIPTOR	DETAIL
	<p>Witbank 80 IS portion 27  Witbank 80 IS portion 28  Witbank 80 IS portion 29  Witbank 80 IS portion 30  Witbank 80 IS portion 31  Witbank 80 IS portion 32  Witbank 80 IS portion 33  Witbank 80 IS portion 34  Witbank 80 IS portion 37  Witbank 576 IS RE  Witransdorp 103 IS portion 4  Witransdorp 103 IS portion 5  Witransdorp 103 IS portion 6  Witransdorp 103 IS portion 7  Witransdorp 103 IS portion 8  Witransdorp 103 IS portion 18  Witransdorp 103 IS portion 22  Witransdorp 103 IS portion 25</p> <p><b>Proposed Overland ROM Conveyor</b>  Elandsfontein 75 IS portion 2  Elandsfontein 75 IS portion 3  Elandsfontein 75 IS portion 4  Elandsfontein 75 IS portion 7  Elandsfontein 75 IS portion 8  Elandsfontein 75 IS portion 9  Elandsfontein 75 IS portion 10  Elandsfontein 75 IS portion 11  Elandsfontein 75 IS portion 13  Legdaar 78 IS portion 1  Legdaar 78 IS portion 4  Legdaar 78 IS portion 5  Legdaar 78 IS portion 6  Legdaar 78 IS portion 7  Legdaar 78 IS portion 16  Legdaar 78 IS portion 17  Middelkraal 50 IS portion 3  Middelkraal 50 IS portion 8  Rensburgshoop 74 IS portion 6  Rensburgshoop 74 IS portion 10  Schoon-Vlei 52 IS portion 2  Vlakkuijlen 76 IS RE.</p>
<b>Application area (Ha)</b>	The mining right application area is approximately 10,700ha of which ~ 7300ha covers the mine plan. The disturbance area will be much less than this because the surface infrastructure and proposed mining area are limited in extent. The approximate area of the proposed surface infrastructure is ~ 220ha (Mine shaft complex ~ 120 ha; Overland conveyor ~ 100 ha).
<b>Magisterial district</b>	Emalahleni Local Municipality Govan Mbeki Local Municipality Proposed Emalahleni Magisterial District Proposed Govan Mbeki Magisterial District Nkangala District Municipality Gert Sibande District Municipality
<b>Distance and direction from nearest town</b>	Located directly adjacent south and south-east of Kriel and ~ 14 km northwest of Bethal.
DESCRIPTOR	DETAIL

DESCRIPTOR	DETAIL	
21 digit Surveyor General Code for each farm portion	<b>21 DIGIT CODE</b>	<b>FARM PORTION</b>
	<b>Proposed Mining Right Area</b>	
	TOIS0000000008100001	Aangewys 81 IS portion 1
	TOIS0000000008100003	Aangewys 81 IS portion 3
	TOIS0000000008100004	Aangewys 81 IS portion 4
	TOIS0000000008100006	Aangewys 81 IS portion 6
	TOIS0000000008100007	Aangewys 81 IS portion 7
	TOIS0000000008100008	Aangewys 81 IS portion 8
	TOIS0000000008100016	Aangewys 81 IS portion 16
	TOIS0000000008100017	Aangewys 81 IS portion 17
	TOIS0000000008100018	Aangewys 81 IS portion 18
	TOIS0000000008100019	Aangewys 81 IS portion 19
	TOIS0000000008100021	Aangewys 81 IS portion 21
	TOIS0000000008100022	Aangewys 81 IS portion 22
	TOIS0000000008100023	Aangewys 81 IS portion 23
	TOIS0000000008100025	Aangewys 81 IS portion 25
	TOIS0000000008100026	Aangewys 81 IS portion 26
	TOIS0000000008100027	Aangewys 81 IS portion 27
	TOIS0000000008100028	Aangewys 81 IS portion 28
	TOIS0000000008100030	Aangewys 81 IS portion 30
	TOIS0000000008100031	Aangewys 81 IS portion 31
	TOIS0000000008100034	Aangewys 81 IS portion 34
	TOIS0000000008100035	Aangewys 81 IS portion 35
	TOIS0000000008100036	Aangewys 81 IS portion 36
	TOIS0000000008100037	Aangewys 81 IS portion 37
	TOIS0000000008100038	Aangewys 81 IS portion 38
	TOIS0000000010200001	Alexander 102 IS portion 1
	TOIS0000000010200002	Alexander 102 IS portion 2
	TOIS0000000010200003	Alexander 102 IS portion 3
	TOIS0000000010200004	Alexander 102 IS portion 4
TOIS0000000010200005	Alexander 102 IS portion 5	
TOIS0000000010200009	Alexander 102 IS portion 9	
TOIS0000000010200010	Alexander 102 IS portion 10	
TOIS0000000010200012	Alexander 102 IS portion 12	
TOIS0000000010200013	Alexander 102 IS portion 13	
TOIS0000000010200014	Alexander 102 IS portion 14	
TOIS0000000008400004	Bakenlaagte 84 IS portion 4	

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS0000000008400006	Bakenlaagte 84 IS portion 6
	TOIS00000000011300004	Boschmanskraal 113 IS portion 4
	TOIS00000000011 700000	Brakfontein 117 IS RE
	TOIS00000000007700000	Caley 77 IS RE
	TOIS00000000007100000	Dorstfontein 71 IS RE
	TOIS00000000007100006	Dorstfontein 71 IS portion 6
	TOIS00000000006900000	Driefontein 69 IS RE
	TOIS00000000006900001	Driefontein 69 IS portion 1
	TOIS00000000006900002	Driefontein 69 IS portion 2
	TOIS00000000006900003	Driefontein 69 IS portion 3
	TOIS00000000006900008	Driefontein 69 IS portion 8
	TOIS00000000006900009	Driefontein 69 IS portion 9
	TOIS00000000006900010	Driefontein 69 IS portion 10
	TOIS00000000006900011	Driefontein 69 IS portion 11
	TOIS00000000006900012	Driefontein 69 IS portion 12
	TOIS00000000006900013	Driefontein 69 IS portion 13
	TOIS00000000006900015	Driefontein 69 IS portion 15
	TOIS00000000006900017	Driefontein 69 IS portion 17
	TOIS00000000006900019	Driefontein 69 IS portion 19
	TOIS00000000006900020	Driefontein 69 IS portion 20
	TOIS00000000006900021	Driefontein 69 IS portion 21
	TOIS00000000006900022	Driefontein 69 IS portion 22
	TOIS00000000006900023	Driefontein 69 IS portion 23
	TOIS00000000006900024	Driefontein 69 IS portion 24
	TOIS00000000006900025	Driefontein 69 IS portion 25
	TOIS00000000006900026	Driefontein 69 IS portion 26
	TOIS00000000006900027	Driefontein 69 IS portion 27
	TOIS00000000006900030	Driefontein 69 IS portion 30
	TOIS00000000006900031	Driefontein 69 IS portion 31
	TOIS00000000006900032	Driefontein 69 IS portion 32
	TOIS00000000006900039	Driefontein 69 IS portion 39
	TOIS00000000006900040	Driefontein 69 IS portion 40
	TOIS00000000007500002	Elandsfontein 75 IS portion 2
	TOIS00000000007500003	Elandsfontein 75 IS portion 3
	TOIS00000000007500010	Elandsfontein 75 IS portion 10
	TOIS00000000006000000	Frischgewaagd 60 IS RE

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS0000000006000001	Frischgewaagd 60 IS portion 1
	TOIS0000000006000002	Frischgewaagd 60 IS portion 2
	TOIS0000000006000003	Frischgewaagd 60 IS portion 3
	TOIS0000000006000005	Frischgewaagd 60 IS portion 5
	TOIS0000000006000006	Frischgewaagd 60 IS portion 6
	TOIS0000000006000007	Frischgewaagd 60 IS portion 7
	TOIS0000000006000008	Frischgewaagd 60 IS portion 8
	TOIS0000000006000013	Frischgewaagd 60 IS portion 13
	TOIS0000000022600001	Geluk 226 IS portion 1
	TOIS0000000022600002	Geluk 226 IS portion 2
	TOIS0000000019000002	Halfgewonnen 190 IS portion 2
	TOIS0000000019000003	Halfgewonnen 190 IS portion 3
	TOIS0000000019000004	Halfgewonnen 190 IS portion 4
	TOIS0000000019000012	Halfgewonnen 190 IS portion 12
	TOIS0000000019000013	Halfgewonnen 190 IS portion 13
	TOIS0000000007900000	Kafferstad 79 IS RE
	TOIS0000000007900002	Kafferstad 79 IS portion 2
	TOIS0000000007900006	Kafferstad 79 IS portion 6
	TOIS0000000007900007	Kafferstad 79 IS portion 7
	TOIS0000000007900008	Kafferstad 79 IS portion 8
	TOIS0000000007900009	Kafferstad 79 IS portion 9
	TOIS0000000007900010	Kafferstad 79 IS portion 10
	TOIS0000000007900011	Kafferstad 79 IS portion 11
	TOIS0000000007900014	Kafferstad 79 IS portion 14
	TOIS0000000007900017	Kafferstad 79 IS portion 17
	TOIS0000000007900019	Kafferstad 79 IS portion 19
	TOIS0000000007300000	Kriel 73 IS RE
	TOIS0000000007300001	Kriel 73 IS portion 1
	TOIS0000000007300003	Kriel 73 IS portion 3
	TOIS0000000007300004	Kriel 73 IS portion 4
	TOIS0000000007300012	Kriel 73 IS portion 12
	TOIS0000000006500000	Kriel Power Station 65 IS RE
	Town	Kriel Town
	TOIS0000000007800005	Legdaar 78 IS portion 5
	TOIS0000000007800006	Legdaar 78 IS portion 6
	TOIS0000000007800007	Legdaar 78 IS portion 7

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS0000000007800016	Legdaar 78 IS portion 16
	TOIS0000000007800017	Legdaar 78 IS portion 17
	TOIS00000000014100000	Matla Power Station 141 IS RE
	TOIS00000000005000000	Middelkraal 50 IS remaining extent (RE)
	TOIS00000000005000003	Middelkraal 50 IS portion 3
	TOIS00000000005000005	Middelkraal 50 IS portion 5
	TOIS00000000005000006	Middelkraal 50 IS portion 6
	TOIS00000000005000008	Middelkraal 50 IS portion 8
	TOIS00000000005900000	Nooitgedacht 59 IS RE
	TOIS00000000005900001	Nooitgedacht 59 IS portion 1
	TOIS00000000005900002	Nooitgedacht 59 IS portion 2
	TOIS00000000005900003	Nooitgedacht 59 IS portion 3
	TOIS00000000005900006	Nooitgedacht 59 IS portion 6
	TOIS00000000005900007	Nooitgedacht 59 IS portion 7
	TOIS00000000005900008	Nooitgedacht 59 IS portion 8
	TOIS00000000005900010	Nooitgedacht 59 IS portion 10
	TOIS00000000007000001	Onverwacht 70 IS portion 1
	TOIS00000000007000002	Onverwacht 70 IS portion 2
	TOIS00000000007000003	Onverwacht 70 IS portion 3
	TOIS00000000007000004	Onverwacht 70 IS portion 4
	TOIS00000000007000007	Onverwacht 70 IS portion 7
	TOIS00000000007000009	Onverwacht 70 IS portion 9
	TOIS00000000007000010	Onverwacht 70 IS portion 10
	TOIS00000000007000011	Onverwacht 70 IS portion 11
	TOIS00000000007000012	Onverwacht 70 IS portion 12
	TOIS00000000007000013	Onverwacht 70 IS portion 13
	TOIS00000000007000014	Onverwacht 70 IS portion 14
	TOIS00000000007000015	Onverwacht 70 IS portion 15
	TOIS00000000007000016	Onverwacht 70 IS portion 16
	TOIS00000000007000019	Onverwacht 70 IS portion 19
	TOIS00000000007000021	Onverwacht 70 IS portion 21
	TOIS00000000007000023	Onverwacht 70 IS portion 23
	TOIS00000000007400002	Rensburgshoop 74 IS portion 2
	TOIS00000000007400005	Rensburgshoop 74 IS portion 5
	TOIS00000000007400007	Rensburgshoop 74 IS portion 7



DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS00000000010000002	Rietfontein 100 IS portion 2
	TOIS00000000010000004	Rietfontein 100 IS portion 4
	TOIS00000000010000005	Rietfontein 100 IS portion 5
	TOIS00000000010000006	Rietfontein 100 IS portion 6
	TOIS00000000010000007	Rietfontein 100 IS portion 7
	TOIS00000000010000008	Rietfontein 100 IS portion 8
	TOIS00000000010000010	Rietfontein 100 IS portion 10
	TOIS00000000010000012	Rietfontein 100 IS portion 12
	TOIS00000000010000013	Rietfontein 100 IS portion 13
	TOIS00000000010000014	Rietfontein 100 IS portion 14
	TOIS00000000010000015	Rietfontein 100 IS portion 15
	TOIS00000000010100000	Rietfontein 101 IS RE
	TOIS00000000010100001	Rietfontein 101 IS portion 1
	TOIS00000000010100002	Rietfontein 101 IS portion 2
	TOIS00000000010100004	Rietfontein 101 IS portion 4
	TOIS00000000010100005	Rietfontein 101 IS portion 5
	TOIS00000000005800000	Roodebloem 58 IS RE
	TOIS00000000005800003	Roodebloem 58 IS portion 3
	TOIS00000000004000002	Roodepoort 40 IS portion 2
	TOIS00000000004000014	Roodepoort 40 IS portion 14
	TOIS00000000022700007	Schurvekop 227 IS portion 7
	TOIS00000000022700012	Schurvekop 227 IS portion 12
	TOIS00000000022700013	Schurvekop 227 IS portion 13
	TOIS00000000022700014	Schurvekop 227 IS portion 14
	TOIS00000000022700022	Schurvekop 227 IS portion 22
	TOIS00000000022700026	Schurvekop 227 IS portion 26
	TOIS00000000022700027	Schurvekop 227 IS portion 27
	TOIS00000000022700028	Schurvekop 227 IS portion 28
	TOIS00000000006800001	Vaalpan 68 IS portion 1
	TOIS00000000006800002	Vaalpan 68 IS portion 2
	TOIS00000000006800003	Vaalpan 68 IS portion 3
	TOIS00000000006800004	Vaalpan 68 IS portion 4
	TOIS00000000006800006	Vaalpan 68 IS portion 6
	TOIS00000000006800007	Vaalpan 68 IS portion 7
	TOIS00000000006800008	Vaalpan 68 IS portion 8
	TOIS00000000006800009	Vaalpan 68 IS portion 9

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS00000000006800010	Vaalpan 68 IS portion 10
	TOIS00000000006800011	Vaalpan 68 IS portion 11
	TOIS00000000006100004	Vierfontein 61 IS portion 4
	TOIS00000000006100006	Vierfontein 61 IS portion 6
	TOIS00000000006100024	Vierfontein 61 IS portion 24
	TOIS00000000006100032	Vierfontein 61 IS portion 32
	TOIS00000000006100039	Vierfontein 61 IS portion 39
	TOIS00000000006100040	Vierfontein 61 IS portion 40
	TOIS00000000006100045	Vierfontein 61 IS portion 45
	TOIS00000000006100046	Vierfontein 61 IS portion 46
	TOIS00000000006100047	Vierfontein 61 IS portion 47
	TOIS00000000006100048	Vierfontein 61 IS portion 48
	TOIS00000000006100049	Vierfontein 61 IS portion 49
	TOIS00000000006100050	Vierfontein 61 IS portion 50
	TOIS00000000007600000	Vlakkuiilen 76 IS RE
	TOIS00000000008300001	Vlaklaagte 83 IS portion 1
	TOIS00000000008300002	Vlaklaagte 83 IS portion 2
	TOIS00000000008300003	Vlaklaagte 83 IS portion 3
	TOIS00000000008300004	Vlaklaagte 83 IS portion 4
	TOIS00000000008300005	Vlaklaagte 83 IS portion 5
	TOIS00000000005550000	Wilgervlei 555 IS RE
	TOIS00000000008000001	Witbank 80 IS portion 1
	TOIS00000000008000003	Witbank 80 IS portion 3
	TOIS00000000008000004	Witbank 80 IS portion 4
	TOIS00000000008000006	Witbank 80 IS portion 6
	TOIS00000000008000007	Witbank 80 IS portion 7
	TOIS00000000008000008	Witbank 80 IS portion 8
	TOIS00000000008000010	Witbank 80 IS portion 10
	TOIS00000000008000011	Witbank 80 IS portion 11
	TOIS00000000008000012	Witbank 80 IS portion 12
	TOIS00000000008000013	Witbank 80 IS portion 13
	TOIS00000000008000014	Witbank 80 IS portion 14
	TOIS00000000008000015	Witbank 80 IS portion 15
	TOIS00000000008000017	Witbank 80 IS portion 17
	TOIS00000000008000020	Witbank 80 IS portion 20
	TOIS00000000008000021	Witbank 80 IS portion 21

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS00000000008000023	Witbank 80 IS portion 23
	TOIS00000000008000024	Witbank 80 IS portion 24
	TOIS00000000008000025	Witbank 80 IS portion 25
	TOIS00000000008000026	Witbank 80 IS portion 26
	TOIS00000000008000027	Witbank 80 IS portion 27
	TOIS00000000008000028	Witbank 80 IS portion 28
	TOIS00000000008000029	Witbank 80 IS portion 29
	TOIS00000000008000030	Witbank 80 IS portion 30
	TOIS00000000008000031	Witbank 80 IS portion 31
	TOIS00000000008000032	Witbank 80 IS portion 32
	TOIS00000000008000033	Witbank 80 IS portion 33
	TOIS00000000008000034	Witbank 80 IS portion 34
	TOIS00000000008000037	Witbank 80 IS portion 37
	TOIS00000000057600000	Witbank 576 IS RE
	TOIS00000000010300004	Witransd 103 IS portion 4
	TOIS00000000010300005	Witransd 103 IS portion 5
	TOIS00000000010300006	Witransd 103 IS portion 6
	TOIS00000000010300007	Witransd 103 IS portion 7
	TOIS00000000010300008	Witransd 103 IS portion 8
	TOIS00000000010300018	Witransd 103 IS portion 18
	TOIS00000000010300022	Witransd 103 IS portion 22
	TOIS00000000010300025	Witransd 103 IS portion 25
	<b>Proposed Overland ROM Conveyor</b>	
	TOIS00000000007500002	Elandsfontein 75 IS portion 2
	TOIS00000000007500003	Elandsfontein 75 IS portion 3
	TOIS00000000007500004	Elandsfontein 75 IS portion 4
	TOIS00000000007500007	Elandsfontein 75 IS portion 7
	TOIS00000000007500008	Elandsfontein 75 IS portion 8
	TOIS00000000007500009	Elandsfontein 75 IS portion 9
	TOIS00000000007500010	Elandsfontein 75 IS portion 10
	TOIS00000000007500011	Elandsfontein 75 IS portion 11
	TOIS00000000007500013	Elandsfontein 75 IS portion 13
	TOIS00000000007800001	Legdaar 78 IS portion 1
	TOIS00000000007800004	Legdaar 78 IS portion 4
	TOIS00000000007800005	Legdaar 78 IS portion 5
	TOIS00000000007800006	Legdaar 78 IS portion 6

DESCRIPTOR	DETAIL	
	21 DIGIT CODE	FARM PORTION
	TOIS00000000007800007	Legdaar 78 IS portion 7
	TOIS00000000007800016	Legdaar 78 IS portion 16
	TOIS00000000007800017	Legdaar 78 IS portion 17
	TOIS00000000005000003	Middelkraal 50 IS portion 3
	TOIS00000000005000008	Middelkraal 50 IS portion 8
	TOIS00000000007400006	Rensburgshoop 74 IS portion 6
	TOIS00000000007400010	Rensburgshoop 74 IS portion 10
	TOIS00000000005200002	Schoon-Vlei 52 IS portion 2
	TOIS00000000007600000	Vlakkuijen 76 IS RE

## 2.2 LOCALITY MAP

A map showing the locality and setting of the proposed project site is provided in Appendix 3.

## 2.3 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

### 2.3.1 LISTED AND SPECIFIED ACTIVITIES

Table 2-2 and Table 2-3 list the activities and infrastructure associated with the proposed project. In each case the relevant listed activity is identified and comprises the NEMA and NEM:WA activities applied for.

An infrastructure plan of the project, showing the location and extent of all of the activities detailed in the Table is provided in Appendix 4.

**TABLE 2-2: LISTED ACTIVITIES OF THE PROPOSED PROJECT**

DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
<b>Site preparation</b>		
Selective clearing of vegetation in areas designated for surface infrastructure.	Approximately (~) 220ha (including Shaft complex ~ 120ha; Overland Conveyor ~ 100ha).	NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12).
<b>Earthworks</b>		
Stripping and stockpiling topsoil and sub-soil and the establishment of a topsoil stockpile area and berm.	<ul style="list-style-type: none"> <li>• Topsoil stockpiles (To be confirmed (TBC));</li> <li>• Topsoil berms (TBC).</li> </ul>	NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12).
Cleaning, grubbing and bulldozing activities.	This forms part of the overall ~ 220ha of disturbance.	As above.
Digging trenches and foundations. Possible blasting.		
Establishing storm water controls (channels, berms) as per storm water management plan.		
Bulk earthworks including building of dam walls and safety berms.		
<b>Civil works</b>		
General building activities and erection of structures.	This forms part of the overall ~ 220ha of disturbance.	As above.
Foundation excavations and compaction.		
Mixing of concrete and concrete work.		
Steel work (including grinding and welding).		
<b>Underground mining</b>		
Underground mining.	~ 7,300ha.	NEMA: GNR 984 (Activity 17).
Backfilling the shaft void with waste rock.		NEMA: GNR 984 (Activity 6); NEMA: GNR 984 (Activity 17); NEM:WA: Category B (Activity 4(2)).

DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
Blasting and drilling.		NEMA: GNR 983 (Activity 12); NEMA: GNR 983 (Activity 19); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12).
<b>Transportation</b>		
Establishment of main and internal access and maintenance roads and new R545 intersection.	TBC.	NEMA: GNR 983 (Activity 19); NEMA: GNR 983 (Activity 24); NEMA: GNR 983 (Activity 28); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 984 (Activity 27); NEMA: GNR 985 (Activity 4); NEMA: GNR. 985 (Activity 12); NEMA: GNR 985 (Activity 15); NEMA: GNR 985 (Activity 18).
Widening of existing gravel road.	TBC.	NEMA: GNR. 983 (Activity 28); NEMA: GNR. 983 (Activity 56); NEMA: GNR. 984 (Activity 17); NEMA: GNR. 985 (Activity 12).
Loading, hauling and transportation of ROM, product and materials.	Loading and hauling within ~ 220ha mine surface infrastructure area. Transportation via overland conveyor ~ 100ha.	NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12); NEMA: GNR 985 (Activity 15).
<b>Mineralised waste</b>		
Temporary overburden waste rock dump (WRD)/stockpile and berms.	<ul style="list-style-type: none"> <li>• WRD (TBC);</li> </ul>	NEMA: GNR 983 (Activity 27);

DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
	<ul style="list-style-type: none"> <li>Waste rock berms (TBC).</li> </ul>	NEMA: GNR 983 (Activity 28); NEMA: GNR 984 (Activity 6); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12); NEMA: GNR 985 (Activity 15); NEM:WA: Category B (Activity 4(7)); NEM:WA: Category B (Activity 4(10)); NEM:WA Category B (Activity 4(11)).
<b>Non-mineralised waste (General and hazardous waste)</b>		
Storage of general waste (industrial - scrap metal, contaminated wood and building rubble; and domestic waste - packaging and food waste) as waste/salvage yard.	This is located within the mine surface infrastructure area which forms part of the overall ~ 220ha of disturbance.	NEM:WA: Category A (Activity 3(2)); NEM:WA: Category A (Activity 3(12)); NEM:WA: Category B (Activity 4(1)); NEM:WA: Category B (Activity 4(2)); NEM:WA: Category B (Activity 4(10));
Storage of hazardous waste (industrial – packaging of hazardous materials, used oil, lubricants, and gypsum and brine from the waste water treatment plant; and medical – swabs and bandages) as waste/salvage yard.		
Bailing sorting, re-use and recycling of waste respectively.		
Storage and/or treatment of contaminated soils.		
Removal of waste by contractor for recycling, re-use and/or final disposal at permitted waste disposal facilities.	Not applicable.	
<b>Water supply, use and management</b>		
Establishment of water supply boreholes.	TBC.	NEMA: GNR. 983 (Activity 27); NEMA: GNR. 983 (Activity 28); NEMA: GNR. 984 (Activity 15); NEMA: GNR. 984 (Activity 17); NEMA: GNR. 985 (Activity 12).
Establishment of a sewage and water treatment plants.	TBC.	NEMA: GNR 983 (Activity 10); NEMA: GNR 983 (Activity 25); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28);

DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
		NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12); NEMA: GNR 985 (Activity 15).
Stormwater controls and water holding facilities: <ul style="list-style-type: none"> <li>• Water supply and reticulation pipelines (potable water, process water and sewage effluent pipelines);</li> <li>• Raw water tank;</li> <li>• Potable water storage tank;</li> <li>• Fire water tank;</li> <li>• Bulk process water storage tank;</li> <li>• Recycled water ponds/pollution control dam; and</li> <li>• Stormwater management facilities (e.g. drains &amp; berms).</li> </ul>	Stormwater controls and water holding facilities: <ul style="list-style-type: none"> <li>• Water supply and reticulation pipelines (potable water, process water and sewage effluent pipelines) (TBC);</li> <li>• Raw water tank (TBC);</li> <li>• Potable water storage tank (TBC);</li> <li>• Fire water tank (TBC);</li> <li>• Bulk process water storage tank (TBC);</li> <li>• Recycled water ponds/pollution control dam (TBC); and</li> <li>• Stormwater management facilities (e.g. drains &amp; berms) (TBC).</li> </ul>	NEMA: GNR 983 (Activity 9); NEMA: GNR 983 (Activity 10); NEMA: GNR 983 (Activity 13); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 6); NEMA: GNR 984 (Activity 11); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 16); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 2); NEMA: GNR 985 (Activity 12); NEMA: GNR 985 (Activity 15).
<b>Power supply and use</b>		
Use of generators.	TBC.	NEMA: GNR 983 (Activity 2); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12).
Establishment of proposed sub-station.	Located within shaft complex area as described above.	NEMA: GNR 983 (Activity 11); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 984 (Activity 15);



DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
		NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 12).
<b>Support infrastructure/services</b>		
Establishment of supporting infrastructure: <ul style="list-style-type: none"> <li>• Fencing;</li> <li>• Incline shaft;</li> <li>• Vertical shaft and ventilation fans;</li> <li>• Overland conveyor and surge silo;</li> <li>• Topsoil stockpiles and berms;</li> <li>• Mini sub-station (Eskom yard);</li> <li>• Power lines;</li> <li>• Change house;</li> <li>• Lighting masts;</li> <li>• Administrative block (including mine offices, kitchen, canteen, training centre, mustering/gathering centre and clinic/emergency room);</li> <li>• Control room;</li> <li>• Car park/ Bus stop and shelter;</li> <li>• Security gate and office;</li> <li>• Workshop and washbay/ cable workshop;</li> <li>• Stores;</li> <li>• Lamp rooms; and</li> <li>• Flammable store.</li> </ul>	Establishment of supporting infrastructure: <ul style="list-style-type: none"> <li>• Fencing (TBC);</li> <li>• Incline shaft (TBC);</li> <li>• Vertical shaft and ventilation fans (TBC);</li> <li>• Overland conveyor and surge silo (TBC);</li> <li>• Topsoil stockpiles and berms (TBC);</li> <li>• Mini sub-station (Eskom yard) (TBC);</li> <li>• Power lines (TBC);</li> <li>• Change house (TBC);</li> <li>• Lighting masts (TBC);</li> <li>• Administrative block (including mine offices, kitchen, canteen, training centre, mustering/gathering centre and clinic/emergency room) (TBC);</li> <li>• Control room (TBC);</li> <li>• Car park/ Bus stop and shelter (TBC);</li> <li>• Security gate and office (TBC);</li> <li>• Workshop and washbay/ cable workshop (TBC);</li> <li>• Stores (TBC);</li> <li>• Borrow pits (TBC);</li> <li>• Lamp rooms (TBC); and</li> <li>• Flammable store (TBC).</li> </ul>	NEMA: GNR 983 (Activity 19); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 983 (Activity 30); NEMA: GNR 984 (Activity 3); NEMA: GNR 984 (Activity 7); NEMA: GNR 984 (Activity 15); NEMA: GNR 984 (Activity 17); NEMA: GNR 985 (Activity 1); NEMA: GNR 985 (Activity 12); NEMA: GNR 985 (Activity 14); NEMA: GNR 985 (Activity 15).
Establishment of fuel storage facility.	TBC.	NEMA: GNR 983 (Activity 14); NEMA: GNR 983 (Activity 27); NEMA: GNR 983 (Activity 28); NEMA: GNR 984 (Activity 4); NEMA: GNR 984 (Activity 15); NEMA: GNR 985 (Activity 10); NEMA: GNR 985 (Activity 12).
<b>General site management</b>		

DESCRIPTION OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA)	LISTED ACTIVITY NUMBER AND APPLICABLE LISTING NOTICE
Appointment of contractors.	Not applicable.	Not applicable.
Site management (monitoring, inspections, maintenance, security, access control).		
Environmental awareness training and emergency response.		
On-going rehabilitation of facilities/disturbed areas.		
Implementing and maintaining management plans.		
<b>Demolition</b>		
Dismantling and demolition of infrastructure and equipment. Possible blasting.	Within the project footprint described above.	Not applicable.
Utilisation of site supporting services (security and access control, portable toilets, diesel storage tanks (re-fuelling equipment)).		
<b>Rehabilitation</b>		
Replacing soil resources.	~ 220ha.	Not applicable.
Slope stabilisation and erosion control.		
Landscaping.		
Re-vegetation of disturbed areas and where infrastructure was removed.		
Removal of alien invasive species from rehabilitated sites.		
Restoration of natural drainage patterns as far as practically possible.		
Rehabilitation of access roads.	TBC.	
<b>Maintenance and aftercare</b>		
Initiation of aftercare and maintenance program.	~ 220ha.	Not applicable.
Maintenance of rehabilitated areas.		

**TABLE 2-3: DESCRIPTION OF THE LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT**

ACTIVITY NUMBER	LISTED ACTIVITY
<b>NEMA LISTING NOTICE 1 GNR.983</b>	
GNR 983 List 1 Activity 2:	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where– (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatt or less but the total extent of the facility covers an area in excess of 1 hectare.
GNR 983 List 1 Activity 9:	The development of infrastructure exceeding 1,000 metres in length for the bulk transportation of water or storm water– (i) with an internal diameter of 0.36 metres or more; or

ACTIVITY NUMBER	LISTED ACTIVITY
	(ii) with a peak throughput of 120 litres per second or more,  excluding where– (a) such infrastructure are for bulk transportation of water or storm water or storm water drainage inside a road reserve; or (b) where such construction will occur within an urban area.
GNR 983 List 1 Activity 10:	The development and related operation of infrastructure exceeding 1,000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes– (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;  excluding where: (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.
GNR 983 List 1 Activity 11:	The development of facilities or infrastructure for the transmission and distribution of electricity– (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.
GNR 983 List 1 Activity 12:	The development of– (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square meters in size; (ix) slipways exceeding 100 square meters in size; (x) buildings exceeding 100 square meters in size; (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square meters or more;  where such development occurs– (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse; –

ACTIVITY NUMBER	LISTED ACTIVITY
	excluding– <ul style="list-style-type: none"> <li>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</li> <li>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</li> <li>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</li> <li>(dd) where such development occurs within an urban area; or</li> <li>(ee) where such development occurs within existing roads or road reserves.</li> </ul>
GNR 983 List 1 Activity 13:	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50,000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.
GNR 983 List 1 Activity 14:	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
GNR 983 List 1 Activity 19:	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from– <ul style="list-style-type: none"> <li>(i) a watercourse;</li> <li>(ii) the seashore; or</li> <li>(iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater–</li> </ul> but excluding where such infilling, depositing, dredging, excavation, removal or moving– <ul style="list-style-type: none"> <li>(a) will occur behind a development setback;</li> <li>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or</li> <li>(c) falls within the ambit if activity 21 in this Notice, in which case that activity applies.</li> </ul>
GNR 983 List 1 Activity 24:	The development of– <ul style="list-style-type: none"> <li>(i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010;</li> <li>(ii) a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres;</li> </ul> but excluding– <ul style="list-style-type: none"> <li>(a) roads which are identified and included in activity 27 of Listing Notice 27 in Notice 2 of 2014; or</li> <li>(b) roads where the entire road falls within an urban area.</li> </ul>
GNR 983 List 1 Activity 25:	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2,000 cubic metres but less than 15,000 cubic metres.
GNR 983 List 1 Activity 27:	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for– <ul style="list-style-type: none"> <li>(i) the undertaking of a linear activity; or</li> <li>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</li> </ul>

ACTIVITY NUMBER	LISTED ACTIVITY
GNR 983 List 1 Activity 28:	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;  excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
GNR 983 List 1 Activity 30:	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
GNR 983 List 1 Activity 56:	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre– (i) where the existing reserve is wider than 13.5 metres; or (ii) where no reserve exists, where the existing road is wider than 8 metres;  excluding where widening or lengthening occur inside urban areas.
<b>NEMA LISTING NOTICE 2: GNR.984</b>	
GNR 984 List 2 Activity 3:	The development and related operation of facilities or infrastructure for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products, nuclear waste or radioactive waste.
GNR 984 List 2 Activity 4:	The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic meters.
GNR 984 List 2 Activity 6:	The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding– (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2,000 cubic metres or less.
GNR 984 List 2 Activity 7:	The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods– (i) in gas form, outside an industrial complex, using pipelines, exceeding 1,000 meters in length, with a throughput capacity of more than 700 tons per day; (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1,000 meters in length, with a throughput capacity more than 50 cubic meters per day; or (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.
GNR 984 List 2 Activity 11:	The development of facilities or infrastructure for the transfer of 50,000 cubic meters or more water per day, from and to or between any combination of the following– (i) water catchments; (ii) water treatment works, or (iii) impoundments;  excluding treatment works where water is to be treated for drinking purposes.

ACTIVITY NUMBER	LISTED ACTIVITY
GNR 984 List 1 Activity 15:	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for– (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
GNR 984 List 2 Activity 16:	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.
GNR 984 List 2 Activity 17:	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
GNR 984 List 2 Activity 27:	The development of– (i) a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); (ii) a road administered by a provincial authority; (iii) a road with a reserve wider than 30 metres; or (iv) a road catering for more than one lane of traffic in both directions;  but excluding the development and related operation of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies.
<b>NEMA LISTING NOTICE 3: GNR. 985</b>	
GNR 985 List 3 Activity 1:	The development of billboards exceeding 18 square meters in size outside urban areas, mining areas or industrial complexes. (a) <b>In Mpumalanga province:</b> i. A protected area identified in terms of NEMPAA excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas; iii. World Heritage Sites; iv. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; v. Sites or areas identified in terms of an International Convention; vi. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; vii. Core areas in biosphere reserves; viii. Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; ix. Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or x. In an estuary.
GNR 985 List 3 Activity 2:	The development of reservoirs for bulk water supply with a capacity of more than 250 cubic meters. (a) <b>In Mpumalanga province:</b> i. In an estuary;

ACTIVITY NUMBER	LISTED ACTIVITY
	<ul style="list-style-type: none"> <li>ii. In a protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>iii. Outside urban areas, in:                             <ul style="list-style-type: none"> <li>(aa) National Protected Area Expansion Strategy Focus areas;</li> <li>(bb) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>(cc) Sites or areas identified in terms of an International Convention;</li> <li>(dd) Critically biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>(ee) Core areas in biosphere reserves;</li> <li>(ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</li> <li>(gg) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>iv. In urban areas:                             <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose; or</li> <li>(cc) Areas seawards of the development setback line or within urban protected areas.</li> </ul> </li> </ul>
GNR 985 List 3 Activity 4:	<p>The development of a road wider than 4 meters with a reserve less than 13.5 meters.</p> <p>(a) <b>In Mpumalanga province:</b></p> <ul style="list-style-type: none"> <li>i. In an estuary;</li> <li>ii. Outside urban areas, in:                             <ul style="list-style-type: none"> <li>(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;</li> <li>(bb) National Protected Area Expansion Strategy Focus areas;</li> <li>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>(dd) Sites or areas identified in terms of an International Convention;</li> <li>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>(ff) Core areas in biosphere reserves;</li> <li>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; excluding disturbed areas; or</li> <li>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> </ul> </li> <li>iii. In urban areas:                             <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose; or</li> </ul> </li> </ul>

ACTIVITY NUMBER	LISTED ACTIVITY
	(cc) Seawards of the development setback line or within urban protected areas.
GNR 985 List 3 Activity 10:	<p>The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic meters.</p> <p>(a) <b>In Mpumalanga province:</b></p> <ul style="list-style-type: none"> <li>i. In an estuary;</li> <li>ii. Outside urban areas, in: <ul style="list-style-type: none"> <li>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>(bb) National Protected Area Expansion Strategy Focus areas;</li> <li>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>(dd) Sites or areas identified in terms of an International Convention;</li> <li>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>(ff) Core areas in biosphere reserves;</li> <li>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or</li> <li>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> <li>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or</li> <li>(jj) Within 500 metres of an estuary; or</li> </ul> </li> <li>iii. In urban areas: <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose; or</li> <li>(cc) Within 500 metres of an estuary.</li> </ul> </li> </ul>
GNR 985 List 3 Activity 12:	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>(a) <b>In Mpumalanga province:</b></p> <ul style="list-style-type: none"> <li>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</li> <li>ii. Within critical biodiversity areas identified in bioregional plans;</li> <li>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on even in urban areas; or</li> <li>iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.</li> </ul>
GNR 985 List 3 Activity 14:	The development of-



ACTIVITY NUMBER	LISTED ACTIVITY
	<p>(i) canals exceeding 10 square metres in size;</p> <p>(ii) channels exceeding 10 square metres in size;</p> <p>(iii) bridges exceeding 10 square metres in size;</p> <p>(iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size;</p> <p>(v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres in size;</p> <p>(vi) bulk storm water outlet structures exceeding 10 square metres in size;</p> <p>(vii) marinas exceeding 10 square metres in size;</p> <p>(viii) jetties exceeding 10 square metres in size;</p> <p>(ix) slipways exceeding 10 square metres in size;</p> <p>(x) buildings exceeding 10 square metres in size;</p> <p>(xi) boardwalks exceeding 10 square metres in size;</p> <p>(xii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs–</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase development footprint of the port or harbour.</p> <p>(a) <b>In Mpumalanga province:</b></p> <p>i. In an estuary;</p> <p>ii. Outside urban areas, in:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) World Heritage Sites</p> <p>(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(ee) Sites or areas identified in terms of an International Convention;</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Core areas in biosphere reserves;</p> <p>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</p> <p>(ii) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</p>

ACTIVITY NUMBER	LISTED ACTIVITY
	<ul style="list-style-type: none"> <li>iii. In urban areas:               <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose; or</li> <li>(cc) Areas seawards of the development setback line.</li> </ul> </li> </ul>
GNR 985 List 3 Activity 15:	The transformation of land bigger than 1,000 square metres in size, to residential, commercial, industrial or institutional use, where such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010.
GNR 985 List 3 Activity 18:	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>(a) <b>In Mpumalanga province:</b></p> <ul style="list-style-type: none"> <li>i. In an estuary;</li> <li>ii. Outside urban areas, in:           <ul style="list-style-type: none"> <li>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>(bb) National Protected Area Expansion Strategy Focus areas;</li> <li>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>(dd) Sites or areas identified in terms of an International Convention;</li> <li>(ee) Critically biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>(ff) Core areas in biosphere reserves;</li> <li>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or form the core area of a biosphere reserve; or</li> <li>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</li> <li>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or</li> </ul> </li> <li>iii. Inside urban areas:           <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space; or</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose.</li> </ul> </li> </ul>
<b>NEM:WA LISTED ACTIVITIES GNR 921</b>	
Category A 3(2)	The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1,000m <sup>2</sup> .
Category A 3(12)	The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).
Category B 4(1)	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.
Category B 4(2)	The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.
Category B 4(7)	The disposal of any quantities of hazardous waste to land.

ACTIVITY NUMBER	LISTED ACTIVITY
Category B 4(10)	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).
Category B 4(11)	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

### 2.3.2 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

Information provided in the following section was provided to Synergistics by the AAIC project team.

The proposed Alexander Project will involve the underground mining of coal on various farm properties located in the Ecca Group of the Karoo Basin. The proposed project will be constructed on land previously used for agriculture, with an estimated prospecting right area/proposed mining right area of 10,700ha, an estimated underground mine area of ~ 7,300ha, and a surface area of disturbance of 220ha (shaft complex ~ 120ha, and overland conveyor ~ 100ha) . A preliminary/conceptual layout plan has been developed for the Alexander mining area (see Figure 1-1). The life of mine (LOM) is approximately between 30 and 35 years.

#### 2.3.2.1 Construction Phase

##### 2.3.2.1.1 Construction Phase - Activities

The following activities are expected to take place during construction:-

- Site establishment of temporary infrastructure/facilities required to support construction phase (see list in section 2.3.2.1.2);
- Clearing of vegetation in accordance with the relevant vegetation management procedures;
- Stripping and stockpiling of soil resources and earthworks in accordance with the relevant soil conservation procedures;
- Sourcing of material for construction;
- Establishment of storm water management facilities such as recycle water ponds/ pollution control dams and clean water realignment berms;
- Excavation of shaft;
- Establishment of water treatment plant;
- Establishment of sewage treatment plant;
- Construction of administrative block;
- Construction of overland conveyor with associated service road (with underpass below the R545 and R544);
- Installation of main tower tank, potable and process water tanks and the fire water tank;
- Construction of new intersection to the R545 provincial road (planned to be in same servitude as that section of the overland conveyor), and establishment of internal roads and parking area; and
- Establishment of access control facilities.

##### 2.3.2.1.2 Construction Phase - Surface Infrastructure

Temporary construction facilities will be established on site to support the construction phase. These facilities could include:-

- Contractor's laydown areas;
- Workshops/maintenance area for servicing and maintaining equipment and vehicles;
- Temporary waste collection and storage area;

- Store for the storing and handling of fuel, lubricants, solvents, paint and construction substances;
- Parking area for cars and equipment;
- Mobile site offices;
- Portable ablution facilities;
- Change houses;
- Soil and overburden rock (shaft excavation material) stockpiles for shaft excavation material;
- Borrow pits;
- Water management infrastructure;
- Security and access control;
- Main access road and internal roads; and
- Generator(s) for temporary power supply.

These facilities would either be removed at the end of the construction phase or incorporated into the layout of the operational mine.

#### 2.3.2.1.3 Transport System

##### Roads

Access to the project site will be provided via a gravel road that links to the R545 provincial road (in the same servitude as the conveyor). The gravel road will be upgraded and tarred and a new intersection to the R545 will be constructed in order to transport staff, material, equipment, and waste material to and from the construction site.

The project's trip generation and traffic loads will be provided in the EIA report.

##### Conveyor

An overland conveyor with an associated service road will be constructed to transport run-of mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery from where it will be transported via the Elders overland conveyor to Goedehoop Colliery for beneficiation purposes. The conveyor will be between 1.2m and 1.5m wide and ~ 18km in length, the associated servitude is ~ 55m wide.

##### Pipelines

The proposed project will require the establishment of a series of pipelines for the transportation of potable water, process water and sewage effluent. Pipelines will be installed to transfer potable and process water within a water reticulation system which will be situated at the shaft complex. All the water reticulation pipelines will be of a high density polyethylene standard and will vary between 50mm and 225mm in diameter. The sewage pipelines between the change houses, office block and sewage treatment plant will be 100mm in diameter.

#### 2.3.2.1.4 Water Supply and Management

##### Potable and construction water

A total volume of 90 000m<sup>3</sup> of water (potable and process) will be required during the construction phase. Potable water will be made available from the neighbouring Anglo mining operations and/or municipal structures, while construction water will be made available from either the neighbouring mining operations or from on-site boreholes.

#### 2.3.2.1.5 Power Supply and Use

Generators will be used as the primary power supply. A total of 1MW will be required for drilling, welding and construction lighting.

#### 2.3.2.1.6 Mineralised Waste Management

Overburden removed during the incline and vertical shaft excavations will be stored on a waste rock dump until reuse. Overburden will be used during decommissioning and closure of the Alexander shaft void.

#### 2.3.2.1.7 Non-mineralised Waste Management

##### Domestic and industrial waste

Facilities for the temporary storage of non-mineralised waste associated with the project will be provided. The types of waste that could be generated during the construction phase includes: hazardous industrial waste (such as packaging for hazardous materials, used oil, lubricants), general industrial waste (such as scrap metal, contaminated wood and building rubble), and domestic waste (such as packaging and food waste). These wastes will be temporarily handled and stored on site before being removed for recycling by suppliers and approved waste handling companies, reuse by scrap dealers or final disposal at permitted waste disposal facilities in the area.

##### Sewage

Construction workers will make use of portable toilets serviced on a regular basis. The sewage will be removed off-site by a reputable waste contractor for disposal at a licensed waste facility.

#### 2.3.2.1.8 Construction Phase Employment and Housing

An estimated 500 employment opportunities will be available during the construction phase. No housing will be provided on site as construction workers will be accommodated in the nearby towns.

#### 2.3.2.1.9 Operating Hours

It is anticipated that the construction phase will consist of 1 shift per day from 06h00 to 18h00 from Monday to Friday. Saturdays will consist of a half shift from 06h00 to 12h00. In the instance where emergency action or critical activities are required, motivation will be provided for the extension of the construction hours.

#### 2.3.2.1.10 Construction Phase Timing

Provided the required authorisations are obtained, construction is expected to take 3 years.

#### 2.3.2.1.11 Security and Access Control

A fence will be erected around the perimeter of the proposed Alexander infrastructure areas with a designated access control and security office for the shaft complex area.

### 2.3.2.2 Operational Phase

#### 2.3.2.2.1 Mining Method

Underground mining activities will be undertaken as part of the proposed Alexander Project which will be designed to process ~ 6 million tonnes per annum during steady state production. Although the No. 2, 3, 4 and 5 coal seams are all developed within the Alexander Project area, only the No. 4 seam is considered within this mining right application. The No. 4 seam is on average 4.90m thick and occurs at a depth of 63m below surface with the preferred quality situated in the lower two-thirds of the seam.

Two shafts will be required for the proposed project, one incline shaft for material and coal extraction and one vertical shaft with ventilation fans for personnel and small material access. A conveyor belt system will be linked to the incline shaft in order to transport the ROM coal extracted underground to the surface.

The mining method will be the traditional Bord and Pillar method with cutting of the coal through Continuous Miner technology. Bord and Pillar is a mining system in which the mined material is extracted across a horizontal level, creating horizontal rows of rooms and pillars.

In the continuous mining technology, a Continuous Miner Machine will be utilised with a large rotating steel drum that is equipped with teeth to scrape coal from the seam. The coal then gets loaded directly onto a shuttle which transfers the coal to the conveyors for transportation to the surface.

Dewatering activities will be required to allow for safe mining operations.

#### 2.3.2.2.2 Surface infrastructure

Operational phase surface infrastructure is listed below:-

- Fencing;
- Boxcut/portal;
- Incline shaft;
- Vertical shaft and ventilation fans;
- Overland conveyor and surge/surface ROM and stonedust silo;
- Topsoil stockpiles and berms;
- Overburden rock dump/ stockpile and berm;

- Main access road (sealed);
- Internal and maintenance access gravel roads;
- Water treatment plant;
- Sewage treatment plant;
- Sub-station (Eskom yard);
- Power lines;
- Change house;
- Water holding facilities (raw water tank, fire water tank, ground level potable water storage tank and elevated bulk process water storage tank);
- Stormwater management facilities (drains, berms and recycled water ponds/ pollution control dam);
- Potable water, process water and sewage effluent pipelines;
- Lighting masts;
- Fuel and oil storage facilities and refuelling bays;
- Waste/salvage yard;
- Administrative block (including mine offices, kitchen, canteen, training centre, mustering/gathering centre and clinic/emergency room);
- Control room;
- Car park/ Bus stop and shelter;
- Security gate and office;
- Workshop and wash-bay/ cable yard repair workshop;
- Stores;
- Lamp rooms; and
- Flammable store.

#### 2.3.2.2.3 Mineral processing plant

A processing plant will not be required for the proposed Alexander Project, since all run-of-mine (ROM) production will be transported via the overland conveyor to Elders and then to the Goedehoop beneficiation plant.

#### 2.3.2.2.4 Transport System

##### Roads

Access to the project site will be provided via the upgraded and tarred gravel road that links to the R545 provincial road through a new intersection. The road will be in the same servitude as the conveyor belt.

Internal gravel roads established within the shaft complex area and along the conveyor route. These will be stabilised by using an ongoing treatment compound as required.

The project's trip generation and traffic loads will be provided in the EIA report.



### Conveyors

An overland conveyor will transport run-of mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery from where it will be transported via the Elders overland conveyor to Goedehoop Colliery for beneficiation purposes. The conveyor will be between 1.2m and 1.5m wide and ~ 18km in length, the associated servitude is ~ 55m wide.

### Pipelines

The proposed project will require the establishment of a series of pipelines for the transportation of potable water, process water and sewage effluent. Pipelines will be installed to transfer potable and process water within a water reticulation system situated at the shaft complex. All the water reticulation pipelines will be of a high density polyethylene standard and will vary between 50mm and 225mm in diameter. The sewage pipelines between the change houses, office block and sewage treatment plant will be 100mm in diameter.

#### 2.3.2.2.5 Water Supply and Management

##### Potable water

Potable water will be required during the operational phase and will be stored in the potable water storage tank. The potable water storage tank will be constructed from steel panels on a ground level concrete foundation. Potable water will be made available from the water treatment plant or alternatively from neighbouring municipal water structures.

##### Process water

Process water will be required during the operational phase and will be stored in the bulk process water storage tank. The bulk process water storage tank will be constructed from steel panels mounted on a steel tank stand. Any shortfall of water from the recycle water ponds/pollution control dam will be topped up with raw water from on-site boreholes or piped along the overland conveyor route from Elders Colliery or supplied from the water treatment plant.

##### Fire water

A fire water network will be installed for the proposed Alexander Project, which will supply water from the fire water tank to hose reels at designated points within the administrative block, workshops, wash-bays and change house. Fire water will be made available from the bulk process water storage tank.

##### Water treatment plant

A reverse osmosis water treatment plant will be established as a single integrated unit. The purpose of the plant is to treat water for appropriate uses.

##### Stormwater management

Water management facilities for the control of storm water and prevention of pollution will be designed to meet the requirements in accordance with Regulation 704 (1999) in terms of the NWA. Clean water will be diverted away from infrastructure areas by means of earth berms, and discharged back into the natural environment. Dirty water on-site will be contained in a dirty water management system comprising channels, drains, berms and dams.

#### 2.3.2.2.6 Power Supply and Use

One consumer substation will be established within the shaft complex of the proposed Alexander Project in order to supply the mine with power from an Eskom power line. The power line approval will be handled by Eskom.

#### 2.3.2.2.7 Mineralised Waste Management

Overburden removed during the incline and vertical shaft excavations will be stored on a waste rock dump until reuse. Overburden will be used during decommissioning and closure of the Alexander shaft void.

#### 2.3.2.2.8 Non-mineralised Waste Management

##### Domestic and industrial waste

Facilities for the temporary storage of non-mineralised waste associated with the project will be provided. The types of waste that could be generated during the construction phase includes: hazardous industrial waste (such as packaging for hazardous materials, used oil, lubricants), general industrial waste (such as scrap metal and building rubble), medical waste (such as swabs and bandages) and domestic waste (such as packaging, canteen waste and office waste). These wastes will be temporarily handled and stored on site before being removed for recycling by suppliers and approved waste handling companies, reuse by scrap dealers or final disposal at permitted waste disposal facilities in the area.

##### Sewage

Sewage will be managed with the provision of a package sewage treatment plant. Sewage effluent will be pumped from the administrative block and change houses to the sewage treatment plant via a series of pipelines. The treated sewage effluent will be pumped from the sewage treatment plant to the main tower tank for re-use as process water. Sewage sludge will be removed on a regular basis by a reputable waste contractor for disposal at appropriate licensed facilities.

#### 2.3.2.2.9 Employment and Housing

Although an estimated 480 employment opportunities will be available at full production, it is expected that employees will be transferred from Elders Colliery which means that these are not new opportunities. Nobody will be housed on-site as part of the operational phase of the proposed project. Operational workers will be accommodated in nearby towns.

#### 2.3.2.2.10 Operating Hours

It is anticipated that the operations phase will be 24 hours a day for five and a half days a week.

#### 2.3.2.2.11 Life of Mine

It is anticipated that mining and processing activities will reach full production ~ 4 years after construction has commenced. The LOM is approximately between 30 and 35 years.

### **2.3.2.3 Decommissioning and Closure**

The conceptual closure plan objectives and principles include the following:

- Environmental damage is minimised to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of cultivated land is achieved.
- All surface infrastructure will be removed from site after rehabilitation and the shaft cavity will be completely backfilled and sealed.
- Mine closure is achieved efficiently, cost effectively and in compliance with the law.
- The social and economic impacts resulting from mine closure are managed in such a way that negative socio-economic impacts are minimised.

## 2.4 POLICY AND LEGISLATIVE CONTEXT

This section outlines the key legislative requirements applicable to the proposed project. The table below provides a summary of the applicable legislative context and policy.

**TABLE 2-4: LEGAL FRAMEWORK**

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	RELEVANCE OR REFERENCE
Mineral and Petroleum Resources Development Act, 2002 (MPRDA, No. 28 of 2002).	See Section 1.3, page 1-2 and Section 2.4.1, page 2-42.
National Environmental Management Act, 1998 (NEMA, No. 107 of 1998).	See Section 1.3, page 1-2 and Section 2.4.2, page 2-42.
Environmental Impact Assessment regulations (Government Notice Regulation (GNR) 982, 983, 984 and 985, published 4 December 2014) (EIA Regulations) in terms of NEMA.	See Section 1.3, page 1-2 and Section 2.4.2, page 2-42.
DEA (2010), Guideline on Need and Desirability, Integrated Environmental Management Guideline Series 9, Department of Environmental Affairs.	See Section 2.5, page 2-43.
DEA (2010), Public Participation 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs.	See Section 3.2, page 3-5.
National Environmental Management: Waste Act, 2008 (NEM:WA, No 59 of 2008).	See Table 2-2 on page 2-14.
GNR 921 published 29 November 2013 in terms of NEM:WA including listed activities as amended in GNR 633.	See Table 2-2 on page 2-14.
SANBI Grasslands Programme's Mining and Biodiversity Guideline (2012)	See Section 3.4.1.5, page 3-18.
National Environmental Management: Biodiversity Act, 2004 (NEM:BA No 10 of 2004)	See Section 3.4.1.5, page 3-18.
Conservation of Agricultural Resources Act, 1983 (CARA, No. 43 of 1983);	See Section 3.4.1.5, page 3-18.
National Freshwater Ecosystem Priority Assessment (NFEP) (2012)	See Section 3.4.1.5, page 3-18.
SANBI Wetland Inventory (2006)	See Section 3.4.1.5, page 3-18.
National Forest Act No. 84 of 1998	See Section 3.4.1.5, page 3-18.
National Veld and Forest Fire Act No. 101 of 1998	See Section 3.4.1.5, page 3-18.
International Union for Conservation of Nature (IUCN)	See Section 3.4.1.5, page 3-18.
National Protected Areas Expansion Strategy 2008 (NPAES)	See Section 3.4.1.5, page 3-18.
South African National Botanical Institute (SANBI) Integrated Biodiversity Information	See Section 3.4.1.5, page 3-18.
Emalaheni Local Municipality Reviewed Integrated Development Plan (2014/2015)	See Section 3.4.2, page 3-25.
Govan Mbeki Local Municipality Draft Integrated Development Plan (2014-2015)	See Section 3.4.2, page 3-25.

Gert Sibande District Municipality Integrated Development Plan (2012/13 – 2016/17)	See Section 3.4.2, page 3-25.
Nkangala District Municipality Final Integrated Development Plan (2011/12 – 2015/16)	See Section 3.4.2, page 3-25.
National Heritage Resources Act, 1999 (NHRA, No 25 of 1999);	See Section 3.4.1.10, page 3-24.

This document has been prepared strictly in accordance with the DMR Scoping Report template format, and was informed by the guidelines posted on the official DMR website. This is in accordance with the requirements of the MPRDA. In addition, this report complies with the requirements of the NEMA and EIA regulations (2014) GNR 982. The table below provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

**TABLE 2-5: STRUCTURING OF THE SCOPING REPORT**

Legal and Regulatory Requirement		Cross Reference to Report Section
As per the DMR template	As per the GNR 982 Appendix 2 Section 2.	
	A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process:	
The EAP who prepared the report; Expertise of the EAP.	(a) details of: (i) the <b>EAP</b> who prepared the report; and (ii) the <b>expertise</b> of the EAP, including a curriculum vitae;	See Table 1-1 on page 2-38, Appendix 1 and Appendix 2.
Description of the property.	(b) the <b>location of the activity</b> , including: (i) The <b>21 digit surveyor general code</b> of each cadastral land parcel; (ii) Where available, the <b>physical address and farm name</b> ; (iii) Where the requirement information in terms (i) and (ii) is not available, the <b>coordinates of the boundary of the property or properties</b> .	See Table 2-1 on page 2-1.
Locality plan.	(c) <b>a plan which locates the proposed activity</b> or activities applied for 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; or (ii) on land where the property has not been defined, the <b>coordinates within which the activity is to be undertaken</b> ;	See Appendix 4.

Legal and Regulatory Requirement		Cross Reference to Report Section
As per the DMR template	As per the GNR 982 Appendix 2 Section 2.	
Description of the scope of the proposed overall activity, including listed and specified activities; Description of the activities to be undertaken.	(d) a <b>description of the scope of the proposed activity</b> : (i) all <b>listed and specified activities triggered</b> ; (ii) a <b>description of the activities to be undertaken</b> , including associated structures and infrastructure.	See Section 2.3, page 2-13.
Policy and legislative context.	(e) a <b>description of the policy and legislative context within which the development is proposed</b> including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning framework and instruments that are applicable to this activity and are to be considered in the assessment process;	See Section 2.4, page 2-37.
Need and desirability of the proposed activity.	(f) a <b>motivation for the need and desirability for the proposed development</b> including the need and desirability of the activity in the context of the preferred location;	See Section 2.5, page 2-43.
Period for which the environmental authorisation is required.		See Section 2.6, page 2-44.
Description of the process followed to reach the proposed preferred site.	(h) a <b>full description of the process followed to reach the proposed preferred activity</b> , site and location within the site, including;	See Section 3, page 3-1.
Details of the alternatives considered.	(i) <b>details of all the alternatives considered</b> ;	See Section 3.1, page 3-1.
Details of the public participation process followed.	(ii) <b>details of the public participation process undertaken</b> in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	See Section 3.2, page 3-5.
Summary of issues raised by IAPs.	(iii) a <b>summary of the issues raised by interested and affected parties</b> , and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	See Section 0, page 3-5.
Environmental attributes associated with the sites.	(iv) the <b>environmental attributes associated with the alternatives</b> focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	See Section 3.4, page 3-11.
Impacts identified.	(v) the <b>impacts and risks identified for each alternative</b> , including the nature, significance, consequence,	See Section 4.1, page 4-1.

Legal and Regulatory Requirement		Cross Reference to Report Section
As per the DMR template	As per the GNR 982 Appendix 2 Section 2.	
	<p>extent, duration and probability of the impacts, including the degree to which these impacts-</p> <ul style="list-style-type: none"> <li>(aa) can be reversed;</li> <li>(bb) may cause irreplaceable loss of resources; and</li> <li>(cb) can be avoided, managed or mitigated;</li> </ul>	
Methodology used in determining the significance of environmental impacts.	(vi) the <b>methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts</b> and risks associated with the alternatives;	See Section 4.2, page 4-14.
The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected.	(vii) <b>positive and negative impacts that the proposed activity and alternatives will have</b> on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	See Section 4.3, page 4.3.
The possible mitigation measures that could be applied and the level of risk.	(viii) the <b>possible mitigation measures that could be applied and level of residual risk</b> ;	See Section 4.5, page 4-29.
The outcome of the site selection matrix. Final site layout plan.	(ix) the <b>outcome of the site selection matrix</b> ;	See Section 4.6, page 4-36.
Motivation where no alternative sites were considered.	(x) <b>if no alternatives</b> , including alternative locations for the activity were investigated, the <b>motivation for not considering such</b> and	See Section 4.7, page 4-37.
Statement motivating the preferred site.	(xi) a <b>concluding statement indicating the preferred alternatives</b> , including preferred location of the activity;	See Section 4.7, page 4-37.
Plan of study for the environmental impact assess process;	(i) a <b>plan of study for undertaking the environmental impact assessment process</b> to be undertaken, including:	See Section 5, page 5-1.
Description of alternatives to be considered including the option of not going ahead with the activity	(i) a <b>description of the alternatives to be considered and assessed within the preferred site</b> , including the option of not proceeding with the activity;	See Section 5.1, page 5-1.
A description of the aspects to be assessed as part of the environmental impact assessment process	(ii) a <b>description of the aspects to be assessed</b> as part of the environmental impact assessment process;	See Section 5.2, page 5-1.

Legal and Regulatory Requirement		Cross Reference to Report Section
As per the DMR template	As per the GNR 982 Appendix 2 Section 2.	
Description of aspects to be assessed by specialists.	(iii) <b>aspects to be assessed by specialists;</b>	See Section 5.3, page 5-2.
Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives.	(iv) <b>a description of the proposed method of assessing the environmental aspects,</b> including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	See Section 5.4, page 5-2.
Proposed method of assessing duration significance.	(v) <b>a description of the proposed method of assessing duration and significance;</b>	See Section 5.5, page 5-7.
The stages at which the competent authority will be consulted.	(vi) <b>an indication of the stages at which the competent authority will be consulted;</b>	See Section 5.6, page 5-7.
Particulars of the public participation process with regard to the impact assessment process that will be conducted.	(vii) <b>particulars of the public participation process that will be conducted</b> during the environmental impact assessment process; and	See Section 5.7, page 5-7.
Description of the tasks that will be undertaken during the environmental impact assessment process.	(viii) <b>a description of the tasks that will be undertaken</b> as part of the environmental impact assessment process;	See Section 5.8, page 5-8.
Measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	(ix) <b>identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.</b>	See Section 5.9, page 5-9.
Undertaking regarding correctness of information;	(j) <b>An undertaking under oath or affirmation by the EAP</b> in relation to: <ul style="list-style-type: none"> <li>(i) The <b>correctness of the information</b> provided in the report;</li> <li>(ii) The <b>inclusion of comments and inputs</b> from stakeholders and interested and affected parties; and</li> <li>(iii) Any <b>information provided by the EAP to interested and affected parties</b> and any responses by the EAP to comments or inputs made by interested or affected parties;</li> </ul>	See Section 6, page 6-1 and Appendix 5.
Undertaking regarding level of agreement.	(k) <b>An undertaking under oath or affirmation by the EAP</b> in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	See Section 6, page 6-1.



Legal and Regulatory Requirement		Cross Reference to Report Section
As per the DMR template	As per the GNR 982 Appendix 2 Section 2.	
Other information required by the competent authority.	(l) Where applicable, any specific information required by the competent authority; and	No request received to date.
Other matter required in terms of section 24(4)(a) and (b) of the Act.	(m) Any other matter required in terms of section 24(4)(a) and (b) of the Act.	None identified.

#### 2.4.1 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002

The MPRDA governs all mining activities in South Africa and replaced the Minerals Act (No. 50 of 1991). In terms of the MPRDA, a mining right is required prior to the commencement of any mining activity. An applicant may only be granted a mining right, in terms of the MPRDA, if:-

- The mineral can be mined optimally and in accordance with a mining work programme;
- The applicant has access to financial resources and technical ability;
- The financial plan is compatible with the intended operations;
- The mining will not result in unacceptable pollution, ecological degradation or damage to the environment;
- The applicant has provided financially and otherwise for a social and labour plan;
- The applicant can comply with the provisions of the Mine Health and Safety Act;
- The applicant is not in contravention with provisions of this Act; and
- The granting of the right will further the objects of the MPRDA.

AAIC currently holds several prospecting rights over the proposed Alexander mining area in terms of the MPDRA and has submitted a mining right application to the Department of Mineral Resources (DMR) over the same area (see Figure 1-1) in February 2016.

A key component of a mining right application is the assessment of potential environmental impacts.

#### 2.4.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The proposed Alexander Project requires authorisation in terms of NEMA and the new EIA Regulations. The DMR is the competent authority responsible for administration, review and decision-making (granting or refusal regarding this EIA).

Activities listed in GNR 983, 984 and 985 apply to the project and thus a full scoping and EIA will be conducted. An application form was submitted to the DMR on 29 January 2016. The listed activities which formed part of the application are listed in Table 2-2 above.

The applicable list of activities may be updated as the design of the project progresses during the EIA process. The EIA will specifically address the environmental impacts of the different activities and the EMP will deal with the management of activities to avoid or minimise environmental impacts.

### **2.4.3 NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008**

Prior to December 2014, mining wastes and wastes incidental to mining, as defined in the National Environmental Management: Waste Act (No 59 of 2008) (NEMWA), did not require a waste management license (WML). However since 8 December 2014 residue deposits and residue stockpiles are no longer excluded from the ambit of the NEM:WA.

Various other non-mineralogical wastes associated with the project and associated activities will also require licensing. The listed activities which formed part of the WML application are listed in Table 2-2 above.

NEM:WA requires an EIA process and reports structured in terms of the requirements of GNR 982 (EIA regulations) in terms of the NEMA. The DMR is the competent authority responsible for administration, review and decision-making (granting or refusal regarding this EIA).

The applicable list of waste activities may be updated as the design of the project progresses during the EIA process. The EIA will specifically address the environmental impacts of the different wastes and the EMP will deal with the management of wastes to avoid or minimise environmental impacts.

## **2.5 NEED AND DESIRABILITY OF THE PROPOSED PROJECT**

The project site has been selected on the basis of the presence of an economically mineable resource. The proposed project plan and site layout has been based on limiting the project footprint and trying to avoid sensitive areas where possible from an environmental and social perspective, while still considering engineering feasibility and financial factors.

Development of the mine supports the national SA economy at a macro level by gearing exports that will leverage foreign income to the country. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees. This is in line with the Govan Mbeki Spatial Development Framework (GMLM, 2014) which identifies mining as a strategic objective for economic development and job creation supporting and guiding development. Mining diversifies and strengthens the local economy by providing a long term advantage to the creation of sustainable economies, communities and jobs. Further to this, through employment, persons at the proposed mine will gain skills in the construction and operation of a mine in keeping with the skills upgrading and development which contributes to the building of the nation.

Although mining is a major contributor to the local economy, the primary objective should be to prevent mining activities from encroaching onto high potential agricultural land and areas of high biodiversity, and to ensure that the mining area is properly rehabilitated and that the agricultural values of the land are restored once the mineral resources are depleted (Emalahleni Draft Spatial Development Framework (ELM, 2015)).

The proposed development will also ensure local economic development through implementation of projects identified in the social and labour plan.

More detail relating to the need and desirability of the proposed project will be provided in the EIA and EMP report.

## **2.6 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED**

The estimated period is 38 years comprising 3 years for construction and 35 years for operations.

### **3 PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVE**

#### **3.1 DETAILS OF ALL ALTERNATIVES CONSIDERED**

This section describes land use or development alternatives, alternative means of carrying out the operation, and the consequences of not proceeding with the proposed project.

The main project alternatives to be considered include:-

- Property or locality;
- Type of activity;
- Design or layout;
- Technology;
- Operational aspects; and
- The “no-go” alternative.

##### **3.1.1 PROPERTY OR LOCALITY**

The property on which the actual underground mining related activities takes place is dependent on the location of the target mineral resource. It follows that no alternatives could be considered for the mine site.

##### **3.1.2 TYPE OF ACTIVITY**

###### **3.1.2.1 Underground Mine**

In broad terms the alternatives for mining and extracting target mineral resources are open cast or underground mining. Given the depth of the ore body the chosen alternative for the Alexander Project is underground mining.

##### **3.1.3 DESIGN OR LAYOUT**

Eight shaft complex site location alternatives were considered (see Appendix 4) within the proposed Alexander mining right area. An alternative selection matrix was compiled in order to determine the preferred alternative for the shaft complex. Table 3-1 presents the results of the related site selection process. The ranking system is a simple seven score relative ranking system. For each criterion, a score of one is allocated to the best option and a score of eight to the worst. The option with the lowest total score is the preferred option.

**TABLE 3-1: SHAFT COMPLEX SITE SELECTION MATRIX**

CRITERIA	ALTERNATIVE SITE OPTIONS								DISCUSSION
	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	
<b>Aspect/Impact</b>									
Soils and land capability	4	4	4	4	4	4	5	4	Option 1 – 6 and 8 are located in – the deeper and more sandy loam soils are considered High Potential materials and are considered to have a lower sensitivity, while option 7 is located in shallower and more structured cracking soils which are considered to be more sensitive and will require greater management if disturbed (Section 3.4.1.4. The related land capability is cultivation for all proposed shaft complex site location options. There is no relative score difference.
Biodiversity (terrestrial and aquatic fauna, flora)	5	5	6	5	6	5	5	6	All options would be located within the endangered Eastern Highveld Grassland (Section 3.4.1.5). All options are located within areas heavily modified and deemed to be of low biodiversity importance. In addition, options 3 and 5 would be located in close proximity to wetlands.
Proximity to primary surface water courses	1	1	1	1	1	1	1	1	The Steenkoolspruit River is bisecting the proposed project area in an east - west direction. None of the options will be located within 100m from the Steenkoolspruit River.
Ground water regime and impacts on downstream users	1	1	1	1	1	1	1	1	All options assumed to be similar in terms of the type of underlying aquifer.
Visual impact	2	2	3	3	3	3	3	3	All options assumed to be visible from one or more surrounding residential areas. Therefore the visual impacts are assumed to be similar for all options. Options 1 and 2 are however located close to existing mining operations so the visual impact associated with these options is slightly reduced.
Heritage resources	1	1	1	1	1	1	2	1	None of the proposed site location options would interfere with known existing heritage resources. Option 7 is the closest to known existing heritage resources.
Proximity to residential areas from a dust and noise perspective	5	5	3	3	3	3	3	3	Options 1 and 2 are the closest to residential areas. All of the other options are situated at a similar distance from the main residential areas surrounding the proposed project.
Sterilisation of mineral resources	1	1	1	1	1	1	1	1	This is not an issue for any of the options.
Interference with surface infrastructure	1	1	1	1	1	3	1	1	Option 6 is situated on the R545 provincial road. If this was the preferred shaft complex site the road would have to be realigned.

CRITERIA	ALTERNATIVE SITE OPTIONS								DISCUSSION
	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	
									This is not an issue for any of the other options.
Discussion	21	21	21	20	21	22	22	21	The relative difference between the sites is negligible and therefore the deciding factor is ultimately the best location from a mine access and operational perspective. Shaft complex site location option 4 is preferred.

### **3.1.4 OPERATIONAL ASPECTS**

#### **WATER SUPPLY ALTERNATIVES**

The following sources are being considered: on-site boreholes (including dewatering), neighbouring Anglo mining operations, municipal structures, on-site water treatment plant.

Further details will be provided in the EIA/EMP report.

#### **ROM TRANSPORT ROUTE ALTERNATIVES**

##### Conveyor

An overland conveyor will transport run-of mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery from where it will be transported via the Elders overland conveyor to Goedehoop Colliery for beneficiation purposes. From the Alexander incline shaft, four conveyor route options were considered as part of the proposed project.

The preferred conveyor route option was selected for the following reasons: smallest impact on streams and watercourses, no impacts on rocky outcrops, and smallest impact on private landowners/ farmers due to the route following property boundaries of mostly AAIC property.

### **3.1.5 THE “NO-GO” ALTERNATIVE**

The assessment of this option requires a comparison between the options of proceeding with the proposed project with that of not proceeding with the proposed project. Proceeding with the proposed project attracts potential economic benefits and potential negative environmental and social impacts. Not proceeding with the proposed project leaves the status quo. This will be detailed further in the EIA and EMP report.

## **3.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED**

This section describes the undertaking of the public participation process and details the information provided to the community, landowners and interested and affected parties (IAPs). The intent was to inform them of what the proposed project will entail, in sufficient detail, in an order that may contribute meaningfully to the identification of impacts and alternatives.

### **3.2.1 LANDOWNER AND OCCUPIER NOTIFICATIONS**

During the week of the 18<sup>th</sup> of January 2016, background information letters via email were sent to the landowners and farmers within the proposed mining right area. In addition letters were delivered to Mr Deon van der Westhuizen. It was agreed that he would distribute these to the farming community at large. Councilor Dirk Grobler, a PR Councilor in the Kriel area also received letters to distribute to the farming community and other landowners. Additional letters were delivered to Councilors Zingisa Mbuku, Mahlangu, Mtsweni and Mdluli to distribute further to the occupiers and the farm workers community. Proof of both notification email and delivery is attached in Appendix 5.

### **3.2.2 STATE DEPARTMENT NOTIFICATIONS**

During the week of 18<sup>th</sup> of January 2016, letters were sent to the following authorities:-

- Department of Minerals Resources (DMR);
- Department of Economic Development, Environment and Tourism (DEDET);
- Department of Water and Sanitation (DWS);
- Mpumalanga Parks Board (MPB);
- South African Heritage Resources Agency (SAHRA);
- Department of Agriculture, Forestry and Fisheries (DAFF);
- Department of Public Works, Roads and Transport (DPWRT);
- Department of Rural Development and Land Reform (DRDLR);
- Department of Agriculture, Rural Development and Land Administration (DARDLA);
- Gert Sibande District Municipality (GSDM);
- Nkangala District Municipality (NDM);
- Emalahleni Local Municipality (ELM); and
- Govan Mbeki Local Municipality (GMLM).

### **3.2.3 SOCIAL SCAN**

A social scan of areas surrounding the proposed project area was conducted by Synergistics on 23 December 2015 and again on 13 and 15 January 2016. The purpose of the social scan is as follows:-



- To identify relevant surrounding landowners, land occupiers, relevant ward councilors, municipalities, organs of state, regulatory authorities and other IAPs;
- To obtain contact details for IAPs;
- To identify appropriate communication structures; and
- To inform IAPs of the proposed project, upcoming public consultation process and associated scoping and EIA/EMP process.

One output of the social scan is an IAP database which will be updated on an on-going basis throughout the EIA process.

#### **3.2.4 SITE NOTICES AND ADVERTISEMENTS**

On Friday 22<sup>nd</sup> of January 2016, site notices in English, Afrikaans and Zulu were placed at key conspicuous positions in and around the project area. A map showing the laminated A2 site notices' distribution is included in Appendix 5.

Press adverts were placed in the following newspapers:-

- Witbank News local and community newspaper (ELM) on Thursday 21 January 2016;
- Ridge Times Echo local and community newspaper (GMLM) on Wednesday 27 January 2016;
- Witbank News local and community newspaper (ELM) on Thursday 4 February 2016; and
- Ridge Times Echo local and community newspaper (GMLM) on Wednesday 3 February 2016.

In addition legal notices were placed and published in the National Gazette on Friday 29 January and Friday 5 February 2016.

The press, gazette publications and site notifications were undertaken to elicit interest from other IAPs that might not have been identified during the earlier stakeholder identification process. The advert and proof of site notices are included in Appendix 5.

#### **3.2.5 BACKGROUND INFORMATION LETTER DISTRIBUTION**

A letter was compiled for the proposed project. The purpose of the letter was to inform IAPs and authorities about the proposed project, the EIA process, environmental attributes, possible environmental impacts and means of providing input into the EIA process. The letter was made available in English, Zulu and Afrikaans.

Letters were distributed by hand via the ward councilors of both ELM and GMLM and representatives of the farming community. Letters were also distributed to all identified stakeholders. The letter also included details of the planned public engagement meetings.

Copies of the letter together with the proof of distribution are included in Appendix 5.

### **3.2.6 PUBLIC MEETINGS**

#### **3.2.6.1 Information-sharing scoping meeting**

Four general public scoping meetings will be held in Kriel and Secunda on 10 and 11 February 2016 covering audiences who speak Afrikaans and Zulu. Informal meetings will be held with the ward councilors in both municipalities. The purpose of the meetings will be as follows:-

- To provide an overview of the proposed project;
- To provide an overview of the EIA process that will be undertaken for the proposed project;
- To provide an overview and obtain input on the existing status of the environment;
- To outline and obtain input on impacts identified for the proposed project;
- To record any comments and issues raised. These issues and concerns will be used to inform the Plan of Study for the EIA Phase; and
- Agree on the way forward and the logistics for report distribution.

Minutes of the public meetings will be included in Appendix 5 of the final scoping report.

#### **3.2.6.2 Regulatory authority scoping meeting**

A regulatory authorities meeting was held on Wednesday 03 February in Secunda. The purpose of the meeting was as follows:-

- To provide an overview of the proposed project;
- To provide an overview of the EIA process that will be undertaken for the proposed project;
- To provide an overview and obtain input on the existing status of the environment;
- To outline and obtain input on impacts identified for the proposed project;
- To record any comments and issues raised. These issues and concerns will be used to inform the Plan of Study for the EIA Phase; and
- Agree on the way forward and the logistics for report distribution.

Minutes of the authority scoping meeting have been included in Appendix 5 of the scoping report.

### **3.2.7 INTERESTED AND AFFECTED PARTY (IAP) DATABASE**

One output of the social scan, the focused meetings, the regulatory authorities meeting and the public meetings is an IAP database which will be updated on an on-going basis throughout the EIA process. The latest copy of the IAP database is included in Appendix 5.

### **3.2.8 REVIEW OF THE DRAFT SCOPING REPORT**

#### **3.2.8.1 Public review of scoping report**

The draft scoping report will be made available for public review from the beginning of 9 February 2016 (for 30 days) until close of business on 9 March 2016 and comment at the following venues:

- Kriel Library (Civic Centre);
- Secunda Library (Govan Mbeki Local Municipality);
- Bethal Civic Centre (Govan Mbeki Local Municipality);
- Enkundleni Primary School;
- Mr Van der Westhuizen Home (Witrand Farm);
- Electronic copies of the scoping report will be made available at the 'Report FTP' page of [www.synergistics.co.za](http://www.synergistics.co.za) with the following login details - Username: synergistics; Password: v9urweyf.

IAPs were notified of when and where the scoping report will be available for review through follow-up press adverts that were placed in the National Gazette on Friday 5 February 2016, and in the Ridge Times Echo and Witbank News and local and community newspapers on Wednesday 4 February 2016 and Thursday 5 February 2016 respectively. In addition IAPs on the database were notified directly via e-mail and sms.

Summaries of the scoping report will be made available to all IAPs registered on the public involvement database via e-mail, post and hand delivery.

The final scoping report will be made available to the DMR inclusive of review comments from the IAPs.

#### **3.2.8.2 Regulatory authority review of scoping report**

The draft scoping report will be made available for review by regulatory authorities registered on the public involvement database for a period of 30 days from the beginning of 9 February 2016 until close of business on 9 March 2016. The final scoping report will be made available to the DMR inclusive of review comments from other authorities.

### **3.3 SUMMARY OF ISSUES RAISED BY IAPS**

A summary of the issues and concerns raised by regulatory authorities (to date) in relation to the proposed project and the alternatives are provided in Table 3-2 below. All issues raised at the scheduled public scoping meetings and/or submitted in writing by the 9<sup>th</sup> of March 2016 will be included in the final scoping report.

#### **3.3.1 KEY ISSUES RAISED BY REGULATORY AUTHORITIES**

**TABLE 3-2: SUMMARY OF ISSUES RAISED BY REGULATORY AUTHORITIES**

IAP DETAILS		DATE OF COMMENT	ISSUE RAISED	RESPONSE (as amended for the purposes of the scoping report)
<b>Affected Parties</b>				
Govan Mbeki Local Municipality				
Ignatius Mathebula	X	3 February 2016 at the authority scoping meeting.	At a later stage, a town planner must be consulted in order to address issues of land use and rezoning. What is the mining method that will be used for the project?	Synergistics has noted your comment for the attention of AAIC. The requirement to apply for a change in land use/re-zoning is included in section 4.3.5 of the scoping report. The project will use continuous mining, bord and pillar method at an average depth of approximately 63 metres below surface. A detailed project description is included in section 2.3 of the scoping report.
Mxolisi Fakude	X	3 February 2016 at the authority scoping meeting.	What type of rehabilitation strategy will be used for the project? Will it be ongoing or done at the end of the life of the mine?	The project will be an underground mine and accessed through a shaft. Rehabilitation will only be possible at the end of the life of mine unlike an opencast mine where rehabilitation can be done on an ongoing basis.
Ignatius Mathebula	X	3 February 2016 at the authority scoping meeting.	Are there any specific rehabilitation plans that will be implemented such as revegetation initiatives? This could be a good opportunity to partner with local communities in such initiatives.	This issue has been noted and will be addressed in detail during the EIA/EMP phase.
Mxolisi Fakude	X	2016 at the authority scoping meeting.	Are there any identified or unknown graves in the project area? This must be confirmed early in the process as it may be a risk to the progress of the project.	Numerous grave sites have been identified in the greater application area. This issue has been noted and will be addressed by the Heritage specialist and during the EIA/EMP phase of the project. The additional work required to address this issue is set out in the heritage/cultural resources study terms of reference as per section 5.4.11.
Ignatius Mathebula	X	2016 at the authority scoping meeting.	The local communities will be very helpful in assisting with identifying graves in the project area. The project must consider the new Gert Sibande District Biodiversity Management Plan on the assessment of potential biodiversity impacts. I see that on the project description it was only mentioned that the run-of-mine coal will be transported via the conveyor belt. Are there no plans to include road transport in this project? If by any chance, road transport will also be used, the associated impact assessment needs to be included as part of this project.	
				This issue has been noted and provided the plan is finalised it will be addressed by the Biodiversity specialist and during the EIA/EMP phase of the project. At this stage, road transport of coal does not form part of this project. The overland conveyor will be used to transport run-of-mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery from where it will be transported via the Elders overland conveyor to Goedehoop Colliery for beneficiation purposes. There will not be any processing plants as part of the

IAP DETAILS		DATE OF COMMENT	ISSUE RAISED	RESPONSE (as amended for the purposes of the scoping report)
				Alexander Project. A detailed project description is included in section 2.3 of the scoping report.
			The impact of mining below road infrastructure and the permission thereof must be investigated.	This issue has been noted and will be addressed during the EIA/EMP phase of the project.
			It has been indicated that no new job opportunities will be created by this project. This will be a major blow for the communities in which the project will be located as such projects are usually viewed as major contributors to economic upliftment. This may cause some unrest from the communities.	This issue has been noted and will be addressed as part of the socio-economic studies during the EIA/EMP Phase. It must be noted though that at this stage no new job opportunities will be created and community upliftment initiatives will be through the social and labour plan (SLP). The additional work required to address this issue is set out in the socio-economic resources study terms of reference as per section 5.4.6.
Mxolisi Fakude	X	2016 at the authority scoping meeting.	Communities will not be pleased that there will not be any job opportunities especially during the production phase. It must be noted that most of the affected communities are unskilled and will depend largely on the general labour job opportunities during production. Can AAIC consider this fact during the assessment?	
Emalahleni Local Municipality				
Dirk Grobler	X	2016 at the authority scoping meeting.	What is the total size of the project (prospecting) area in hectares and how much of that will form part of the mining layout?	The total size of the prospecting area is 10 700ha. The total size of the underground mining area is about 7 300ha. The total size of the surface infrastructure layout is 220ha. A detailed project description is included in section 2.3 of the scoping report.
			Farmers are very concerned about the overall impact this project will have on the maize farming industry. Farmers are already stressed with the lack of water and possible drought and how it is already affecting food shortages in the country as a whole.	This issue has been noted and will be addressed by the relevant specialists and during the EIA/EMP phase of the project. The additional work required to address these issues are set out in the specialist studies terms of reference as per section 5.4.
Department of Public Works, Roads and Transport				
N. Naidoo	X	2016 at the authority scoping meeting.	The project team must in addition to the South African Heritage Resources Agency engage with the Provincial Department of Arts and Culture when it comes to the issues of graves and heritage.	Numerous grave sites have been identified in the greater application area. This issue has been noted and will be addressed by the Heritage specialist and during the EIA/EMP phase of the project. The additional work required to address this issue is set out in the heritage/cultural resources study terms of reference as per section 5.4.11.
			The impact on roads, traffic and other Public Works infrastructure such as schools must be included in your studies.	This issue has been noted and will be addressed during the EIA/EMP phase of the project.

### 3.4 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT AND ALTERNATIVES

The baseline information provided here is aimed at giving the reader perspective on the existing status of the cultural, socio-economic and biophysical environment. More detailed information will be provided in the EIA report once the specialist reports and other research has been concluded.

#### 3.4.1 BASELINE ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

##### 3.4.1.1 Air quality

###### Introduction

A change in ambient air quality can result in a range of impacts, which in turn, may cause a disturbance to nearby receptors. As a baseline, this section provides a short description of pre-mining conditions in the area from which to measure changes as a result of the proposed project. More detailed information will be provided in the EIA and EMP.

###### Data Sources

Information in this section was sourced from available baseline information.

###### Results/Conclusion

###### Existing emission sources

Neighbouring land-use in the surrounding of the proposed project area comprises predominantly of farming and mining activities. These land-uses contribute to baseline pollutant concentrations via the following sources:

- Power generation: Operational power stations are in close proximity of the proposed. The main emissions from such electricity generation operations are carbon dioxide (CO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxides and ash (particulates). Fly-ash particles emitted comprise various trace elements such as arsenic, chromium, cadmium, lead, manganese, nickel, vanadium and zinc. Small quantities of volatile organic compounds are also released from such operations. The power stations are large sources of SO<sub>2</sub>, which oxidizes in the atmosphere to particulate sulfate at a rate of between 1 and 4% per hour. Fine particulate sulfate has been used to trace the transportation of power station plumes across the southern African sub-continent.
- Mining sources: Fugitive emissions from open cast and underground mining operations mainly comprise of land clearing operations (i.e. scraping, dozing and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), vehicle entrainment from haul roads, wind erosion from open areas, drilling and blasting. These activities mainly result in particulates and dust emissions, with small amounts of oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO), SO<sub>2</sub>, methane and CO<sub>2</sub> being released during blasting operations. Open cast and underground coal mines in this region include the Kriel, Elders, Impunzi Division, New Clydesdale, Isibonelo, Goedehoop, Zibulo and Tweefontein Collieries.

- Fugitive dust sources: Sources of fugitive dust identified in the proposed project area include, paved and unpaved roads, agricultural tilling operations and wind erosion of sparsely vegetated surfaces.
- Unpaved and paved roads: Emissions from unpaved roads constitute a major source of emissions to the atmosphere in the South African context. Dust emissions from unpaved roads vary in relation to the vehicle traffic and the silt loading on the roads. Emission from paved roads are significantly less than those originating from unpaved roads, however they do contribute to the particulate load of the atmosphere. Particulate emissions occur whenever vehicles travel over a paved surface. The fugitive dust emissions are due to the re-suspension of loose material on the road surface.
- Wind erosion and open areas: Windblown dust generates from natural and anthropogenic sources. For wind erosion to occur, the wind speed needs to exceed a certain threshold, called the threshold velocity. This relates to gravity and the inter-particle cohesion that resists removal. Surface properties such as soil texture, soil moisture and vegetation cover influence the removal potential. Conversely, the friction velocity or wind shear at the surface is related to atmospheric flow conditions and surface aerodynamic properties. Thus, for particles to become airborne, its erosion potential has to be restored; that is, the wind shear at the surface must exceed the gravitational and cohesive forces acting upon them, called the threshold friction velocity. Erodible surfaces may occur as a result of agriculture and/or grazing activities.
- Domestic fuel combustion: Domestic households are known to have the potential to be one the most significant sources that contribute to poor air quality within residential areas. Individual households are low volume emitters, but their cumulative impact is significant. It is likely that households within the local communities or settlements utilize coal, paraffin and/or wood for cooking and/or space heating (mainly during winter) purposes. Pollutants arising from the combustion of wood include respirable particulates, CO and SO<sub>2</sub> with trace amounts of polycyclic aromatic hydrocarbons (PAHs), in particular benzo(a)pyrene and formaldehyde. Particulate emissions from wood burning have been found to contain about 50% elemental carbon and about 50% condensed hydrocarbons. Coal is relatively inexpensive in the Mpumalanga region and is easily accessible due to the proximity of the region to coal mines and the well-developed coal merchant industry. Coal burning emits a large amount of gaseous and particulate pollutants including SO<sub>2</sub>, heavy metals, total and respirable particulates including heavy metals and inorganic ash, CO, PAHs (recognized carcinogens), NO<sub>2</sub> and various toxins. The main pollutants emitted from the combustion of paraffin are NO<sub>2</sub>, particulates, CO and PAHs.
- Biomass burning: Biomass burning includes the burning of evergreen and deciduous forests, woodlands, grasslands, and agricultural lands. Within the project vicinity, crop-residue burning and wild fires (locally known as veld fires) may represent significant sources of combustion-related emissions. The frequency of wildfires in the Highveld grasslands varies between annual and triennial. Biomass burning is an incomplete combustion process with carbon monoxide, methane and nitrogen dioxide gases being emitted. Approximately 40% of the nitrogen in biomass is emitted as nitrogen, 10% is left in the ashes, and it may be assumed that 20% of the nitrogen is emitted as higher molecular weight nitrogen compounds. The visibility of the smoke plumes is attributed to the aerosol

(particulate matter) content. In addition to the impact of biomass burning within the vicinity of the proposed mining activity, long-range transported emissions from this source can be expected to impact on the air quality between the months of August to October. It is impossible to control this source of atmospheric pollution loading; however, it should be noted as part of the background or baseline condition before considering the impacts of other local sources.

- Vehicle tailpipe emissions: Emissions resulting from motor vehicles can be grouped into primary and secondary pollutants. While primary pollutants are emitted directly into the atmosphere, secondary pollutants form in the atmosphere as a result of chemical reactions. Significant primary pollutants emitted combustion engines include carbon dioxide (CO<sub>2</sub>), carbon (C), sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (mainly NO), particulates and lead. Secondary pollutants include NO<sub>2</sub>, photochemical oxidants such as ozone, sulphur acid, sulphates, nitric acid, and nitrate aerosols (particulate matter). Transport in the vicinity of the proposed project area is via trucks and private vehicles along the R545 and R544 (public) provincial roads, which are the main sources of vehicle tailpipe emissions.

#### Potential receptors

Potential receptors located within and surrounding the proposed project site includes the following:

- Kriel town that bounds the proposed project boundary to the northwest;
- Bethal town located about 13 km southeast of the proposed project boundary;
- Evander and Kinross towns located about 20 km southwest of the proposed project boundary;
- Secunda industrial area located about 15 km southwest of the proposed project boundary;
- Thubelihle residential area located about 5 km north of the proposed project boundary;
- Farmer and farmworker houses within the proposed project boundary; and
- Farmer and farmworker houses within the 5km radius of the proposed project boundary.

The proposed project falls within the Highveld Priority Area, which is an area that has been characterised with poor air quality where the background concentrations of PM10 and SO<sub>2</sub> are already elevated. It is recommended that the management plan for the Highveld Priority Area be included in the EMP for the proposed project.

### **3.4.1.2 Surface water**

#### **Introduction**

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Project-related activities have the potential to alter the drainage of surface water through the establishment of infrastructure and/or result in the contamination of the surface water resources through seepage and/or spillage of potentially polluting materials, non-mineralised waste (general and hazardous) and mineralised wastes (waste rock stockpiles).

As a baseline, this section provides a brief description of surface water resources in the project area in order to facilitate an understanding of the hydrological catchments that could be affected by the project



and the status of surface water resources in the project area. This section should be read with reference to Figure 3-6.

### **Data Sources**

Information in this section was sourced from available baseline information.

### **Results/Conclusion**

#### Regional hydrology

The proposed project is situated within the Witbank Dam catchment, which is part of the Loskop Dam catchment. The majority of the mine property lies within Quaternary sub-catchment B11C, with portions of the north western and north eastern tips of the mine boundary lying in Quaternary sub-catchment B11D, B11B and B11A, of the Limpopo-Olifants primary drainage region.

The majority of the proposed mining area drains in a westerly direction towards the Steenkoolspruit, with the north eastern corner of the proposed mining area draining towards a tributary of the Olifants River. Eventually the Steenkoolspruit joins the Olifants River, which lies to the north of the site. The Olifants River flows through the Witbank Dam, and further downstream into the Loskop Dam. From the Loskop Dam, the Olifants River flows through Mpumalanga and the central part of the Kruger National Park to Mozambique.

#### Local hydrology

The Steenkoolspruit River drains across the middle of the site from east to west, before turning northwards and forming the western boundary of the site.

#### Surface water quality

The results of the surface water quality monitoring indicated moderate existing impacts on the water quality in some of the watercourses on the project site, which might be attributed to farming activities in the catchment.

#### Surface water users

Based on past experience in the area, water downstream of the project site, up to the Witbank Dam, would primarily be used for agricultural and livestock watering purposes.

#### Wetlands

The total wetland extent on the project site was found to exceed 4 470 hectares and covers ~ 40% of the surface area within the boundaries of the proposed project area. Five different hydro-geomorphic wetland types were identified as follows:

- Channelled valley bottom wetlands;
- Floodplain wetlands;

- Unchannelled valley bottom wetlands;
- Depression/pan wetlands; and
- Hillslope seepage wetlands.

### 3.4.1.3 Groundwater

#### Introduction

Groundwater is a valuable resource and is defined as water which is located in cavities and fractures of rock formations in the lithosphere. Understanding the geology of the area provides a basis from which to understand the occurrence and distribution of groundwater resources. Project-related activities such as the development of the underground mining areas, the handling, storage and disposal of mineralised and non-mineralised wastes, have the potential to impact on groundwater resources, both to the environment and third party users, through dewatering and pollution.

As a baseline, this section provides a brief description of the pre-mining groundwater conditions to facilitate an understanding of the potential for dewatering cones of depression and pollution plumes to occur as a result of project-related activities.

#### Data Sources

Information in this section was sourced from available baseline information.

#### Results/Conclusion

The regional geohydrology conditions are naturally influenced by the associated geological formations and properties thereof. Underground mining operations have led to alterations of the natural geohydrological conditions of the environment.

The study area is underlain by predominately arenaceous rocks (sandstone) of the Eccra Group. Groundwater in this zone occurs primarily within joints and fractures in competent arenaceous rocks related to tensional or compressional stresses and offloading. The borehole yielding within the Eccra group is classified as class d2, which implies a median yield which varies between 0.1 l/s to 0.5l l/s.

The groundwater potential for the area is given as between 40% and 60%, which indicates the probability of drilling a successful borehole (yield>0.1 l/s). No large scale groundwater abstraction occurred in close vicinity to the study area. The probability of obtaining a yield in excess of 2 l/s is given as between 10% and 20%.

The mean annual recharge (MAR) to the groundwater system at the study area is given as between 25 mm/a and 37mm/a. The mean annual precipitation (MAP) is between 600 mm/a and 800 mm/a. This means that 4.5% of the MAP is recharged into the groundwater system. The groundwater contribution to surface stream base flow is low at between 0mm to 10mm.

The depth to groundwater levels are estimated to be between 10 m and 20 m below the surface. The aquifer storativity (S) for the arenaceous rock aquifers in the study is estimated to be between 0.001 and 0.01. The saturated interstice types (storage medium) are pores in disintegrated / decomposed, partly decomposed rock and fractures which are principally restricted to a zone directly below groundwater level. The formation comprises mainly from compacted sedimentary rocks excluding dolomite and limestone.

Sampled groundwater quality is good with a Total Dissolved Solids (TDS) of <300 mg/l. The Electrical Conductivity (EC) is at average 0-70 mS/m. The groundwater is classified to be of the hydro-chemical type B, with dominant cations  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  and dominant anion being  $\text{HCO}_3^-$ .

With reference to the local geology of the site, the primary aquifer type present is namely a lateral extensive shallow weathered zone aquifer. This aquifer extends over the entire study area and is extremely thick, with an average weathering depth/ vertical thickness of 13.92 m below surface. The bulk of the groundwater in this area will be stored and transported within this aquifer zone. The aquifer will also be highly susceptible to surface induced impacts and activities, due to the unconfined and semi-unconfined piezometric conditions that occur within the aquifer.

Due to the shallow nature of the shallow weathered aquifer, the top of the unsaturated zone is described by the land surface, whilst the bottom of the unsaturated zone is defined by the groundwater table/ level. The thickness of the unsaturated zone is therefore defined as the depth to the groundwater level recorded at the boreholes. The unsaturated zone is indicated to vary between 0.36m and 11.50m, with an average vertical thickness calculated as 5.42m.

The saturated zone of the shallow weathered zone aquifer is defined at the top by the groundwater table/ level and at the bottom by the weathered/ fractured and fresh bedrock interface. The thickness of the saturated zone is calculated to vary between 16m and 29.64m, with an average thickness of about 24.58m.

#### **3.4.1.4 Soil and land capability**

##### **Introduction**

Soil is an important natural resource and provides ecosystem services that are critical for life, such as:

- Water filtering;
- Providing growth medium for plants, which in turn provide food for plant-eating animals; and
- Providing habitat for a wide variety of life forms.

Soil forms rather slowly by the breaking down of rock material and is therefore viewed as a non-renewable resource. Soil determines the type of land use the area is suitable for, for example, soil with low nutrients may not be able to support unassisted crop farming.

Soil resources are vulnerable to pollution, erosion (wind and water) and compaction, which could be caused by project-related activities.

The baseline soil information will be used to identify sensitive soil types, to guide the project planning in order to avoid sensitive soil types where possible, to determine how best to conserve the soil resources in the area and allow for proper rehabilitation of the site once mining ceases.

The land capability of an area is based on the soil properties and related potential to support various land use activities. Mining operations have the potential to significantly transform the land capability.

A brief description of the soil types and land capability in the project area is provided below. More detailed information will be provided in the EIA/EMP.

### **Data Sources**

Information in this section was sourced from available baseline information.

### **Results/Conclusion**

The soils range from shallow sub-outcrop and outcrop of hard plinthite and parent materials (sediments and intrusive dolerite) to moderately deep sandy loams and sandy clay loams, all of which are associated with either a hard rock base to the "C" horizon, a thin saprolitic layer (weathering rock) or ferricrete/laterite at differing depths. The saprolitic horizons are generally quite thin, with soil occurring on hard bedrock in most instances.

The different soil types have differing potentials and sensitivities based on various characteristics e.g. structure, depth, water permeability, texture. The deeper and more sandy loam soils are considered High Potential materials and are considered to have a lower sensitivity (see 'PT1' Figure 3-3). These occur at greater depths within the soil profile (>500mm). These soils are red, yellow and/or greyish soils with low to medium base status.

The shallower and more structured materials are considered to be more sensitive and will require greater management if disturbed (see 'VR' Figure 3-3). These soils are shallower within the soil profile (< 500mm), mainly dark coloured and dominated by swelling clays (vertical soils). They may occur associated with one or more melanic and red structured soils.

The third group of soils is associated with the hard pan ferricrete layer and perched soil water. These soils are generally associated with a wet base and are situated in close proximity of watercourses (e.g. the Steenkoolspruit River and pans within the greater application area). The group of materials that reflect wetness (wet based soils) falling within the top 500mm soil profile is regarded as highly sensitive. The ferricrete layer within the soil profile is of significance as its development is based on geological time and the presence of specific soils and water chemistry. The situation required to form this horizon will be difficult to emulate or recreate if impacted or destroyed.

#### Land Capability

The land capability of the study area was classified into four distinct classes: wet land or lands with wet based soils, arable land, grazing land, and wilderness or conservation land. The arable land has little to no grazing potential soils. This is mainly due to the poor rainfall in the area which has affected the growth potential. Grazing land is capable of sustaining palatable plant species on a sustainable basis, provided there are no rocks or pedocrete fragments in the upper horizons of this soil group; this will limit the land capability to wilderness land. The majority of the study area classifies as being low intensity grazing land or having wilderness status. Wilderness land does not qualify as having wetland soils, arable land or grazing land, and thus is regarded as requiring conservation actions. Wetland areas, in terms of soil, are considered very important, highly sensitive and vulnerable based on their ability to contain and hold water for periods through the summers and into the dry winter seasons.

### **3.4.1.5 Ecology, Biodiversity and Wetlands**

#### **Introduction**

Biodiversity refers to the flora (plants) and fauna (animals). According to the International Union for Conservation of Nature (IUCN) (2011), biodiversity is crucial for the functioning of ecosystems which provide us with products and services which sustain human life. Healthy ecosystems provide us with oxygen, food, fresh water, fertile soil, medicines, shelter, protection from storms and floods, stable climate and recreation.

#### **Data Sources**

Information in this section was sourced from available baseline information.

#### **Results/Conclusion**

With reference to Figure 3-4, Figure 3-5, Figure 3-6 and Figure 3-7 the floral, faunal, aquatic and wetland ecological aspects of the project area are discussed below.

The study area covers approximately 12 600 ha and is situated almost entirely within Eastern Highveld Grassland (see Figure 3-4), which has a national ecosystem status of Endangered. About 8 300 ha, or 66% of the study area, has been transformed, mostly through commercial crop cultivation and open-cast coal mining. The remaining 4 300 ha comprise five untransformed vegetation communities, which were

identified within the study area on the basis of distinctive vegetation structure, floristic composition and position in the landscape:

- Untransformed Grassland on Rocky Ridges;
- Untransformed Grassland on Hillslopes and Plateaus;
- Untransformed Grassland on Plains;
- Evergreen Thicket on Rocky Scarps and Outcrops;
- Wetlands.

Two hundred and eighty-seven plant species were recorded within the study area during fieldwork. Fifteen of these are protected under the Mpumalanga Nature Conservation Act (No. 10 of 1998). Five plant species of conservation concern were confirmed to occur in the study area, four of which have the status of Declining (*Boophone disticha*, *Crinum bulbispermum*, *Eucomis autumnalis subsp. clavata*, *Hypoxis hemerocallidea*). The fifth species has been provisionally identified as *Khadia beswickii*, which is classified as Vulnerable. An additional seven species of conservation concern have been recorded within the quarter-degree grid 2629 AD and surrounding grids with similar habitat, of which six species have a moderate or high likelihood of occurring because of the presence of suitable habitat and / or presence of known populations nearby.

Eight fauna species of conservation concern were confirmed during fieldwork, two of which are Vulnerable (Secretarybird, Southern Bald Ibis), and six of which are Near Threatened (Brown Hyaena, Serval, Black-winged Pratincole, Blue Korhaan, Greater Flamingo, Lanner Falcon). Two Near Threatened mammals (Highveld Golden Mole and Southern African Hedgehog) are considered to have a moderate likelihood of occurring in the study area. A number of mammals classified as Data Deficient have a moderate likelihood of occurring, particularly shrews and rodents. Fifteen bird species confirmed to occur in the general vicinity of the study area during the current South African Bird Atlas Project have Red Data status. Six of these have been confirmed and have been mentioned above. Seven other species have a moderate likelihood of occurring, four of which are classified as Vulnerable (Blue Crane, White-bellied Korhaan, Lesser Kestrel, African Grass Owl), while the rest are Near Threatened (Pallid Harrier, Yellow-billed Stork and Lesser Flamingo). Two reptiles with Near Threatened status have a moderate likelihood of occurring in any untransformed grassland fragments (Transvaal Grass Lizard, Spotted Harlequin Snake). No amphibian species of conservation concern were recorded within the study area, although habitat is present for the Giant Bullfrog, which is Near Threatened.

Five vegetation communities have High Biodiversity Value, namely the three Untransformed Grassland communities, Evergreen Thicket on Scarps and Rocky Outcrops and Wetlands. These are the key ecosystems that need to remain intact and functional. Impacts within these communities will have the highest significance levels and therefore the impact footprint should remain outside of these communities as much as possible.

The untransformed vegetation within the study area falls within a Critical Biodiversity Area (CBA) within the new Mpumalanga Biodiversity Sector Plan (Lötter et. al, in press) (see Figure 3-5). A portion of the untransformed vegetation is also classified as Other Natural Habitats, while the transformed areas are classified as Modified. Areas falling within the Modified category are the preferred areas for a wide variety of land-use types, which includes urban and business development. Mining developments within CBAs are considered as inappropriate developments in conflict with the recommended land use guidelines.

### **Aquatic ecology**

The present state of aquatic ecosystems within the Alexander project area ranged from Largely Natural to Seriously Modified. In general, conditions declined in a downstream direction and were mainly a response to deteriorating habitat integrity rather than to water quality (with the exception of site SK-DS downstream of Kriel town). The sub-quadernary reaches were assigned an overall PES category, based on habitat integrity, fish and aquatic macroinvertebrates.

A number of seasonal pans within the study area add to the overall biodiversity by providing suitable conditions for specialised pan-adapted fauna (such as copepods, ostracods and cladocerans). These in turn, provide food for animals higher up in the food chain, such as water birds.

It should be noted that, although not all pans within the study area were sampled, they should be regarded as being of biodiversity importance. They support specialised pan-adapted fauna (such as copepods, ostracods and cladocerans). These in turn, provide food for animals higher up in the food chain, particularly water birds.

### **Protected and Sensitive Areas**

Although no protected areas or National Protected Area Expansion Strategy Focus Areas occur within the study area, various National Biodiversity Priority Areas in terms of the SANBI Grasslands Programme's Mining and Biodiversity Guidelines (2012) exist within the greater study area. The most predominant of which is classified a category D – Moderate Biodiversity Importance with a moderate risk for mining activities (see Figure 3-7).

#### **3.4.1.6 Socio-Economic**

##### **Introduction**

The proposed project has the potential to result in both positive and negative socio-economic impacts. The positive impacts are usually economic in nature with mines contributing directly towards employment, procurement, skills development and taxes on a local, regional and national scale. In addition, mines indirectly contribute to economic growth in the local and regional economies because the increase in the number of income earning people has a multiplying effect on the trade of other goods and services in other sectors.

The negative impacts can be both social and economic in nature. In this regard, mines can cause:-

- Influx of people seeking job opportunities which can lead to increased pressure on basic infrastructure and services (housing, health, sanitation and education), informal settlement development, increased crime, introduction of diseases and disruption to the existing social structures within established communities; and
- A change to not only pre-existing land uses, but also the associated social structure and meaning associated with these land uses and way of life.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

### **Data Sources**

Information in this section was sourced from available baseline information.

### **Results/Conclusion**

#### Population

The project straddles between the Emalahleni and Govan Mbeki Local Municipalities in Mpumalanga Province. There is a high birth rate (00-04 ages) with similar distribution for boy and girl child. The young population however decreases between ages 05-09. This can be as a result of out-migration or child mortality. Between the ages 20-39, the population increases with the highest age group being 24-29. For these age groups, there are more males than females which indicate in-migration in search of employment opportunities. Beyond age 39, the population begins to decrease, which either indicates people leaving the area or dying.

In 2011 Emalahleni made up 32% of Nkangala District's population with 395 466 persons recorded. Emalahleni's population grew 43% from 2001 to 2011 with an annual growth rate of 3.6%. The high population growth in Emalahleni can be attributed to the growth in economic activities in the area especially mining developments, which have presented employment opportunities.

Govan Mbeki Local Municipality makes up 2.8% of Gert Sibande District Municipality. The population grew by 32% from 2001 to 2011 with a calculated annual growth rate of 3.3%. According to the municipality's IDP, the population growth can be attributed to the inward migration due to job opportunities offered by mining and petrochemical industries in the area. The population growth has had negative implications on human settlements and bulk supply services offered by the municipality. The youth population make up 42% of the municipality's population.

#### Basic services

According to census 2011 municipal reports, there are 31 681 households within Emalahleni Local Municipality with an average size of 3.7. Access to basic services is above average with 56.1% of these



households live in formal dwellings. Most households (45.5%) have access to piped water within dwelling or yard have access to piped water inside dwelling. With regards to electricity, 73.4% have access to electricity for lighting. Service delivery for sanitation is however limited with only 11.8 % having flush toilets and 8.3% having weekly refuse removal.

Govan Mbeki Local Municipality has more households with about 83 874 households in the municipality with an average household size of 3.4 persons. 56.5% have access to piped water and 90.3 have access to electricity for lighting. Households within the municipality have better access to services such as 89.9% of the population having access to flush toilets and 91.7% having weekly removal of refuse.

### Education

Nkangala District has higher levels of education when compared to the other district municipalities. This can be attributed to the number of persons coming into the area in search of employment opportunities within the energy mecca. Mpumalanga's illiteracy levels (no schooling) at 14% are however much higher than the National average of 8.4 % which shows a need for investment in Adult Based Education.

#### **3.4.1.7 Topography**

##### **Introduction**

The topography of a particular area will determine the following factors:

- The flow of surface water, and in many cases, also groundwater;
- The depth of soils and the potential for soil erosion, for example, in the case of steep slopes soils are shallower and more prone to erosion;
- The type of land use, for example flat plains are more conducive to crop farming;
- The aesthetic appearance of the area; and
- Topography can also influence climatic factors such as wind speeds and direction, for example, wind will be channelled in between mountains and along valleys.

Changes in the topography caused by the mining activities could therefore alter all of the above-mentioned aspects of the environment. Project-related activities have the potential to alter the topography of the site through the establishment of infrastructure.

This section provides a brief description of the site topography to facilitate an understanding of the topographical features relevant to the proposed project site and surrounding area from which to measure potential change. More detailed information will be provided in the EIA and EMP report.

##### **Data Sources**

Information in this section was sourced from available baseline information.

## Results/Conclusion

The proposed project area is located in a relatively flat to slightly undulating area with a protruding ridge line in the eastern and southern sections. The elevation on site is 1,600m above mean sea level (mamsl). The Steenkoolspruit runs through the centre of the proposed project site (see Figure 1-1).

### 3.4.1.8 Visual

#### Introduction

Project-related activities have the potential to alter the landscape character of the site and surrounding area through the establishment of both temporary and permanent infrastructure. As a baseline, this section provides an understanding of the pre-mining visual character of the project area against which to measure potential change as a result of project infrastructure and activities. More detailed information will be provided in the EIA and EMP.

#### Data source

Information in this section was sourced from available baseline information.

#### Results/conclusion

The project area lies in a landscape characterised by slight to moderate undulating plains, including low hills and is scattered with dams and wetlands/pan depressions. Several drainage lines and streams criss-cross the study area in various directions, contributing to the Steenkoolspruit and the Piekespruit which run through the project area. The vegetation found ideally in this biome is short dense grassland with small scattered rocky outcrops, though most of the surrounding vegetation has been transformed by cultivation and mining activities. Both the eastern and southern sections of the project area is characterised by a protruding ridge line. The eastern ridge line is associated with a small escarpment whereas the southern ridgeline can be described as a shallow, wide crest with moderately sloping sides.

Central to the visual character of an area are the concepts of sense of place and scenic quality. Sense of place is informed by the spatial form and character of the natural landscape taken together with the cultural transformations and traditions associated with the historic use and habitation of the area which lend that area its uniqueness and distinctiveness. The scenic quality of the proposed project site and surrounding area is linked to the type of landscapes that occur within an area. In this regard, scenic quality can range from high to low as follows:

- High – these include the natural features such as mountains and koppies and drainage systems;
- Moderate – these include agricultural activities, smallholdings, and recreational areas; and
- Low – these include towns, communities, roads, railway line, industries and existing mines.

Although numerous mining related structures dominate the landscape to the north, north-east, south-west and west of the proposed project area, and the R545 and R544 roads and power lines traverse the proposed project site, the overall scene is characterised by the Steenkoolspruit and Piekespruit drainage

channels and open views of grassland vegetation and agricultural fields. The result is a landscape with a pastoral sense of place and a moderate visual resource value.

### **3.4.1.9 Noise**

#### **Introduction**

Some of the noise generating activities associated with the project may cause an increase in ambient noise levels in and around the site. This may cause a disturbance to nearby potential receptors. As a baseline, this section provides a short description of pre-mining conditions in the area from which to measure changes as a result of project-related noise.

#### **Data Sources**

Information in this section was sourced from available baseline information.

#### **Results/Conclusion**

Ambient noise levels in the centre of the proposed project area correspond to what the South African National Standards 10103 (SANS) states is typically found in rural and urban areas (suburban areas i.e. areas with some human activity with little road traffic). In this regard noise levels range between 50dBA during the day and 40dBA at night. However, ambient noise levels in zones along the main roads and in close proximity of existing mining activities (e.g. Isibonelo opencast operations), as well as near industrial sites (Kriel and Matla Power stations), were higher reaching levels up to 52dBA during the day and 46dBA at night. Even farming and domestic activity on their own, tend to elevate ambient noise levels on farmyards slightly above the nominal 40dBA night-time level for industrialised rural districts with established public road networks. Over the remainder of the project area and at the farm houses, the ambient noise levels were at the expected levels for this type of district.

### **3.4.1.10 Heritage/Cultural Resources**

#### **Introduction**

This section describes the existing status of the heritage and cultural environment that may be affected by the proposed project. Heritage (and cultural) resources include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

Paleontological resources are fossils, the remains or traces of prehistoric life preserved in the geological (rock stratigraphic) record. They range from the well-known and well publicised (such as dinosaur and mammoth bones) to the more obscure but nevertheless scientifically important fossils (such as palaeobotanical remains, trace fossils, and microfossils). Paleontological resources include the casts or impressions of ancient animals and plants, their trace remains (for example, burrows and trackways),

microfossils (for example, fossil pollen, ostracodes, and diatoms), and unmineralised remains (for example, bones of Ice Age mammals).

### **Data Sources**

Information in this section was sourced from available baseline information.

### **Results/Conclusion**

Sites of cultural importance have been identified within the greater application area which includes two Iron Age sites, one farm building, one farm yard and various grave sites. These resources are protected by the National Heritage Resources Act (No 25 of 1999) and may not be affected (demolished, altered, renovated, removed) without approval.

## **3.4.2 CURRENT LAND USES**

### **Introduction**

Mining activities have the potential to affect land uses both within the proposed project areas and in the surrounding areas. This can be caused by physical land transformation and through direct or secondary impacts.

To understand the basis of the potential land use impacts, a brief baseline situational analysis is described below. More detailed information will be provided in the EIA and EMP.

### **Data source**

Information in this section was sourced from available baseline information.

### **Results/conclusion**

The discussion below should be considered with reference to Figure 3-1.

#### Mineral/prospecting rights

AAIC currently holds the prospecting rights (MP30/5/1/1/2/(61), MP30/5/1/1/2/(54) and MP30/5/1/1/2/(59) on the farm portions outlined in Table 3-3 below.

#### Landowners within the proposed project area

Landowners located within the proposed project area are outlined in Table 3-3 below. A significant surface area footprint will need to be purchased for the location of the mine surface infrastructure (shaft complex and overland ROM conveyor). There are also various servitudes (including a power line and roads) throughout the study area.

**TABLE 3-3: LANDOWNERS LOCATED WITHIN THE PROPOSED MINING RIGHT AREA**

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
<b>Proposed mining right area</b>		
Aangewys 81 IS	Portion 1	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 3	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 4	Vosbreet Boerdery Pty Ltd
Aangewys 81 IS	Portion 6	Jacobus Stephanus Grobler
Aangewys 81 IS	Portion 7	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 8	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 16	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 17	South African National Roads Agency Ltd
Aangewys 81 IS	Portion 18	Jastoet Holsteins (Pty) Ltd
Aangewys 81 IS	Portion 19	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 21	Cornelia Johanna Britz
Aangewys 81 IS	Portion 22	N C Boerdery cc
Aangewys 81 IS	Portion 23	Susanna Cornelia Schoeman
Aangewys 81 IS	Portion 25	Js Grobler
Aangewys 81 IS	Portion 26	Vosbreet Boerdery Pty Ltd
Aangewys 81 IS	Portion 27	Jacques Grobler Familie Trust
Aangewys 81 IS	Portion 28	Jacques Grobler Familie Trust
Aangewys 81 IS	Portion 30	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 31	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 34	Vosbreet Boerdery Pty Ltd
Aangewys 81 IS	Portion 35	Susanna Cornelia Schoeman
Aangewys 81 IS	Portion 36	Anglo American Inyosi Coal Pty Ltd
Aangewys 81 IS	Portion 37	Susanna Cornelia Schoeman
Aangewys 81 IS	Portion 38	Susanna Cornelia Schoeman
Alexander 102 IS	Portion 1	Forzando Coal Mines Pty Ltd
Alexander 102 IS	Portion 2	Anglo American Inyosi Coal Pty Ltd
Alexander 102 IS	Portion 3	Merwe Anna Johanna Van De
Alexander 102 IS	Portion 4	Anglo Operations Pty Ltd
Alexander 102 IS	Portion 5	Susanna Cornelia Schoeman
Alexander 102 IS	Portion 9	Anglo Operations Pty Ltd
Alexander 102 IS	Portion 10	Anglo Operations Pty Ltd
Alexander 102 IS	Portion 12	Anglo Operations Pty Ltd
Alexander 102 IS	Portion 13	Anglo Operations Pty Ltd
Alexander 102 IS	Portion 14	Anglo Operations Pty Ltd
Bakenlaagte 84 IS	Portion 4	Anglo Operations Pty Ltd

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Bakenlaagte 84 IS	Portion 6	Dunn Maria Magdalena Catharina
Boschmanskraal 113 IS	Portion 4	Theron Daniel Albertus
Brakfontein 117 IS	RE	Anglo Operations Pty Ltd
Caley 77 IS	RE	Anglo Operations Pty Ltd
Dorstfontein 71 IS	RE	Anglo Operations Pty Ltd
Dorstfontein 71 IS	Portion 6	Anglo Operations Pty Ltd
Driefontein 69 IS	RE	Cornelius Johannes Greyling
Driefontein 69 IS	Portion 1	Cornelius Johannes Greyling
Driefontein 69 IS	Portion 2	Van De Merwe Pieter Hendrik Schalk
Driefontein 69 IS	Portion 3	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Driefontein 69 IS	Portion 8	Above & Beyond Catering & Accommodation cc
Driefontein 69 IS	Portion 9	Above & Beyond Catering & Accommodation cc
Driefontein 69 IS	Portion 10	Above & Beyond Catering & Accommodation cc
Driefontein 69 IS	Portion 11	Phs Van De Merwe Eiendomme cc
Driefontein 69 IS	Portion 12	Cronje Andries Johannes
Driefontein 69 IS	Portion 13	Van De Merwe Pieter Hendrik Schalk
Driefontein 69 IS	Portion 15	Van De Merwe Pieter Hendrik Schalk
Driefontein 69 IS	Portion 17	Van De Merwe Pieter Hendrik Schalk
Driefontein 69 IS	Portion 19	Anglo Operations Pty Ltd
Driefontein 69 IS	Portion 20	Saul Moshe Spitz
Driefontein 69 IS	Portion 21	Cronje Andries Johannes
Driefontein 69 IS	Portion 22	Janse Van Rensburg Nici
Driefontein 69 IS	Portion 23	Henry Brown Dunn
Driefontein 69 IS	Portion 24	Venter Johanna Dorethea Petronella
Driefontein 69 IS	Portion 25	Spade Reen Sending Internasionaal
Driefontein 69 IS	Portion 26	Spade Reen Vereniging Vir Bejaardes
Driefontein 69 IS	Portion 27	Janse Van Rensburg Nici
Driefontein 69 IS	Portion 30	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Driefontein 69 IS	Portion 31	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Driefontein 69 IS	Portion 32	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Driefontein 69 IS	Portion 39	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Driefontein 69 IS	Portion 40	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Elandsfontein 75 IS	Portion 2	Vosbreet Boerdery Pty Ltd
Elandsfontein 75 IS	Portion 3	Kosotsheliwe Community Prop Assoc
Elandsfontein 75 IS	Portion 10	Gerhardus Josua Holtshauzen
Frischgewaagd 60 IS	RE	Kerneels Trust
Frischgewaagd 60 IS	Portion 1	Vosbreet Boerdery Pty Ltd

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Frischgewaagd 60 IS	Portion 2	Gerhardus Josua Holtshauzen
Frischgewaagd 60 IS	Portion 3	Van De Merwe Pieter Hendrik Schalk
Frischgewaagd 60 IS	Portion 5	Grobler Balthazer Johannes
Frischgewaagd 60 IS	Portion 6	Kerneels Trust
Frischgewaagd 60 IS	Portion 7	Grobler Balthazer Johannes
Frischgewaagd 60 IS	Portion 8	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Frischgewaagd 60 IS	Portion 13	Van De Merwe Pieter Hendrik Schalk
Geluk 226 IS	Portion 1	Henry & Marlene Dunn Witbank Trust
Geluk 226 IS	Portion 2	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Halfgewonnen 190 IS	Portion 2	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Halfgewonnen 190 IS	Portion 3	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Halfgewonnen 190 IS	Portion 4	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Halfgewonnen 190 IS	Portion 12	Henry & Marlene Dunn Witbank Trust
Halfgewonnen 190 IS	Portion 13	Sandriena Johanna Venter
Kafferstad 79 IS	RE	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kafferstad 79 IS	Portion 2	Henry & Marlene Dunn Witbank Trust
Kafferstad 79 IS	Portion 6	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kafferstad 79 IS	Portion 7	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kafferstad 79 IS	Portion 8	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kafferstad 79 IS	Portion 9 (Shaft complex)	Himie Norman Hirschowitz
Kafferstad 79 IS	Portion 10	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kafferstad 79 IS	Portion 11	Henry & Marlene Dunn Witbank Trust
Kafferstad 79 IS	Portion 14	Witbank Plaas Trust
Kafferstad 79 IS	Portion 17	Witbank Plaas Trust
Kafferstad 79 IS	Portion 19 (Shaft complex)	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Kriel 73 IS	RE	Himie Norman Hirschowitz
Kriel 73 IS	Portion 1	Himie Norman Hirschowitz
Kriel 73 IS	Portion 3	Himie Norman Hirschowitz
Kriel 73 IS	Portion 4	Henry Brown Dunn
Kriel 73 IS	Portion 12	Sandriena Johanna Venter
Kriel Power Station 65 IS	Portion 0	Sandriena Johanna Venter
Kriel Town	TOWN	Witbank Plaas Trust
Legdaar 78 IS	Portion 5	Van De Merwe Pieter Hendrik Schalk
Legdaar 78 IS	Portion 6	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Legdaar 78 IS	Portion 7	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Legdaar 78 IS	Portion 16	Spade Reen Sending Internasionaal
Legdaar 78 IS	Portion 17	Spade Reen Sending Internasionaal

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Matla Power Station 141 IS	RE	Eksteen Daniel Johannes
Middelkraal 50 IS	RE	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Middelkraal 50 IS	Portion 3	Klipkraal Trust
Middelkraal 50 IS	Portion 5	Spade Reen Sending Internasionaal
Middelkraal 50 IS	Portion 6	Above & Beyond Catering & Accommodation cc
Middelkraal 50 IS	Portion 8	Huis Spesialis Onderhoudsplan cc
Nooitgedacht 59 IS	RE	Grobler Balthazer Johannes
Nooitgedacht 59 IS	Portion 1	Grobler Balthazer Johannes
Nooitgedacht 59 IS	Portion 2	Holtshauzen Johan Georg Snyman
Nooitgedacht 59 IS	Portion 3	Holtshauzen Johan Georg Snyman
Nooitgedacht 59 IS	Portion 6	Holtshauzen Johan Georg Snyman
Nooitgedacht 59 IS	Portion 7	H & M Trust
Nooitgedacht 59 IS	Portion 8	Maisela M. J
Nooitgedacht 59 IS	Portion 10	Snyman Van De Merwe Trust
Onverwacht 70 IS	Portion 1	Van De Merwe Anna Johanna
Onverwacht 70 IS	Portion 2	Eskom Holdings Ltd
Onverwacht 70 IS	Portion 3	Latter Rain Mission International
Onverwacht 70 IS	Portion 4	Anglo American Inyosi Coal Pty Ltd
Onverwacht 70 IS	Portion 7	Eskom Holdings Ltd
Onverwacht 70 IS	Portion 9	Eskom
Onverwacht 70 IS	Portion 10	Republiek Van Suid-Afrika
Onverwacht 70 IS	Portion 11	Eskom
Onverwacht 70 IS	Portion 12	Anglo American Inyosi Coal Pty Ltd
Onverwacht 70 IS	Portion 13	Claassen Guillam Jacobus
Onverwacht 70 IS	Portion 14	Eskom Holdings Ltd
Onverwacht 70 IS	Portion 15	Eskom Holdings Ltd
Onverwacht 70 IS	Portion 16	Eskom
Onverwacht 70 IS	Portion 19	Eskom
Onverwacht 70 IS	Portion 21	Eskom
Onverwacht 70 IS	Portion 23	Eskom
Rensburgshoop 74 IS	Portion 2	Eskom
Rensburgshoop 74 IS	Portion 5	Eskom Holdings Ltd
Rensburgshoop 74 IS	Portion 7	Eskom
Rietfontein 100 IS	Portion 2	Anglo American Inyosi Coal Pty Ltd
Rietfontein 100 IS	Portion 4	Eskom Holdings Ltd
Rietfontein 100 IS	Portion 5	Anglo American Inyosi Coal Pty Ltd
Rietfontein 100 IS	Portion 6	Eskom



RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Rietfontein 100 IS	Portion 7	Anglo American Inyosi Coal Pty Ltd
Rietfontein 100 IS	Portion 8	Anglo American Inyosi Coal Pty Ltd
Rietfontein 100 IS	Portion 10	Prinsloo Johannes Arnoldus
Rietfontein 100 IS	Portion 13	Prinsloo Johannes Arnoldus
Rietfontein 100 IS	Portion 15	Anglo American Inyosi Coal Pty Ltd
Rietfontein 100 IS	Portion 12	Eskom Holdings Ltd
Rietfontein 100 IS	Portion 14	Anglo American Inyosi Coal Pty Ltd
Rietfontein 101 IS	RE	Anglo American Inyosi Coal Pty Ltd
Rietfontein 101 IS	Portion 1	Republiek Van Suid-Afrika
Rietfontein 101 IS	Portion 2	Republiek Van Suid-Afrika
Rietfontein 101 IS	Portion 4	Eskom Holdings Ltd
Rietfontein 101 IS	Portion 5	Eskom Holdings Ltd
Roodebloem 58 IS	RE	Eskom Holdings Ltd
Roodebloem 58 IS	Portion 3	Eskom Holdings Ltd
Roodepoort 40 IS	Portion 2	Eskom Holdings Ltd
Roodepoort 40 IS	Portion 14	Eskom Holdings Ltd
Schurvekop 227 IS	Portion 7	Eskom Holdings Ltd
Schurvekop 227 IS	Portion 12	Eskom Holdings Ltd
Schurvekop 227 IS	Portion 13	Eskom Holdings Ltd
Schurvekop 227 IS	Portion 14	Grobler & Mocke Trust
Schurvekop 227 IS	Portion 22	Republiek Van Suid-Afrika
Schurvekop 227 IS	Portion 26	Telkom Sa Ltd
Schurvekop 227 IS	Portion 28	Provincial Government Of Mpumalanga
Schurvekop 227 IS	Portion 27	Fine Asset Inv 40 Pty Ltd
Vaalpan 68 IS	Portion 1	Eskom
Vaalpan 68 IS	Portion 2	
Vaalpan 68 IS	Portion 3	Eskom Holdings Ltd
Vaalpan 68 IS	Portion 4	Rina & Nilo Nooitgedacht cc
Vaalpan 68 IS	Portion 6	Opperman Jacobus Johannes
Vaalpan 68 IS	Portion 7	Dries Cronje Boerdery cc
Vaalpan 68 IS	Portion 8	Schutte Wilhelmina Susanna
Vaalpan 68 IS	Portion 9	Rooibloem Boerdery No 1 Trust
Vaalpan 68 IS	Portion 10	Merwe Anna Susanna Van Der
Vaalpan 68 IS	Portion 11	Eskom Holdings Ltd
Vierfontein 61 IS	Portion 4	Dries Cronje Boerdery cc
Vierfontein 61 IS	Portion 6	Eskom
Vierfontein 61 IS	Portion 24	Eskom

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Vierfontein 61 IS	Portion 32	Claassen Guillam Jacobus
Vierfontein 61 IS	Portion 39	Eskom
Vierfontein 61 IS	Portion 40	Mahlangu Ngangasi Joseph
Vierfontein 61 IS	Portion 45	Eskom
Vierfontein 61 IS	Portion 46	Eskom Holdings Ltd
Vierfontein 61 IS	Portion 47	Claassen Guillam Jacobus
Vierfontein 61 IS	Portion 48	Eskom Holdings Ltd
Vierfontein 61 IS	Portion 49	Eskom Holdings Ltd
Vierfontein 61 IS	Portion 50	Eskom Holdings Ltd
Vlakkullen 76 IS	Portion 0	Claassen Guillam Jacobus
Vlaklaagte 83 IS	Portion 1	Eskom Holdings Ltd
Vlaklaagte 83 IS	Portion 2	Eskom Holdings Ltd
Vlaklaagte 83 IS	Portion 3	Vosstoffel Pty Ltd
Vlaklaagte 83 IS	Portion 4	Vosstoffel Pty Ltd
Vlaklaagte 83 IS	Portion 5	Schwartz Theodore
Wilgervlei 555 IS	RE	Paulana Boerdery Pty Ltd
Witbank 80 IS	Portion 1	Vosstoffel Pty Ltd
Witbank 80 IS	Portion 3	Claassen Guillam Jacobus
Witbank 80 IS	Portion 4	Lize Trust
Witbank 80 IS	Portion 6	Schutte Wilhelmina Susanna
Witbank 80 IS	Portion 7	Eskom Holdings Ltd
Witbank 80 IS	Portion 8	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 10	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 11	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 12	Eskom Holdings Ltd
Witbank 80 IS	Portion 13	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 14	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 15	Eskom Holdings Ltd
Witbank 80 IS	Portion 17	Eskom Holdings Ltd
Witbank 80 IS	Portion 20	Dries Cronje Boerdery cc
Witbank 80 IS	Portion 21	Eskom Holdings Ltd
Witbank 80 IS	Portion 23	National Government Of The Republic Of South Africa
Witbank 80 IS	Portion 24	Eskom Holdings Ltd
Witbank 80 IS	Portion 25	Eskom Holdings Ltd
Witbank 80 IS	Portion 26	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 27	Eskom Holdings Ltd
Witbank 80 IS	Portion 28	Eskom Holdings Ltd

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Witbank 80 IS	Portion 29	Eskom Holdings Ltd
Witbank 80 IS	Portion 30	Niekerk Andries Jacobus Van
Witbank 80 IS	Portion 31	Eskom Holdings Ltd
Witbank 80 IS	Portion 32	Eskom Holdings Ltd
Witbank 80 IS	Portion 33	Eskom Holdings Ltd
Witbank 80 IS	Portion 34	Eskom Holdings Ltd
Witbank 80 IS	Portion 37	Eskom
Witbank 576 IS	RE	Schwartz Theodore
Witrand 103 IS	Portion 4	Eskom
Witrand 103 IS	Portion 5	Eskom
Witrand 103 IS	Portion 6	Eskom
Witrand 103 IS	Portion 7	Niekerk Andries Jacobus Van
Witrand 103 IS	Portion 8	Cornelius Johannes Greyling
Witrand 103 IS	Portion 18	Paulana Boerdery Pty Ltd
Witrand 103 IS	Portion 22	Cornelius Johannes Greyling
Witrand 103 IS	Portion 25	Paulana Boerdery Pty Ltd
<b>Proposed overland ROM conveyor</b>		
Elandsfontein 75 IS	Portion 2	Vosbreet Boerdery Pty Ltd
Elandsfontein 75 IS	Portion 3	Kosotsheliwe Community Prop Assoc
Elandsfontein 75 IS	Portion 4	Anglo American Inyosi Coal Pty Ltd
Elandsfontein 75 IS	Portion 7	Anglo American Inyosi Coal Pty Ltd
Elandsfontein 75 IS	Portion 8	Anglo Operations Pty Ltd
Elandsfontein 75 IS	Portion 9	BRITZ NICOLAAS MATTHEUS
Elandsfontein 75 IS	Portion 10	Gerhardus Josua Holtshauzen
Elandsfontein 75 IS	Portion 11	N C BOERDERY CC
Elandsfontein 75 IS	Portion 13	Anglo American Inyosi Coal Pty Ltd
Legdaar 78 IS	Portion 1	GROBLER BALTHAZER JOHANNES
Legdaar 78 IS	Portion 4	GROBLER BALTHAZER JOHANNES
Legdaar 78 IS	Portion 5	Van De Merwe Pieter Hendrik Schalk
Legdaar 78 IS	Portion 6	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Legdaar 78 IS	Portion 7	Hj Pieterse Vlakfontein Tweehonderd Pty Ltd
Legdaar 78 IS	Portion 16	Spade Reen Sending Internasionaal
Legdaar 78 IS	Portion 17	Spade Reen Sending Internasionaal
Middelkraal 50 IS	Portion 3	Klipkraal Trust
Middelkraal 50 IS	Portion 8	Huis Spesialis Onderhoudsplan cc
Rensburgshoop 74 IS	Portion 6	VOSBREET BOERDERY PTY LTD
Rensburgshoop 74 IS	Portion 10	VOSBREET BOERDERY PTY LTD

RELEVANT FARMS	RELEVANT PORTION	LANDOWNER
Schoon-Vlei 52 IS	Portion 2	Anglo Operations Pty Ltd
Vlakkuijen 76 IS	Portion 0	Claassen Guillam Jacobus

#### Surrounding mining companies

Current and proposed mining operations in the area include various underground and opencast coal mines (Anglo – Kriel, Isibonelo, Elders and Goedehoop) (see Figure 3-2).

#### Agriculture

The proposed Alexander Project study area is located on land mostly described as agricultural/cultivation land with small pockets of grazing land, natural land, water bodies and residential areas (see Figure 3-1). Most of the site has intensive grazing of the natural veld grasses, commercial crops and cultivated pastures. The land use of the area is considered to be altered from its original grassland biome to commercial farmlands. While cultivation, livestock grazing and crop production was noted in the lower lying areas associated with wetlands and wet based soils, these areas largely remain unchanged. There is little to no subsistence farming and no other commercial industry or urban dwellings in the study area. Homesteads and farm employees are the only other dwellings noted within the proposed project area. The areas at all the proposed shaft complex site options are currently cultivated land.

#### Communities/towns and isolated farmsteads

With reference to Figure 3-1 the nearest residential areas include the following:

- The town of Kriel located directly adjacent to the north and north-west of the proposed project area boundary.
- Residential dwelling for farmers and farmworkers.
- The Thubelihle community located ~ 6km north from the boundary of the proposed project area.
- The town of Bethal situated ~ 14km south-east from the boundary of the proposed project area.
- The town of Trichardt located ~ 14km south to south-west from the boundary of the proposed project area.

It is noted that as part of the SDFs, the study area of the proposed project does not fall within areas demarcated by the GMLM and ELM for urban infill or strategic development.

#### Regional powerline infrastructure

A regional powerline traverses the north-eastern section of the proposed project area in a south-east north-west direction.

#### Local Road Network

Existing roads within the vicinity of the proposed project area include:

- The tarred R544 that traverses the north-eastern section of the proposed project area;

- The tarred R545 that bisects the proposed project site and runs between Bethal and Kriel;
- The tarred R547 that links the R544 and R545; and
- The tarred N17 that runs between Bethal and Trichardt, is located ~ 8km south of the proposed project area.

#### Land claims

As part of the public consultation process, the Department of Rural Development and Land Reform: Land Claim Commissioner was contacted to confirm if any land claims have been lodged on any of the farms located within the proposed project area. To date no feedback has been received from the land claim commissioner and according to the GMLM SDF (2014), no land claims have been gazetted or approved on any of the farms located within the proposed project area. However the ELM SDF (2015) indicates that land claims have been lodged and registered on the portions 3 and 4 of the farm Onverwacht 70 IS and the RE and portion 6 of the farm Dorstfontein 71 IS. According to AAIC in conjunction with the Department of Land Affairs and Rural Development land claims were lodged on portions 3, 4, 6, 7, 8, 16, 17, 18, 19, 31, 34, 36, 37 and RE of the farm Aangewys 81 IS and portions 3 and 4 of the farm Onverwacht 70 IS.

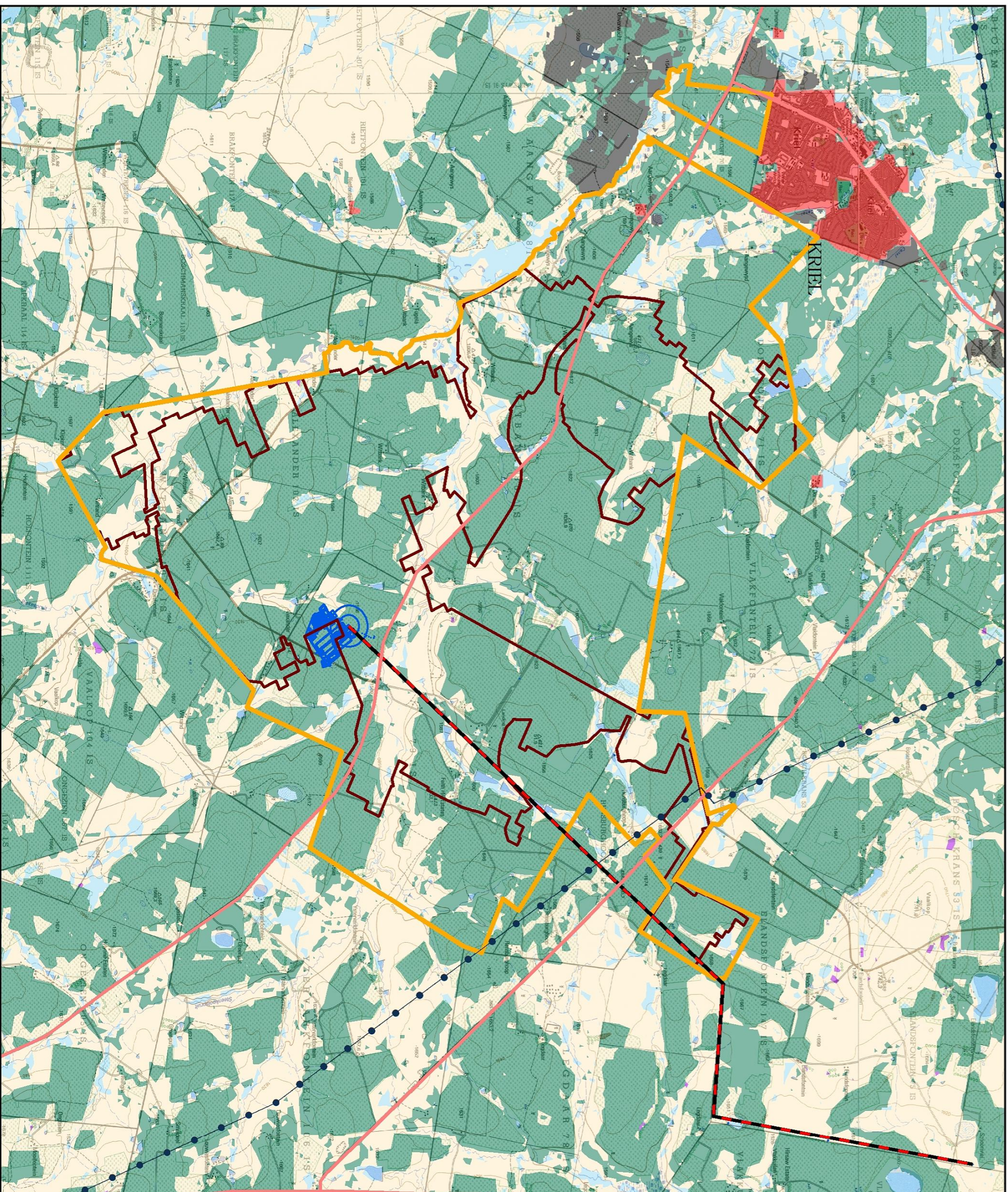
#### **3.4.3 SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE**

The environmental features in the project area are described in Section 3.4.1 above, however the notable environmental feature is the Steenkoolspruit River bisecting the proposed project area in an east-west direction. Infrastructure within and close to the project area is discussed in Section 3.4.2 above. The notable infrastructure within the proposed project area is the R545 and R544 provincial roads and an Eskom power line that traverses the proposed project site.













#### **3.4.4 ENVIRONMENTAL AND CURRENT LAND USE MAP(S)**

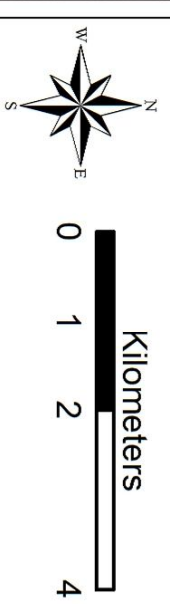
A conceptual map showing topographical information as well as land uses on and immediately surrounding the proposed project area is provided in Figure 3-1. This may be refined during the EIA/EMP Phase.





### Legend

-  Main Roads
  -  Powerline
  -  Proposed Conveyor Route
  -  Shaft Complex
  -  Proposed Alexander Mining Right Area
  -  Alexander Mine Plan
- Land Use**
-  Cultivation
  -  Grazing
  -  Mining
  -  Plantations
  -  Urban Built -up /Residential Areas
  -  Waterbodies

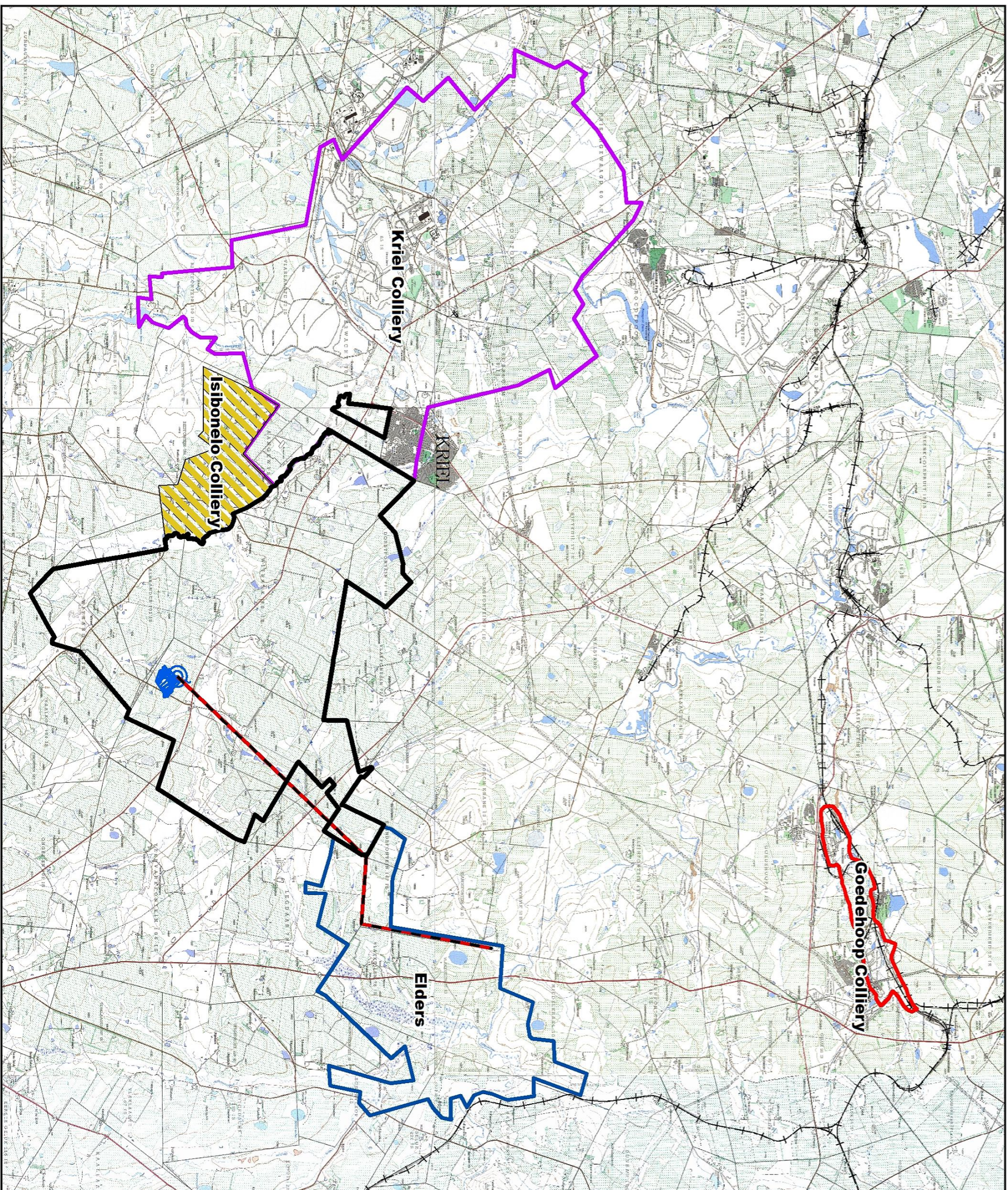


**Figure 3-1 : Current Land Use within and Surrounding the Project Area**










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Coordinate System  
 Spheroid Hartbeesthoek '94  
 DMS Central Meridian LO29





### Legend

-  Proposed Conveyor Route
-  Shaft Complex
-  Railway
-  Proposed Alexander Mining Right Area
-  Surrounding Existing and Proposed Operations
-  Elders
-  Isibonelo Colliery
-  Kriel Colliery
-  Goedehoop Mine



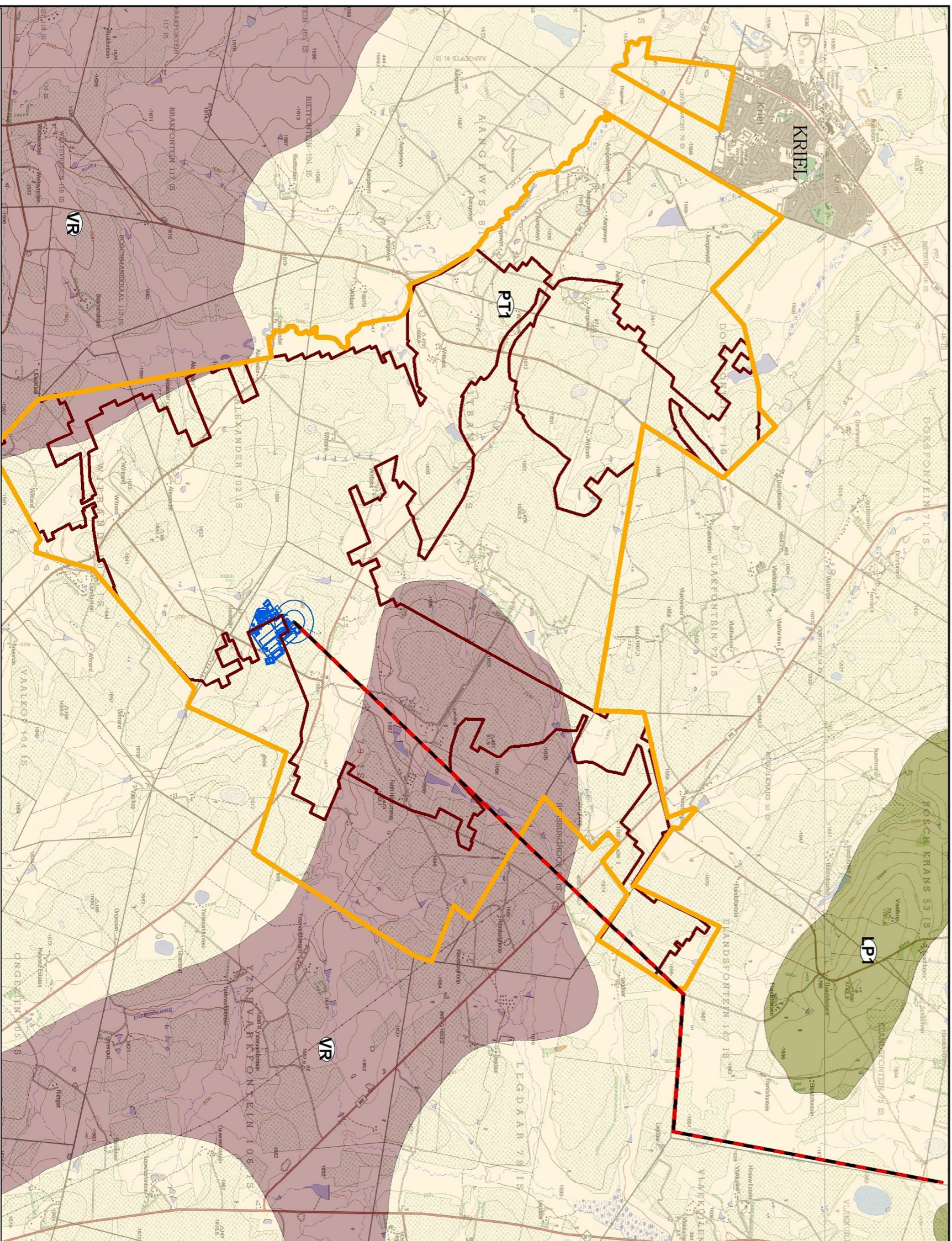

**SLR** Synergistics is an SLR group company

**Figure 3-2: Surrounding Existing and Proposed Operations**

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Coordinate System  
 DMS  
 Spheroid Hartbeesthoek '94  
 Central Meridian LO29





Soils Code	Description
PT1	Red, yellow and / or greyish soils with low to medium base status.
VR	Strongly structured cracking soils, mainly dark coloured, dominated by swelling clays (vertic soils). They may occur associated with one or more of melanic and red structured soils.
LP1	Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime rare or absent in the landscape.

KEY

### Legend

- Proposed Conveyor Route
- Shaft Complex
- Alexander Mine Plan
- Proposed Alexander Mining Right Area

**Soils (Code)**

- PT1
- VR
- LP1

Source: ARC/JSCW (2003)

N  
S  
E  
W

Kilometers

0 1 2 4

**Figure 3-3: Soil Types of the Project Area**

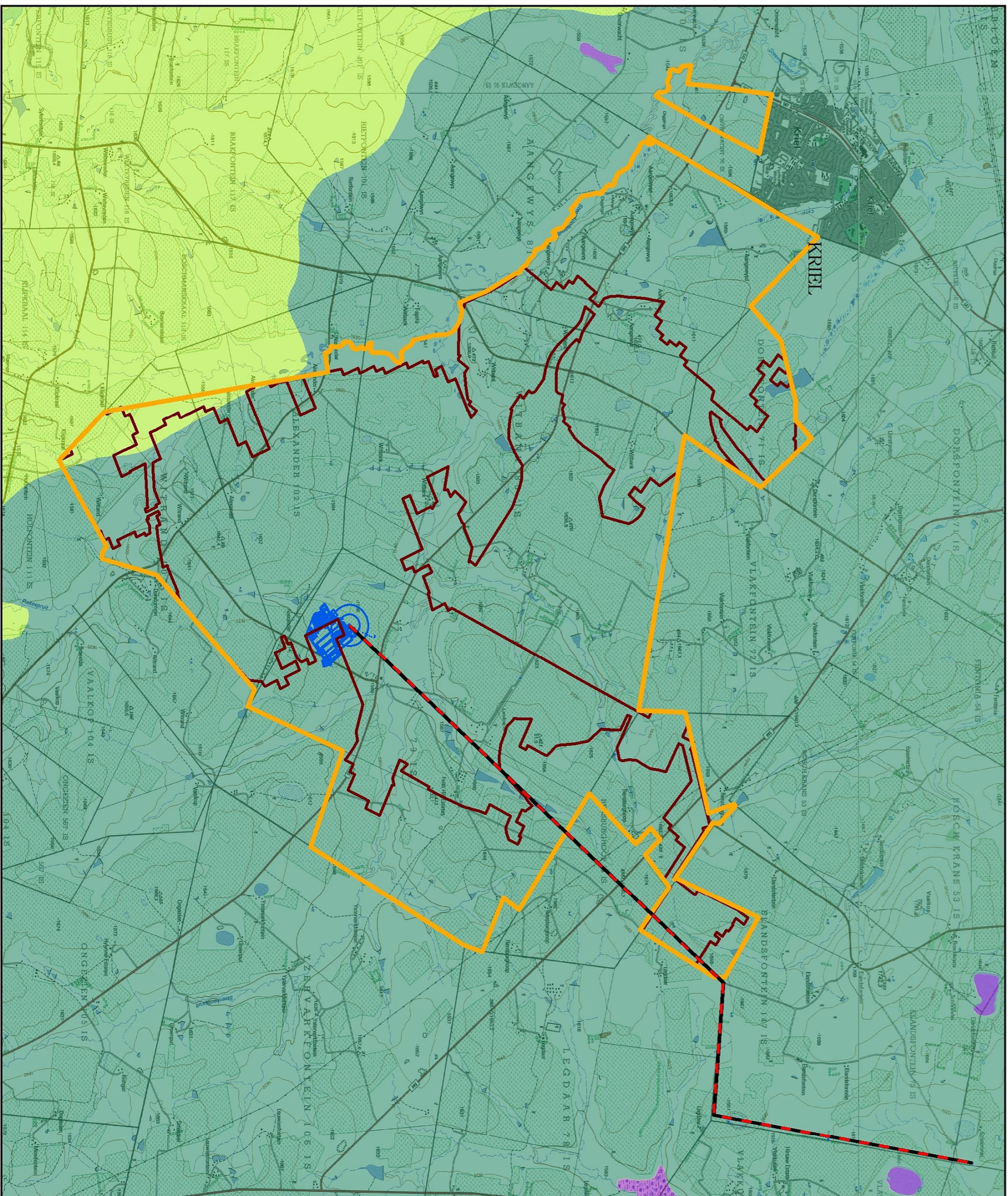
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Coordinate System  
DMS

Spheroid Hartbeesthoek '94  
Central Meridian LO29

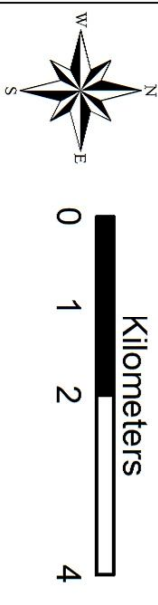




**Legend**

- Proposed Conveyor Route
  - Shaft Complex
  - Alexander Mine Plan
  - Proposed Alexander Mining Right Area
- Vegetation**
- Eastern Highveld Grassland
  - Eastern Temperate Freshwater Wetlands
  - Soweto Highveld Grassland

Source: Mucina, L. & Rutherford, M.C (2006)

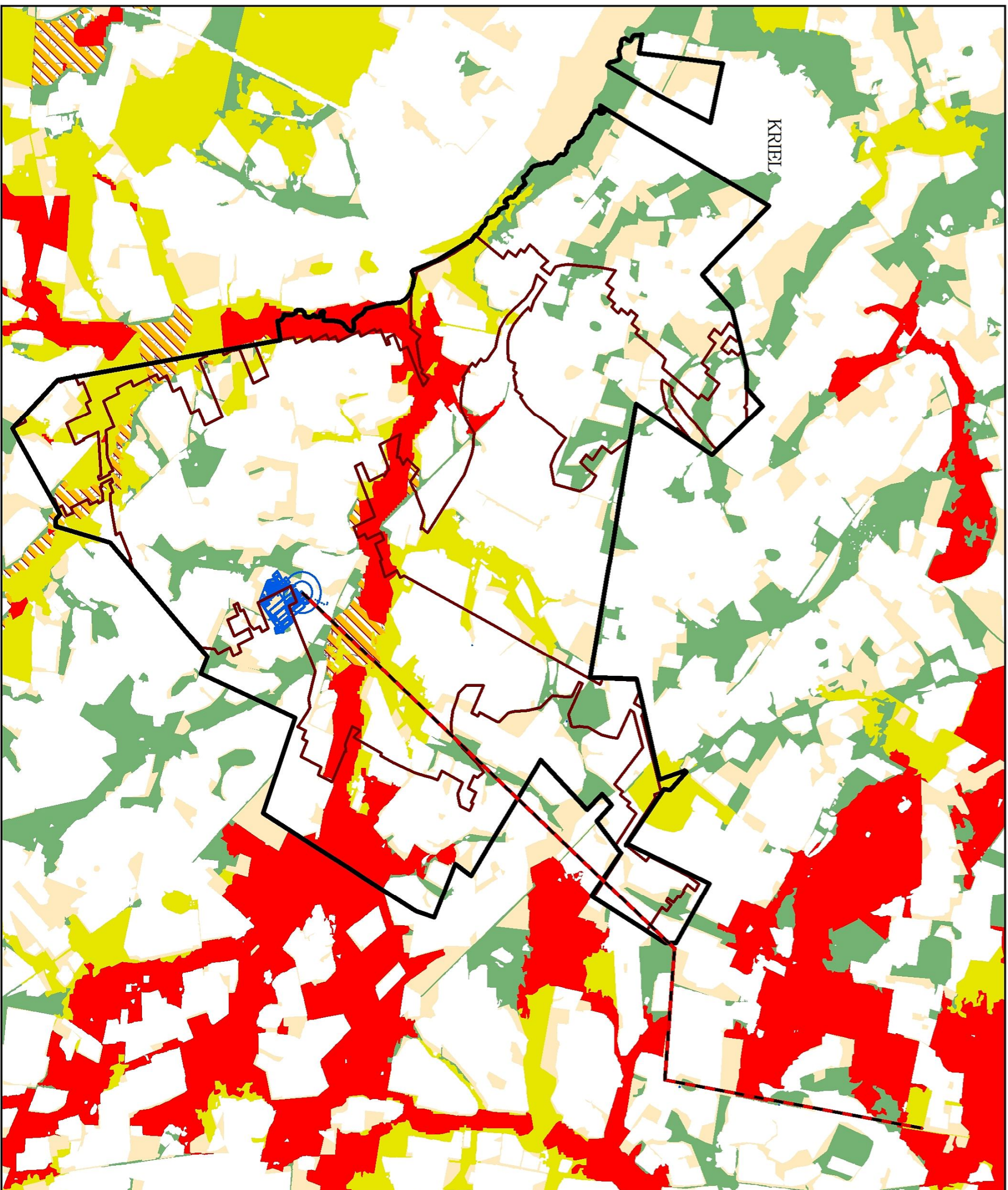


**Figure 3-4: Vegetation Types**

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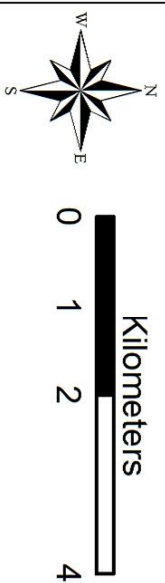
Coordinate System  
 Spheroid Hartbeesthoek '94  
 Central Meridian LO29





### Legend

- Proposed Conveyor Route
  - Shaft Complex
  - Alexander Mine Plan
  - Proposed Alexander Mining Right Area
- Mbsp Terrestrial Assessment**
- Subcategory**
- CBA Irreplaceable
  - CBA Optimal
  - ESA Landscape corridor
  - ESA Local corridor
  - Other Natural Areas
  - Moderately modified - Old lands
  - Heavily modified



**Synergistics**  
Environmental Services

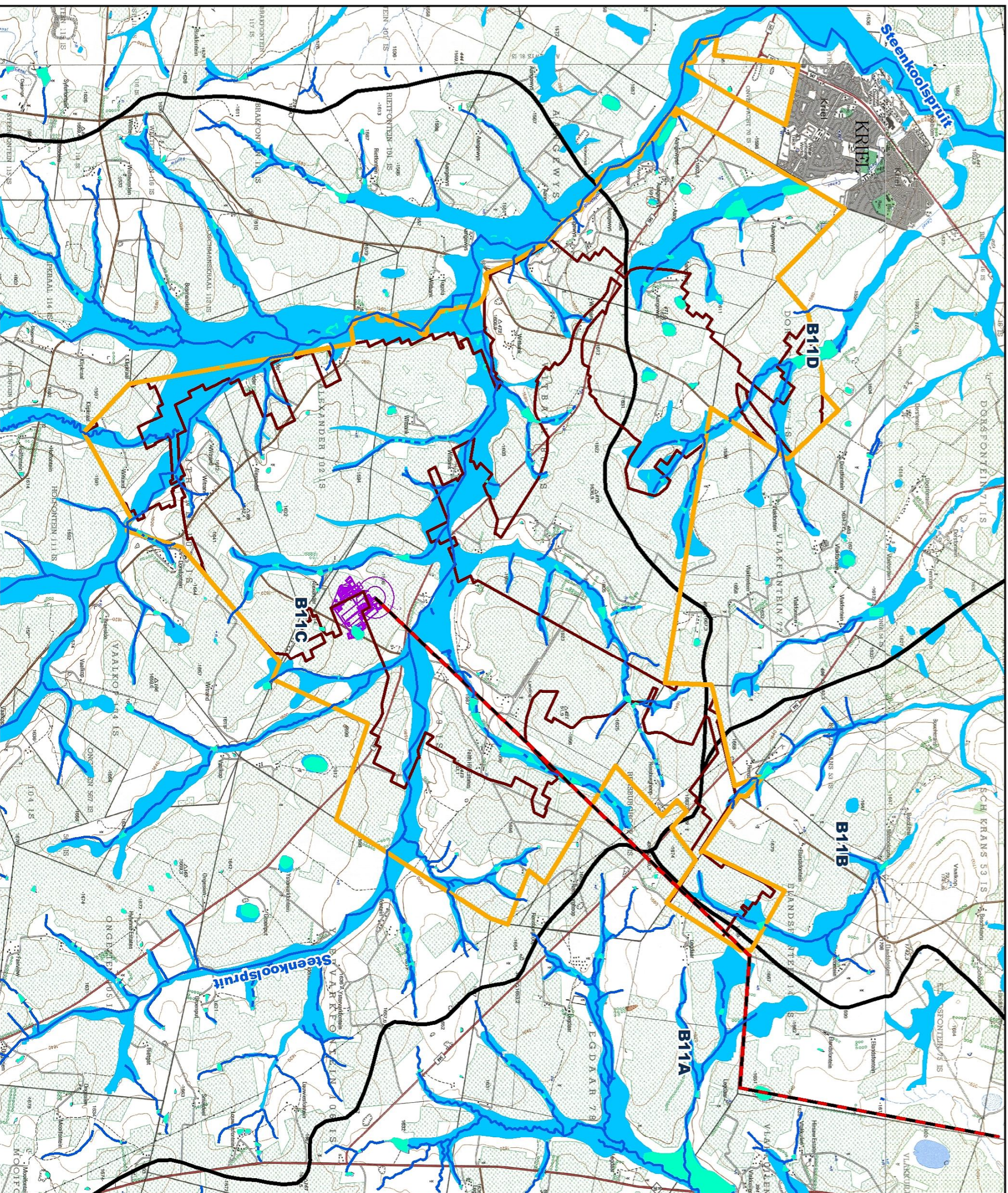
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Figure 3-5: Mpumalanga Biodiversity Sector Plan

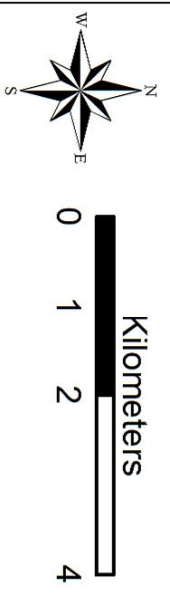
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Coordinate System  
DMS  
Spheroid Hartbeesthoek '94  
Central Meridian LO29





- ### Legend
- Rivers & Drainage
  - Proposed Conveyor Route
  - Shaft Complex
  - Alexander Mine Plan
  - Catchment Areas
  - Inland Water (Pans and Dams)
  - NFEPA Wetlands
  - Proposed Alexander Mining Right Area

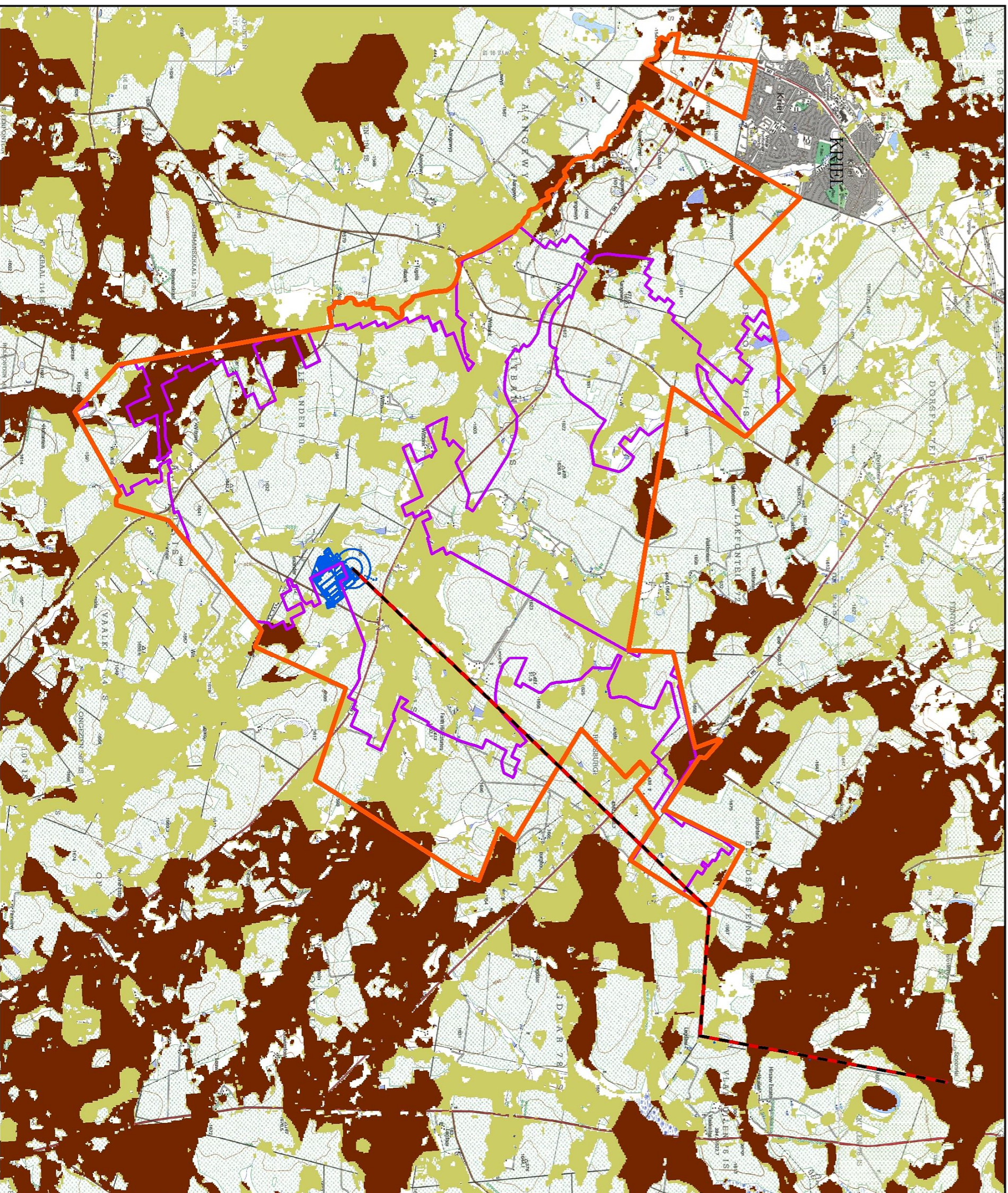


**Figure 3-6: Catchment Areas, Surface Water Feature and National Freshwater Ecological Priority Areas**

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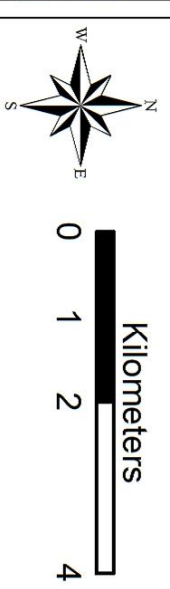
Coordinate System  
 Spheroid DMS  
 Central Meridian  
 Hartbeesthoek '94 LO29





### Legend

- Proposed Conveyor Route
  - Shaft Complex
  - Alexander Mine Plan
  - Proposed Alexander Mining Right Area
- Mine Guide**
- Category**
- A. LEGALLY PROTECTED - MINING PROHIBITED
  - B. HIGHEST BIODIVERSITY IMPORTANCE - HIGHEST RISK FOR MINING
  - C. HIGH BIODIVERSITY IMPORTANCE - HIGH RISK TO MINING
  - D. MODERATE BIODIVERSITY IMPORTANCE - MODERATE RISK FOR MINING



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Environmental Services

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**Figure 3-7: National Biodiversity Priority Areas in terms of Mining and Biodiversity Guidelines (2012)**

750.01080.P0002

Coordinate System  
Spheroid DMS Central Meridian  
Hartebeesthoek '94 LO29



## 4 ENVIRONMENTAL IMPACTS

### 4.1 IMPACTS IDENTIFIED FOR EACH ALTERNATIVE

This section provides a list of potential impacts on environmental and socio-economic aspects that have been identified in respect of each of the main project actions/activities and processes for each of the project phases (Table 4-1). A discussion of each of the impacts identified is provided in Section 4.3. The preliminary ratings for consequence, probability and significance of each of the impacts in the **unmitigated scenario** (which assumes that no consideration is given to the prevention or reduction of environmental and social impacts) are also provided in the table below in accordance with the new DMR report template. In this regard it must be noted that a conservative approach has been applied to these ratings in the absence of site specific studies. Once all the site specific studies have been completed the assessment and related ratings may change. The final ratings will be included in the EIA/EMP report.

**TABLE 4-1: PRELIMINARY LIST OF POTENTIAL IMPACTS IDENTIFIED FOR THE PROPOSED PROJECT**

The preliminary assessment ratings provided in this table are for the unmitigated scenario only which assumes that no consideration is given to the prevention or reduction of environmental and social impacts. Furthermore, a conservative approach has been applied to these ratings in the absence of site specific studies. Once all the site specific studies have been completed the assessment and related ratings may change. Moreover, once the mitigation/management measures have been incorporated into the assessment as part of the EIA and EMP a determination of residual impact will be provided. The final ratings will be included in the EIA and EMP report.

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT			
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED	
<b>Site preparation</b>											
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	
Physical destruction of biodiversity			H	H	M	H	H	Partially			
General disturbance of biodiversity			M	H	M	H	H	Partially			
Pollution from emissions to air			H	H	M	H	H	Fully			
Noise pollution			H	H	M	H	M	Fully	Unlikely		
Negative visual impacts			M	H	M	L	M	Fully			
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible		Can be avoided
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully			
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			
<b>Earthworks</b>											
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT			
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED	
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully			
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully			
Physical destruction of biodiversity			H	H	M	H	H	Partially			
General disturbance of biodiversity			M	H	M	H	H	Partially			
Contamination of surface water resources			H	H	M	M	H	Fully			
Alteration of natural drainage patterns (loss from containment infrastructure and encroachment to Steenkoolspruit River)			M	H	M	H	H	Fully			
Alteration of natural drainage patterns			Construction	H	H	M	H	H			Fully
Contamination of groundwater resources			Construction	H	H	M	H	H			Fully
Pollution from emissions to air			Operation	H	H	M	H	H			Fully
Noise pollution			Decommissioning	H	H	M	H	M			Fully
Negative visual impacts			M	H	M	L	M	Fully			
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible	Can be avoided	
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		Can be managed/mitigated to acceptable levels	
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			
<b>Civil works</b>											
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	
Loss of soil resources and land capability through pollution		Operation Decommissioning	H	H	M	H	H	Fully			

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT			
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED	
Contamination of surface water resources		Construction Operation Decommissioning	H	H	M	M	H	Fully	Unlikely		
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully			
Contamination of groundwater resources			H	H	M	H	H	Fully			
Pollution from emissions to air			H	H	M	H	H	Fully			
Noise pollution			H	H	M	H	M	Fully			
Negative visual impacts			M	H	M	L	M	Fully			
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully			Possible
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			
<b>Underground mining</b>											
Loss and sterilisation of mineral resources	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	
Hazardous excavations, surface subsidence and infrastructure that can be harmful to people and animals			H	H	M	H	H	Fully			
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully			
General disturbance of biodiversity			M	H	M	H	H	Partially			
Contamination of surface water resources			H	H	M	M	H	Fully			
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully			
Contamination of groundwater resources			H	H	M	H	H	Fully			
Reducing groundwater levels and availability (mine dewatering and abstraction of water from	N/A	Construction Operation Decommissioning	H	M	M	M	H	Fully			



POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT			
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED	
boreholes)	1 to 8	Operation	H	M	M	M	H	Fully	Unlikely	Can be avoided Can be managed/mitigated to acceptable levels	
Reducing groundwater levels and availability (mine dewatering)		Construction	H	H	M	H	H	Fully			
Pollution from emissions to air		Operation	H	H	M	H	M	Fully			
Increase in disturbing noise levels		Decommissioning	H	H	M	H	M	Fully			
Blasting related impacts (air blasts, ground vibration and fly rock)		Construction	H	H	H	M	H	Fully			Possible
Negative visual impacts		Operation	M	H	M	L	M	Fully			Unlikely
Loss of or damage to heritage resources		Decommissioning	M	H	L	M	M	Partially			Possible
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully			
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			
<b>Transport systems</b>											
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	
Loss of soil resources and land capability through pollution		Operation	H	H	M	H	H	Fully			
Loss of soil resources and land capability through physical disturbance		Decommissioning	H	H	L	H	H	Fully			
Physical destruction of biodiversity			H	H	M	H	H	Partially			
General disturbance of biodiversity			M	H	M	H	H	Partially			
Contamination of surface water resources			H	H	M	M	H	Fully			

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT		
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully	Possible	Can be avoided Can be managed/mitigated to acceptable levels
Contamination of groundwater resources		Construction	H	H	M	H	H	Fully		
Pollution from emissions to air		Operation	H	H	M	H	H	Fully		
Noise pollution		Decommissioning	H	H	M	H	M	Fully		
Disturbance of roads by project related traffic			H	H	M	M	H	Fully		
Negative visual impacts			M	H	M	L	M	Fully		
Loss of or damage to heritage resources			M	H	L	M	M	Partially		
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully		
Change in land use			H	H	M	H	H	Fully		
<b>Power supply and use</b>										
Hazardous excavations and infrastructure that can be harmful to people and animals	N/A	Construction	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels
Loss of soil resources and land capability through pollution		Operation	H	H	M	H	H	Fully		
Loss of soil resources and land capability through physical disturbance		Decommissioning	H	H	L	H	H	Fully		
Physical destruction of biodiversity			H	H	M	H	H	Partially		
General disturbance of biodiversity			M	H	M	H	H	Partially		
Contamination of surface water resources			H	H	M	M	H	Fully		
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully		
Contamination of groundwater resources		Construction	H	H	M	H	H	Fully		

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT		
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED
Pollution from emissions to air		Operation	H	H	M	H	H	Fully	Unlikely	Can be avoided Can be managed/mitigated to acceptable levels
Noise pollution		Decommissioning	H	H	M	H	M	Fully		
Negative visual impacts		M	H	M	L	M	Fully			
Loss of or damage to heritage resources		M	H	L	M	M	Partially	Possible		
Positive socio – economic impacts (economic impact)		H+	H	H	H	H	H+	Fully		
Negative socio – economic impacts (inward migration)		H	H	H	H	H	H	Fully		
Change in land use		H	H	M	H	H	H	Fully		
<b>Water supply and use</b>										
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels
Loss of soil resources and land capability through pollution		Operation	H	H	M	H	H	Fully		
Loss of soil resources and land capability through physical disturbance		Decommissioning	H	H	L	H	H	Fully		
Physical destruction of biodiversity		H	H	M	H	H	Partially			
General disturbance of biodiversity		M	H	M	H	H	Partially			
Contamination of surface water resources		H	H	M	M	H	Fully			
Alteration of natural drainage patterns (loss from containment infrastructure)		M	H	M	H	H	Fully			
Contamination of groundwater resources		Construction					Fully			
Lowering of groundwater levels (only applicable if abstraction from boreholes takes place)	N/A	Operation	H	M	M	M	M	Fully		
Negative visual impacts	1 to 8	Decommissioning	M	H	M	L	M	Fully	Unlikely	
Loss of or damage to heritage/palaeontological		M	H	L	M	M	Partially	Possible	Can be avoided	

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT				
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED		
resources												
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		Can be managed/mitigated to acceptable levels		
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully				
Change in land use			H	H	M	H	H	Fully				
<b>Mineralised waste</b>												
Loss and sterilization of mineral resources	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels		
Hazardous excavations and infrastructure that can be harmful to people and animals			H	H	M	H	H	Fully				
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully				
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully				
Physical destruction of biodiversity			H	H	M	H	H	Partially				
General disturbance of biodiversity			M	H	M	H	H	Partially				
Contamination of surface water resources			H	H	M	M	H	Fully				
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully				
Contamination of groundwater resources		Construction Operation Decommissioning	H	H	M	H	H	Fully	Unlikely			
Pollution from emissions to air			H	H	M	H	H	Fully				
Noise pollution			H	H	M	H	M	Fully				
Negative visual impacts			M	H	M	L	M	Fully				
Loss of or damage to heritage resources			M	H	L	M	M	Partially			Possible	Can be avoided
Positive socio – economic impacts (economic impact)			H+	H	H	H	H	H+			Fully	Can be managed/mitigated to

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT		
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully		acceptable levels
Change in land use			H	H	M	H	H	Fully		
<b>Non-mineralised waste management (general and hazardous)</b>										
Loss of soil resources and land capability through pollution	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully		
Physical destruction of biodiversity			H	H	M	H	H	Fully		
General disturbance of biodiversity			M	H	M	H	H	Partially		
Contamination of surface water resources			H	H	M	M	H	Partially		
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully		
Contamination of groundwater resources		Construction Operation Decommissioning	H	H	M	H	H	Fully	Unlikely	
Pollution from emissions to air			H	H	M	H	H	Fully		
Noise pollution			H	H	M	H	M	Fully		
Negative visual impacts			M	H	M	L	M	Fully		
Loss of or damage to heritage resources			M	H	L	M	M	Partially		
Positive socio – economic impacts (economic impact)			H <sup>+</sup>	H	H	H	H <sup>+</sup>	Fully		
Negative socio – economic impacts (inward migration)		H	H	H	H	H	Fully	Possible	Can be avoided Can be managed/mitigated to acceptable levels	
Change in land use		H	H	M	H	H	Fully			
<b>Support services</b>										
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT					
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED			
Loss of soil resources and land capability through pollution		Operation Decommissioning	H	H	M	H	H	Fully		acceptable levels			
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully					
Physical destruction of biodiversity			H	H	M	H	H	Partially					
General disturbance of biodiversity			M	H	M	H	H	Partially					
Contamination of surface water resources			H	H	M	M	H	Fully					
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully					
Contamination of groundwater resources		Construction Operation Decommissioning	H	H	M	H	H	Fully					
Pollution from emissions to air			H	H	M	H	H	Fully					
Noise pollution			H	H	M	H	M	Fully				Unlikely	
Negative visual impacts			M	H	M	L	M	Fully					
Loss of or damage to heritage resources			M	H	L	M	M	Partially				Possible	Can be avoided
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully					Can be managed/mitigated to acceptable levels
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully					
Change in land use			H	H	M	H	H	Fully					
<b>General site management</b>													
Loss of soil resources and land capability through pollution	1 to 8	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels			
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully					
Physical destruction of biodiversity			H	H	M	H	H	Partially					
General disturbance of biodiversity			M	H	M	H	H	Partially					

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT		
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED
Contamination of surface water resources		Construction Operation Decommissioning	H	H	M	M	H	Fully		Can be avoided Can be managed/mitigated to acceptable levels
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully		
Contamination of groundwater resources			H	H	M	H	H	Fully		
Pollution from emissions to air			H	H	M	H	H	Fully	Unlikely	
Negative visual impacts			M	H	M	L	M	Fully		
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible	
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully		
Change in land use			H	H	M	H	H	Fully		
<b>Demolition</b>										
Hazardous excavations and infrastructure that can be harmful to people and animals	N/A	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully		
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully		
Physical destruction of biodiversity			H	H	M	H	H	Partially		
General disturbance of biodiversity			M	H	M	H	H	Partially		
Contamination of surface water resources			H	H	M	M	H	Fully		
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully		
Contamination of groundwater resources			H	H	M	H	H	Fully		
Pollution from emissions to air			H	H	M	H	H	Fully		

POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT		
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED
Noise pollution			H	H	M	H	M	Fully	Unlikely	
Negative visual impacts			M	H	M	L	M	Fully		
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible	Can be avoided
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		Can be managed/mitigated to acceptable levels
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully		
Change in land use			H	H	M	H	H	Fully		
<b>Rehabilitation</b>										
Hazardous excavations, surface subsidence and infrastructure that can be harmful to people and animals	N/A	Construction Operation Decommissioning	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully		
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully		
Physical destruction of biodiversity			H	H	M	H	H	Partially		
General disturbance of biodiversity			M	H	M	H	H	Partially		
Contamination of surface water resources			H	H	M	M	H	Fully		
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully		
Contamination of groundwater resources			H	H	M	H	H	Fully		
Pollution from emissions to air			H	H	M	H	H	Fully		
Noise pollution			H	H	M	H	M	Fully	Unlikely	
Negative visual impacts			M	H	M	L	M	Fully		
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible	Can be avoided



POTENTIAL IMPACT	ALTERNATIVE	PROJECT PHASES	CONSEQUENCE			PROBABILITY	SIGNIFICANCE	DEGREE TO WHICH IMPACT			
			INTENSITY	DURATION	EXTENT			CAN BE REVERSED	CAUSES IRREPLACEABLE LOSS OF RESOURCES	CAN BE AVOIDED/ MANAGED/ MITIGATED	
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully		Can be managed/mitigated to acceptable levels	
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			
<b>Maintenance and aftercare</b>											
Hazardous excavations and infrastructure that can be harmful to people and animals	1 to 8	Construction Operation Decommissioning Closure	H	H	M	H	H	Fully	Possible	Can be managed/mitigated to acceptable levels	
Loss of soil resources and land capability through pollution			H	H	M	H	H	Fully			
Loss of soil resources and land capability through physical disturbance			H	H	L	H	H	Fully			
Physical destruction of biodiversity			H	H	M	H	H	Partially			
General disturbance of biodiversity			M	H	M	H	H	Partially			
Contamination of surface water resources			H	H	M	M	H	Fully			
Alteration of natural drainage patterns (loss from containment infrastructure)			M	H	M	H	H	Fully			
Contamination of groundwater resources			H	H	M	H	H	Fully			
Pollution from emissions to air			H	H	M	H	H	Fully			
Negative visual impacts			M	H	M	L	M	Fully	Unlikely		
Loss of or damage to heritage resources			M	H	L	M	M	Partially	Possible		Can be avoided
Positive socio – economic impacts (economic impact)			H+	H	H	H	H+	Fully	Can be managed/mitigated to acceptable levels		
Negative socio – economic impacts (inward migration)			H	H	H	H	H	Fully			
Change in land use			H	H	M	H	H	Fully			

## 4.2 METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

The proposed method for the assessment of environmental issues is set out in Table 4-2. This assessment methodology enables the assessment of environmental issues including: cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

**TABLE 4-2: IMPACT ASSESSMENT METHODOLOGY APPLIED IN SCOPING**

*Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.*

<b>PART A: DEFINITION AND CRITERIA*</b>	
<b>Definition of SIGNIFICANCE</b>	<b>Significance = consequence x probability</b>
<b>Definition of CONSEQUENCE</b>	<b>Consequence is a function of intensity, spatial extent and duration</b>
<b>Criteria for ranking of the INTENSITY of environmental impacts</b>	<b>VH</b> Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	<b>H</b> Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	<b>M</b> Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	<b>L</b> Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	<b>VL</b> Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	<b>VL+</b> Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	<b>L+</b> Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	<b>M+</b> Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	<b>H+</b> Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	<b>VH+</b> Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.

<b>Criteria for ranking the DURATION of impacts</b>	<b>VL</b>	Very short, always less than a year.
	<b>L</b>	Short-term, occurs for more than 1 but less than 5 years.
	<b>M</b>	Medium-term, 5 to 10 years.
	<b>H</b>	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	<b>VH</b>	Very long, permanent, +20 years (Irreversible. Beyond closure)
<b>Criteria for ranking the EXTENT of impacts</b>	<b>VL</b>	A portion of the site.
	<b>L</b>	Whole site.
	<b>M</b>	Beyond the site boundary, affecting immediate neighbours
	<b>H</b>	Local area, extending far beyond site boundary.
	<b>VH</b>	Regional/National

**PART B: DETERMINING CONSEQUENCE**

**SEVERITY = VL**

<b>DURATION</b>	Very long	<b>VH</b>	Medium	Medium	Medium	High	High
	Long term	<b>H</b>	Low	Medium	Medium	Medium	High
	Medium term	<b>M</b>	Low	Low	Medium	Medium	Medium
	Short term	<b>L</b>	Very low	Low	Low	Medium	Medium
	Very short	<b>VL</b>	Very low	Low	Low	Low	Medium

**SEVERITY = L**

<b>DURATION</b>	Very long	<b>VH</b>	Medium	Medium	High	High	High
	Long term	<b>H</b>	Medium	Medium	Medium	High	High
	Medium term	<b>M</b>	Low	Medium	Medium	Medium	High
	Short term	<b>L</b>	Low	Low	Medium	Medium	Medium
	Very short	<b>VL</b>	Very low	Low	Low	Medium	Medium

**SEVERITY = M**

<b>DURATION</b>	Very long	<b>VH</b>	Medium	High	High	High	Very High
	Long term	<b>H</b>	Medium	Medium	High	High	High
	Medium term	<b>M</b>	Medium	Medium	Medium	High	High
	Short term	<b>L</b>	Low	Medium	Medium	Medium	High
	Very short	<b>VL</b>	Very low	Low	Medium	Medium	Medium

**SEVERITY = H**

<b>DURATION</b>	Very long	<b>VH</b>	High	High	High	Very High	Very High
	Long term	<b>H</b>	Medium	High	High	High	Very High
	Medium term	<b>M</b>	Medium	Medium	High	High	High
	Short term	<b>L</b>	Medium	Medium	Medium	High	High
	Very short	<b>VL</b>	Low	Medium	Medium	Medium	High

**SEVERITY = VH**

<b>DURATION</b>	Very long	<b>VH</b>	High	High	Very High	Very High	Very High
	Long term	<b>H</b>	High	High	High	Very High	Very High
	Medium term	<b>M</b>	Medium	High	High	High	Very High
	Short term	<b>L</b>	Medium	Medium	High	High	High
	Very short	<b>VL</b>	Low	Medium	Medium	High	High
			<b>VL</b>	<b>L</b>	<b>M</b>	<b>H</b>	<b>VH</b>
			A portion of the site	Whole site	Beyond the site	Local area, extending	Regional/National

		boundary, affecting immediate neighbours	far beyond site boundary.	
<b>EXTENT</b>				

PART C: DETERMINING SIGNIFICANCE							
<b>PROBABILITY (of exposure to impacts)</b>	Definite/ Continuous	<b>VH</b>	Medium	High	High	Very High	Very High
	Probable	<b>H</b>	Medium	Medium	High	High	Very High
	Possible/ frequent	<b>M</b>	Low	Medium	Medium	High	High
	Conceivable	<b>L</b>	Low	Low	Medium	Medium	High
	Unlikely/ improbable	<b>VL</b>	Very low	Low	Low	Medium	Medium
			<b>VL</b>	<b>L</b>	<b>M</b>	<b>H</b>	<b>VH</b>
<b>CONSEQUENCE</b>							

PART D: INTERPRETATION OF SIGNIFICANCE	
<b>Significance</b>	<b>Decision guideline</b>
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation

\*VH = very high, H = high, M= medium, L= low and VL= very low and + denotes a positive impact.

**TABLE 4-3: ALTERNATIVE RANKING METHOD**

	Score of 1	Score of 3-5	Score of 8
<b>Alternative X with regards to a particular aspect or rating criteria</b>	The best option or most preferred of the alternatives	An average option or indistinguishable from other alternatives	The poorest option or least preferred of the alternatives

**4.3 POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES**

Potential impacts that were identified during the scoping process, in consultation with IAPs, are discussed under environmental component headings in this section. These discussions should be read with the corresponding descriptions of the baseline environment in Section 3.4.1 of the scoping report.

The potential impacts associated with all the phases (construction, operations, decommissioning and closure) have been identified and described and reference has been made to the studies/investigations that are required to provide the necessary additional information. **In the absence of site specific studies the assessment conclusions are conservative. It follows that the assessment provided**

**below is a preliminary assessment which will be refined/changed in the EIA/EMP report with specialist input, as appropriate.**

With reference to Section 3.1, site layout alternatives and water supply alternatives are being considered as part of the proposed project. The assessment below provides a preliminary assessment of the alternatives. It is important to note that the shaft complex site layout alternatives have been assessed for each environmental and socio-economic aspect. Water supply alternatives are however limited to surface water and groundwater aspects. It follows that water supply alternatives have only been assessed in sections 4.3.2 and 4.3.3.

#### 4.3.1 AIR QUALITY

##### ISSUE: POLLUTION FROM EMISSIONS TO AIR

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

Mining projects present a number of air pollution sources that can have a negative impact on ambient air quality and surrounding land uses in all phases. Pollution sources include land clearing activities, materials handling, wind erosion from stockpiles, wind erosion of disturbed areas, vehicle movement along unpaved roads and gas emissions mainly from vehicles and generators. These emissions could have a negative impact on ambient air quality and could result in health impacts for nearby sensitive receptors if unmanaged. This is a high severity in the unmitigated scenario and can be reduced with measures to reduce emissions. Without mitigation the duration of the impacts could extend beyond closure. With mitigation, the duration of impacts will be limited to the phase prior to closure. The spatial scale of the potential impact extends off site in both the mitigated and unmitigated scenarios. The significance of this impact is high in the unmitigated scenario and can be reduced with mitigation. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.1 of this scoping report.

#### 4.3.2 SURFACE WATER

##### ISSUE: ALTERING DRAINAGE PATTERNS

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

Pre-mining natural drainage across the proposed project area is via sheet flow and/or preferential flow paths (drainage lines). None of the shaft complex location options will be located within 100m from the Steenkoolspruit River. Rainfall and surface water run-off will be collected in all areas that have been designed with water containment infrastructure as required by legislation. The collected run-off will therefore be lost to the catchment and can result in the alteration of drainage patterns. During the construction and operational and decommissioning phase, these activities will continue until such time as project infrastructure can be removed and/or the project areas are rehabilitated. During the closure phase, rehabilitation will allow for the restoration of drainage patterns.

When considering the loss of run-off to the catchment as a result of containment infrastructure, the severity of the impact could be moderate in the unmitigated scenario and depends on the amount of run-off lost from the catchment. This can be reduced to low with mitigation measures. Without mitigation, drainage patterns would continue to be impacted upon post-closure and this is a high duration. With mitigation however, run-off patterns should be re-established reducing the duration to medium. In the mitigated and unmitigated scenario the physical alteration of drainage patterns will extend beyond the site boundary as flow reduction impacts could extend further downstream. The significance is high in the unmitigated scenario as the probability of the alteration of drainage patterns is definite without mitigation. With mitigation, the re-establishment of run-off patterns reduces the significance of this impact to low.

The run-off assessment above applies to all the shaft complex site location options given that with all options, run-off will be collected within containment infrastructure. The water flow assessment applies to the water supply alternatives.

The additional work required to address this issue is described in Section 5.4.2 of this scoping report.

**ISSUE: CONTAMINATION OF SURFACE WATER RESOURCES**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
///	///	///	///

Discussion

Projects of this nature will generally present a number of pollution sources that can have a negative impact on surface water quality if unmanaged in all project phases. The following pollution sources may exist: fuel and lubricants, sewage, mine residue (waste rock stockpiles), dirty water circuit, chemicals, non-mineralised waste (hazardous, general), and erosion of particles from exposed soils in the form of suspended solids.

Should AAIC choose to treat and discharge surplus groundwater into surface water resources, additional impacts on water quality may occur.

In the unmitigated scenario the severity is high and can be reduced to medium with mitigation measures focussed on diverting clean water away from the proposed project area and containing contaminated run-off and process water for re-use. In the unmitigated scenario pollution events can extend beyond the LOM. With mitigation, pollution events can be prevented or mitigated within the LOM. In the unmitigated and mitigated scenario a pollution event can extend beyond the site boundary. The significance in the unmitigated scenario is high and can be reduced to moderate/low with mitigation. This assessment applies to all the shaft complex site location and water supply alternatives.

The additional work required to address this issue is described in Section 5.4.2 of this scoping report.

### 4.3.3 GROUNDWATER

#### ISSUE: REDUCING GROUNDWATER LEVELS AND AVAILABILITY

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
			N/A

#### Discussion

Groundwater levels could be reduced through the abstraction of groundwater from boreholes during the construction, operational and decommissioning phases. In addition to this, dewatering of the underground mine could also reduce groundwater levels during the construction and operational phase. If the abstraction of groundwater within the proposed project area causes a temporary reduction or loss of water to third party users, this is a high severity in the unmitigated scenario. With mitigation this can be reduced to low. The duration of the impact is linked to the duration of the activity which is expected to be for the life of the proposed project. If the reduction of groundwater levels influences third party users the impact will extend beyond the site boundary. In the unmitigated scenario the significance of this impact is high and can be reduced to low with mitigation.

This assessment applies to all on-site water supply alternatives.

The additional work required to address this issue is described in Section 5.4.3 of this scoping report.

#### ISSUE: CONTAMINATION OF GROUNDWATER RESOURCES

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

Groundwater could become contaminated through the incorrect stockpiling of potentially polluting waste materials on the site during the construction and decommissioning of infrastructure. Possible sources of groundwater contamination during the operational phase include seepage from accidental spills and

leaks, seepage from blasting residues and exposure of groundwater to exposed rock and seepage from the waste rock and other stockpiles, both on-surface as well as underground. Of key concern to groundwater quality is seepage from mineralised waste material contained in the proposed WRD. This is a high severity in the unmitigated scenario and can be reduced to medium with pollution prevention and/or mitigation measures. In the unmitigated scenario, groundwater contamination is long term in nature. With mitigation the impact can be limited to the life the proposed project. In both the unmitigated and mitigated scenarios, groundwater pollution is likely to extend beyond the site boundary. The significance is high in the unmitigated scenario and can be reduced to medium/low with mitigation. This assessment applies to all the shaft complex site location and water supply alternatives.

The additional work required to address this issue is described in Section 5.4.3 of this scoping report.

**4.3.4 SOILS AND LAND CAPABILITY**

**ISSUE: LOSS OF SOIL AND LAND CAPABILITY THROUGH POLLUTION**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Soil is a valuable resource that supports a variety of ecological functions. Mining projects in general have the potential to damage soil resources through contamination. A loss of soil resources would result in a decrease in the natural rehabilitation and future land use potential. There are a number of sources in all phases that have the potential to pollute soil resources.

The overall severity in the unmitigated scenario is expected to be high and reduces to low in the mitigated scenario as the number of sources and number of pollution events should be significantly less. Most pollution impacts and associated loss in land capability will remain long after closure. In the mitigated scenario most of these potential impacts should either be avoided or be remedied immediately which reduces the duration to less than the life of the mine. The potential loss of soil resources and associated land capability will extend beyond the site boundary without mitigation. With mitigation, the potential loss of soil resources and associated land capabilities will be restricted to within the site boundary. The significance of this impact is high in the unmitigated scenario and can be reduced to low with mitigation. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.4 of this scoping report.

**ISSUE: LOSS OF SOIL AND LAND CAPABILITY THROUGH PHYSICAL DESTRUCTION**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure





Discussion

Soil is the key to re-establishing post closure land capability. Soil resources can be disturbed through removal, erosion and compaction which can result in a loss of soil functionality as an ecological driver. There are a number of activities/infrastructure in all phases that have the potential to disturb soils and related land capability.

In the unmitigated scenario the severity is high as soils will be lost to the area of disturbance, soil functionality will be compromised and soils are likely to erode. The loss of soil and related land capability is long term and will continue after the life of the mine. The duration of this impact can be reduced to medium with mitigation as most of the soil can be conserved and used for rehabilitation. The potential loss of soil and land capability through physical disturbance will be restricted to within the site boundary. The significance of this impact is high in the unmitigated scenario and can be reduced to low with mitigation. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.4 of this scoping report.

**4.3.5 LAND USE**

**ISSUE: CHANGE IN LAND USE**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Activities and infrastructure may have an impact on land uses within and surrounding the proposed project area in all phases.

All of the proposed shaft complex site location options will be located on cultivated land, which will result in a change in land use which requires a change of land use and/or re-zoning application.

Land uses surrounding the proposed project area include: farming, residential, urban development and mining.

These land uses within and surrounding the proposed project area may be affected by one or more of the following environmental and social impacts:

- Hazardous infrastructure and excavations.
- Land clearing (vegetation and soil) for infrastructure and activities.
- Surface and groundwater quality and quantity.



rehabilitation and can be further reduced to low at closure with emphasis placed on restoring disturbed areas. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.5 of this scoping report.

**ISSUE: GENERAL DISTURBANCE OF BIODIVERSITY**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

The placement of mining infrastructure and activities has the potential to directly disturb vegetation, vertebrates and invertebrates in all project phases.

Biodiversity can be disturbed by anthropogenic activities such as killing of fauna, illegal removal of fauna and flora species, settlement of dust on vegetation, generation of noise that may scare off vertebrates and invertebrates, road kills, general litter and establishment of fires. This is a medium severity in the unmitigated scenario and can be reduced to low in the mitigated scenario with measures focussed on preventing or mitigating the impact to acceptable levels. In the unmitigated scenario, the impacts are long term because this impact is likely to exist beyond the LOM. With mitigation the impacts should not extend post closure. Biodiversity processes are not confined to the proposed project area and as such the spatial scale of impacts will extend beyond the site boundary in the unmitigated and mitigated scenarios. In the unmitigated scenario, the significance of this potential impact is high as the probability is definite. In the mitigated scenario, the significance is reduced to medium with a reduction in the probability of the impact. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.5 of this scoping report.

**4.3.7 SOCIO-ECONOMIC ISSUES**

**ISSUE: ECONOMIC IMPACT (POSITIVE SOCIO-ECONOMIC)**

The promise of further development and the very presence of the mine will result in both positive and negative socio-economic impacts.

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

All activities associated with the proposed project will have positive socio-economic impacts in all phases. The proposed project has a positive economic impact on the local, regional and national economies. Direct benefits are derived from wages, taxes and profits. Indirect benefits through the procurement of



### 4.3.8 VISUAL

**ISSUE: NEGATIVE VISUAL IMPACTS**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
///	///	///	///

Discussion

Visual impacts on this receiving environment may be caused by activities and infrastructure in all mine phases. The more significant visual impacts relate to the larger infrastructure components (such as the waste facilities and stockpiles). After closure most of the infrastructure should be removed and/or the site and remaining infrastructure rehabilitated as far as possible.

The severity in the unmitigated scenario is moderate when considered in the context of existing mining operations located north, north-east, south-west and west of the proposed project area. The severity is unlikely to reduce with mitigation until the closure phase when all surface infrastructure on the site has been rehabilitated (in the mitigated scenario). Without mitigation the duration will be long term. The spatial scale will extend beyond the mine boundary in both the unmitigated and mitigated scenarios. The significance of this impact is medium in the unmitigated scenario. In the mitigated scenario the significance of the impact is medium before closure and low after closure given that the proposed site will have been rehabilitated. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.7 of this scoping report.

### 4.3.9 TOPOGRAPHY

**ISSUE: HAZARDOUS EXCAVATION, INFRASTRUCTURE AND SURFACE SUBSIDENCE**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
///	///	///	///

Discussion

Hazardous excavations and infrastructure include all structures into or off which third parties and animals can fall and be harmed. Included in this category is surface subsidence associated with mining areas. Hazardous excavations and infrastructure occur in all mine phases from construction through operation to decommissioning and closure.

The overall severity in the unmitigated scenario is expected to be high. This can reduce to low with the implementation of management measures focused on access control to prevent and/or mitigate impacts. In the event of injury to third parties or humans, the potential health impact could be long-term in nature. The spatial scale may extend beyond the project site to the communities to which the injured people or

animals belong. The significance of this impact is high without mitigation and could be reduced to low with mitigation. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.2.1 of this scoping report.

**4.3.10 TRAFFIC**

**ISSUE: DISTURBANCE OF ROADS BY PROJECT RELATED TRAFFIC**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
			N/A

Discussion

An increase in traffic as well as the use of these roads by heavy vehicles may result in a decrease in road service and safety levels. Traffic impacts are expected from construction through to the end of the decommissioning phase when trucks, buses, and private vehicles make use of the public transport network surrounding the proposed project area. The key potential traffic related impacts are on road capacity and public safety when additional traffic is added to the existing transport network. In addition to this, the establishment of road access as part of the proposed project can result in safety issues particularly if the design and implementation are not undertaken with appropriate safety protection measures. In the unmitigated scenario the severity is high. In the mitigated scenario the severity reduces to medium because the frequency of potential accidents is expected to reduce. Any serious injury or death is a long term impact in both the unmitigated and mitigated scenarios. The spatial scale is medium in both the unmitigated and mitigated scenarios given that any injuries or fatalities will extend to the communities to which injured people/animals belong. The significance is high in the unmitigated scenario and can be reduced to medium with mitigation with a reduction in probability.

None of the mine surface infrastructure (shaft complex) site location options require any road diversions, however the overall impact will remain unchanged for all site location options because this will not eliminate the potential for road related accidents.

The additional work required to address this issue is described in Section 5.4.8 of this scoping report.

**4.3.11 NOISE**

**ISSUE: INCREASE IN DISTURBING NOISE LEVELS**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
			N/A

Discussion

Although the current noise environment in the wider area is already compromised by sources, additional noise emission sources may result in cumulative noise impacts on the closest third party receptors. These additional noise sources could include operation of the mine and vent shaft and supportive equipment, on-surface handling of materials and transportation of staff, equipment and consumables. The severity in the unmitigated scenario is expected to be medium and can be reduced to low with mitigation measures. In both the unmitigated and mitigated scenarios the noise pollution impacts will occur until the closure phase of the mine when the noise generating activities are stopped. This is a medium duration. In the unmitigated and mitigated scenarios the noise impacts will extend beyond the site boundary. The significance is medium in the unmitigated scenario and can be reduced to low with mitigation. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.9 of this scoping report.

**4.3.12 VIBRATIONS AND BLASTING**

**ISSUE: BLASTING RELATED IMPACTS**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
		N/A	N/A

Discussion

Blasting (particularly surface and near surface blasting during construction) may result in potential impacts. As mining operations will take place at depths of 63m below surface, underground mining related blast impacts on surface infrastructure is also expected.

Blasting activities have the potential to impact on people, animals and structures located in the vicinity of the proposed project area. Blasting hazards include ground vibration, airblast and fly rock. Ground vibrations travel directly through the ground and have the potential to cause damage to surrounding structures. Airblasts result from the pressure released during the blast resulting in an air pressure pulse which travels away from the source and has the potential to damage surrounding structures. Fly rock is the release of pieces of rock over a distance and can be harmful to people and animals and damage structures and property.

The potential impact could have a high severity in the unmitigated scenario. In the mitigated scenario, this severity reduces to low because measures can be taken to control blasts and associated impacts. Blasting will only take place for the life of the project, however, injury or death is considered long term in nature. The spatial scale may extend beyond the mine boundary in both the unmitigated and mitigated scenario. The probability of injury to third party or damage to third party infrastructure is considered to be moderate in the unmitigated scenario and can be reduced to low with mitigation. The overall significance

is expected to be high in the unmitigated scenario and low in the mitigated scenario. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.10 of this scoping report.

**4.3.13 HERITAGE/CULTURAL RESOURCES**

**ISSUE: LOSS OF OR DAMAGE TO HERITAGE AND/OR PALEONTOLOGICAL RESOURCES**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
			N/A

Discussion

The areas where the mine surface infrastructure (shaft, plant and water dam) will be located will take place on disturbed, cultivated land and therefore no impacts on surface heritage resources are foreseen. Although heritage sites have been identified within the greater application area, there are no known heritage resources on these infrastructure areas but more detailed fieldwork is required may contain surface heritage resources. Furthermore, the underground mine development could potentially impact on palaeontological resources.

There are a number of activities/infrastructure in all phases prior to closure that have the potential to remove, damage or destroy heritage/cultural resources, either directly or indirectly, and result in the loss of the resource for future generations. In the unmitigated scenario the severity is medium. With mitigation measures in place that aim to minimise the disturbance of heritage/cultural sites, the severity is reduced to low. If the heritage/cultural resources are removed, damaged or destroyed the impact duration is long term. In the mitigated scenario the duration reduces to less than the project life. The spatial scale will be localised to the site boundary in both the unmitigated and mitigated scenario. The significance of the impact is medium and can be reduced to low with mitigation with a reduction on probability. This assessment applies to all the shaft complex site location alternatives.

The additional work required to address this issue is described in Section 5.4.11 of this scoping report.

**4.4 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK**

The table below provides a list of the preliminary impacts identified by the EAP or raised by interested and affected parties, as well as the possible management and mitigation measures. The preliminary level of residual risk after management or mitigation is also estimated. This will be refined during the EIA phase with specialist input as appropriate.



#### 4.5 POSSIBLE MITIGATION MEASURES AND THE LEVEL OF RESIDUAL RISK

The table below provides a list of the prominent impacts identified by the EAP or raised by interested and affected parties, as well as the possible management and mitigation measures. The level of residual risk after management or mitigation is also estimated. This will be refined during the EIA phase with specialist input as appropriate.

**TABLE 4-4: POSSIBLE MITIGATION MEASURES AND ANTICIPATED LEVEL OF RESIDUAL RISK**

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Underground mining Mineralised waste	Loss and sterilization of mineral resources	<ul style="list-style-type: none"> <li>• Incorporate cross discipline planning to avoid mineral sterilisation. A key component of the cross cutting function is the Mine resource manager.</li> <li>• Mine workings will be developed and designed so as not to limit the potential to exploit deeper minerals.</li> </ul>	Low
Earthworks Civil works Shaft complex Transportation Mineralised waste Water supply and use Power supply and use Support services Demolition Rehabilitation Maintenance and aftercare	Hazardous excavations, surface subsidence and infrastructure	<ul style="list-style-type: none"> <li>• Access control, barriers and warning signs at hazardous areas.</li> <li>• Operate the shaft complex infrastructure in a manner to address stability related safety risks to third parties and animals.</li> <li>• Monitoring and maintenance post closure to observe whether the relevant long-term safety objectives have been achieved and to identify the need for additional intervention where the objectives have not been met.</li> <li>• Where AAIC has caused injury or death to third parties and/or animals, appropriate compensation will be provided.</li> <li>• In case of injury or death due to hazardous excavations, an emergency response procedure must be implemented.</li> </ul>	Low
Site preparation Earthworks Civil works Shaft complex Transport system Mineralised waste Non-mineralised waste Water supply and use	Loss of soil resources through pollution	<ul style="list-style-type: none"> <li>• Basic infrastructure design that is adequate to contain polluting substances.</li> <li>• Training of workers to prevent pollution.</li> <li>• Equipment and vehicle maintenance.</li> <li>• Fast and effective clean-up of spills.</li> <li>• Effective waste management.</li> <li>• In case of major spillage incidents an emergency response procedure must be implemented.</li> </ul>	Low

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Power supply and use Support services General site management Demolition Rehabilitation Maintenance and aftercare			
Earthworks Shaft complex Transport system Mineralised waste Non-mineralised waste Water supply and use Power supply and use Support services General site management Demolition Rehabilitation Maintenance and aftercare	Loss of soil resourced through physical destruction	<ul style="list-style-type: none"> <li>• Limit site clearance to what is absolutely necessary.</li> <li>• Develop and implement a soil management plan that addresses soil stripping, stockpiling and use for rehabilitation.</li> </ul>	Low
Site preparation Earthworks Shaft complex Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Physical disturbance of biodiversity	<ul style="list-style-type: none"> <li>• Limit site clearance to what is absolutely necessary.</li> <li>• Preconstruction surveys of the development footprints for species suitable for search and rescue operations.</li> <li>• Avoid sensitive areas as far as practically possible.</li> <li>• Obtain relevant permits prior to removal of protected species.</li> <li>• Implementation of an alien invasive species programme.</li> <li>• Implementation of a biodiversity action plan to ensure that the undeveloped/disturbed areas within the property are properly conserved and maintained.</li> <li>• Effective rehabilitation to as close to pre-mining conditions as practically possible.</li> </ul>	Medium
Site preparation	General disturbance of biodiversity	<ul style="list-style-type: none"> <li>• Limit dust emissions and soiling of vegetation.</li> </ul>	Medium

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Earthworks Shaft complex Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare		<ul style="list-style-type: none"> <li>• Training of employees on the value of biodiversity.</li> <li>• Zero tolerance for harming and harvesting fauna and flora.</li> <li>• Limit light and noise disturbance as far as practically possible.</li> <li>• Effective waste management and pollution prevention.</li> <li>• Effective rehabilitation to as close to pre-mining conditions as practically possible.</li> <li>• Prevention and combatting veld fires through establishment and maintaining of fire breaks and through the education of employees in order to comply with the National Veld and Forest Fire Act No. 101 of 1998.</li> </ul>	
Earthworks Civil works Shaft complex Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Contamination of surface water resources	<ul style="list-style-type: none"> <li>• Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999):                             <ul style="list-style-type: none"> <li>○ Clean and dirty water system will be separate.</li> <li>○ Clean run-off will be diverted away from the site.</li> <li>○ Dirty water will be contained.</li> <li>○ The necessary exemptions and approvals will be obtained for activities and infrastructure located within 100m or within the 1:100 year floodline of the Steenkoolspruit River.</li> </ul> </li> <li>• Conduct surface water monitoring and implement remedial actions as required.</li> <li>• Effective equipment and vehicle maintenance.</li> <li>• Fast and effective clean-up of spills.</li> <li>• Effective waste management.</li> <li>• Education and training of workers.</li> <li>• Effective rehabilitation of residue facility and the overall site.</li> </ul>	Medium/Low
Earthworks Civil works Shaft complex Transport system Power supply and use Water supply and use	Alteration of natural drainage patterns	<ul style="list-style-type: none"> <li>• Obtain the necessary authorisations in terms of the NWA and exemptions in terms of Regulation 704 (4 June 1999) for activities and infrastructure located within 100m or within the 1:100 year floodline of the Steenkoolspruit River.</li> <li>• Develop and implement a stormwater management plan to minimise containment areas and divert clean water away from the site.</li> <li>• Effective rehabilitation to as close to pre-mining conditions as practically possible.</li> </ul>	Low

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare		possible.	
Earthworks Civil works Underground mining Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Contamination of groundwater	<ul style="list-style-type: none"> <li>• Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999).</li> <li>• Infrastructure that has the potential to pollute groundwater will be identified and included into a groundwater pollution management plan which will be implemented as part of the operational phase through post-closure as required.</li> <li>• Conduct groundwater monitoring and implement remedial actions as required. This includes compensation for mine related loss of third party water supply.</li> <li>• Effective equipment and vehicle maintenance.</li> <li>• Fast and effective clean-up of spills.</li> <li>• Effective waste management.</li> <li>• Education and training of workers.</li> <li>• Effective rehabilitation of residue facility and the overall site.</li> </ul>	Medium/Low
Underground mining Water supply and use	Reducing groundwater levels and availability	<ul style="list-style-type: none"> <li>• Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply.</li> <li>• This monitoring programme should include third party boreholes.</li> </ul>	Low
Site preparation Earthworks Civil works Transport system Power supply and use Mineralised waste Non-mineralised waste Support services	Air pollution	<ul style="list-style-type: none"> <li>• Limit disturbed areas.</li> <li>• Suppress dust effectively on unpaved roads and at material transfer points as required.</li> <li>• Monitor pollutants of concern and implement additional mitigation as required.</li> <li>• Maintain vehicles and equipment in good working order.</li> <li>• Undertake a carbon footprint assessment.</li> </ul>	Medium

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
General site management Demolition Rehabilitation Maintenance and aftercare			
Site preparation Earthworks Civil works Underground mining Transport system Power supply and use Mineralised waste Non-mineralised waste Support services Demolition Rehabilitation	Noise pollution	<ul style="list-style-type: none"> <li>• Maintain vehicles and equipment in good working order.</li> <li>• Conduct noise monitoring in the unlikely event that AAIC receives noise related complaints.</li> <li>• Adhering to blasting schedule.</li> </ul>	Low
Shaft excavation	Blasting impact	<ul style="list-style-type: none"> <li>• Develop and implement a blast management plan which addresses blast design criteria to limit air blast, ground vibration and fly rock; pre-blast warning and evacuation and auditing of the blasts to check compliance to applicable requirements.</li> <li>• Communication of scheduled blasts with IAPs.</li> <li>• Remediation of all impacts caused by blasting.</li> <li>• In case of a person or animal being injured by blasting activities an emergency response procedure will be followed.</li> <li>• Limit blasting frequency and conduct blasting during daylight hours.</li> </ul>	Low
Site preparation Earthworks Civil works Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste	Visual impact	<ul style="list-style-type: none"> <li>• Limit disturbed areas.</li> <li>• Suppress dust to prevent a visual dust cloud.</li> <li>• Effective waste management.</li> <li>• Implement effective use of lighting which reduces light spill.</li> <li>• Effective rehabilitation of the overall site.</li> </ul>	Medium and low at closure

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Support services General site management Demolition Rehabilitation Maintenance and aftercare			
Transport system	Road disturbance and traffic safety	<ul style="list-style-type: none"> <li>• Construct safe access point/intersection.</li> <li>• Educate employees (temporary and permanent) about road safety.</li> <li>• Enforce strict vehicle speeds.</li> <li>• If a person or animal is injured by transport activities an emergency response procedure must be implemented.</li> </ul>	Medium
Site preparation Earthworks Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Loss of heritage resources	<ul style="list-style-type: none"> <li>• Limit the area of disturbance as far as practically possible.</li> <li>• Training of workers about the heritage and cultural sites that may be encountered and about the need to conserve these.</li> <li>• These resources are protected by the National Heritage Resources Act (No 25 of 1999) and may not be affected (demolished, altered, renovated, removed) without approval. In the event that resources are identified, a chance find emergency procedure should be implemented.</li> </ul>	Low
Site preparation Earthworks Civil works Underground mining Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services	Economic impact	<ul style="list-style-type: none"> <li>• Employ local people and procure goods and services locally as far as practically possible.</li> <li>• Ensure that closure planning considerations address the re-skilling of employees for the downscaling, early closure and long-term closure scenarios.</li> </ul>	High positive

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
General site management Demolition Rehabilitation Maintenance and aftercare			
Site preparation Earthworks Civil works Underground mining Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Inward migration	<ul style="list-style-type: none"> <li>• Effective communication with local communities to manage expectations with regard to employment and other opportunities.</li> <li>• Worker training on health and safety related issues.</li> <li>• Work together with landowners and land users to prevent the establishment of informal settlements and to manage issues such as security.</li> </ul>	Low
Site preparation Earthworks Civil works Transport system Power supply and use Water supply and use Mineralised waste Non-mineralised waste Support services General site management Demolition Rehabilitation Maintenance and aftercare	Land use	<ul style="list-style-type: none"> <li>• Effectively manage noise, dust, surface and groundwater quality, blasting hazards, social impacts and visual impacts.</li> <li>• Effective rehabilitation of the overall site for post closure land use.</li> <li>• In the event that any Telkom lines need to be relocated this cost will be handled by AAIC.</li> <li>• Telkom needs to be notified when construction commences and a final plan needs to be submitted to Telkom within 30 days of completion of construction.</li> </ul>	Medium and low at closure

#### **4.6 OUTCOME OF THE SITE SELECTION MATRIX**

The position of the underground mine is dictated by the ore resource. With reference to Section 3.1.3, eight shaft complex site location options were considered (see Appendix 4). Based on the outcome of the site selection matrix (see Table 3-1), the preferred site layout is option 4.



**4.7 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED**

Not applicable.

**4.8 THE PREFERRED ALTERNATIVES**

Refer to Section 4.6.

## **5 PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT**

The main objectives of the EIA phase will be to:-

- Assess the potential cultural, heritage, socio-economic and biophysical impacts of the project.
- Identify and describe procedures and measures that will mitigate potential negative impacts and enhance potential positive impacts.
- Liaise with IAPs including relevant government departments on issues relating to the proposed development to ensure compliance with existing guidelines and regulations.
- Undertake consultation with IAPs and provide them with an opportunity to review and comment on the outcomes of the EIA process and acceptability of mitigation measures.
- Develop an EMP and a conceptual closure/decommissioning plan.
- Provide measures for ongoing monitoring (including environmental audits) to ensure that the project plan and proposed mitigation measures are implemented as outlined in the detailed EIA/EMP report.

This chapter describes the nature and extent of further investigations to be conducted by Synergistics in the EIA, and sets out the proposed approach to the EIA/EMP phase.

### **5.1 ALTERNATIVES TO BE CONSIDERED**

The alternatives considered and the preferred site layout alternatives are provided in Section 3-1. These include: water supply options and the optimal layout within the preferred shaft complex site.

### **5.2 ASPECTS TO BE ASSESSED**

This section lists the environmental aspects that will be considered and investigated in the Environmental Impact Assessment phase.

#### **5.2.1 TOPOGRAPHY**

It is proposed that no specialist investigations are required. The assessment and detailed management measures will be provided in the EIA/EMP report by Synergistics.

#### **5.2.2 GEOLOGY**

It is proposed that no specialist investigations are required. The assessment and detailed management measures will be provided in the EIA/EMP report by Synergistics.

### 5.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

This section lists the aspects to be subject to specialist investigation in the Environmental Impact Assessment phase.

- Air Quality;
- Surface Water;
- Groundwater and Geochemistry;
- Soil, Land Use and Land Capability;
- Ecology, Biodiversity and Wetlands;
- Social;
- Economic and Sustainable Land Use;
- Visual;
- Traffic;
- Noise;
- Blasting and Vibrations;
- Heritage; and
- Closure Cost Estimate.

### 5.4 METHOD OF ASSESSING THE ENVIRONMENTAL ASPECTS

This section describes the nature and extent of the investigations required in the EIA phase. In particular it describes the scope of work for the specialist investigations.

#### 5.4.1 AIR QUALITY

A specialist study is required and will include the followings tasks:

- Consideration of baseline air quality.
- Establishment of a comprehensive atmospheric emissions inventory key.
- Identify potential air pollution receptors.
- Develop an atmospheric dispersion model to predict emission dispersion.
- Screening of model outputs against relevant air quality assessment criteria.
- Assessment of the significance of air quality impacts.
- Provide input, together with Synergistics and the technical project team into air quality management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### 5.4.2 SURFACE WATER

A specialist study is required and will include the followings tasks:

- Conduct a hydrocensus including identification of surface water uses and users.
- Conduct baseline surface water sampling in the study area if possible.
- Describe baseline hydrology of the site.
- Estimate the relevant rainfall, run off, flow regimes and flood lines.
- Assess the significance of surface water impacts.
- Develop a water balance relevant surface water management plan;
- Provide input, together with Synergistics and the technical project team into surface water management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### 5.4.3 GROUNDWATER AND GEOCHEMISTRY

A specialist study is required and will include the followings tasks:

- Conduct a hydro-census to identify existing water uses and users in the surrounding area.
- Conduct baseline ground water sampling in the study area. Identify the groundwater regimes and aquifers that could be affected by the proposed development.
- Determine the geochemical pollution potential of key potential sources.
- Model the pollution dispersion (from key sources) and de-watering impacts on surrounding users.
- Assess the significance of potential impacts.
- Provide input, together with Synergistics and the technical project team into groundwater management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### 5.4.4 SOIL, LAND USE AND LAND CAPABILITY

A specialist study is required and will include the followings tasks:

- Map the soils in the relevant sections of the project site.
- Determine the physical and chemical soil properties.
- Determine the current land capabilities on site following the classification system stipulated by the South African Chamber of Mines to determine pre-mining baseline land capabilities.
- Assist with the identification of current land uses.
- Assess the impact of the proposed project on soil, land use and land capability.

- Provide input together with Synergistics and the technical project team into soil resource management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.5 ECOLOGY, BIODIVERSITY AND WETLANDS**

This component will comprise of three separate studies namely Terrestrial Ecology, Aquatic Ecology and Wetlands which will be conducted by specialists and include the tasks as indicated below:

##### **5.4.5.1 Terrestrial Ecology**

A specialist study is required and will include the followings tasks:

- Identify and describe various habitats.
- Identify key floral species associated with each habitat.
- Conduct field work to identify the occurrence of fauna.
- Identify the presence of various species through direct observations (visual) and indirect identifications (spoor, burrow and scat).
- Map sensitive areas where detail will be given of the ecological aspect of concern in each sensitivity zone.
- Establish the presence of Red Data Listed (RDL) and protected plants.
- Compile a species list, detailing their specific conservation status.
- Assess terrestrial flora and fauna impacts.
- Provide input together with Synergistics and the technical project team into terrestrial flora and fauna management measures going forward.

##### **5.4.5.2 Aquatic Ecology**

A specialist study is required and will include the followings tasks:

- Conduct field work to identify the occurrence of aquatic ecosystems.
- Assess aquatic impacts.
- Provide input together with Synergistics and the technical project team into aquatic management measures going forward.

##### **5.4.5.3 Wetlands**

A specialist study is required and will include the followings tasks:

- Delineation of wetlands and riparian zones.
- Classification and definition of wetland conservation status and local and regional functional importance.
- Assess wetland ecological and biodiversity functionality.

- Provide input together with Synergistics and the technical project team into wetland management measures going forward.

The assessments and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist reports will be provided in the EIA and EMP.

#### **5.4.6 SOCIO-ECONOMIC**

A specialist study is required and will include the followings tasks:

- Describe socio-economic baseline of the local/municipal area (current levels and historic trends).
- Assess socio-economic impacts.
- Provide comparative sustainable land use analysis.
- Provide input together with Synergistics and the technical project team into socio-economic management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.7 VISUAL**

A specialist study is required and will include the followings tasks:

- Determine the visual resource.
- Identify potential visual receptors.
- Determine and assess the visual impact.
- Provide input together with Synergistics and the technical project team into visual management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.8 TRAFFIC**

A specialist study is required and will include the followings tasks:

- Conduct traffic counts at key road site(s).
- Describe baseline traffic and road conditions.
- Assess traffic impact of proposed mine (including mine access requirements, public transport and pedestrian activities) on public roads at key road site(s).
- Provide input together with Synergistics and the technical project team into traffic management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.9 NOISE**

A specialist study is required and will include the followings tasks:

- Determine baseline noise environment through monitoring.
- Identify potential noise receptors.
- Establish a noise emissions inventory for key noise sources.
- Assess noise impacts.
- Provide input together with Synergistics and the technical project team into noise management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.10 VIBRATIONS AND BLASTING**

A specialist study is required and will include the followings tasks:

- Review of blast plan.
- Assess blasting related impacts on potential receptors.
- Provide input together with Synergistics and the technical project team into blast management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.11 HERITAGE/CULTURAL RESOURCES**

A specialist study is required and will include the followings tasks:

- Identify and map heritage resources.
- Assess the impact on heritage resources.
- Provide input together with Synergistics and the technical project team into heritage management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.12 PALAEOLOGICAL RESOURCES**

A specialist study is required and will include the followings tasks:

- Identify and map (through literature review and field work) all paleontological resources in the proposed project area;
- Assess the significance of the identified resources;
- Assess the impact of the proposed project on the paleontological resources;
- Provide input, together with Synergistics into project alternatives and management measures going forward.

The assessment and detailed management measures will be provided in the EIA and EMP report by Synergistics. A copy of the specialist report will be provided in the EIA and EMP.

#### **5.4.13 CLOSURE COST ESTIMATE**

It is proposed that a closure cost estimate be undertaken in accordance with Section 24P of NEMA.

### **5.5 METHOD OF ASSESSING IMPACT SIGNIFICANCE**

Refer to Section 4.2.

### **5.6 CONSULTATION WITH THE COMPETENT AUTHORITY**

The draft and final EIA/EMP reports will be submitted to all identified commenting authorities and the DMR for review. A site visit and meeting shall be held, if requested.

### **5.7 THE PUBLIC PARTICIPATION PROCESS IN THE EIA**

#### **5.7.1 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES**

IAPs on the project database will be provided with information in the form of summary documents and will be notified when the EIA/EMP report are available for public review via electronic mail, post and bulk SMS. IAPs will similarly be invited to attend a public feedback meeting during the EIA phase, if required.

#### **5.7.2 DETAILS OF THE ENGAGEMENT PROCESS TO BE FOLLOWED**

The stakeholder engagement process in the EIA Phase will include the following:

- Public and/or stakeholder meeting/s to give feedback on the findings of the EIA (if required);
- Collation of issues and concerns into a report for submission to the commenting authorities and DMR;



- Circulation of the EIA/EMP report (draft and final if there are material changes made to the draft report) for public and authority review and collation of comments;
- Notification of IAPs on the database on the relevant DMR decisions.

### 5.7.3 INFORMATION TO BE PROVIDED TO INTERESTED AND AFFECTED PARTIES

The following information will be included in the EIA and EMP reports which will be made available for public review:

- Detailed description of the proposed project.
- A site layout.
- Details of the list of activities to be authorised in terms of NEMA and NEM:WA.
- Scale and extent of activities to be authorised in terms of NEMA and NEM:WA.
- The duration of the activity.
- An assessment of the environmental and socio-economic impacts identified during the environmental assessment process, through input from IAPs, regulatory authorities and specialists.
- Detailed management measures to reduce and control environmental and socio-economic impact.
- Copies of the specialist reports undertaken for the proposed project.

During the EIA Phase a summary of the findings of the EIA will be provided in English, Afrikaans and Sesotho. In addition, the EIA/EMP report will be subjected to public review. Once the DMR has issued decisions on the applications, IAPs on the project database will be informed accordingly.

### 5.8 TASKS TO BE UNDERTAKEN DURING THE EIA

A description of the tasks that will be undertaken during the EIA phase is provided below in Table 5-1.

**TABLE 5-1: EIA TASKS AND TIMING**

Phase	EAP activity	Opportunities for Consultation and Participation		SCHEDULE
		Competent Authorities	IAPs, State Departments and Organs of State	
Specialist Assessments and Input	EAP to manage specialist activities and receive inputs for EIA.			April to May 2016
EIA Phase	Assess environmental impacts. Compile draft EIA/EMP report			May to June 2016

Phase	EAP activity	Opportunities for Consultation and Participation		SCHEDULE
		Competent Authorities	IAPs, State Departments and Organs of State	
	Submit draft EIA report to IAPs and authorities.	Review of draft EIA report (30 days). Comments to EAP	Review of draft EIA report (30 days). Comments to EAP	June/July 2016
	Arrange meetings and consultations	Meetings with authorities during EIA if required.	Public Feedback Meeting. Focused consultation with IAPs or commenting authorities if required.	
	Address public comment and finalise EIA/EMP report			July 2016
Authority review and Authorisation Phase	Final EIA report to DMR (106 days from acceptance of scoping).	Authority Acknowledge Receipt of EIA report (10 days).	Review of final EIA report Comments to CA	July to November 2016
		Environmental Authorisation Granted / Refused (107 days).		
			Notifications to IAPs regarding environmental authorisation (granted or refused).	December 2016
Appeal Phase	EAP to provide guidance regarding the appeal process as and when required.	Consultation during processing of appeal if relevant.	Submit appeal in terms of National Appeal Regulations	Variable

## 5.9 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IDENTIFIED IMPACTS

See Table 4-4. It should be noted that this table has been compiled with the information in hand and will be refined during the EIA phase.

## 5.10 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional requests for information have been received to date.

### 5.10.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The potential socio-economic impacts are discussed in Section 4.3 and will be investigated further during the EIA Phase as outlined in Section 5.4.6.

### 5.10.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

A heritage study will be conducted to identify potential impacts on heritage resources. The results of this study will be provided in the EIA/EMP.

**5.10.3 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT**

None.

## 6 UNDERTAKINGS BY THE EAP

I, Marline Medallie, the Environmental Assessment Practitioner responsible for compiling this report, undertake that:

- the information provided herein is correct;
- the comments and inputs from stakeholders and IAPs have been correctly recorded;
- information and responses provided to stakeholders and IAPs by the EAP is correct; and
- the level of agreement with IAPs and stakeholders has been correctly recorded and reported.

\_\_\_\_\_  
Signature of the EAP

Date: \_\_\_\_\_

## 7 REFERENCES

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- Wetland Consulting Services, 2014: Aquatic Ecosystem Assessment for the Alexander Biodiversity Assessment.
- Wetland Consulting Services, 2013: Baseline Wetland Delineation & Assessment – AATC Alexander Project.
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## RECORD OF REPORT DISTRIBUTION

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Mr Dan Hlanyane	Gert Sibande District Municipality	13	February 2016	M Medallie
Office of the Speaker	Govan Mbeki Local Municipality	14	February 2016	M Medallie
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