



**mineral resources**

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

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**  
**And**  
**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**  
**DRAFT FOR STAKEHOLDER REVIEW**

**FOR LISTED ACTIVITIES ASSOCIATED WITH AMANDELBULT  
COMPLEX PROPOSED FINE CHROME RECOVERY PLANT  
PROJECT**

**DMR Reference Number:**  
**LP30/5/1/2/2/48 MR**  
**Section 102 Application**

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

NAME OF APPLICANT: Anglo American Platinum Amandelbult Complex

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DMR REFERENCE NUMBER: LP30/5/1/2/2/48 MR



**PLATINUM**



## IMPORTANT NOTICE

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

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

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

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

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

## OBJECTIVE OF THE SCOPING PROCESS

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

## Executive summary

Anglo American Platinum, Rustenburg Platinum Mine's (RPM) Amandelbult Complex (Amandelbult) is situated within the Thabazimbi Local Municipality and Waterberg District Municipality and extends over some 20 km from west to east. The mine is approximately 15 km north northeast of the towns of Northam and 30 km south southwest of Thabazimbi on the northern limb of the Platinum Belt. The mine consists of four different operational units. The four units function as discreet business units, each headed by separate management teams:

- Tumela Mine consisting of a vertical shaft (Tumela shaft, previously known as No 1 Shaft) and a number of other incline and decline shafts, located north of the main vertical shaft;
- Dishaba Mine consisting of a vertical shaft (Dishaba shaft, previously known as No. 2 Shaft) and a number of other incline and decline shafts, located north of the main vertical shaft;
- The Concentrator, Chrome Recovery Plants and associated Tailings Storage Facility (TSF) complex; and
- Support services including offices, workshops, hospital, township, fridge plant, grouting plant and Game Park.

The main activity at Amandelbult is the mining of Platinum Group Metals (PGMs) from both the Merensky and UG2 reefs using underground and open cast mining methods. Mining at Dishaba during 2015 was at a rate of 174 kilo tonnes per month (ktpm), 324 ktpm at Tumela Mine and 43 ktpm for open cast mining (total of 541 ktpm). Anglo American Platinum estimates that adequate reserves remain for a life of mine (LOM) extending to at least 2050 with opencast mining scheduled to extend to 2024.

Opencast mining was undertaken in the past in the Dishaba and Tumela mining areas, with further opencast operations planned for Dishaba. The historical open cast mining ceased in 2005 and the land has been rehabilitated in accordance with the approved Environmental Management Plan (EMPr), dated 1995, and subsequent approved EMPr Addendums.

Ore mined from the reserves is processed at the Concentrator before being transported to off-site smelters for further refining. The main product is platinum with other products including gold and the PGMs: rhodium, palladium, ruthenium, iridium, and osmium. By-products include copper, nickel and cobalt.

The Amandelbult Concentrator Complex has an existing approved and operational chrome recovery plant. However, this existing chrome recovery plant is not designed to recover fine chrome (-100 µm fraction). An initiative was therefore identified in which an increased recovery of chrome can be realised at Amandelbult through the beneficiation of fine chrome from the Concentrator tailings. It is envisaged that the additional recovery of metallurgical and/or chemical grade chrome will result in an increased yield of chrome for Amandelbult, as well as reduced water losses associated with the existing approved tailings dams.

Prior to the development of the proposed project, environmental authorisation is required from the Department of Mineral Resources (DMR) and a Water Use Licence (WUL) needs to be issued by the Department of Water and Sanitation (DWS). Anglo American Platinum appointed SRK Consulting South Africa (Pty) Ltd (SRK) as the independent Environmental Assessment Practitioner (EAP) to manage and facilitate the environmental authorisation process and associated stakeholder engagement process.

This Draft Scoping Report has been compiled in terms of the provisions of Appendix 2 of December 2014 Regulation 982 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

*This report is titled "Environmental Impact Assessment and Environmental Management Plan Report for Stakeholder Review" and fulfils the requirements for a Draft Environmental Impact Report (DEIR) as contemplated in the NEMA regulations. All comments received during the review of the Scoping Report for Stakeholder Comment (or DSR) and Final Scoping Report for Authority Comment (or FSR) were incorporated into this report.*

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## List of Abbreviations

AA	Anglo American
AOL	Anglo Operations (Pty) Limited
AAP	Anglo American Platinum
Cand.Sci.Nat	Candidate Scientist of Nature
DCOGHSTA	Department of Cooperative Governance, Human Settlement and Traditional Affairs
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Assessments, Environment Impact Assessment
EMPr	Environmental Management Programme
FCR	Fine Chrome Recovery
FSR	Final Scoping Report
I&APs	Interested and Affected Parties
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
LDF	Leadership Development Forum
LDRDLR	Limpopo Department of Rural and Land Reform
LOM	Life of mine
mamsl	metres above mean sea level
MTPA	Mpumalanga Tourism and Parks Agency
NEM:AQA	National Environmental Management: Air Quality Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:WA	The National Environmental Management: Waste Act
NEMA	The National Environmental Management Act
NWA	National Water Act
PGM	Platinum Group Metals
RPM	Rustenburg Platinum Mines
Pr.Sci.Nat	Professional Scientist of Nature
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SHE	Safety, Health and Environment
SMS	Short Messaging Service
SPLUMA	Spatial Planning and Land Use Management Act
SRK	SRK Consulting South Africa (Pty) Ltd
WULA	Water Use Licence Applications

# ENVIRONMENTAL IMPACT REPORT

## Part A: Scope of Assessment and Environmental Impact Assessment (EIA) Report

### 1 Introduction and scope of report

Anglo American Platinum (Platinum) Rustenburg Platinum Mines (RPM) Amandelbult Complex (Amandelbult) is an existing underground mine located near Northam in the Limpopo Province.

Amandelbult is situated in the Thabazimbi Magisterial District, within the Thabazimbi Local Municipality and Waterberg District Municipality and extends over some 20 km from west to east. The mine is about 15 km north northeast of Northam and 30 km south southwest of Thabazimbi on the north-western limb of the geological Bushveld Complex (Figure 3-1).

The mine consists of four different operational units:

- **Tumela Mine** consisting of a vertical shaft (Tumela shaft, previously known as 1 shaft) and a number of other incline and decline shafts, located north of the main vertical shaft;
- **Dishaba Mine** consisting of a vertical shaft (Dishaba shaft, previously known as No. 2 shaft) and a number of other incline and decline shafts, located north of the main vertical shaft;
- **The Concentrator, Chrome Recovery Plants** and associated tailings storage facility (TSF) complex; and
- **Support services** including offices, workshops, hospital, township, fridge plant, grouting plant and Game Park.

The main activity at Amandelbult is the mining of Platinum Group Metals (PGMs) from both the Merensky and UG2 reefs using underground and opencast mining methods. Mining at Dishaba during 2015 was at a rate of 174 kilo tonnes per month (ktpm), 324 ktpm at Tumela Mine and 43 ktpm for open cast mining (total of 541 ktpm). Anglo estimates that adequate reserves remain for a life of mine (LOM) extending to at least 2050 with opencast mining scheduled to extend to 2024.

Opencast mining has recently been initiated at Tumela and was undertaken in the past in the Dishaba and Tumela mining areas, with further opencast operations planned for Dishaba. The historical open cast mining ceased in 2005 and the land has been rehabilitated in accordance with the approved Environmental Management Program Report (EMPr), dated 1995, and subsequent approved EMPr Addendums. Ore mined from the reserves is processed at the Concentrator before being transported to off-site smelters for further refining. The main product is platinum with other products including the Platinum Group Metals (PGMs): rhodium; palladium; ruthenium; iridium; and osmium. By-products from the refinery include copper; nickel and cobalt.

#### Fine Chrome Recovery Plant Project

The Fine Chrome Recovery (FCR) initiative forms part of the “Making Amandelbult Investable Again” programme and the Amandelbult journey towards “P101”. The Amandelbult Concentrator Complex has an existing approved and operational Chrome Recovery Plant. However, this existing Chrome Recovery Plant is not designed to recover fine chromite (-100 µm fraction). An initiative was therefore identified in which an increased recovery of chromite can be realised at Amandelbult through the beneficiation of fine chromite from the Concentrator tailings. It is envisaged that the additional recovery of metallurgical and/or chemical grade chrome will result in an increased yield of chromite for Amandelbult, as well as reduced water losses associated with the existing approved tailings dams.

The tailings streams from both the UG2 #1 and UG2 #2 Concentrators as well as the Merensky Concentrator tailings stream will feed the proposed FCR Plant to realize the full benefit of fine chromite recovery. AAP will design, construct and operate a mobile pilot plant with the aim of finalizing the plant design for the recovery of fine chromite from the Amandelbult Concentrator tailings streams.

The mobile pilot plant will be designed to be modular as a “plug-and-play” unit that can be transported to other AAP operations for future test programmes. The technologies considered for the mobile pilot plant include magnetic and gravity separation beneficiation methods. The outcome of the mobile pilot plant test programme will inform the FCR Plant design, based on the achieved metallurgical performance, fine chromite yield, product grade, mineralogical characteristics of the feed, ore variability response, technology maturity, operability, cost and local support by supplier criteria.

Prior to the development of the proposed project, an environmental authorisation is required from the Department of Mineral Resources (DMR) and a Water Use Licence (WUL) needs to be issued by the Department of Water and Sanitation (DWS). RPM appointed SRK Consulting South Africa (Pty) Ltd (SRK) as the independent Environmental Assessment Practitioner (EAP) to manage and facilitate the environmental authorisation process and associated stakeholder engagement process.

## 2 Contact person and correspondence address

The details and qualifications of the EAP are provided in Table 2-1 and Table 2-2 below, and copies of the qualifications are provided in Appendix 1.

### 2.1 Details of the EAP who prepared the report

SRK assigned Beth Candy, a principal environmental scientist, Suzanne van Rooy, a senior environmental scientist, Estie Retief, an environmental scientist and Aphiwe-Zona Dotwana, an environmental scientist as the environmental assessment practitioners (EAPs) to undertake the necessary environmental authorisation process.

**Table 2-1: EAP Details**

EAP Name	Contact Number	Fax Number	Email Address
Beth Candy	011 441 1221	086 503 1045	<a href="mailto:bcandy@srk.co.za">bcandy@srk.co.za</a>
Suzanne van Rooy	011 441 6151	086 555-0886	<a href="mailto:svanrooy@srk.co.za">svanrooy@srk.co.za</a>
Estie Retief	011 441 6161	086 503 2498	<a href="mailto:eretief@srk.co.za">eretief@srk.co.za</a>
Aphiwe-Zona Dotwana	011 441 6105	086 503 6825	<a href="mailto:adotwana@srk.co.za">adotwana@srk.co.za</a>

### 2.2 Expertise of the EAP

#### 2.2.1 The qualifications of the EAP

**Table 2-2: EAP Qualifications**

EAP Name	Qualifications	Years' Experience
Beth Candy	MSc (Environmental Science), Pr. Sci. Nat.	15
Suzanne van Rooy	MPhil (Environmental Management), Pr. Sci. Nat.	11
Estie Retief	MA (Environmental Management)	13
Aphiwe-Zona Dotwana	MEd (Environmental Education), Cand. Sci. Nat.	4

#### 2.2.2 Summary of the EAP's past experience

The EAPs' expertise is provided in Table 2-3. Detailed curricula vitae for the project team is provided Appendix 2.

**Table 2-3: EAP Expertise**

EAP Name	Expertise
Beth Candy	<p>Beth Candy is an environmental scientist with more than 14 years' experience in environmental impact assessments and environmental management. With a strong background in Geology (BSc Hons Geology) her core experience and expertise is in the mining industry sector. Her expertise includes:</p> <ul style="list-style-type: none"> <li>• Risk Assessments;</li> <li>• Environment Impact Assessments (EIA);</li> <li>• Environmental Management Programmes (EMP);</li> <li>• Water Use Licence Applications (WULA); and</li> <li>• Due diligence and integrated regulatory processes.</li> </ul>
Suzanne van Rooy	<p>Suzanne has been involved in the field of environmental and aquatic science for the past 9 years. Her expertise includes:</p> <ul style="list-style-type: none"> <li>• Project management</li> </ul>

EAP Name	Expertise
	<ul style="list-style-type: none"> <li>• Coordinating environmental impact assessments</li> <li>• Compilation of environmental impact assessment and management programme reports (EIA/EMPs)</li> <li>• Compilation of mining right applications;</li> <li>• Environmental performance assessments;</li> <li>• Water use licence audits;</li> <li>• Public participation;</li> <li>• Closure cost assessment;</li> <li>• Biomonitoring including SASS5 (South African Scoring System Version 5) and IHAS (Invertebrate Habitat Assessment System).</li> </ul>
Estie Retief	<p>Estie Retief has over 13 years of experience in the environmental consulting field. Estie's experience thus far was focussed mainly on environmental authorisation processes relating to mining developments in terms of the MPRDA, NEMA &amp; NEM: WA and NWA legislation. Her expertise includes:</p> <ul style="list-style-type: none"> <li>• General Environmental Management;</li> <li>• Environmental Impact Assessments;</li> <li>• Environmental Management Programmes; And</li> <li>• Environmental Audits.</li> </ul>
Aphiwe-Zona Dotwana	<p>Aphiwe-Zona Dotwana has been involved in the field of environmental science since 2015. Her expertise and subject interest include:</p> <ul style="list-style-type: none"> <li>• Wetland delineation and assessment;</li> <li>• Fauna and Flora assessment;</li> <li>• Environmental authorisations (EIA, Basic Assessments);</li> <li>• Water Use Licence Applications;</li> <li>• Public Participation; and</li> <li>• Stakeholder Engagement.</li> </ul>

### 3 Description of the property

The Amandelbult Complex is located within the Thabazimbi Local Municipality and Waterberg District Municipality and the Amandelbult complex extends over some 20 km from west to east. The mine is about 15 km north northeast of Northam and 30 km south southwest of Thabazimbi on the north-western limb of the Bushveld Complex.

RPM Amandelbult Complex is the holder of the mining right for the properties within the mine boundary area, which are listed in Table 3-1. Surface ownership and information pertaining to the properties (i.e. portion numbers, areas and title deed numbers) are also presented in Table 3-1. The following farms form part of the proposed project area. Details relating to each of these properties is provided in Table 3-2.

**Table 3-1: List of properties within the mine boundary area of Amandelbult**

Property	Area(ha)	Surface Owner	Title Deed
Schilpadnest 385 KQ*	1456	Bophalane Ba Montserre Community Development Trust	T69837/2004
Elandsfontein 386 KQ	2505	Rustenburg Platinum Mines Limited	T40982/75
Amandelbult 383 KQ	1482	Rustenburg Platinum Mines Limited	T15698/1973
Elandskuil 378 KQ Portion 1	1413	Rustenburg Platinum Mines Limited	T16988/79
Elandskuil 378 KQ Portion 2	165	Rustenburg Platinum Mines Limited	T16988/1979
Haakdoordrift 374 KQ	484	Rustenburg Platinum Mines Limited	T31631/1980
Middellaagte 382 KQ	1392	Rustenburg Platinum Mines Limited	T38966/1974
Zwartkop 369 KQ Portion 17	58	Rustenburg Platinum Mines Limited	T3623/1986
Zwartkop 369 KQ Portion 18	207	Trollope Prop (Pty) Ltd	T82992/992
Zwartkop 369 KQ Portion 24	312	Rustenburg Platinum Mines Limited	T43347/2002

\* Property is leased by Amandelbult from the surface owners.

**Table 3-2: Description of Property associated with FCR Plant**

Detail	Description
Farm Name:	Amandelbult 383 KQ Portion 0
Application Area (Ha)	<b>Farm Area:</b> 1482.6683 Ha <b>FCR Plant Footprint Area:</b> 5 Ha <b>Product Pads 1 &amp; 2:</b> 4 Ha
Magisterial District:	Thabazimbi Local Municipality
Distance and direction from nearest town	20km North East of Northam 25km South of Thabazimbi
21 Digit Surveyor General Code for each farm portion:	T0KQ00000000038300000

#### 3.1 Locality map

*(Show nearest town, scale not smaller than 1: 250 000 attached as Appendix 3)*

The locality map for the Amandelbult Complex as well as the positions of the proposed FCR Plant is provided in Figure 3-1 and Appendix 3 for the locality map.





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

### 4.1 Listed and specified activities

(Provide a plan drawn to scale acceptable to the Competent Authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on the site.)

The listed activities associated with the proposed Fine Chrome Recovery (FCR) Plant are provided in Table 4-1. The location, area and infrastructure associated with the project are provided in Appendix 4.

The listed activities table has been amended from the application and scoping phase to exclude the following (refer to Section 18.11):

- Railway extension – GNR 983, Activity 64;
- Identification of sensitive area – GNR 983, Activity 30; and
- Land use – GNR 985, Activity 15.

In addition, the project footprint area has increased from 4.5ha to 10.85ha (related to GNR 983, Activity 27).

The FCR Plant does not trigger a listing as per GNR 984, Activity 17 related to primary processing, as the FCR Plant is considered a secondary process, as slurry will be obtained from the concentrator, which is considered the primary process.

**Table 4-1: Listed activities triggered by the FCR Plant Project**

Name of activity	Aerial extent of the activity	Listed activity	Applicable listing notice	Waste management authorisation
<i>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc E.g. for mining - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and Boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</i>	<i>Ha or m<sup>2</sup></i>	<i>(Mark with an X where applicable or affected).</i>	<i>(GNR 983, GNR 984 or GNR 985)/ NOT LISTED</i>	<i>(Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)</i>
Clearance of vegetation: Clearance of an area between 1 – 20ha.	10.85ha	Yes	GNR 983 Activity 27	-
Stormwater dam: An amendment of a WUL or a new WUL will be required for the stormwater dam, which triggers this activity, alternatively GNR 984 Activity 6. To be confirmed with DWS.	0.5ha	Yes	GNR 984 Activity 6	-
Process water tank: An amendment of a WUL or a new WUL will be required for the process water tank, which triggers this activity, alternatively GNR 984 Activity 6. To be confirmed with DWS.	0.5ha	Yes	GNR 984 Activity 6	-

## 4.2 Description of the activities to be undertaken

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

Anglo American Platinum Rustenburg Platinum Mines (RPM) Amandelbult Section is an existing platinum mine located near Northam in the Limpopo Province. The Fine Chrome Recovery (FCR) initiative forms part of the “Making Amandelbult Investable Again” programme and the Amandelbult journey towards “P101”. The Amandelbult Concentrator Complex has an existing approved and operational Chrome Recovery Plant. However, this existing Chrome Recovery Plant is not designed to recover fine chromite (-100 µm fraction).

An initiative was therefore identified in which an increased recovery of chromite can be realised at Amandelbult through the beneficiation of fine chromite from the Concentrator tailings. It is envisaged that the additional recovery of metallurgical and/or chemical grade chromite will result in an increased yield of chromite for Amandelbult, as well as reduced water losses associated with the existing approved tailings dams. The tailings streams from both the UG2 #1 and UG2 #2 Concentrators as well as the Merensky Concentrator tailings stream will feed the proposed FCR Plant to realize the full benefit of fine chromite recovery.

At the Concentrator Plant, the majority of water used in the process is obtained from recycled water, followed by groundwater removed from the shafts, and then potable water.

The bulk of the potable water supply to the mine is via Magalies Water with supply augmented by the 3.5 MI/d reverse osmosis plant located at Dishaba Mine, which treats fissure water removed from underground at Dishaba shaft. Magalies supply is via the Elandsfontein Reservoir adjacent to Tumela Mine. The water is sourced from the Vaalkop Dam and treated in the Vaalkop treatment plant prior to distribution to Amandelbult and Thabazimbi town. The allocation from Magalies Water is approximately 12 MI/d but in the region of only 8.8 MI/d was used during 2015. Shortages of water have been experienced due to either high demands or infrastructure constraints.

There is considerable pressure on the Magalies Water supply infrastructure and its ability to meet water demand for the various mining operations and towns in the surrounding areas. It will therefore be in the Amandelbult’s best interest to reduce its dependency on Magalies Water as much as possible.

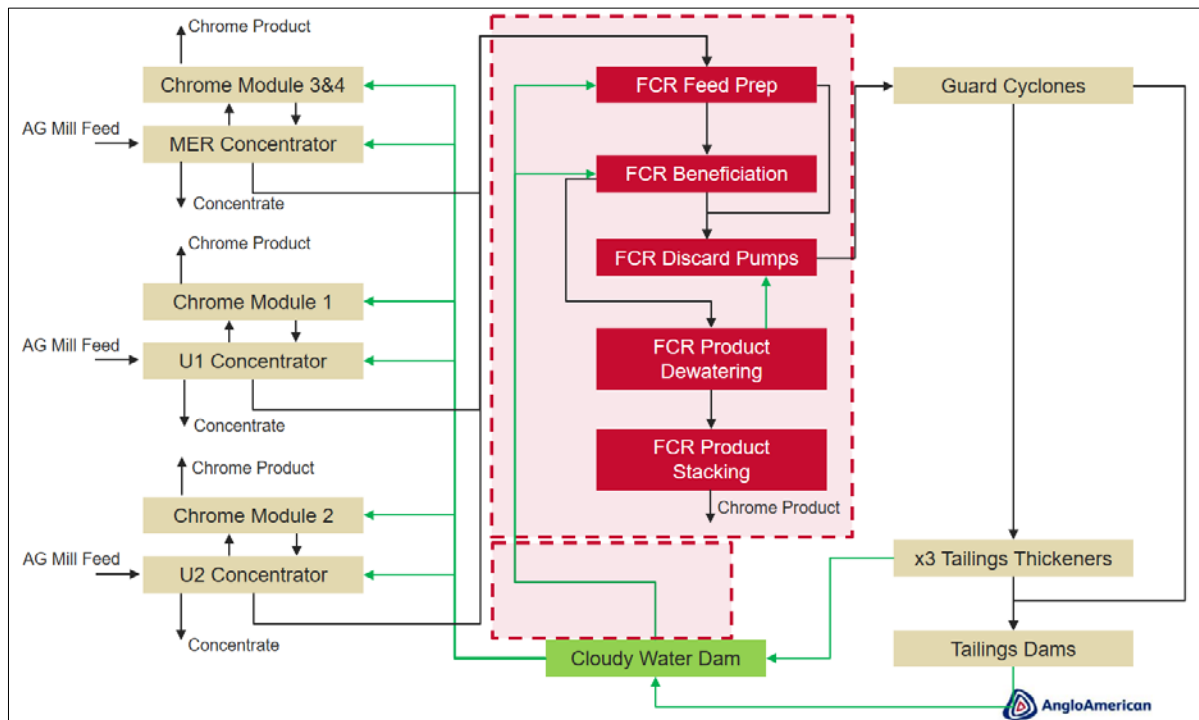
As the Amandelbult FCR Plant receives guard cyclone feed slurry and has its own thickener separate from the Concentrator, it will always be water positive. This means there will always be excess process water returned back from the Amandelbult FCR Plant to the Concentrators cloudy water tank.

Cleaned process water will be used for pump gland sealing and flocculant make-up at the proposed Amandelbult FCR Plant. The proposed Amandelbult FCR Plant requires 216 m<sup>3</sup>/hr (5.2 MI/d) of clean water make-up. For the purpose of this phase of the study, allowance has been made for clean water standby make-up pumps to pump cleaned process water from the Concentrator to the Amandelbult FCR Plant. In the event that the Concentrator cannot supply in the clean water need, the proposed Amandelbult FCR Plant can potentially follow the same philosophy as the existing pilot plant and generate its own clean water from process water instead of returning process water back to the Concentrators cloudy water tank. This could be done by installing relatively cheap small diameter cyclones to remove +10 micron material prior to discharging their overflow into the Amandelbult FCR Clean water tank from where it will be re-used in the Amandelbult FCR.

Figure 4-1 and Table 4-2 provide details regarding the proposed FCR process.

**Table 4-2: Proposed FCR Plant Process Description**

Circuit	Description
FCR Feed Preparation	Feed to the FCR will be taken from the Merensky, U1 & U2 Concentrators Final Tailings streams. The feed streams to the FCR will be classified according to the correct size fractions for optimal recovery in the FCR Feed Preparation Circuit. Material not suitable for processing in the FCR will be combined with final FCR Discard and pumped to the existing Guard Cyclones.
FCR Beneficiation	The sized feed material obtained from the FCR Feed Preparation Circuit will be upgraded by the selected beneficiation technology in the FCR Beneficiation Circuit and the product will be transferred to the FCR Product Dewatering Circuit. The tailings generated from the FCR Beneficiation Circuit will also report to the existing Guard Cyclones.
FCR Product Dewatering	The product generated from the FCR Beneficiation Circuit will be dewatered and the dewatered product (fine concentrate) will be stacked on the identified Fine Product Stacking Stockpile. The water recovered by dewatering the FCR Product will also report to the existing Guard Cyclones.
FCR Product Stacking	The dewatered product (fine concentrate) will be stacked onto the allocated stockpile area for further dewatering. The runoff water from the stockpile will be collected and returned to the process, eventually reporting to the existing Guard Cyclones.
Overall Process Water Impact	As the amount of Final Concentrator Tailings solids will be reduced as a result of the new FCR Plant, the water losses associated with the Final Tailings reporting to the Tailings Dams will also be reduced.



**Figure 4-1: FCR Plant Process Description**

### 4.3 Extent of activity

The mining boundary area of Amandelbult extends over more than 20 km and occupies a total surface area of 14 252 ha. Of the total surface area encompassed by the mining boundary area, approximately 1268 ha (excluding opencast areas) is disturbed by surface infrastructure. The rehabilitated historical opencast areas cover approximately 291 ha and the currently scheduled open cast pit area covers approximately 94 ha.

The mine area is divided into western, central and eastern sections. Numerous roads provide access between these sections of the mine, with several authorised road crossings over the Bierspruit. Several railway lines traverse the Amandelbult mining boundary area, connecting the main provincial railway line to the western, central and eastern sections of the mine. Power is provided from the Eskom grid and is fed to the surface complexes and underground workings from an 11kV overhead line network.

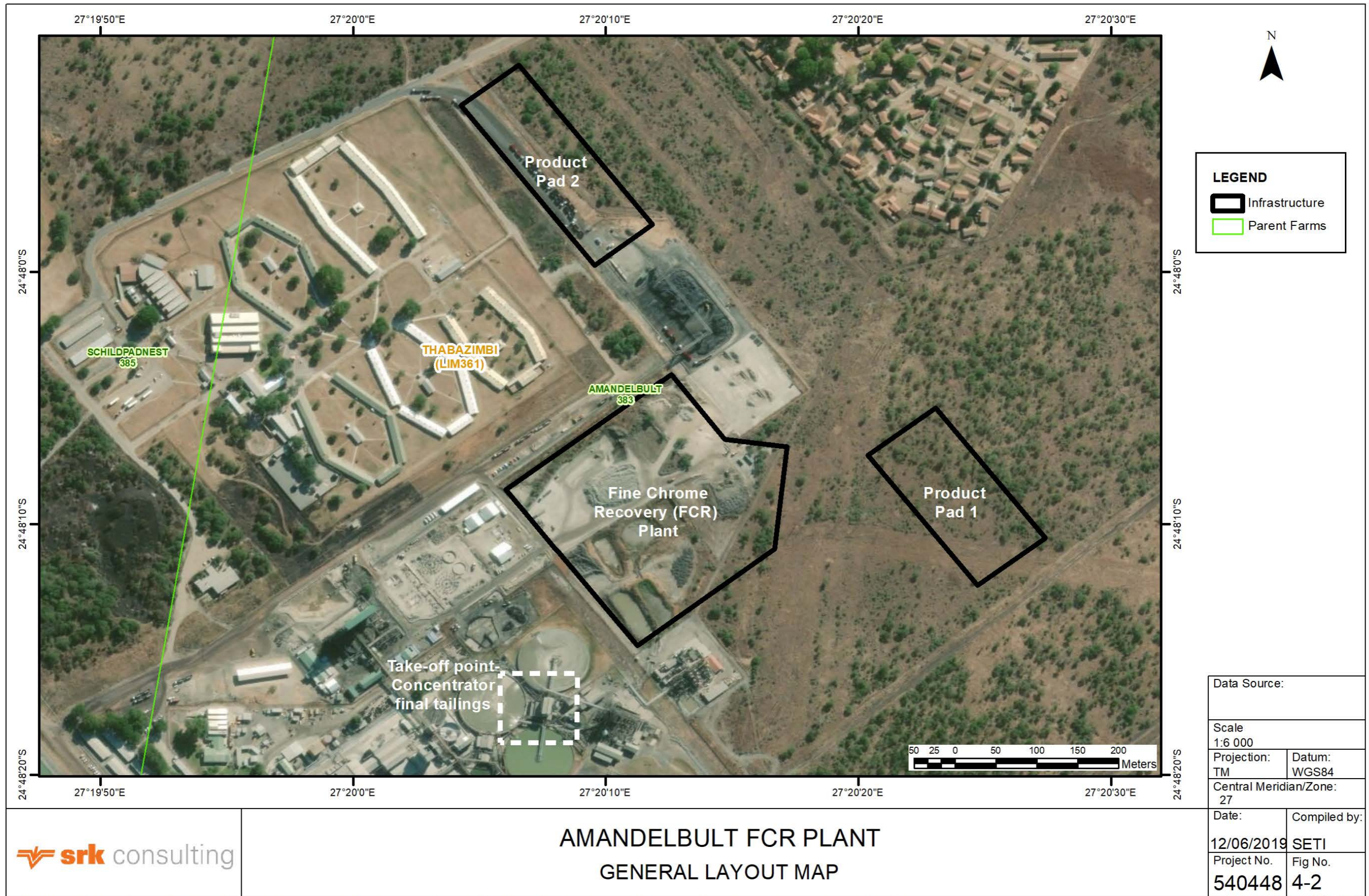
The proposed FCR Plant project will add limited infrastructure to the extensive Amandelbult Complex and will further utilise the existing facilities, thereby reducing the impact of the project significantly. Refer to Figure 4-2 and Figure 4-3 for the project layout.

A summary of the existing operations (processes and products), description of infrastructure associated with the current operations are presented in Table 4-3.

**Table 4-3: Overview of the existing Amandelbult Complex mining operation and water and waste management systems**

Aspect	Method/system
<b>Mining</b>	
Underground mining:	<ul style="list-style-type: none"> <li>Underground mining occurs via two complexes, namely Tumela Mine (western section of the mine) and Dishaba Mine (eastern section of the mine).</li> <li>The mechanised breast mining method is widely used with the room and pillar method used in some places such as at the 16W UG2 mining area.</li> <li>The ore is scraped into stope orepasses and then hauled (footwall haulages) by battery powered locomotives to the main hoisting shafts.</li> <li>From surface the ore is transported to the Concentrator by rail.</li> </ul>
<b>Western Section:</b>	<b>Tumela mining operation</b> located on the farms Elandsfontein 386 KQ and Schilpadnest 385 KQ
Mining infrastructure	<ul style="list-style-type: none"> <li>Tumela vertical shaft (previously known as No 1. Shaft), change houses, compressors and Fridge Plant.</li> <li>Several incline and decline shafts grouped and managed as separate entities: <ul style="list-style-type: none"> <li><b>Tumela upper:</b> <ul style="list-style-type: none"> <li>16W comprising a decline at 16W and two footwalls at 20W and 10W;</li> <li>30W comprising a decline and chairlift at 30W, two footwall inclines at 36W and 28W, and a Raise Bore at 28W;</li> </ul> </li> <li><b>Tumela Central:</b> <ul style="list-style-type: none"> <li>7E: currently not operational;</li> <li>15 East: including change houses, compressors and offices.</li> <li>15 East Dropdown (as proposed in this application)</li> </ul> </li> </ul> </li> <li>Main Office Complex and Training Centre.</li> <li>Zero Dams (for storage and pumping of ground water influx to the Concentrator Plant).</li> <li>Discharge points from Tumela shaft and Zero Dams into the Bierspruit.</li> <li>Magazine.</li> <li>Grout Plant at 20W</li> </ul>
Mining-related infrastructure	<ul style="list-style-type: none"> <li>Tumela Hostel.</li> <li>Amandelbult Township including Post Office and Shopping Centre.</li> <li>Amandelbult Hospital.</li> </ul>
Amenities	<ul style="list-style-type: none"> <li>Recreation Club.</li> <li>Golf Course.</li> <li>Sports Ground.</li> <li>Game Park, including slaughter facilities.</li> </ul>
<b>Eastern Section:</b>	<b>Dishaba mining operation</b> located on the farms Zwartkop 369 KQ, Middellaagte 382 KQ and Elandskuil 378 KQ

Aspect	Method/system
Mining infrastructure	<ul style="list-style-type: none"> <li>• Dishaba vertical shaft (previously known as No 2. Shaft), change houses, compressors, cooling towers and Fridge Plant.</li> <li>• Several incline and decline shafts grouped and managed as separate entities: <ul style="list-style-type: none"> <li>○ 44E <b>incline</b> and Raise Bores;</li> <li>○ 50E <b>incline</b> shaft, which pumps underground water to 49E shaft surface dams;</li> <li>○ 62 East incline shaft (currently on care and maintenance with plans to reopen this shaft in the near future).</li> <li>○ 62 <b>East</b> Raise Bore (as proposed in this application)</li> <li>○ 43E <b>decline</b></li> </ul> </li> <li>• Water treatment at Dishaba shaft: Reverse Osmosis Plant.</li> <li>• Discharge points from Dishaba shaft and 49E Dams to the Crocodile River. Water is contained in Jabulani Dam prior to discharge.</li> <li>• Contractors yard.</li> <li>• Magazine.</li> <li>• Central Workshop.</li> <li>• Mine stores.</li> <li>• Protection services.</li> </ul>
Mining-related infrastructure	<ul style="list-style-type: none"> <li>• Farm House.</li> <li>• Dishaba Hostel.</li> </ul>
Amenities	<ul style="list-style-type: none"> <li>• None</li> </ul>
Open pit/cast mining:	<p>Opencast/pit mining includes a number of small operational, historic and proposed opencast operations located along the northern boundary of the mine site, which lies adjacent to the Merensky and UG2 reef outcrops where the various Dishaba and Tumela inclines and declines are situated as follows:</p> <ul style="list-style-type: none"> <li>• <b>Rehabilitated</b> opencast areas on the farms Middellaagte, Zwartkop, Schilpadnest, Elandsfontein, Elandskuil.</li> <li>• <b>Operational</b> opencast mining areas on the farm Middellaagte: Pit 1 and 2 were mined in 2015 and rehabilitation is in progress.</li> <li>• <b>Proposed</b> future opencast operations on the farms Middellaagte and Haakdoorndrift: <ul style="list-style-type: none"> <li>○ the <b>1998</b> EMPR approved Pit 4, 5, 6, 7, 7a and 37 (Pit 3 will not be mined as 15 East Shaft is in the Pit 3 area);</li> <li>○ new pits on Haakdoorndrift (EMP/EIA submitted in July 2016) will be mined in 2018 for four years.</li> </ul> </li> </ul> <p>These operations do not form part of the site-wide reticulation system and operate as stand-alone entities. No decant from historic workings has been observed thus far.</p> <p>Ore is conveyed to the Concentrator via haul trucks.</p>
<b>Beneficiation</b>	
<b>Central section:</b>	Located on the farms Amandelbult 389 KQ and Middellaagte 382 KQ
Beneficiation infrastructure	<ul style="list-style-type: none"> <li>• Concentrator Plant processing 576 ktpm – with capability to accommodate 770 ktpm. The ore undergoes several processes, including milling and concentrating, to extract the target minerals.</li> <li>• The concentrate is transported to off-site smelters for further refinement.</li> <li>• There is an existing operational Chrome Recovery Plant situated at the Concentrator.</li> <li>• Tailings is pumped to the Tailings Storage Facility (TSF) Complex comprising TSF 1, 2, 3A and 3B.</li> </ul>
Beneficiation-related infrastructure	<ul style="list-style-type: none"> <li>• TSF Complex and associated Return Water Dam (RWD) and Holding Dam.</li> <li>• Sewage treatment plant (STP).</li> <li>• Mlanje single accommodation village (SAV)</li> <li>• Rethabile SAV.</li> </ul>



Path: J:\Proj\540448\_Amandelbult\_FCR\_Plant\8GIS\GISPROJ\MXD\Scoping\_Report\540448\_A4\_Map4\_2\_Amandelbult\_FCR\_Plant\_General\_Layout\_Map\_20190611.mxd

Revision: A Date: 12/06/2019

Figure 4-2: The Fine Chrome Recovery Plant Location

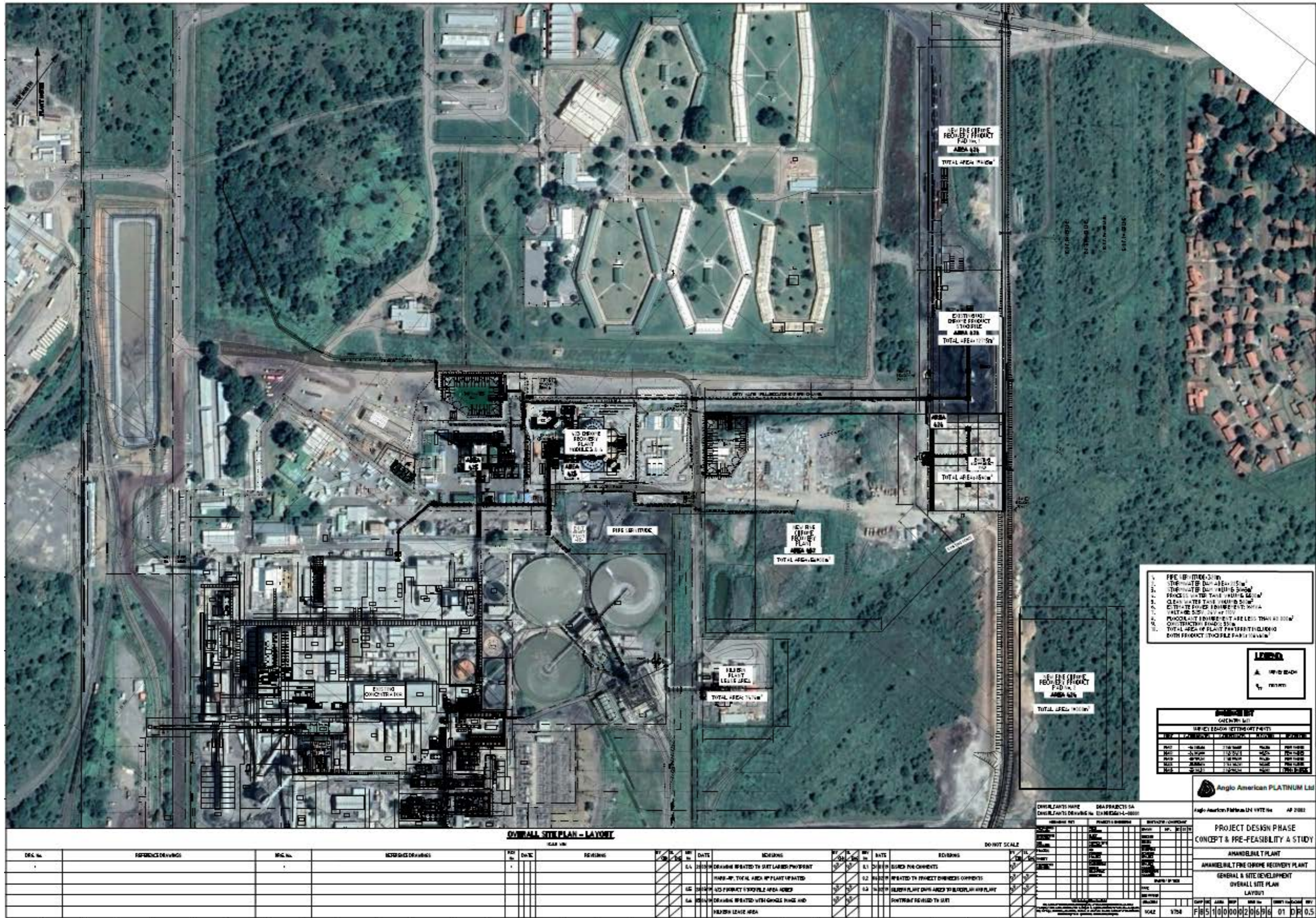


Figure 4-3: The Fine Chrome Recovery Plant Conceptual layout



## 5 Policy and legislative context

This section provides an overview of the policy and legislative context within which the projects is proposed (Table 5-1). It identifies legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and need to be considered in the assessment process, which may be applicable or have relevance to the proposed project.

**Table 5-1: Policy and Legislative Context**

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<b>South African Legal Framework</b>		
<p><u>Constitution of the Republic of South Africa, (Act No. 108 of 1996)</u>            The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act 108 of 1996) makes provisions for environmental issues and declares that:            “Everyone has the right –            (a) to an environment that is not harmful to their health or well-being; and            (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:                (i) prevent pollution and ecological degradation;                (ii) promote conservation; and                (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”            Therefore, the EIA process being conducted fulfils the requirements of the Bill of Rights.</p>	Throughout the Scoping and EIA process.	<p>The Constitution of South Africa is the overarching framework legalisation driving the NEMA principles and therefore EIA process.</p> <p>The right to a safe environment and the right to information are addressed in the EIA process through stakeholder engagement, where available information pertaining to the environment and proposed activities are disclosed.</p>
<p><u>The National Environmental Management Act, (Act No. 107 of 1998) (NEMA) as amended</u>            The National Environmental Management Act (Act 107 of 1998 (NEMA) with the Regulations of 4 December 2014 (R982, R983, R984 and R985) and amended in April 2017 (R324, R325, R326 and R327) being applicable. NEMA is the key national legislation underpinning environmental authorisations in South Africa.            Listed Activities are activities identified in terms of Section 24(5) and 44 of the NEMA which are likely to have a detrimental impact on the environment, and</p>	<p>Throughout the Scoping report.            Section 4 of this report details the proposed project developments and associated listed activities triggered.            Table 4-1 details the listed activities to be authorised</p>	<p>The S&amp;EIA Process is based on the principles of the NEMA and the EIA Regulations.            Chapter 4 of the EIA Regulations as detailed in GNR982 guides the process for application for environmental authorisation.            This Scoping Report is compiled according to the requirements and as set out in R. 982, Section 21 and Appendix 2.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p>which may not commence without Environmental Authorisation (EA) from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&amp;EIA) with applicable timeframes associated with each process. The Regulations contains three listings, each requiring a different type of environmental authorisation process.</p> <ul style="list-style-type: none"> <li>• Listing 1: Activities requiring a Basic Assessment process (approximately 197 days);</li> <li>• Listing 2: Activities requiring a Scoping and Impact Assessment (S&amp;IA) process (approximately 300 days); and</li> <li>• Listing 3: Activities within certain geographic areas requiring a Basic Assessment process (approximately 197 days).</li> </ul> <p>The Department of Mineral Resources (DMR) is the competent authority for mining-related applications in terms of NEMA.</p>	according to NEMA.	Numerous listed activities as per Listing Notices 1, 2 and 3 were identified to be relevant to this proposed project.
<b>Specific Environmental Management Acts (SEMAs)</b>		
<p><u>Environment Conservation Act, (Act No. 73 of 1989) (ECA)</u></p> <p>The Environment Conservation Act (Act 73 of 1989 – ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations (GNR 154 of 1992) promulgated under this section are still in effect. These Regulations serve to control noise and general prohibitions relating to noise impact and nuisance.</p>	Throughout the Scoping report. Specialist studies	<p>Requires the landowner to manage:</p> <ul style="list-style-type: none"> <li>• Agricultural resources i.e. the removal of invasive species,</li> <li>• Protection of soils against water and wind erosion; and</li> <li>• Management of water resources.</li> </ul> <p>An alien invasive species plan, and land use and soil management plan will developed and will form part of the EIA/EMPr.</p>
<p><u>The National Water Act, (Act No. 36 of 1998) (NWA)</u></p> <p>The National Water Act (Act No 36 of 1998) (NWA) recognises that water is a scarce and unevenly distributed national resource, which must managed encompassing all aspects of water resources.</p> <p>The NWA, MPRDA and NEMA primarily regulate water management at mines in terms of listed activities. Section 21 of the NWA lists 11 water uses that requires authorisation, either as a Water Use Licence Application (WULA) (approximately 300 days) or a General Authorisation (approximately 30 day review period).</p>	Throughout the Scoping and EIA process, including the WULA – pertaining to all water related aspects.	<p>Application for a water use licence (WUL) will be submitted to DWS for the Section 21 activities that are triggered.</p> <p>GN 704 will be assessed as part of the water use licence application process and if needed applications for exemptions will be submitted.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p>In terms of Chapter 4 of the NWA, activities and processes associated with any water use are required to be licensed by the Department of Water and Sanitation (DWS).</p> <p>Other applicable Government Notice Regulations:</p> <p><b>Government Notice Regulation 704 of 4 June 1999</b></p> <p>Regulations on use of water for mining and related activities aimed at the protection of water resources.</p>		
<p><u>The World Heritage Convention Act, (Act No. 49 of 1999) (WHCA)</u></p> <p>South Africa became a signatory to and ratified the <i>World Heritage Convention</i>, 1972 (WHC) in 1997. It thereby voluntarily agreed to identify and conserve world heritage areas of universal value for the benefit of mankind. South Africa currently has eight world heritage sites (WHS) in its territory. Governance of these sites is regulated in terms of an extensive legal framework, mainly consisting of environmental and incidental laws. The primary act is the World Heritage Convention Act (WHCA) which incorporated the WHC into South African law. It provides for the recognition, establishment and management of WHS in South Africa.</p>	<p>Throughout the Scoping report.</p> <p>Heritage Assessment</p> <p>Baseline description Section</p>	<p>Baseline Permits may be required for the destruction or removal of any heritage resources affected by the development; this will include all buildings and graves that will be impacted by this project.</p>
<p><u>National Environmental Management: Protected Areas Act, (Act No. 57 of 2003) (NEM:PAA)</u></p> <p>The National Environmental Management: Protected Areas Act, No 57 of 2003 (NEM:PAA) is a complimentary act to NEMA. NEMPAA aims to provide for the protection and conservation of ecologically viable areas that are representative of South Africa's biological diversity. This objective is accomplished through the declaration and management and protected these identified areas (section 2).</p>	<p>Throughout the scoping report.</p> <p>Biodiversity Assessment</p> <p>Baseline description Section</p>	<p>The specialist biodiversity study takes into consideration NEMPAA, NEM:BA and NFA.</p> <p>The proposed project footprint area was screened by the specialist, and the information was taken into consideration in the preliminary layout of the infrastructure areas in order to avoid sensitive areas. Detailed specialist assessments are currently underway for the proposed development, which will determine the presence of protected species. Should protected plant species be present on the proposed development footprint area, permits will be obtained for their removal, relocation or destruction.</p>
<p><u>The National Environmental Management: Biodiversity Act, (Act No.10 of 2004) (NEM:BA)</u></p> <p>The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable</p>	<p>Throughout the scoping report.</p> <p>Biodiversity Assessment</p> <p>Baseline description Section</p>	<p>The specialist biodiversity study takes into consideration NEMPAA, NEM:BA and NFA.</p> <p>The proposed project footprint area was screened by the specialist, and the information was taken into consideration in the preliminary layout of the infrastructure areas in order to avoid sensitive areas.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p>use of indigenous biological resources.</p> <p>NEM:BA GN 1002 of 9 Dec 2011 contains a National List of Ecosystems that are threatened and in need of protection and requires environmental authorisation.</p> <p>Regulation 151 published on 23 February 2007</p> <p>Publication of critically endangered, vulnerable and protected species: No person may carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit.</p>		<p>Detailed specialist assessments are currently underway for the proposed development, which will determine the presence of protected species. Should protected plant species be present on the proposed development footprint area, permits will be obtained for their removal, relocation or destruction.</p>
<p><b><u>The National Environmental Management: Air Quality Act, (Act No. 39 of 2004) (NEM:AQA)</u></b></p> <p>The National Environmental Management Air Quality Act (NEM:AQA) came into effect in April 2010 and is applied in accordance with the principals stipulated in NEMA. The Act outlines norms and standards with regards to air quality management planning, monitoring, compliance and management measures in order to protect and enhance the quality of air and reduce risks to human health. NEM:AQA also promotes sustainable development.</p> <p><b>The Greenhouse Gas Reporting Regulations, 2017 (GN R275 in Government Gazette No. 40762, dated 3 April 2017)</b></p> <p>The purpose of the GHG reporting Regulations is to introduce a single national reporting system for the transparent reporting of greenhouse gas emissions. The information generated through these regulations will be used to update and maintain a National Greenhouse Gas Inventory, to fulfil the reporting obligations under the United Framework Convention on Climate Change (UNFCCC) and instrument treaties to which it is bound, as well as to inform the formulation and implementation of legislation and policy.</p> <p><b>Notice Declaring Greenhouse Gases as Priority Air Pollutants, 2017 (GN R710 in Government Gazette No. 40996, dated 21 July 2017)</b></p> <p>These regulations declared the following greenhouse gases as priority air pollutants: (a) Carbon dioxide (CO<sub>2</sub>); (b) Methane (CH<sub>4</sub>); (c) Nitrous oxide (N<sub>2</sub>O); (d) Hydrofluorocarbons (HFCs); (e) Perfluorocarbons (PFCs); and (~ Sulphur hexafluoride (SF<sub>6</sub>)).</p> <p><b>Pollution Prevention Plan Regulations, 2017 (GN R712 in Government Gazette No. 40996, dated 21 July 2017)</b></p> <p>The purpose of these Regulations is to prescribe the requirements that pollution prevention plans of greenhouse gases declared as priority air</p>	<p>Specialist studies, Baseline description</p>	<p>Specialist study to be conducted.</p>

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<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
pollutants need to comply with in terms of section 29(3) of the Act.		
<p><u>The National Environmental Management: Waste Act, (Act No. 59 of 2008) (NEM:WA)</u></p> <p>The National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA) Regulations lists waste related activities that require environmental authorisation.</p> <p>The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) commenced on 1 July 2009. In terms of this Act, all listed waste management activities must be licensed and in terms of Section 44 of the Act, the licensing procedure must be integrated with the environmental impact assessment process. Government Notice 921, which commenced on 29 November 2013, lists the waste management activities that require licensing in terms of the NEM:WA. NEM:WA has as three categories of activities that require environmental authorisation.</p> <ul style="list-style-type: none"> <li>• Category A: activity requiring a Basic Assessment process;</li> <li>• Category B: Activities requiring a S&amp;IA process; and</li> <li>• Category C: Activities that do not require an environmental authorisation process, but need adhere to the required Norms and Standards.</li> </ul> <p>The Department of Mineral Resources (DMR) is the competent authority for mining-related applications in terms of NEM:WA.</p>	Not applicable	Not applicable to this project
<p><u>National Norms and Standards for the Storage of Waste, 2013</u></p> <p>The development of the norms and standards is the foundation of the regulatory system established in terms of section 7 (1)(c) of the NEM:WA. The Waste Act allows for an integrated system of norms and standards across the three spheres of government. Certain norms and standards at a national level are mandatory, while others are discretionary. In addition provinces may set norms and standards that are not in conflict with national norms and standards. Municipalities may also set local waste service standards.</p>	Section 4 of this report details the proposed project developments and associated listed activities triggered.	The national norms and standards for storage of waste will be considered by the project applicant.
<p><u>The National Environmental Management: Integrated Coastal Management Act, (Act No. 204 of 2008) (NEM:ICMA)</u></p> <p>The ICM Act sets out a new approach to managing the nation's coastal resources to promote social equity and make best economic use of coastal resources, whilst protecting the natural environment. It is a legal instrument dedicated to managing our coastline in an integrated fashion and ensuring the</p>	Not applicable	Not applicable to this project.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<p><i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i></p>		<p><i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i></p>
<p>sustainable use of the coast's natural resources. The Act offers an approach to managing the activities of people in the coastal zone. The Act is based on a national vision for the coast, which includes the socially justified sharing of benefits derived from a resource-rich coastal areas without compromising the ability of future generations to access those benefits.</p>		
<p><b>Other applicable national legislation</b></p>		
<p><u>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)</u></p> <p>The MPRDA makes provision for equitable access to and sustainable development of South Africa's mineral resources. The MPRDA requires that the environmental management principles set out in NEMA shall apply to all mining operations and serves as a guideline for the interpretation, administration and implementation of the environmental requirements of NEMA.</p> <p>The MPRDA requires that a reconnaissance permission, prospecting right, Mining Right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right, production right, prospecting work programme; exploration work programme, production work programme, mining work programme, environmental management programme, or an environmental authorization issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralized bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister.</p> <p>Previously, environmental authorisations for mining related projects were regulated under the MPRDA. In 2014, the Department of Environmental Affairs (DEA) identified the need for the alignment of environmental authorisations and proposed a single environmental system where all projects requiring environmental authorisations are regulated under the same law: The National Environmental Management Act (NEMA). For mining related projects, the competent authority is still the Department of Mineral Resources (DMR).</p> <p>In addition, Section 102 of the MPRDA -Amendment of rights, permits, programmes and plans requires that a mining right, mining work programme, environmental management programme, and environmental management plan may not be amended or varied without the written consent of the Minister.</p>	<p>Throughout the Scoping report.</p>	<p>The proposed project will require authorisation in terms of a Section 102 amendment process. RPM will undertake the Section 102 process, which will include an updated the Mining Works Programme, Social and Labour Plan.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p><u>The National Heritage Resources Act, (Act No. 25 of 1999) (NHRA)</u></p> <p>The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations.</p> <p>The Act requires all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 ha. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities.</p> <p>The South African Heritage Resources Agency (SAHRA) will need to approve heritage assessments undertaken as part of any impact assessment process.</p>	Heritage Assessment Baseline description Section	The proposed project footprint area was screened by the specialist, and the information was taken into consideration in the preliminary layout of the infrastructure areas in order to avoid sensitive areas. Detailed specialist assessments are currently underway for the proposed development, which will determine the presence of sites which will require thee need for permits to be applied for to the South African Heritage Resources Agency (SAHRA).
<p><u>The Sub-Division of Agricultural Land Act, (Act No. 70 of 1970)</u></p> <p>In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted.</p>	Specialist studies	
<p><u>Hazardous Substances Act, (Act No. 15 of 1973)</u></p> <p>Hazardous Substances Act is probably the most important chemical regulation in South Africa. It controls the production, import, use, handling and disposal of hazardous substances. Under the Act, <b>hazardous substances</b> are defined as substances that are toxic, corrosive, irritant, strongly sensitising, flammable and pressure generating under certain circumstances and may injure, cause ill-health or even death in humans.</p> <p>Hazardous substances are classified into 4 groups (see below). Anyone who intends to sell or distribute group I hazardous substances must apply for a license from health authority first (Department of Health).</p> <ul style="list-style-type: none"> <li>• Group I: industrial chemicals (<b>IA</b>) and pesticides (<b>IB</b>);</li> <li>• Group II: 9 classes of <b>wastes</b> excluding Class 1: explosives and class 7: radioactive substances;</li> <li>• Group III: electronic products and group; and</li> </ul> <p>Group IV: radioactive substances.</p>	Throughout the authorisation process. Section 4 of this report details the proposed project developments and associated listed activities triggered. Table 4-1 details the listed activities to be authorised	Authorisation for dangerous good storage will be required.
<p><u>National Forestry Act, (Act No. 84 of 1998) (NFA)</u></p> <p>The NFA protects against the cutting, disturbance, damage, destruction or removal of protected trees. During the specialist investigation phase, it will be</p>	Throughout the authorisation process. Biodiversity Assessment	The specialist biodiversity study takes into consideration NEMPAA, NEM:BA and NFA. The proposed project footprint area was screened by

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<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
determined if a permit from the Department of Agriculture, Forestry and Fisheries (DAFF) which authorises the removal and transplantation of trees will be required.	Baseline description Section	the specialist, and the information was taken into consideration in the preliminary layout of the infrastructure areas in order to avoid sensitive areas. Detailed specialist assessments are currently underway for the proposed development, which will determine the presence of protected species. Should protected plant species be present on the proposed development footprint area, permits will be obtained for their removal, relocation or destruction.
<u>National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNRA)</u> The NNRA provides for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices.	Not applicable	Not applicable to this development
<u>Spatial Planning and Land Use Management Act, (Act No. 16 of 2013) (SPLUMA)</u> The Spatial Planning and Land Use Management Act (Act 16 of 2013) (SPLUMA) was promulgated in May 2015. SPLUMA is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency and uniformity in procedures and decision-making in this field. SPLUMA will also assist municipalities to address historical spatial imbalances and the integration of the principles of sustainable development into land use and planning regulatory tools and legislative instruments.	Throughout the authorisation process.	The need for SPLUMA authorisation will be determined during the EIA/EMPr process.
<u>The Promotion of Administrative Justice Act, (Act No. 3 of 2000) (PAJA)</u> This Act gives effect to the Constitutional right to administrative action that is lawful, reasonable and procedurally fair. It also gives effect to the right to written reasons for administrative action as contemplated in section 33 of the Constitution. The Act aims to promote an efficient administration and good governance and to create a culture of accountability, openness and transparency in the public administration or in the exercise of a public power or the performance of a public function by giving effect to the right to just administrative action. In terms of the Act, administrative action which materially and adversely affects the rights or legitimate expectations of any person must be procedurally fair. "Administrative action" as defined in section 1 of PAJA means any decision taken, or any failure to take a decision, by-	Throughout the authorisation process.	The stakeholder engagement process will be undertaken in line with the NEMA requirements, throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.



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<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p>(a) an organ of state, when:</p> <ul style="list-style-type: none"> <li>(i) exercising a power in terms of the Constitution or a provincial constitution; or</li> <li>(ii) exercising a public power or performing a public function in terms of any legislation; or</li> </ul> <p>(b) a natural or juristic person, other than an organ of state, when exercising a public power or performing a public function in terms of an empowering provision, which adversely affects the rights of any person and which has a direct, external legal effect, excluding certain classes of executive, legislative and quasi-judicial functions set out in the Act.</p>		
<p><u>The Promotion of Access to Information Act, (Act No. 2 of 2000) (PAIA)</u></p> <p>This Act gives effect to Section 32 of the Constitution by providing mechanisms to ensure access to certain information held by a public body as well as to information held by private bodies (in the latter case, as long as this information is required in order to exercise or protect any rights). The Act allows for access to records, regardless of when such records came into existence. The Act specifically retains Sections 31 (1) and (2) of NEMA which also deal with access to information from a public or private body. While the Act confers specific rights of access to information, I&amp;APs should not forego the normal public participation process and only try to obtain information through the PAIA provisions. As registered I&amp;APs, they have specific rights (and responsibilities) in terms of being afforded an opportunity to "access" all the information to provide comments and to be informed of the outcome.</p>	Throughout the authorisation process.	The stakeholder engagement process will be undertaken in line with the NEMA requirements, throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.
<b>Sub-ordinate legislation</b>		
<p><u>Noise Control Regulations</u></p> <p>In terms of section 25 of the ECA, the national Noise Control Regulations (NCR) (GN R154 in Government Gazette No. 13717, dated 10 January 1992) were promulgated. The NCRs were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. These noise control regulations will need to be considered in relation to the potential noise that may be generated mainly during the construction and decommissioning phases of the proposed project. The two key aspects of the noise control regulations relate to: disturbing noise; and noise nuisance. The South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction</p>	Noise Specialist Study	A noise specialist study is currently underway.

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<p><i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i></p>		<p><i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i></p>
with these regulations.		
<p><b>Noise Standards</b> There are a few South African Scientific Standards (SABS) relevant to noise from mines, industry and roads. They are:</p> <ul style="list-style-type: none"> <li>• South African National Standard (SANS) 10103:2008. The measurement and rating of environmental noise with respect to annoyance and to speech communication;</li> <li>• SANS 10210:2004. Calculating and predicting road traffic noise;</li> <li>• SANS 10328:2008. Methods for environmental noise impact assessments;</li> <li>• SANS 10357:2004. The calculation of sound propagation by the Concave method;</li> <li>• SANS 10181:2003. The Measurement of Noise Emitted by Road Vehicles when Stationary; and</li> <li>• SANS 10205:2003. 'The Measurement of Noise Emitted by Motor Vehicles in Motion'.</li> </ul> <p>The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se.</p>	Throughout application phase.	The project development will take cognisance of the related noise legislation, standards and by laws.
<b>Applicable guidelines</b>		
<p><b>Integrated Environmental Management Information Guidelines series:</b> This series of guidelines was published by the Department of Environmental Affairs (DEA), and refers to various environmental aspects. Applicable guidelines in the series include:</p> <ul style="list-style-type: none"> <li>• Guidelines 5: Companion to NEMA EIA Regulations of 2010;</li> <li>• Guideline 7: Public Participation; and</li> <li>• Guideline 9: Need and Desirability.</li> </ul> <p>Additional guidelines published in terms of the NEMA EIA Regulations (2006),</p>	Throughout the authorisation process.	The NEMA guidelines are considered throughout the environmental authorisation process.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
<p>in particular:</p> <ul style="list-style-type: none"> <li>• Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006;</li> <li>• Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006; and</li> </ul> <p>Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006.</p>		
<p><u>Best Practice Guideline (BPG) series:</u> The BPG series is a series of publications by the then Department of Water Affairs and Forestry (now DWS – Department of Water and Sanitation) providing best practice principles and guidelines relevant to certain aspects of water management.</p>	Surface water and groundwater specialist studies	The water related specialist studies considers the DWS best practice guidelines.
<b>Provincial and local government legislation</b>		
<p><u>The Municipal Structures Act, (Act No. 117 of 1998)</u> In terms of local government legislation, the Municipal Structures Act No. 117 of 1998, assigns responsibility for scheduled functions between the tiers of local government. Section 84 of this Act specifies those functions and powers which are vested specifically with District Municipalities (and are thus excluded from the functions and powers of local municipalities). In terms of the 'environmental cluster' of functions, this has the following implication: District municipalities (Category C) are responsible for solid waste disposal sites, in so far as it relates to-</p> <ul style="list-style-type: none"> <li>• the determination of a waste disposal strategy;</li> <li>• the regulation of waste disposal;</li> <li>• the establishment, operation and control of waste disposal sites, bulk waste transfer facilities and waste disposal facilities for more than one local municipality</li> </ul> <p>Local municipalities (Category B) are responsible for all environmental functions not assigned to districts. Metropolitan municipalities are assigned all environmental functions.</p>	Throughout the authorisation and the stakeholder engagement process	The stakeholder engagement process will be undertaken in line with the NEMA requirements, throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.
<p><u>Municipal Integrated Development Plan (IDP):</u> Section 25 of the Municipal System Act (MSA) (Act No. 32 of 2000) requires</p>	Throughout the authorisation and the stakeholder	The stakeholder engagement process will be undertaken in line with the NEMA requirements,

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
<i>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process).</i>		<i>(e.g in terms of the National Water Act, a Water Use License has/has not been applied for)</i>
that every elected Council must develop and adopt a strategic plan, commonly known as Integrated Development Plan (IDP) to guide & inform the municipality's planning, development and budgeting. This Act also requires that the approved IDP be reviewed annually based on its performance & other changing circumstances deemed relevant and necessary by the municipal council. Integrated development planning is a process through which a municipality prepare an inclusive strategic development plan for a period of five years. The need for the integrated development plans is entrenched in the South African Constitution (section 152 and 153). The Constitution states that local government is in charge of the development process in municipalities and it is in charge of municipal planning. Furthermore, the MSA provides that all municipalities have to undertake an integrated development planning process to produce integrated development plans. As the Integrated Development Plan is a legal requirement it has a legal status and thus supersedes all plans that guide development at a local government level.	engagement process	throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.
<p><u>Municipal Environmental Management Framework (EMF):</u></p> <p>An EMF can be described as a set of information that can be used by decision-makers to assist in determining the best approaches (procedural and/or technical) to dealing with a variety of environmental challenges. EMFs can assist in mapping the ecological integrity of an area by considering impacts of invasive developments and harmonizing conflicting land use imperatives, identifying different interests, and understanding how the costs and benefits of conservation are distributed. EMFs are therefore a testament to and the embodiment of IEM, focusing on strategic and pre-emptive measures that guide stakeholders and raise awareness in biodiversity conservation. An Environmental Management Framework (EMF) aims to ensure that environmental limits to development are included in spatial planning documents. The purpose of the EMF is to function as a support mechanism in the environmental impact assessment process in the evaluation and review of development applications, as well as informing decision making regarding land use planning applications.</p>	Throughout the authorisation and the stakeholder engagement process	The stakeholder engagement process will be undertaken in line with the NEMA requirements, throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.
<p><u>Municipal By Laws:</u></p> <p>There may be relevant by-laws that apply or monitoring requirements that the local authority may wish to perform. These will have to be approached directly.</p>	Throughout the authorisation and the stakeholder engagement process	The stakeholder engagement process will be undertaken in line with the NEMA requirements, throughout the authorisation process to keep registered stakeholders notified of the process and any decisions taken by the Competent Authorities.

## 5.1 Anglo American policies and guidelines

The Anglo American plc Executive Committee has endorsed and committed to the implementation of an internal document known as the Anglo American Environment Way, which is governing framework for the management of environmental impacts for all Environmental projects. The Board seeks assurance of compliance with the Anglo American Environment Way standards through regular self-assessments, peer review and third party audits.

The Anglo American Safety, Health and Environmental (SHE) Policy describes Anglo's environmental vision, which is to minimise harm to the environment by designing, operating and closing all of their operations in an environmentally responsible manner.

Underpinning this vision are four core principles:

- Zero mindset: Anglo American shall apply the mitigation hierarchy of avoiding, minimising and mitigating environmental impacts arising from our activities, products and services;
- No repeats: all necessary steps will be taken to learn from environmental impacts, incidents, audit findings and other non-conformances, to prevent their recurrence;
- Non-negotiable standards and rules: common, non-negotiable;
- Environmental Performance Standards and Procedures shall be applied throughout the Group as a minimum requirement; and
- The Anglo American policies will guide and inform the study phase inputs.

### 5.1.1 Anglo American Platinum strategy and values

Anglo Platinum's strategy is to create maximum value through understanding and developing the market for PGMs, grow the Company to expand into those opportunities and to conduct its business cost effectively and competently. Anglo American Platinum has the following six company values:

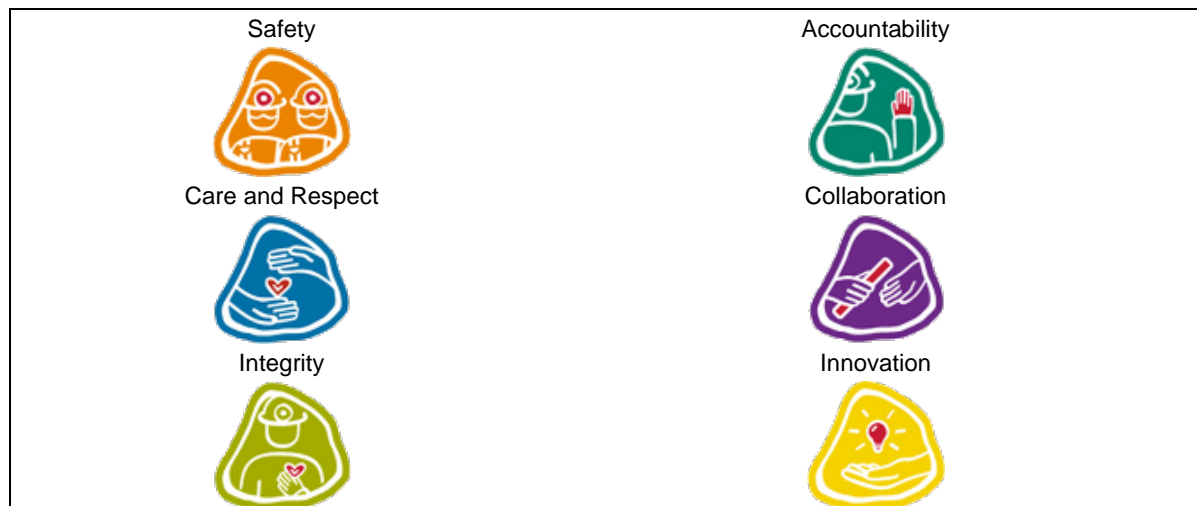


Figure 5-1: Anglo American Platinum Company Values

### 5.1.2 Anglo American Platinum environmental policy

Amandelbult is committed to the implementation of the Anglo American Platinum policy towards environmental management, with specific focus on water related issues. The policy states that: "Anglo American Platinum Corporation Limited, as the world's leading primary producer of platinum group metals, commits itself to the creation of a safe and healthy environment for all our employees and the citizens of the communities with which we interact".

In order to give practical expression to their commitments and to measure their progress, Anglo American Platinum has the following aims with regard to the environment:

- Conserve environmental resources;
- Prevent or minimise adverse impacts arising from our operations;
- Demonstrate active stewardship of land and biodiversity;
- Promote good relationships with, and enhance capacities of, the local communities of which we are a part; and
- Respect people's culture and heritage.



Figure 5-2: Anglo American Platinum Strategic Priorities

### 5.1.3 Amandelbult SHE policies

Each business unit has its own Safety, Health and Environmental (SHE) Policy. Key policy commitments include the following:

“Management of every operation is responsible to provide effective leadership in environmental issues whilst recognising that environmental management is the responsibility of all who work for us”.

Managers of operations are responsible for the full implementation of the Anglo American Platinum Environmental Management Framework and participation in the Anglo American Platinum Peer Review Program. This requires the following:

- The allocation of appropriate resources and the provision of training, education, consultation and auditing to ensure compliance;
- The development, implementation and maintenance of environmental policies, objectives, targets, programs and procedures;
- Effective environmental impact identification, assessment and control, designed to achieve proactive management of our activities, products and services; and
- We shall conserve and protect environmental resources through, amongst others, the efficient use of energy and water, minimising waste and preventing pollution.

We shall demonstrate active stewardship of land, water systems and biodiversity with which we interact. We respect people's culture and heritage. We shall comply with environmental legislation and other requirements to which we subscribe, and develop a culture of continual improvement.”

## 6 Need and desirability of the proposed activities

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

### 6.1 Mining benefits

The FCR initiative forms part of the “Making Amandelbult Investable Again” programme and the Amandelbult journey towards “P101”.

An initiative was identified in which an increased recovery of chromite can be realised at Amandelbult through the beneficiation of fine chrome from the Concentrator tailings. More specifically, the aim of the proposed FCR Plant is to beneficiate the fine chromite (-100 µm) which is not recovered by the existing Chrome Recovery Plant. It is envisaged that the additional recovery of metallurgical and/or chemical grade chromite will result in an increased yield of chromite for Amandelbult, as well as reduced water losses associated with the existing approved tailings dams.

### 6.2 Environmental responsibility

Extensive use will be made of existing infrastructure and facilities at the Amandelbult Concentrator Complex. This allows the surface footprint of the proposed project to be small, as it will only require supplementary infrastructure.

The existing Concentrator and existing Chrome Recovery Plant will be used for processing as per the approved EIA/EMPr and authorisations. The Concentrator Complex tailings will then be pumped to the new FCR Plant where the fine chromite will be extracted before the tailings is routed to the existing Tailings Handling Facility and Tailings Dams of the Amandelbult Concentrator Complex.

The tailings from the FCR Plant will be disposed of at the existing and approved Amandelbult Tailings Storage Facility. Since more chromite will be recovered through the FCR process, the final tailings volumes will be reduced (with reduced associated water losses). The additional beneficiation of fine chromite will therefore prolong the Tailings Storage Facility’s operational life.

### 6.3 Socio-economic benefits

The aim of the FCR Plant will be to increase the Amandelbult Concentrator Complex chrome recovery which will ultimately lead to more sustainable production.

As part of the MPRDA Section 102 process that Anglo American Platinum will undertake, the Social and Labour Plan will be updated, which will continue to improve the livelihoods of surrounding communities impacted on by the mining operations.

### 6.4 No-go option

Anglo American Platinum are busy with capital intensive expansion projects such as Middellaagte, which will take a number of years to develop and implement. The proposed FCR Plant will assist in improving the profitability of the Amandelbult Complex.

The socio-economic impacts of cessation or curtailing of operations at the Amandelbult complex include local, regional and more than likely national impacts:

Local and regional: planned socio-economic initiatives within the surrounding communities would not be able to go ahead and employees and contractors’ workers would be impacted; more than half of whom are semi-skilled/unskilled and thus would not easily find alternative employment; and

National: Reduction in foreign exchange for South Africa will be incurred due to the decrease in mine product sales internationally.

The cessation or curtailing of the Amandelbult operations will also mean that ore reserves would remain underutilised, in addition to the employment and local economic opportunities and revenue that would be lost.

## **7 Motivation for the preferred development footprint**

*(Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site. NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.)*

### **7.1 Process followed to reach proposed development footprint**

The location of the proposed project is constrained to the location of the existing Concentrator and Chrome Recovery Plant. As such, no property alternatives were viable to be considered for this project.

### **7.2 Consideration of alternative to the initially proposed site layout**

The location of the proposed project is constrained to the location of the existing Concentrator and Chrome Recovery Plant. As such, no property alternatives were viable to be considered for this project.



## 8 Details of all alternatives considered

*With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:*

- (a) The property on which or location where it is proposed to undertake the activity;*
- (b) The type of activity to be undertaken;*
- (c) The design or layout of the activity;*
- (d) The technology to be used in the activity;*
- (e) The operational aspects of the activity;*
- (f) The option of not implementing the activity.*

### 8.1 Property alternatives

The location of the proposed project is constrained to the location of the mineral resource, and proven reserve, as well as the location of the existing Concentrator and Chrome Plant. As such, no property alternatives were deemed viable for consideration by the project.

### 8.2 Type of activity to be undertaken

The project activity type is constrained to the development and construction of a FCR Plant, which is a secondary processing activity of tailings received from the existing concentrator, and as such, no other activity is considered.

Refer to technology alternatives below for how the proposed FCR Plant will be operated.

### 8.3 The design or layout of the activity

The following aspects were taken into consideration for the design of the layout of the project:

- Placing the FCR Plant in close proximity of the existing Chrome Recovery Plant and Concentrator boundary in order to keep the project related footprint close to already disturbed area;
- Minimising the overall footprint;
- Regulation GN 704, which indicates that mining activities should take place outside the 1:100 year floodline or 100 m from a watercourse, whichever is the greatest; and
- Separation of clean and dirty water around the site, as well as directing all dirty water runoff from surface infrastructure areas to a pollution control dam.

### 8.4 Technology alternatives

The beneficiation of fine chromite is expected to be based on gravity separation and/or magnetic separation technologies. A preliminary high-level technical assessment undertaken by the project applicant suggests that fine chromite recovery could possibly be achieved with beneficiation technologies such as Reflux Classifiers and/or bespoke “fine particle” Spirals. Over and above Reflux Classifiers and Spirals, a host of other gravity separation and magnetic separation technologies are also being considered. Examples include:

- WHIMS (Wet High-Intensity Magnetic Separator);
- REDS/RERS (Rare Earth Drums/Roll Separator);
- SLon Wet Magnetic Separator;
- Multi-Gravity Separator / Centrifuge;
- Up-Current Classifier;
- Knelson Concentrator;
- Falcon Concentrator; and

- Shaking Table, etc.

The gravity separation and magnetic separation technology alternatives are currently being determined.

## 8.5 The operational aspects of the activity

### 8.5.1 Use of existing infrastructure and services

By locating the proposed FCR Plant and its associated infrastructure adjacent to the existing Chrome Plant and Concentrator, it will be possible to limit the need for the development of new infrastructure, and the existing services can be further utilised. The tailings from the FCR Plant will be disposed of at the existing and approved Amandelbult Tailings Storage Facility. Since more chromite will be recovered through the FCR process, the final tailings volumes will be reduced (with reduced associated water losses). The additional beneficiation of fine chromite will therefore prolong the Tailings Storage Facility's operational life.

### 8.5.2 Product transportation

The operational aspects of the activity involve transporting product from the FCR Plant to the market by utilising the railway line and/or conveyor, or by using trucks. During the operational phase of the project one or a combination of the following options will be implemented:

- Option 1: Trucking;
- Option 2: Conveyors; and
- Option 3: Railway.

## 8.6 Option of not implementing the activity

An initiative was identified in which an increased recovery of chromite can be realised at Amandelbult through the beneficiation of fine chromite (-100 µm) in the Concentrator tailings, since the recovery of fine chromite is currently between 0% and 35% with the existing spiral technology Chrome Recovery Plants.

In addition to forming part of the "Making Amandelbult Investable Again" programme, the FCR initiative also aligns with the AA and AAP strategy of innovation and the journey towards "P101". It is envisaged that the additional recovery of metallurgical and/or chemical grade chromite will result in an increased yield with resultant revenue increase, which will improve the profitability of Amandelbult Complex. Furthermore, AAP is following a strategy of disciplined capital allocation, with sharp focus on low capital, value accretive and fast payback projects. Should Amandelbult Complex not remain profitable, the complex will be unable to sustain its workforce and maintain its infrastructure.

The socio-economic impacts of cessation or curtailing of operations at the Amandelbult Complex include local, regional and more than likely national impacts:

- Local and regional: planned socio-economic initiatives within the surrounding communities would not be able to go ahead and employees and contractors' workers would be impacted; more than half of whom are semi-skilled/unskilled and thus would not easily find alternative employment; and
- National: Reduction in foreign exchange for South Africa will be incurred due to the decrease in mine product sales internationally.

The cessation or curtailing of the Amandelbult operations will also mean that ore reserves would remain underutilised, in addition to the employment and local economic opportunities and revenue that would be lost.

## 9 Details of the Public Participation Process followed

*(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.)*

### 9.1 Objectives of stakeholder engagement

The objectives of stakeholder engagement for the phases of the application are presented below.

#### 9.1.1 During pre-application and scoping

The objectives of the stakeholder engagement during pre-application and scoping phases is to provide sufficient and accessible information to stakeholders in an objective manner to enable them to raise issues of concern and suggestions for enhanced benefits and to verify that their issues have been recorded. The stakeholders can also provide input into the terms of reference (ToR) for specialist studies, impact assessment and management planning and contribute relevant local and traditional knowledge to the environmental assessment.

Feedback was not received from stakeholders (commenting authorities or interested and affected parties) for inclusion into the Specialist ToR.

#### 9.1.2 During impact assessment

The objectives of the stakeholder engagement during the EIA/EMPr phase is to verify that their issues have been considered in the environmental assessment and to further comment on the findings of the environmental assessment.

#### 9.1.3 During the decision-making phase

Following the outcome of the decision-making process by authorities, registered stakeholders will be informed of the outcome and the process through which the decision can be appealed.

#### 9.1.4 Identification of interested and affected parties

The NEMA EIA Regulations (GN R 982 amended) require identification of and consultation with communities and interested and affected parties (I&APs). In terms of Section 24 0 (2) of NEMA, specific state departments were identified and recognised as commenting authorities on aspects of this EMPr Amendment. Representatives from these departments are included in the stakeholder database.

The term I&AP generically refers to persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. SRK's approach recognises that I&APs are diverse in character and in their project interest. The following criteria were used to identify I&APs:

- **Zone of influence:** physical location relative to the project site and potential impacts. Generally, the closer stakeholders live to a project site, the higher their interest and the potential impacts of the project;
- **Stakeholder values:** the value stakeholders attach to the area that might be affected by the project. This includes aspects such as livelihoods, land use, ownership, heritage and sense of place; and
- **Jurisdiction:** the mandate/influence of institutions over the regulatory process and public opinion.

RPM Ltd has been identified as the landowner on which the proposed FCR plant will be situated.

The initial database comprises of eight stakeholder groups, representing various sectors of society. Refer to Appendix 5-1 for the full database of stakeholders that include:

- Provincial Government: Limpopo Department of Mineral Resources (DMR);
- National Government: such as the Department of Water and Sanitation (DWS);
- Limpopo Department of Economic Development, Environment & Tourism (LDEDET);
- Limpopo Department of Rural and Land Reform (DRDLR);
- Limpopo Department of Agriculture, Limpopo Department of Cooperative Governance, Human Settlement and Traditional Affairs (COGHSTA);
- Internal stakeholders (Anglo American Platinum);
- Internal stakeholders;
- District and local municipalities;
- Municipal ward councillors;
- Department of Labour;
- Regional Land Claims Commissioner;
- Traditional authorities;
- South African Heritage Resource Association (SAHRA);
- Landowners;
- Adjacent Landowners;
- Community Based Organisations; and
- The Leadership Development Forum (LDF).

The stakeholder database will be reviewed and updated after each round of engagement during the EMPr Amendment process. Refer to the box below for more information between I&APs and registered I&APs.

**Box 1. Distinction between I&APs and Registered I&APs**

The NEMA Regulations (GN 982 amended) distinguishes between I&AP's and registered I&APs.

I&AP's, as stated in Section 24(4)(d) of the NEMA include: (a) any person, group of persons or organisation interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.

In terms of the Regulations "**registered interested and affected parties**" means:

**An interested and affected party whose name is recorded in the register opened for that application.**

For that purpose, an EAP managing an application must open and maintain a register, which contains the names, contact details and addresses of:

- (a) All persons who have submitted written comments or attended meetings with the applicant or EAP;
- (b) All persons who have requested the applicant or EAP managing the application, in writing, for their names to be placed on the register; and
- (c) All organs of state, which have jurisdiction in respect of the activity to which the application relates.

Anglo American Platinum Amandelbult Complex launched the LDF in 2015 as part of their ongoing engagement with leadership in the region. This forum is the representative and formal engagement structure between Anglo American Platinum and their stakeholders and comprises the Baphalane Traditional Authority (TA), Bakgatla Ba Kgafela TA, Moses Kotane Local Municipality (MKLM), Thabazimbi Local Municipality (TLM), Mantserre Development Trust/Community and the Dikuno Tsa Sechaba (DTS) Trust. The LDF meets regularly (every quarter) and has a standing agenda as follows:

- Procurement;
- Bursaries;
- Recruitment;
- Current and new SLP; and
- Stakeholder donation requests from the General Manager (GM).

The LDF meeting that took place on 6 December 2018 was considered the best platform to introduce the proposed project. This forum meets on a quarterly basis and will be consulted to give ongoing

feedback to ensure the majority of residents are aware about the proposed project in order to participate fully. This LDF meeting was however disrupted due to legacy issues unrelated to the FCR plant project, and the project team was unable to present the project.

On 28 May 2019, another LDF meeting was held, where the FCR Plant project was discussed. Comments received and client and EAP responses during this meeting is included in Table 9-3.

A register of I&AP in terms of Section 42 of the EIA Regulations (GN R 982 of 2014) was compiled, utilising the existing I&AP database as a starting point. This regulation requires that the register contain full contact details of registered I&APs and be submitted to the competent authority. In order to maintain privacy of I&APs contact details, the register of I&APs in this report will not contain contact details but will be kept on record.

A list of identified I&APs and the register of I&APs is provided in .

## 9.2 Identification of landowners

The identification of landowners in the project area is an important part of the stakeholder engagement process. SRK conducted a deed search to identify landowners adjacent to and in the immediate surroundings of the proposed project areas.

## 9.3 Identification of district and local municipalities

The project area falls within the jurisdiction of the Thabazimbi Local Municipality and Waterberg District Municipality in the Limpopo Province. Details of the relevant municipalities and respective ward councillors are provided in Table 9-1. The details of the relevant municipalities and respective ward councillors will be updated during the environmental authorisation process.

**Table 9-1: District and Local Municipalities**

District Municipality	Local Municipality	Contact Person	Designation
Bojanala Platinum	Madibeng	Jane Mulaud	TBC
Bojanala Platinum	Moses Kotane	Fetsang Mokati-Thebe	Mayor
Bojanala Platinum	Moses Kotane	Pogiso Shikwane	Municipal Manager
Waterberg	Thabazimbi	Patricia Mosito	Mayor
Waterberg	Thabazimbi	TBC	Ward Committee member
Waterberg	Thabazimbi	Mr T.G Ramagaga	Municipal Manager

### 9.3.1 Identification of relevant government departments

The relevant authority applicable to the environmental authorisation process for the proposed project is the DMR and the DWS for which contact details are provided in Table 9-2.

**Table 9-2: Relevant Government Department**

Department	Contact Person	Office Telephone Number
DMR (EMPr Amendment and consolidation) - Polokwane Office	Mr Thivhulawi Kolani	015 287 4700
DMR - Polokwane Office	Mr. Nicholas Chavalala	015 287 4700
DMR-Polokwane Office	Mr. Shadrack Fhedzisani	015 287 4700
DWS-Hartbeespoort Dam Office	Ms. Nametso Kgalibeng	012 207 9911
DWS-Hartbeespoort Dam Office	Ms. Mashudu Mmbadi	012 207 9911
DWS-Hartbeespoort Dam Office	Mr Philip Tjale	012 207 9911

Department	Contact Person	Office Telephone Number
DWS Head Office	Mr Paul Meulenbeld	012 336 7663

## 9.4 Public participation for the environmental authorisation process

### 9.4.1 Pre-application announcement consultation

During the pre-announcement consultation phase, a meeting was held with the DMR on 12 December 2018. A pre-application meeting was held with the DWS on Tuesday, 19 February 2019. Attendance registers and presentations are available in Appendix 5-1.

### 9.4.2 Announcement of project and availability of the scoping report for public comment

The project was announced to identified stakeholders with a background information letter, I&AP registration and comment form (in English and Sepedi). These documents were distributed to registered stakeholders on 18 January 2019. The background letter provided information on the proposed scope of the project, the environmental authorisation process to be followed and how stakeholders can become involved (See Appendix 5-2 for copies of the letter). The letter also announced the availability of the Scoping Report for public comment.

In addition, the following project notification was undertaken:

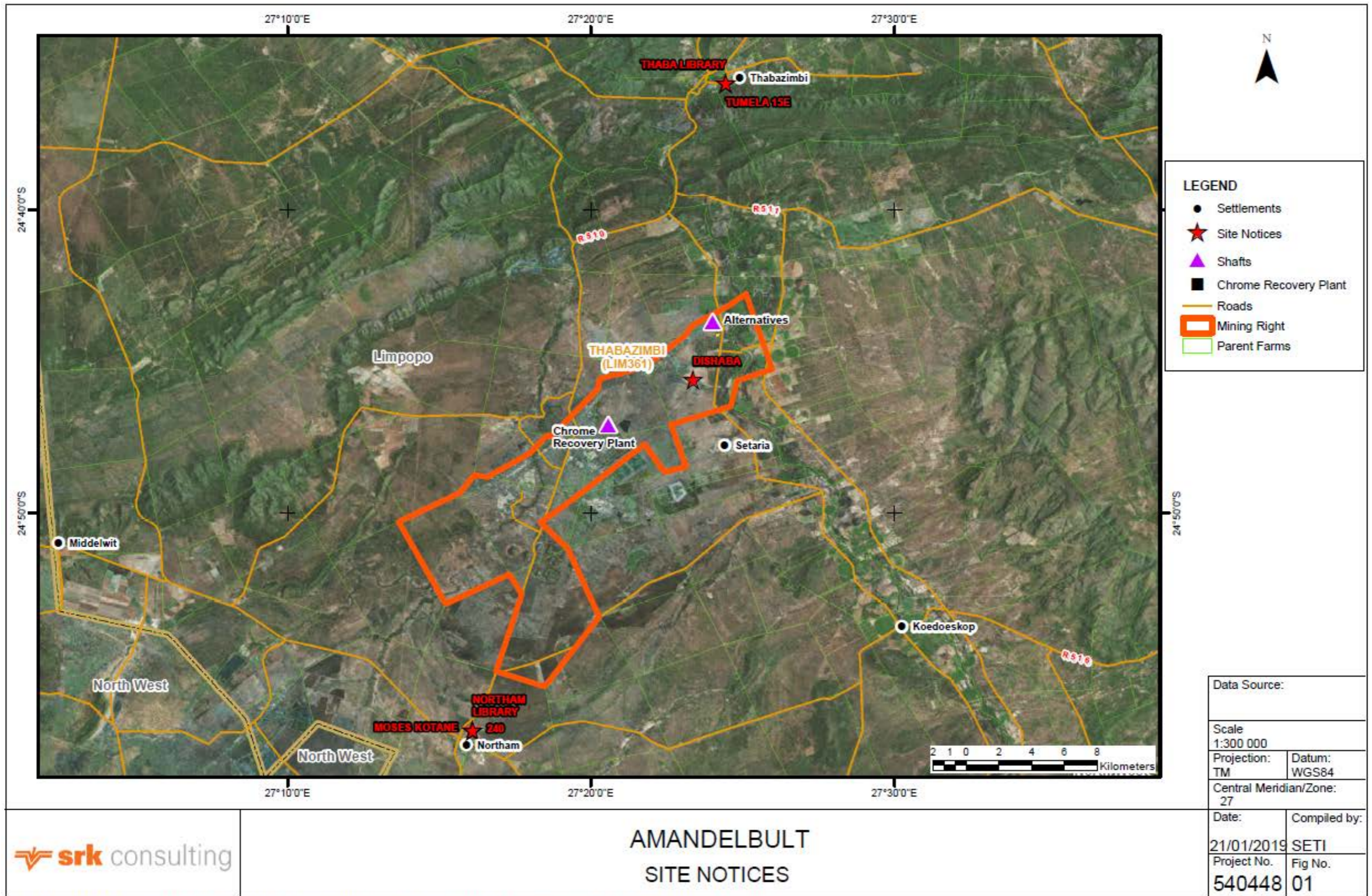
- Advertisements announcing the project, advertising the availability of the Scoping Report for public comment were published in the Platinum on Friday 19 January 2019;
- Site notices were placed at the Amandelbult security offices; and
- SMSs notifying stakeholders of the availability of the Scoping Report were sent out.

The Scoping Report was made available for public comment for a period of 30 days (18 January 2019 – 18 February 2019). The Scoping Report, letter and comment sheet were made available for public viewing and comment at the following public venues in the study area:

- Thabazimbi Local Municipality;
- Northam Public Library; and
- Anglo American Platinum Limited – Rustenburg Platinum Mines- Amandelbult Complex Security Office.

The Scoping Report, letter and comment sheet were posted on the SRK website [www.srk.co.za](http://www.srk.co.za). Figure 9-1 presents the location where site notices were placed during the Scoping phase.

The Final Scoping Report was accepted by the DMR on 9 April 2019. Refer to Appendix 5-8 for a copy of the letter.



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Revision: A Date: 01 06 2015

Figure 9-1: Site Notice Locations

### **9.4.3 Environmental Impact Assessment and Environmental Management Programme (EIA/EMPr) for public review**

During this phase, the EIA/EMP for public review (also named Draft EIA/EMPr) will be made available for public comment to obtain comments from stakeholders.

The steps to be undertaken in this phase will include:

- Announcing the availability of the EIA/EMP for public review by means of:
  - Letters to registered stakeholders
  - Advertisements
  - Placing EIA/EMP in public places
  - Uploading EIA/EMP on SRK website
  - Meetings with registered stakeholders (two meetings are planned)
  - Submission of Final EIA/EMPr to the DMR
  - Telephonic consultations; and
- Inputs of stakeholder comment and responses into the EIA/EMP for submission to authorities.

### **9.4.4 Notification of environmental authorisation**

Registered stakeholders will be informed of DMR's decision, the appeals process and the associated timeframes via email, post or via Short Messaging Service (SMS).

The steps undertaken in this phase will include:

- Inform registered stakeholders on record of decision and the appeals process; and
- Letters to stakeholders and uploads to SRK website.

## **9.5 Summary of issues raised by I&APs**

All comments obtained from stakeholders during the integrated application process will be captured (see template in Table 10-3) and included in the relevant reports. It is envisaged that stakeholder comments will be received during the review of the Draft EIA/EMPr . All comments received will be included in the issues and response table of the Final EIA/EMPr.



**Table 9-3: Summary of issues raised by I&APs during the scoping phase**

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
<b>Affected Parties</b>				
<b>Organs of state: DMR</b>	12 December 2018	It was stated that the DMR would advise whether detailed specialist studies will be required after the application form is submitted.	SRK stated that it is proposed that relevant specialists will prepare project notes (related to heritage, soils and land capability, aquatic/wetland and terrestrial ecology) based on their extensive knowledge of the current project area, to be confirmed with a site visit.	Feedback required from the DMR on the specialist study requirements.
		The DMR required clarification on whether there would be any waste related activities for the proposed project.	SRK stated that all waste related activities will be undertaken in line with the existing approved Amandelbult infrastructure.	Closed
<b>Organs of state: DMR</b>	January 2019	The DMR requested more clarity on the size of the proposed infrastructure and the proposed layout of the activities, and that the NEMA application form be amended and resubmitted.	SRK resubmitted the NEMA application form and conceptual infrastructure layout plan on 8 February 2019.	Closed
<b>Organs of state: DWS</b>	19 February 2019	The DWS enquired whether there are any chemicals used in the recovery of chrome from the tailings and what the tailings are composed of.	RPM explained that no chemicals are used and that the plant employs a centrifugal method to separate out the fine chromite. RPM indicated that the tailings are mainly composed of silica and other PGM (Platinum Group Metals) by-products.	Closed
		The DWS enquired whether the design of the proposed stormwater dam for the FCR Plant is similar to the design of the dam for the Chrome Recovery Plant Module 3 &4.	RPM indicated that the designs are similar at the moment as the project is still at concept phase.	Closed
		The DWS indicated that stockpiles should also be authorised. It was explained that any storage of material that could generate pollution should be authorised.	SRK confirmed that the stockpile will be included in the Water Use Licence.	Closed
		The DWS indicated that a Geohydrology Study should also be included as one of the specialist studies as well as the dam designs.	SRK indicated that a groundwater study for the Amandelbult Complex was completed in 2018 and will be included as part of the Water Use Licence Application. In addition, the required Water Use Licence designs will be included in the application.	Closed

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
		The DWS requested clarity on what the surface water study would be investigating since there are no watercourses/wetlands within the vicinity of the FCR Plant.	SRK explained that the surface water study will focus on stormwater management as well as provide an understanding of the surface water baseline conditions. This will include the location of the nearest watercourse, water monitoring of the nearest watercourse as well as monitoring of process water.	Closed
		The DWS enquired whether there would be any abstraction of water associated with the proposed development.	SRK confirmed that the FCR Plant will take water from the existing Amandelbult water supply service provider. As a result, there will be no abstraction of water licence requirements.	Closed
		The DWS indicated that there might be a challenge in undertaking a site visit as per the stipulated legislative process. The DWS also indicated that they will inform the project team if there is a need for them to undertake a site visit for this project based on the close proximity to the existing Chrome Plant that the Department visited in 2018.	SRK indicated that they would wait to hear from the DWS regarding their availability for the site visit.	Open
<b>Organs of state: Thabazimbi Local Municipality</b>	13 February 2019	The Thabazimbi Local Municipality acknowledged the receipt of the Draft Scoping report and stated that they have no objections to the project.	On 14 February 2019, SRK acknowledged and thanked the municipality for sending through the letter acknowledging receipt of the draft Scoping Report for the Fine Chrome Plant project as well as confirming that the Municipality does not have any objections to the project.	Closed
		The Thabazimbi Local Municipality requested that all subsequent documentation be made available to the Municipality for future stakeholder engagement.	On 14 February 2019, SRK confirmed that the Municipality will receive a copy of the Final Scoping Report as well as other engagement processes and information as the process continues.	Consultation to continue throughout the process.
<b>Interested and Affected Party</b>	28 May 2019	During the LDF meeting, it was queried what opportunities will there be for communities from the recovery of the Fine Chrome?	The Fine Chrome Plant is currently in Prefeasibility A phase. Therefore the project is still considering alternatives and viability. As a result, community opportunities have not been identified, confirmed and finalised yet. Further feedback will be provided to the LDF once more detail is available.	Consultation to continue throughout the process.

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
Interested and Affected Party	28 May 2019	During the LDF meeting, it was queried what process will be followed for the delivery of the Fine Chrome? Joint venture between mine and community? Existing Contractors and Local Contractors?	The Fine Chrome Plant is currently in Prefeasibility A phase. Therefore the project is still considering alternatives and viability. As a result, community opportunities have not been identified, confirmed and finalised yet. Further feedback will be provided to the LDF once more detail is available.	Consultation to continue throughout the process.
Interested and Affected Party	28 May 2019	During the LDF meeting, it was queried if external businesses also working with chrome be allowed to use the fine chrome plant as well?	The Fine Chrome Plant is currently in Prefeasibility A phase. Therefore the project is still considering alternatives and viability. As a result, community opportunities have not been identified, confirmed and finalised yet. Further feedback will be provided to the LDF once more detail is available.	Consultation to continue throughout the process.

## 10 The environmental attributes associated with the sites

This section of the EIA/EMPr Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information and specialist investigations.

Specialist reports compiled for the proposed FCR Plant and related infrastructure are included as Appendix 6 of this report.

### 10.1 Geology

The Bushveld Complex is the world's largest layered intrusion, and because of its unique character most other layered intrusions are compared with it. The Bushveld Complex, as exposed at current levels of erosion, consists of Eastern, Western and Northern limbs. The Amandelbult complex is located within the north-west limb of the geological Bushveld Complex. The upper Critical Zone of the Bushveld Complex hosts the largest concentration of PGMs in the world. Although the Merensky Reef is generally regarded as a uniform reef type, large variations occur in reef thickness, reef composition, as well as the position of the mineralisation. The UG2 Reef is developed some 20 to 400 metres below the better known Merensky Reef.

### 10.2 Topography

The Amandelbult Complex lease area and surroundings are generally flat, featureless and covered by a thin layer of black turf soil. An exception to this is a group of small conical hills rising +/- 150m above the surrounding countryside and forming part of the Main Zone of the Bushveld Complex. The surface elevation varies between 920 amsl and 1000 amsl. The topography dips towards the Bierspruit and Crocodile Rivers.

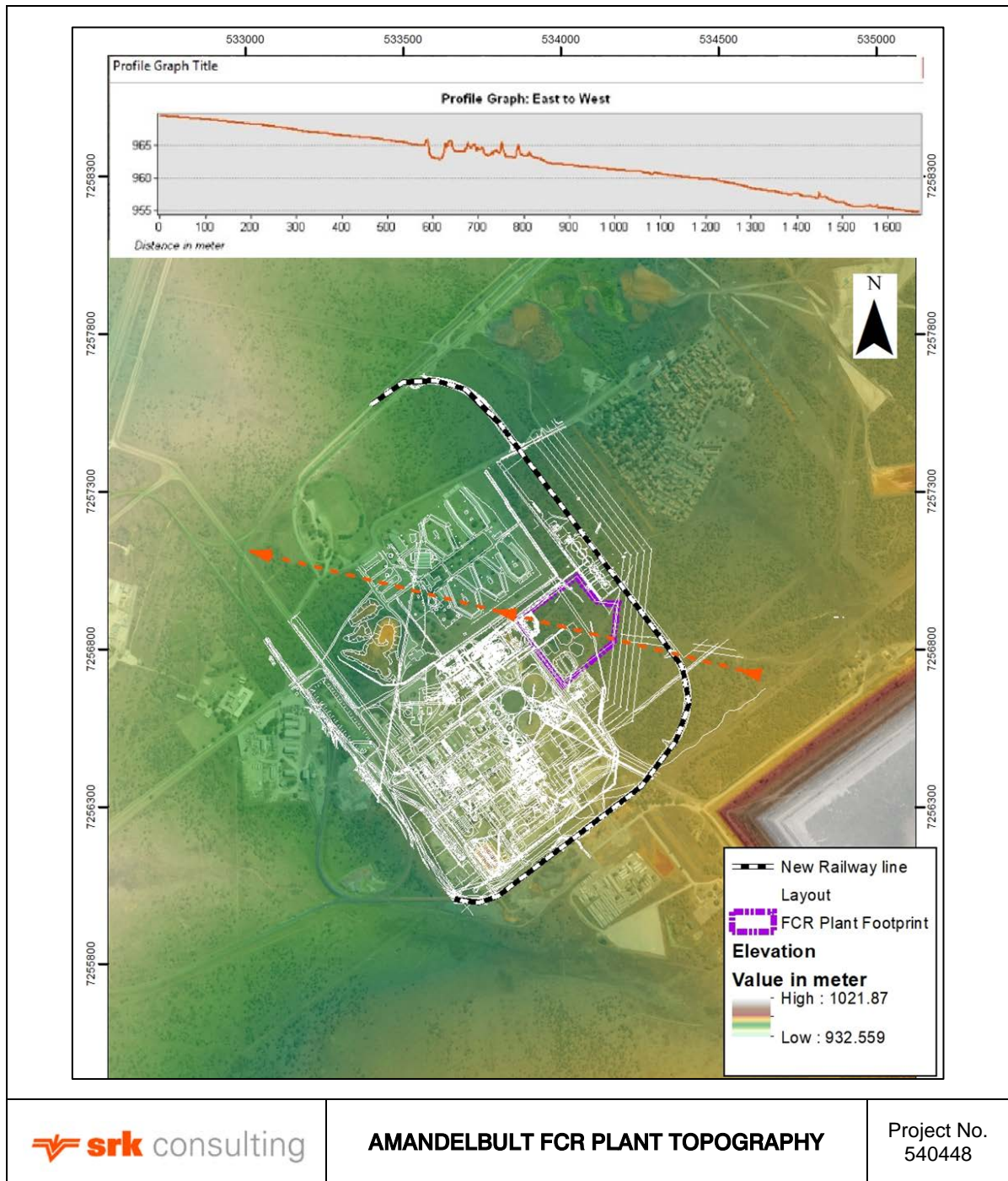


Figure 10-1: Topography associated with the Amandelbult Complex

### 10.3 Climate

Information in this section was obtained from the Surface water specialist study (which is attached as Appendix 6).

The Koppen Climate Classification describes the regional climate as falling within the “B” Climate type (dry climate types). This climate type extends northward and southward from the equator to approximately 20-35 degrees of latitude. In this climate type, average monthly temperatures are greater than 18°C and evaporation exceeds precipitation on average.

The “B” climate type has two subdivisions based on rainfall:

- Bw – dry arid (desert). It covers 12 % of the earth's land surface and is dominated by xerophytic vegetation; and
- Bs – dry semi-arid (steppe). A grassland climate that covers 14% of the earth's land surface. It receives more precipitation than the Bw subdivision from either the Inter-tropical Convergence Zone (ITCZ) or from mid-latitude cyclones.

The project area falls in the “Bsh” climate type, a subdivision of the “Bs” climate type. The average temperatures within the area are greater than 18°C. Rainfall is minimal and occurs mainly when the ITCZ migrates to the region. More than 80% of rainfall is measured during this period.

Weather data has been referenced from the following sources:

- <https://vitalweather.co.za/stations.php>, 2019 (Vital weather) - weather station located at Thabazimbi.
- Lakes Environmental, January 2014 to December 2018 - modelled meteorological data for the site.

### 10.3.1 Temperature

Ambient air temperature data has been sourced from Vital Weather and Lakes Environmental for the site (Table 10-1). The Vital Weather data indicated that average monthly temperatures ranged from 12.1°C to 26.0°C with maximum temperatures reaching 36.1°C and minimum temperatures 0.6°C. The Lakes Environmental data indicated that average monthly temperatures at the site ranged from 11.6°C to 25.9°C, with maximum temperatures reaching 39.8°C and minimum temperatures -1.4°C. Higher monthly temperatures were measured between November to March while lower temperatures were experienced between May and September.

**Table 10-1: Average Annual Temperature**

Month	Lakes Environmental			Vital Weather		
	Ave	Max	Min	Ave	Max	Min
Units	°C	°C	°C	°C	°C	°C
January	25.3	35.8	12.8	25.9	39.4	14.3
February	25.3	34.0	16.9	24.1	37.2	13.9
March	23.7	32.6	13.4	24.2	38.0	13.7
April	20.3	31.2	9.6	19.6	33.7	6.8
May	15.8	25.6	5.0	15.4	30.3	0.0
June	12.7	24.1	0.6	11.6	27.8	-1.0
July	12.1	23.8	1.1	12.0	28.0	-1.4
August	16.2	28.6	2.2	17.9	32.6	-1.1
September	20.4	32.4	5.1	21.3	38.5	-0.4
October	22.5	33.8	8.9	23.1	37.1	8.2
November	24.2	34.1	9.6	25.0	39.8	10.0
December	26.0	36.1	15.2	25.9	38.7	8.6
<b>Annual average</b>	<b>20.4</b>	<b>31.0</b>	<b>8.4</b>	<b>20.5</b>	<b>35.1</b>	<b>6.0</b>

### 10.3.2 Rainfall

Rainfall data are available for two weather stations in the area, Vlaknek weather station W0587350 located approximately 7.3 km west of the mine offices, and Northam weather station W0587477 located 14 km south of the mine offices. The stations have similar records and both of these stations are now closed.

The available data from Vlaknek for the period 1950-2000 and the on-site weather data obtained from the South African Weather Services (SAWS) from 2000 to 2014 provides a 64-year rainfall record. The monthly mean, maximum and minimum annual precipitation obtained from these two records are presented in Table 10-2. The mean annual precipitation (MAP) was determined as 596 mm. The latest water balance report (Golder, 2016) gives the MAP for the Northam station as 576 mm and that for the site station as 603 mm.

The annual rainfall on record varies significantly year to year ranging from 325 mm/annum to 979 mm/annum. A dry year (defined as the 5th percentile) will receive 358 mm/annum. A wet year (defined as the 95th percentile) can receive 834 mm/annum (Golders, 2016).

During the rainy season a maximum of 8 to 12 rain days per month is typically expected, whilst in the dry season a maximum of one rainy day may be expected per month. Most rain (85 %) falls in the six-month period between November and April. Only 8 % of the rainfall occurs between May and September. The rainfall is mainly in the form of thunderstorms.

**Table 10-2: Rainfall Data**

Month	Station W0587477 1950-2000 and site station 2000-2014 (64-year record)			Max 24h Rainfall recorded	Date of Max Rainfall
	Average	Maximum	Minimum		
January	121	501	19	90	12/01/1995
February	90	247	7.4	99	16/02/1978
March	76	271	0	131	11/03/1969
April	44	234	0	50	09/04/1984
May	13	70	0	33	04/05/1976
June	5	77	0	16	21/06/1984
July	2	54	0	9	16/07/1970
August	4	33	0	10	14/08/1977
September	13	88	0	41	10/09/1997
October	43	120	0	57	16/10/1973
November	78	207	3.4	104	05/11/1994
December	108	262	20	163	17/12/1995
Annual Total	596	920	270		

From the rainfall and evaporation data as shown in Figure 10-2, Amandelbult is situated within a water deficit climate where evaporation markedly exceeds rainfall.

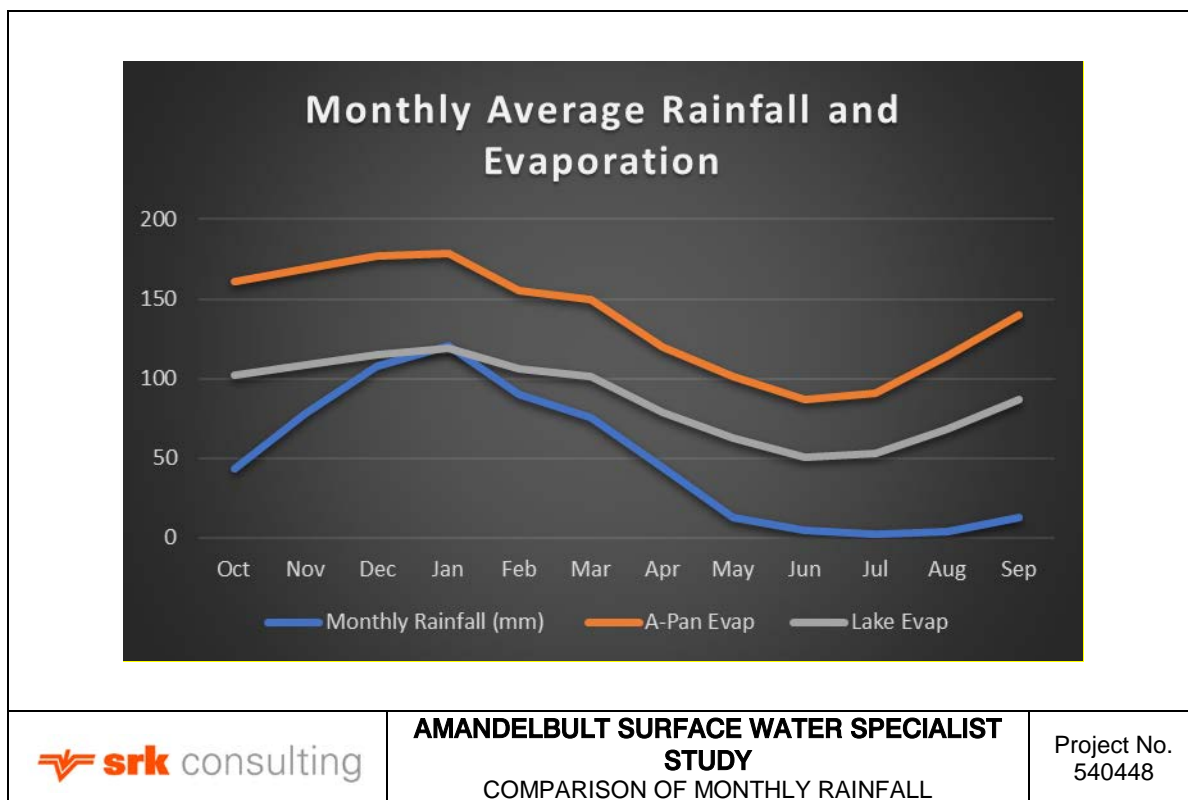


Figure 10-2: Average Monthly Rainfall and Evaporation (mm)

### 10.4 Surface water

Information in this section was obtained from the Surface water specialist study (which is attached as Appendix 6).

Amandelbult is situated in the Limpopo-North West WMA over two quaternary catchment areas, namely A24C (Crocodile) and A24F (Bierspruit). The surface within the mine boundary area is generally flat to gently undulating, with the exception of several rocky hills in the western part of the mine. The western part of the mine falls within the A24F catchment area and drains mainly northward and westward towards the non-perennial Bierspruit. The Middellaagte Spruit is a tributary of the Bierspruit in the vicinity of the TSF area. The eastern part of the mine falls within the A24C catchment and drains mainly north-eastwards and eastwards via a few small ephemeral streams towards the perennial Crocodile River.

Tumela mine is located to the west of the Bierspruit, which runs in a northerly direction into the Crocodile River some 18 km north of the mine. The Bierspruit flows into the Rhino Andalusite Dam, downstream of the mine boundary. Unless the Bierspruit is in flood, none of the dam water is discharged further downstream towards the Crocodile River leading to limited data at the downstream monitoring point AMD P. The Crocodile River flows some 2 km northeast of the Dishaba Mine (Dishaba shaft) and ultimately drains into the Limpopo River.

The proposed Amandelbult FCR Plant is located North west of the existing thickener tanks at the Amandelbult concentrator and there is a residential area just north of the proposed site. The site is currently being used as a laydown area for the construction of the Chrome plant module 3 and 4 and there are a number of old settling dams in the proposed footprint area. Stormwater from the existing grout plant and the Kilkern Plant collects in the settling dams.

The area is relatively flat with a slight slope towards the Bierspruit east of the concentrator. The area east of the plant, between the concentrator and tailings facility is mostly natural bushveld. A railway linking new product pads is currently under construction east of the proposed footprint area. The



railway cutting has a depth of 0- 2 meters with an earth berm on the eastern edge of the cutting to prevent flooding of the railway tracks. The railway will therefore reduce the size of the external catchment draining towards the plant.

Refer to Figure 10-3 for the quaternary catchments associated with the Amandelbult Complex.

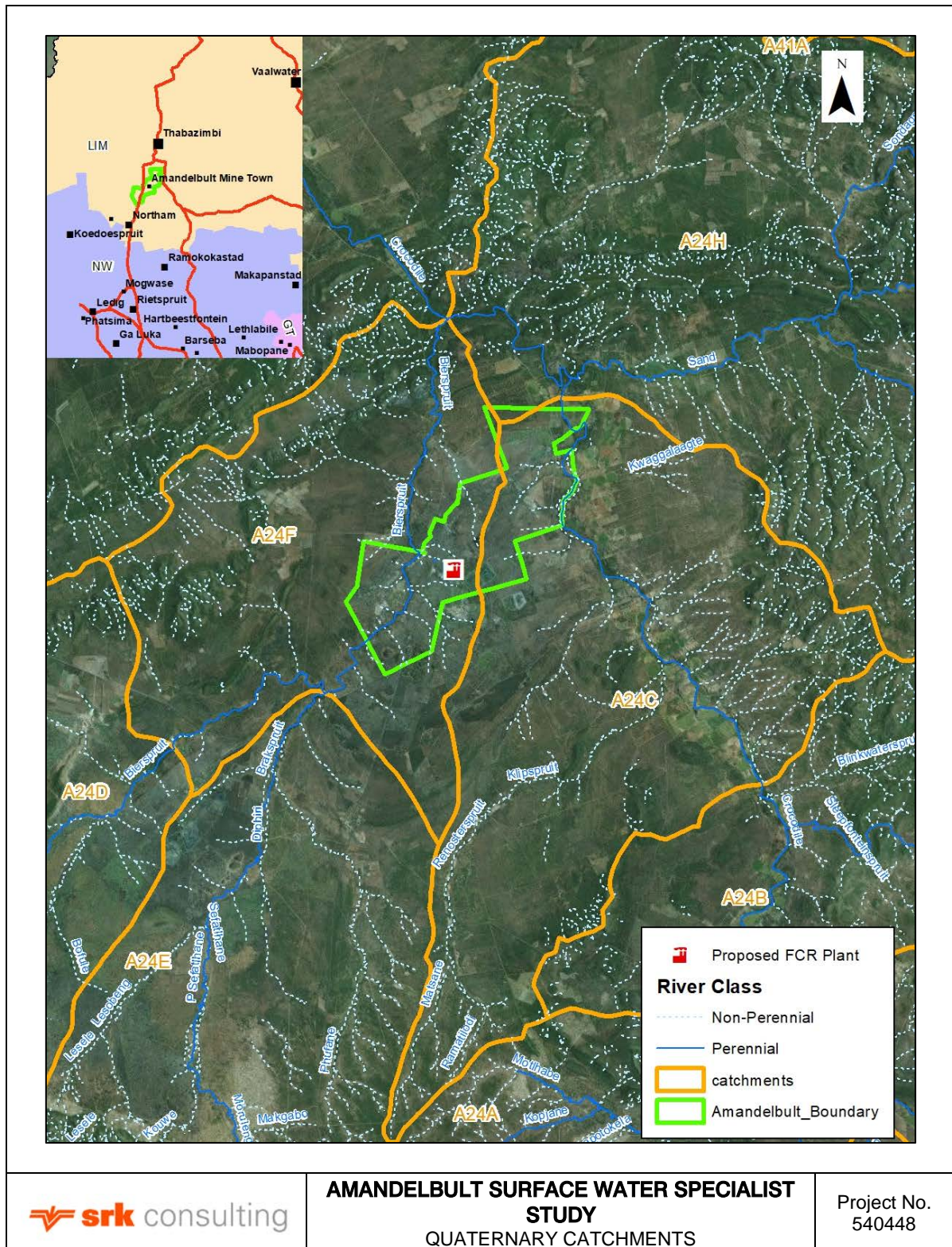


Figure 10-3: Amandelbult Complex quaternary catchments and watercourses

## 10.5 Surface water quality

### 10.5.1 Concentrator Process Water

The average physical and chemical composition of several process water monitoring localities exceeded the target values specified in the AMD WUL Waste Water Discharge limits in terms of pH, EC, Na, Cl, SO<sub>4</sub>, NO<sub>3</sub> and SS concentrations. While qualities for process water may exceed, risk is low as water is maintained in a closed system and no individuals are expected to consume water directly. It is recommended that management actions ensure that process water remains contained in the relevant dams, to prevent possible pollution of any receiving environment or groundwater resource.

### 10.5.2 Water Quality Monitoring relating to the Proposed Amandelbult FCR Plant

The upstream surface water monitoring point for the proposed Amandelbult FCR Plant is the Sewage Treatment Plant monitoring point, which is a process water monitoring point. Similarly, the downstream water monitoring point for the proposed Amandelbult FCR Plant is the 15E Dam, which is also process water.

Surface water monitoring in this area is therefore insufficient, as only process water quality is monitored and not the natural stream. The water quality monitoring programme needs to be updated and the new sampling programme as soon as possible to collect baseline data for the proposed Amandelbult FCR Plant.

## 10.6 Groundwater

Information in this section was obtained from the Surface water specialist study (which is attached as Appendix 6).

The Amandelbult mine lease area is located within a local groundwater divide. Local groundwater flow directions are towards the west/north-west (Bierspruit) and east/north-east (Crocodile River) at average gradients of 0.5% and 0.7%, respectively. The aquifer systems identified within the Amandelbult area are as follows:

- Alluvial aquifer in the coarse-grained alluvium deposited in the paleo-channels of the river systems;
- Shallow aquifer that occurs in the transitional soil and weathered bedrock zone or sub-outcrop horizon; and
- Fractured Bushveld Complex rock-type aquifer in transmissive fractures in the consolidated and mostly impervious bedrock.

No springs are known to occur in the Amandelbult mining area but evidence of groundwater base flow discharge in the low-lying areas close to the Crocodile River and drainage canals does exist.

As groundwater will follow the route of least resistance, groundwater will prefer to move through the mined-out areas. The final mined area and inter-mine flow relationships will directly determine the final groundwater flow paths, directions and decants. Groundwater flow within the shallow and generally deeper fractured rock aquifer is largely restricted to open fractures. Close to the mine's eastern boundary the alluvial aquifer extends for approximately 300 m west of the river with the majority of the aquifer on the eastern side of the river where some high yielding Boreholes can be found. The reason for this is that there is very shallow bedrock in this area.

## 10.7 Soils

Information in this section was obtained from the Soils, land use and land capability specialist study (which is attached as Appendix 6).

The study area traverses a Vertic and Anthropic catenae; with Rustenburg/Acardia and Witbank soil forms being dominant in the landscapes, occupying 20% (Rustenburg/Acardia) and 40% (Witbank) of the total study area respectively.

A significant portion within the surveyed new fine chrome recovery plant area has undergone significant disturbances attributable to activities associated with mining. Some portions within the vicinity of the product pad no.1 and 2 areas have undergone significant disturbance as a result of newly constructed railway line adjacent these areas. However, natural soils within the product pad no. 1 and 2 areas were identified and classified within undisturbed portions. In addition, a portion of the proposed fine chrome recovery plant development area was previously used as a waste material dump for material from various sources and natural soils were buried. These soils were classified as Witbank (Anthrosols) although historically these areas would most likely have been classified as Rustenburg/Acardia soils.

The natural soils with minimal disturbance were found occurring on some portions within product pad no.1 and 2. These soils were classified as Rustenburg/Acardia soil forms and are considered to have low arable potential land capability, attributed to their shallow nature which mainly restrict root growth subsequently creating conditions which are not conducive for cultivation of most cultivated crops. Furthermore, the drainage feature of these soils is characterised by poor internal drainage, as a result of the slowly permeable overlying Vertic A horizon material which is high in clay content and tightly holds water such that they are not readily available for plant uptake.

Based on observations during the site assessment, the new fine chrome recovery plant as well as product pad no.1 areas are surrounded by activities associated with mining while wilderness is the dominant land use in the vicinity of the product pad no.2 study area. The soils within the vicinity of the study area contains some limiting factors for cultivation under normal circumstances such as high clay content and shallow effective depth which limit the penetration of deep-rooted plants. These soils, at best, are suited for pastures and/ or wildlife farming. Refer to Table 10-3 below for the dominant soil forms and related land capability.

**Table 10-3: Dominant Soil Forms and their land capability**

Soil Form	Code	Diagnostic Horizon Sequence	Land Capability	Areal Extent (ha)	Percentage (%)
Rustenburg	Rs	Vertic A/ Hard Rock	Grazing (Class VI)	1.88	19.55
Arcadia	Ar	Vertic A/ Lithic			
Witbank	Wb	Unspecified	Wildlife (Class VIII)	3.834	39.87
Total				9.62	100

The spatial distribution of the identified soils area depicted in Figure 10-4.

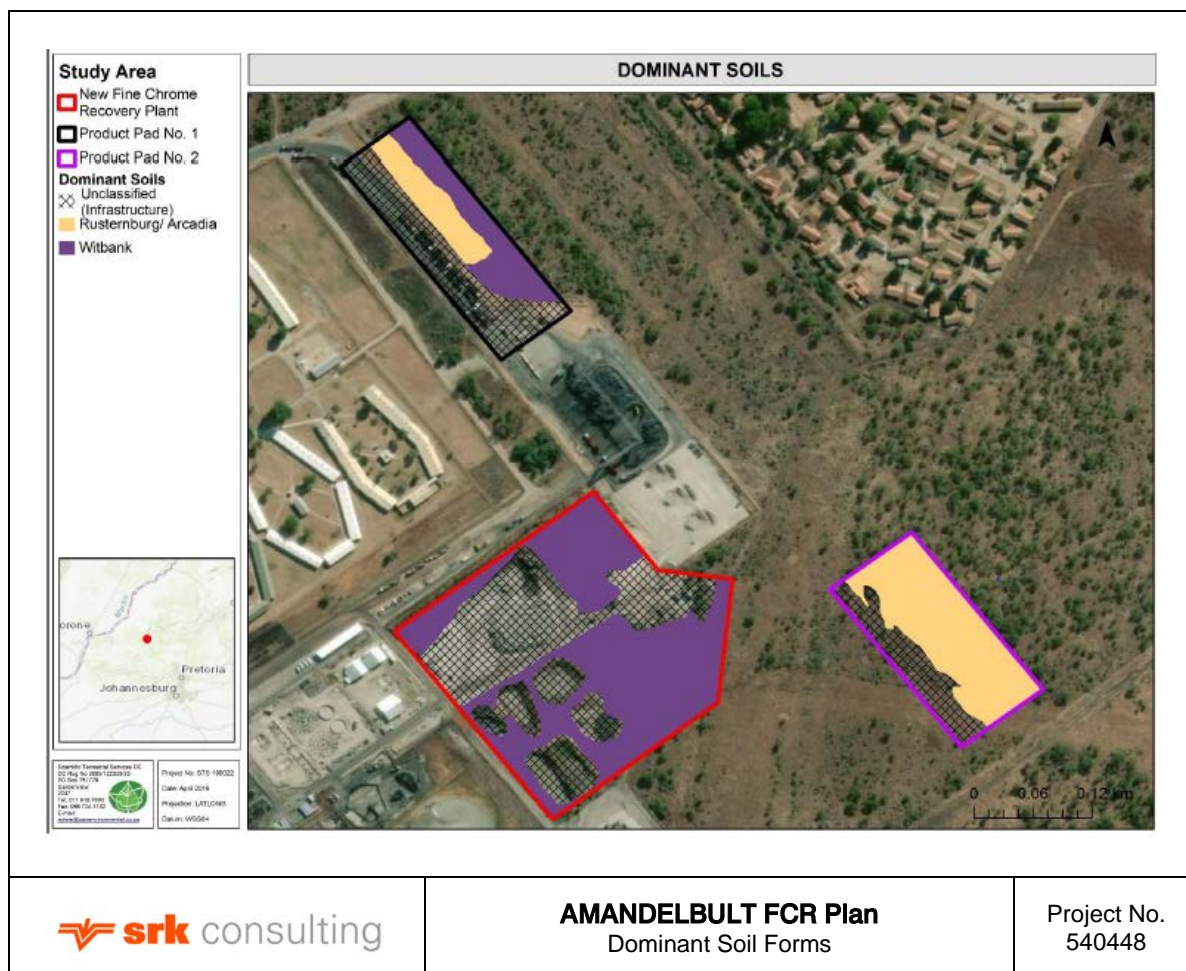


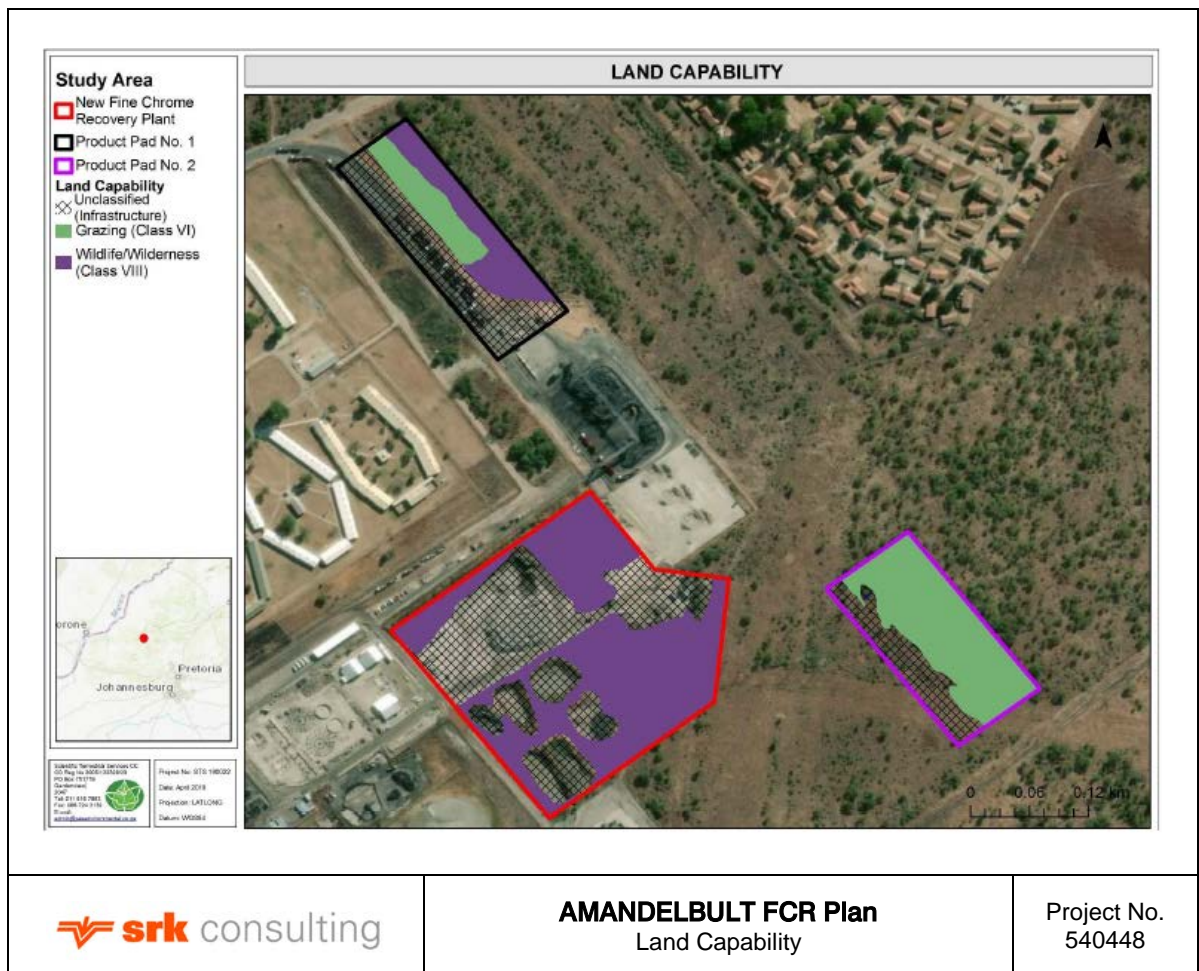
Figure 10-4: Soils associated with the Amandelbult Complex

### 10.7.1 Land capability

Typically, agricultural land capability in South Africa is limited by climatic conditions, particularly water availability. However, even within similar climatic zones different soil types typically have different land use capabilities attributed to their inherent characteristics. High potential agricultural land is defined as having the soil and terrain quality, growing season and adequate available moisture supply required to produce sustained economically high crops yields when treated and managed according to best possible farming practices (Scotney et al., 1987). For the purpose of this assessment, land capability was inferred in consideration of observed limitations to land use due to physical soil properties and prevailing climatic conditions. Climate Capability (measured on a scale of 1 to 8) was therefore considered in the agricultural potential classification. The study area falls into Climate Capability Class 5 at best, receiving a maximum of 600mm per annum, which is best described as having a moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops may be grown at risk of some yield loss.

The identified Rustenburg/Arcadia soil form is considered to be of poor (Class VI) land capability, which is generally not considered suitable for arable agricultural land use. The inherently high natural fertility status of these soils is considered to be of significant value for grazing purposes. Traditionally these soils are ploughed for subsistence farming for shallow rooted arable crops such as vegetables under resource-poor circumstances, due to their limiting factors such as high clay content which tightly holds soil water such that it is not readily available for plant uptake. Thus require intensive management practises. These soils are not considered prime agricultural production soils.

The land capability of the proposed FCR Plant project area ranges from grazing potential to wilderness potential. The areas that classify as grazing land are generally confined to the shallower and transitional zone hydromorphic soil Forms that are moderately well drained. These soils are generally darker in colour and are not always free draining to a depth of 750mm, but are capable of sustaining palatable plant species on a sustainable basis, especially since only the subsoils (at a depth of 500mm) are periodically saturated. In addition, there should be no rocks or pedocrete fragments in the upper horizons of any of the soil groups. If present it will limit the land capability to wilderness land. The areas that classify as either conservation or wilderness land are found associated with the more structured, and shallower and rockier soils. The highly structured nature of the soils that characterise the majority of the study area make for extremes of workability and at best poor grazing potential lands. Refer to Figure 10-5 for the land capability associated with the FCR Plant and associated infrastructure footprint area.



**Figure 10-5: Land Capability associated with the Amandelbult Complex**

### 10.7.2 Land use

Land is currently zoned as Agricultural. This is the case for the entire Amandelbult operation. The majority of the area is used for agricultural purposes, cultivation and grazing (unimproved grasslands). Surface infrastructure has already been established and land is currently vacant with no apparent cultivation taking place. Refer to Figure 10-6 for the land use associated with the FCR Plant and associated infrastructure footprint area.

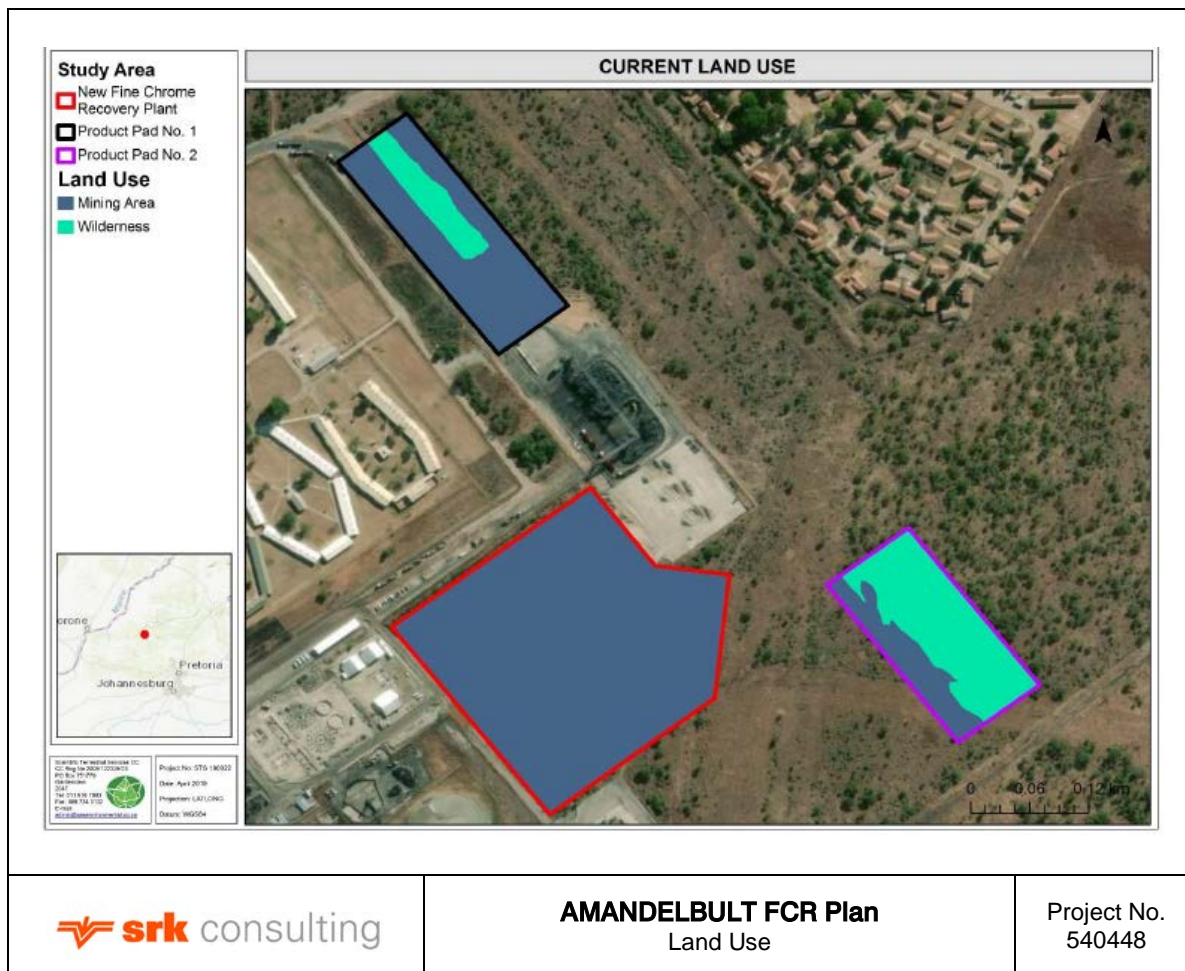


Figure 10-6: Current Land Use

## 10.8 Flora

Information in this section was obtained from the terrestrial ecology specialist study (which is attached as Appendix 6).

Following the assessment of the proposed footprint areas, it has been concluded that there are two habitat units associated with the proposed FCR Plant and Product Pads. Additionally, there are areas which have already been cleared/developed which form part of the current mining activities, and as such these are described as transformed areas, which provide no habitat for faunal or floral species.

### 10.8.1 Secondary Dwaalboom Thornveld

This habitat unit was observed within Product Pad 2, with species such as *Senegalia mellifera* (Black Thorn), *Vachellia nilotica* (Scented Thorn), *Vachellia karroo* (Sweet thorn) and *Ziziphus mucronata* (Buffalo Thorn) observed. Although this habitat unit was noted to be less disturbed than the other habitats units, mining edge effects, limited veld management in terms of vegetation, fire and ungulate interactions and the recent construction of the new railway line has impacted upon the habitat unit.

### 10.8.2 Disturbed Habitat

This habitat unit was observed in the areas which have been historically disturbed as a result of mining activities, as well as areas which have been impacted upon as a result of construction activities associated with mine expansion and development plans. The habitat, and often the topography herein, has in most instances been largely altered from that which would persist under natural conditions. Within this habitat unit, significant alien and invasive plant species (AIP) proliferation was evident, with

habitat integrity further being degraded upon as a result of edge effects and the disposal/storage of construction related material and equipment in the area.

### 10.8.3 Transformed Areas

The transformed areas were noted in areas which have already been cleared and/or developed upon as part of the current mining activities and expansion plans. These areas comprise largely of cleared areas, hardened road surfaces, contractor laydown sites and the newly constructed railway line. The transformed areas provide no habitat for faunal or floral species nor are they considered ecologically beneficial. As such, the transformed areas are not discussed further. Refer to Figure 10-7 for the habitat units associated with the FCR Plant and associated infrastructure footprint area.

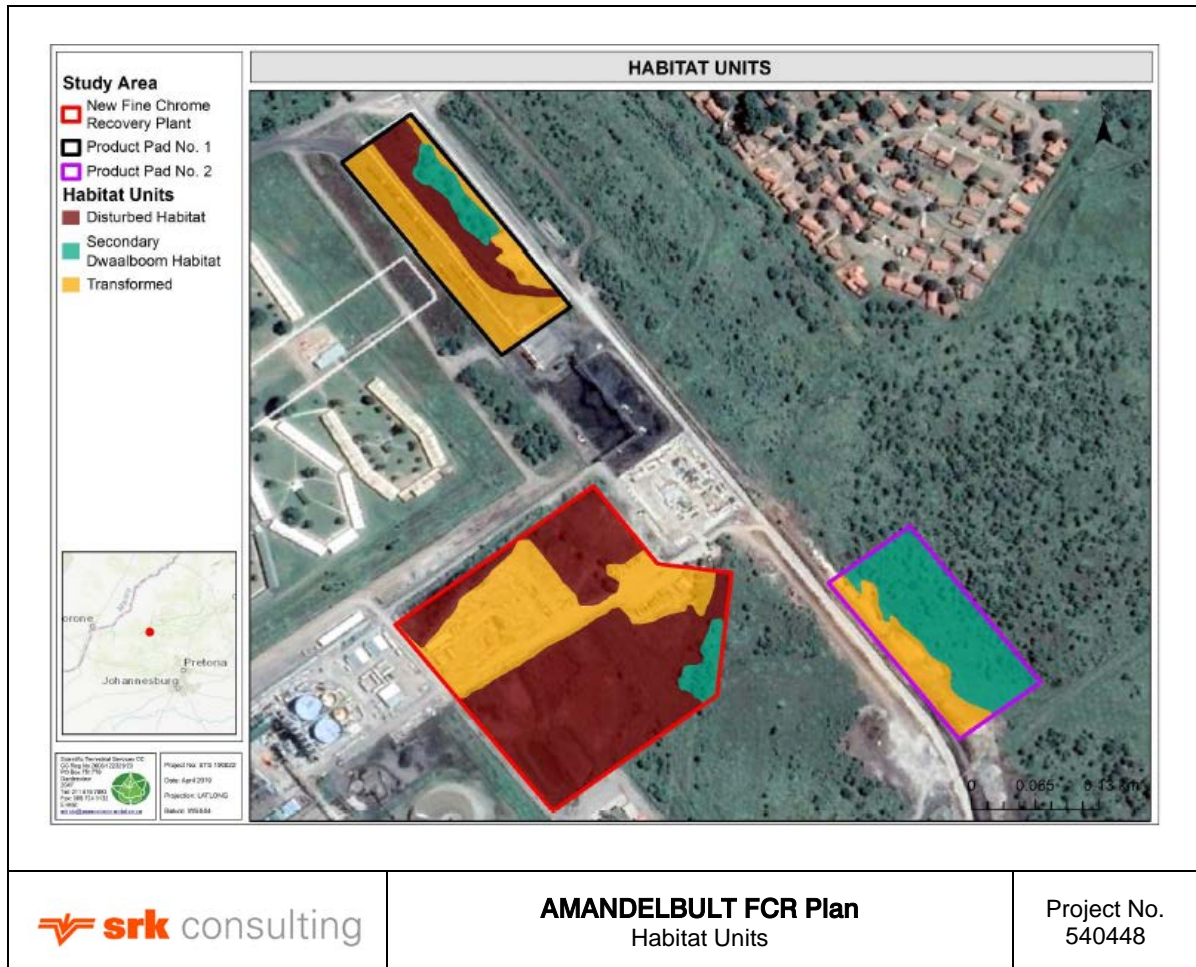


Figure 10-7: Habitat Units

## 10.9 Fauna

Information in this section was obtained from the terrestrial ecology specialist study (which is attached as Appendix 6).

### 10.9.1 Secondary Dwaalboom Thornveld

This habitat unit is located in all of the footprint areas, however, the overall habitat within Product Pad 1 and the FCR Plant has been notably disturbed to a higher extent than that of Product Pad 2. Additionally, Product Pad 1 is located between the newly constructed railway and a large haul road, isolating the habitat from the surrounding natural areas. As a result, the habitat herein is considered less suitable and viable for faunal species, as noted during the field investigation by the low abundance and diversity therein.

Habitat connectivity within Product Pad 2 and the surrounding open space natural areas still exists, and this area was noted to be less disturbed, thus providing an increased level of resource availability and habitat for faunal species. The construction of the railway has led to vegetation clearing and disturbances in some areas of Product Pad 2, however, the overall level of habitat provision is notably higher than that of the habitat associated with Product Pad 1.

### 10.9.2 Disturbed Habitat

Historic earthworks, edge effects, current anthropogenic activities and the proliferation of AIP's have significantly impacted on the overall ecology of this habitat unit. This habitat unit had a notably low diversity and abundance of faunal species, however the temporary presence of rainwater in the artificial dams provides a seasonal water resource to faunal species predominantly avifaunal and small mammal species. Prior to the construction of the railway it is likely that larger mammals may have accessed this water resource during the evenings, however the new railway now forms an effective movement barrier, limiting movement of large mammalian species.

Refer to Table 10-4 for a summary of the terrestrial fauna associated with the project area.

**Table 10-4: Summary of terrestrial fauna**

Faunal Sensitivity	Secondary Dwaalboom Thornveld	Disturbed Habitat
Species of Conservation Concern (SCC)	No faunal SCC were encountered during the field assessment, however, the faunal SCC <i>Pterocles gutturalis</i> (Yellow-throated Sandgrouse. Threatened) and <i>Python natalensis</i> (Southern African Python, VU) may utilise the habitat in the proposed Product Pad 2 for foraging. It is however unlikely that these species will utilise the habitat within the proposed footprint areas on a permanent basis, and as such the developments pose a limited risk to the ongoing conservation of faunal SCC in the region.	No floral SCC were encountered or are expected to occur within this habitat unit. This habitat unit has been extensively degraded and transformed at a landscape level as a result of the construction of the old ROM water dams and surrounding construction activities.
Species Diversity	Faunal species diversity is considered to be intermediate in this habitat unit, dominated by avifaunal and insect species such as <i>Dicrurus adsimilis</i> (Fork-Tailed Drongo) <i>Streptopelia capicola</i> (Cape Turtle Dove), <i>Pycnonotus tricolor</i> (Dark-Capped Bulbul), <i>Numida meleagris</i> (Helmeted Guineafowl), <i>Acanthacris ruficornis</i> (Garden Locust) and <i>Junonia hirta</i> (Yellow Pansy). Spoor of <i>Sylvicapra grimmia</i> (Common Duiker) was observed within all the proposed footprint areas, whilst in addition to <i>S. grimmia</i> , spoor of <i>Tragelaphus strepsiceros</i> (Kudu) were observed within Product Pad 2. <i>T. strepsiceros</i> occur and move through the open natural areas located north of Product Pad 2 but on occasionally more through the more active mining areas that are not enclosed with fences, such as the area associated with Product Pad 2. Site personnel have also observed reptile species such as <i>Bitis arietans</i> (Puff Adder) crossing the road near Product Pad 1, whilst <i>Naja annulifera</i> (Snouted Cobra) and <i>Naja mossambica</i> (Mozambique Spitting Cobra) are known to occur in the area.	Species diversity in the transformed habitat is considered to be moderately low, as was expected given the high level of disturbances to the receiving environment. Faunal species observed within this habitat unit were those that are considered to be commonly occurring, adaptable to disturbed habitats and able to inhabit areas that are in close proximity to human activities. Species observed were primarily of the insect and avifaunal classes, however scat of <i>Lepus saxatilis</i> (Scrub Hare) was also observed.
Habitat availability	Habitat availability is highest within the Product Pad 2, as the Secondary Dwaalboom Thornveld herein is still connected to a larger open space area, is more intact and less susceptible to edge effects. The remaining portions of this habitat unit are all located in areas that are either largely isolated or	Habitat availability is intermediate for faunal species, and although the habitat has been disturbed, the densely vegetated areas, discarded construction implements and old pipes do provide areas of



Faunal Sensitivity	Secondary Dwaalboom Thornveld	Disturbed Habitat
	subject to continued impacts via edge effects as well as the proliferation of AIP's.	refuge, albeit artificial, for various cryptic faunal species.
Habitat Integrity:	Overall, the habitat integrity of this habitat unit has been negatively affected because of historic and current anthropogenic activities associated with mining, leading to localised bush thickening, increased levels of moribund grass material and proliferation of AIPs. These impacts combined with habitat connectivity loss in areas has contributed to a decrease in the overall habitat integrity.	The habitat integrity for faunal species is considered to be low. Disturbances stemming from mining activities, both past and present as well as the proliferation of AIP's has led to a significant degradation of the habitat.

### 10.9.3 Transformed Areas

The transformed areas include cleared areas, hardened road surfaces, contractor laydown sites and infrastructure areas. These areas provide no habitat for faunal species and as such have not been assessed further.

## 10.10 Heritage

Information in this section was obtained from heritage exemption study (which is attached as Appendix 6).

Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity. These include all sites, structures and artifacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included in this. The significance of the sites, structures and artifacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.

Cultural significance is site-specific and relates to the content and context of the site. Sites regarded as having low cultural significance have already been recorded (during previous assessments conducted for the chrome plant and concentrator) in full and require no further mitigation. Sites with medium cultural significance may or may not require mitigation depending on other factors such as the significance of impact on the site. Sites with a high cultural significance require further mitigation. In this particular case, the proposed project location surface area has been disturbed by recent human activities. Accordingly, these areas are seen as low risk areas to reveal heritage sites due to it being almost entirely disturbed.

## 10.11 Air quality

Information in this section was obtained from the air quality specialist study (which is attached as Appendix 6).

The baseline ambient air quality in 1994, as per the EMPR of 1995, determined that no SO<sub>2</sub>, NO<sub>2</sub> and CO emissions were detected, and the suspended dust fell well below the Air Quality Index (AQI) limit at that time (1.0 mg/m<sup>2</sup>/day), at all the sites studied.

A further air quality assessment was undertaken by Simpson Ryder and Associates in 2006, which indicated that the mining right area is inherently dry and that evaporation rates are high. Environmental dust is therefore an inherent property of the natural environment, even without anthropogenic influences such as mining and transport activities.

There are currently 29 dust fallout monitoring sites within the mine boundaries, and 4 dust fallout monitoring sites outside the mine boundaries (refer to Section 19.11.3). All monitoring sites recorded dust fallout rates within the recognized limits (SANS 1929: 2005) for the residential and industrial sites.

The wind field for an area is an important parameter with respect to air quality as winds can affect the dispersion of a pollutant plume. The degree to which winds can influence dispersion is dependent on the wind speed. Higher wind speeds result in longer travel distance and dilution of the pollutants and lower, more stable wind conditions result in shorter travel distance and build-up of pollutant levels (especially gases) over a smaller area.

The following sources of air pollution in the surrounding area were identified:

- Agricultural activities;
- Vehicle entrainment and exhaust gas emissions;
- Domestic fuel burning;
- Fugitive emissions from mining operations; and
- Veld Fires.

The Amandelbult Concentrator Section is located within the Waterberg-Bojanala Priority Area. The sensitive receptors associated with the proposed FCR PLANT project area in terms of air quality include, the Mine Hostel and Rethabile Mine Village.

Impacts on air quality may be associated with the construction and operation and closure phases of the project.

## 10.12 Noise

Sound is a wave motion, which occurs when a sound source sets the nearest particles of air in motion. The movement gradually spreads to air particles further away from the source. Sound propagates in air with a speed of approximately 340 m/s.

The sound pressure level in free field conditions is inversely proportional to the square of the distance from the sound source – inverse square law. Expressed logarithmically as decibels, this means the sound level decreases 6.0dB with the doubling of distance. This applies to a point source only. If the sound is uniform and linear then the decrease is only 3 dB per doubling of distance. The decibel scale is logarithmic, therefore decibel levels cannot be added in the normal arithmetic way, for example, two sound sources of 50.0dB each do not produce 100.0dB but 53.0dB, nor does 50.0dB and 30.0dB equal 80.0dB but remains 50.0dB. Air absorption is important over large distances at high frequencies and it depends on the humidity but is typically about 40.0dB/km @ 4000 Hz. Traffic noise frequencies are mainly mid/low and will be unaffected below 200m.

In terms of the Noise Regulations a noise disturbance is created when the prevailing ambient noise level is exceeded by 7.0dBA or more. Noise however becomes audible when the prevailing ambient noise level is exceeded by 5.0dBA. It will therefore be more environmentally sustainable for a new development that the latter benchmark be used as a completely mechanised development will be introduced into the study area. Noise is part of our daily exposure to different sources which is part of daily living and some of these physical attributes which may at times be intrusive forms part of the ambient levels that people get used to without noticing the higher levels.

The noise sensitive areas associated with the proposed FCR Plant project area include the adjacent Mine Hostel and the Rethabile Mine Village.

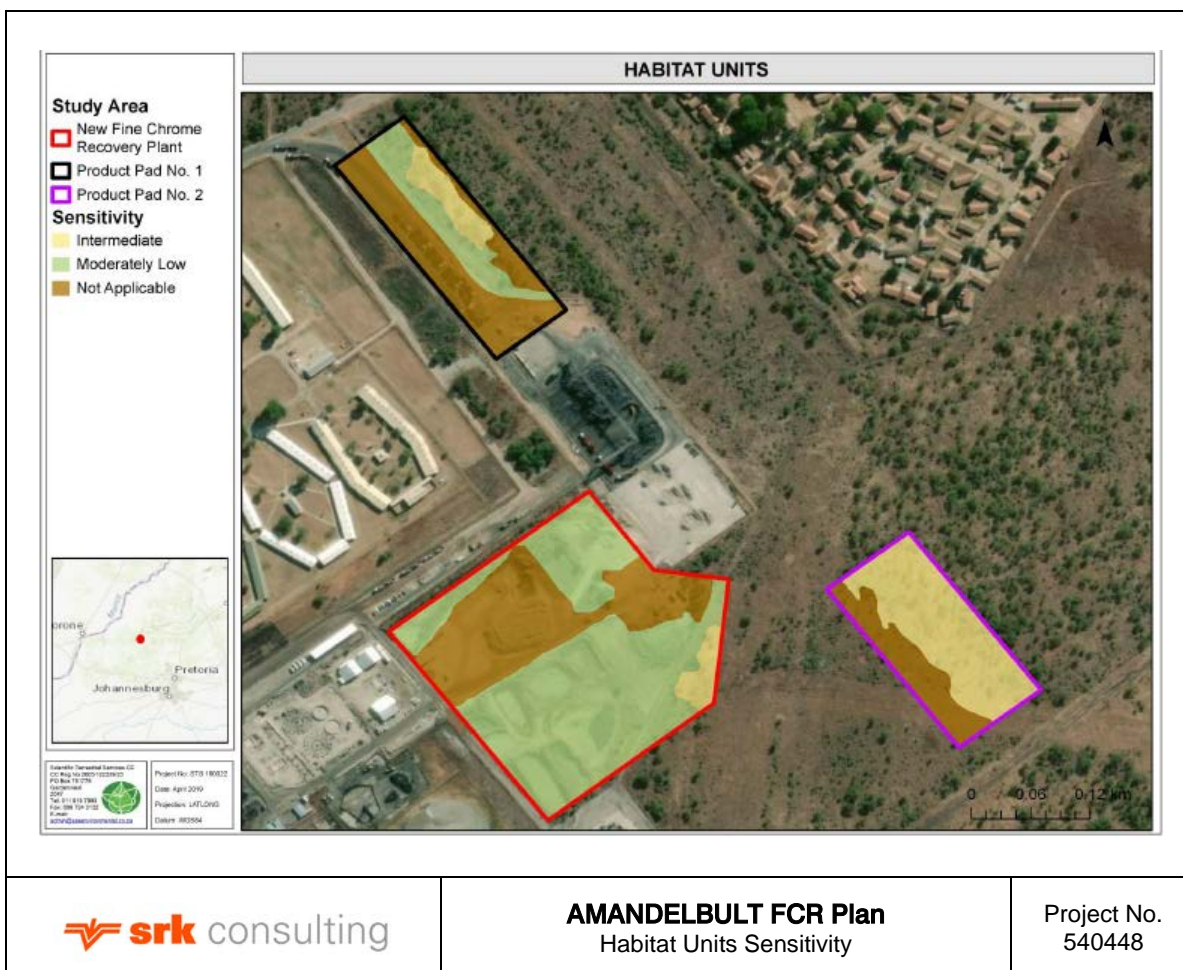
## 10.13 Sensitive environments

Information in this section was obtained from the terrestrial ecology specialist study (which is attached as Appendix 6).

There are no sensitive areas in close proximity to the proposed FCR Plant project area as the development will take place in the footprint of the existing mining activities. Refer to Table 10-5 and Figure 10-6 below for the sensitivity assessment related to each of the habitat units.

**Table 10-5: Sensitivity of each habitat unit**

Habitat Unit	Sensitivity	Conservation Objective	Development Implications
Secondary Dwaalboom Thornveld	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential.	This habitat unit is of intermediate ecological sensitivity. Although placement of infrastructure in this area is unlikely to have a significant impact on the receiving environment, the disturbance timeframes and footprint must be kept to a minimum whilst care must be taken to limit edge effects to the surrounding areas.
Disturbed Habitat	Low	Optimise development potential.	This habitat unit is of low ecological importance and sensitivity. Activities within this habitat unit must be optimised and limited to the existing disturbance footprint. Care must be taken to limit edge effects to the surrounding natural areas.
Transformed Areas	N/A	Due to the nature of the transformed areas, no conservation objectives can be assigned to these areas.	The transformed areas have already been cleared and consist of roadways and contractor laydown areas. These areas are devoid of vegetation, faunal species and as such are not considered ecologically important or relevant.



**Table 10-6: Habitat Unit Sensitivity**

## 10.14 Visual aspects

There was no visual assessment undertaken as part of the environmental assessment process. The visual quality of the proposed FCR Plant project area is low as the proposed development will take place within the mining footprint. Visual aspects of the proposed FCR Plant project area include the adjacent Amandelbult Concentrator and Mine Hostel.

## 10.15 Socio-economic profile

There are 85 234 people residing in the municipality, of which 84,3% are black African, 14,4% are white, with other population groups making up the remaining 1,3%. Amongst those aged 20 years and above, 26,1% have completed matric, 8,2% have some form of higher education, and 8,8% have no form of schooling. Thabazimbi has a low population density of 0,08 people per hectare, largely due to 98,92% of the municipality not being developed (StatsSA, 2011).

### 10.15.1 Income

Households in Thabazimbi Local Municipality are relatively poor with almost 13,98% earning no income at all and 83,87% of the municipality earns less than R12 800/month. There has been significant growth in the income bracket earning between R 3500 and R 12800/month – a clear signal for rental or gap market housing options. However, the unemployment rate (20,6%) and the youth unemployment rate (26,9%) is the lowest in the district. The mining industry is a major source of employment. Agricultural activities include Cattle, Poultry and Game while mining activities include Iron and Platinum (StatsSA, 2011).

### 10.15.2 Gender distribution

The male gender constitutes approximately 58,24% of the total population. This trend can often be observed in mining towns where the mining industry is predominantly male orientated. Refer to Figure 10-8.

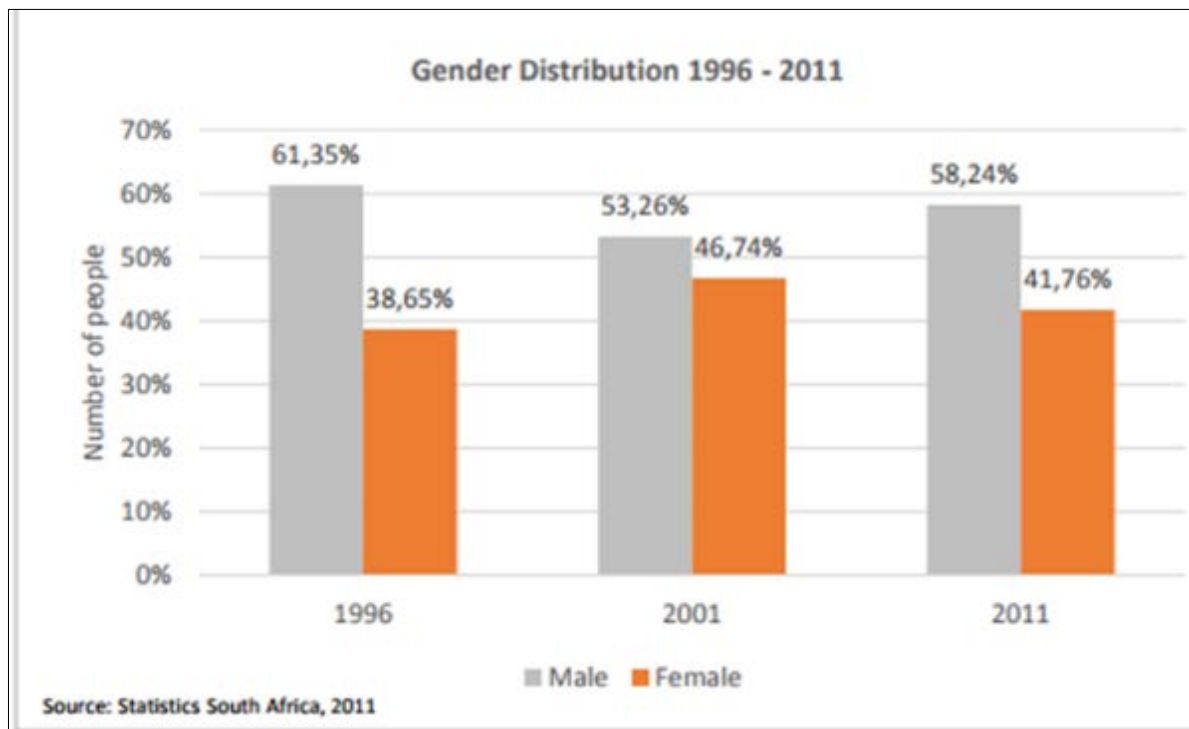


Figure 10-8: Gender Distribution

### **10.15.3 Living conditions**

Of the 25 080 households in the municipality, 47,3% have piped water inside the dwelling, 23,9% have piped water inside the yard, and 12,7% have access to piped water less than 200m from their dwelling. Only 6,2% of households have no access to piped water, and 76,8% of households have access to electricity for lighting (StatsSA, 2011).

### **10.15.4 Economic sector and strength**

The dominant economic sector in Thabazimbi Local Municipality is mining, which contributes to more than 90,98% of the GVA of the municipality. This industry employs more than 58,01% of Thabazimbi's people. All other economic sectors contribute less than 15% each of the GVA of Thabazimbi Local Municipality (StatsSA, 2011).

## 11 Description of the current land uses

Surface infrastructure has already been established and land is currently vacant with no apparent cultivation taking place. The FCR plant as well as product pad no.1 study areas are surrounded by activities associated with mining, while wilderness is the dominant land use in the vicinity of the product pad no.2 study area. The soils within the vicinity of the study area contains some limiting factors for cultivation under normal circumstances such as high clay content and shallow effective depth which limit the penetration of deep-rooted plants. These soils, at best, are suited for pastures and/ or wildlife farming.

## 12 Description of specific environmental features and infrastructure on the site

The major sensitive features within the proposed mining rights area include:

- Watercourses (Bierspruit and Crocodile Rivers); and
- Fauna and Flora species.

A summary of the existing operations (processes and products), description of infrastructure associated with the current operations are presented in Table 4-3.

Existing infrastructure in the area includes mining shafts, linear infrastructure (powerlines, pipelines, railway lines, roads and fences), the existing concentrator plant; chrome plant and ancillary mining infrastructure.

## 13 Environmental and current land use map

The FCR plant as well as product pad no.1 study areas are surrounded by activities associated with mining, while wilderness is the dominant land use in the vicinity of the product pad no.2 study area.



## 14 Impacts identified

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

Potential impacts for the proposed FCR project and associated infrastructure and activities are summarised in Table 14-1 - Table 14-4

. The impact rating methodology for the magnitude, duration and spatial scale applied are provided for in Section 15.

The impacts have been assumed and rated prior to any mitigation measures being put in place and after mitigation measures as proposed are applied.

The spatial extent of the cumulative impacts will vary from project to project. Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant, but may become significant when added to the existing or potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Table 14-1: Construction Phase impacts associated with the proposed FCR Plant**

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Soils, Land Use and Land Capability:</b> <u>Potential for soil erosion</u></p> <p>The proposed development is located on a relatively flat terrain, which decreases the erosion potential. While the identified soils display low susceptibility to erosion under current conditions, their susceptibility to erosion is likely to increase once the land is cleared for construction activities, and the soils will inevitably be exposed to wind and stormwater. The soil erosion impact is therefore considered to be moderate for the identified soils. This is attributed to their typically higher clay content, which offers a considerable degree of aggregate stability against erosion.</p>	-	5	2	1	4	1	<b>35</b>	<b>Moderate</b>	<ul style="list-style-type: none"> <li>The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint;</li> <li>Following completion of construction, all disturbed areas adjacent to the infrastructure should be ripped and re-vegetated with an indigenous grass mix, to re-establish a protective cover, in order to minimise soil erosion;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation; and</li> <li>Storm water management measures should be implemented at the start of the construction phase.</li> </ul>	2	2	1	2	1	<b>10</b>	<b>Low</b>	71.4
<p><b>Soils, Land Use and Land Capability:</b> <u>Potential for soil compaction resulting in loss of soil resource</u></p> <p>Heavy equipment traffic during construction activities is anticipated to cause significant soil compaction. The severity of this impact is anticipated to be significant for the identified soil forms due to the high clay content of these soils. However, such impact is not anticipated to be severe on Witbank soil form, as it has been already disturbed. In addition, there will be a loss of soil resource within the plant and product pad footprints, due to the construction of infrastructure. This impact will however only be confined to the construction area, which is less than 4.5 ha for all construction activities associated with the FCR Plant and related infrastructure.</p>	-	4	2	1	6	1	<b>36</b>	<b>Moderate</b>	<ul style="list-style-type: none"> <li>Soils from the infrastructure footprint must be stripped and stockpiled at a designated area;</li> <li>Stockpile may not exceed three (3) meters in height and should be treated with temporary soil stabilization and erosion control measures;</li> <li>Stockpiles must be revegetated to establish a vegetation cover as an erosion control measure;</li> <li>These stockpiles should also be kept alien vegetation free at all times to prevent loss of soil quality;</li> <li>The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint;</li> <li>Regular dust suppression must be undertaken on bare soils during the construction phase;</li> <li>All disturbed areas adjacent to the infrastructure should be ripped and re-vegetated with an indigenous grass mix, to re-establish a protective cover, in order to minimise soil erosion and dust emissions; and</li> <li>Burying of any waste including rubble, domestic waste, empty containers on the site should be strictly prohibited and all construction rubble waste must be removed to an approved disposal site.</li> </ul>	2	2	2	4	1	<b>16</b>	<b>Low</b>	55.6
<p><b>Soils, Land Use and Land Capability:</b> <u>Soil Contamination</u></p> <p>Contamination sources are mostly unpredictable and often occur as incidental spills or leak for construction developments. Thus, all the identified soils are considered equally predisposed to potential contamination. The significance of soil contamination is considered to be medium-high for all identified soils.</p>	-	3	2	1	6	1	<b>27</b>	<b>Low</b>	<ul style="list-style-type: none"> <li>The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint;</li> <li>Clear and stockpile all suitable topsoil material for use during the closure phase;</li> <li>Regular dust suppression must be undertaken on bare soils during the construction phase; and</li> <li>All disturbed areas adjacent to the infrastructure establishment should be ripped and re-vegetated with an indigenous grass mix, to re-establish a protective cover, in order to minimise soil erosion and dust emissions.</li> </ul>	2	2	1	2	1	<b>10</b>	<b>Low</b>	63.0
<p><b>Soils, Land Use and Land Capability:</b> <u>Loss of Land Capability / Land Use</u></p> <p>The overall potential loss of land capability impacts is anticipated to be relatively low for the soil forms occurring within the proposed development area, attributed to the marginal agricultural potential of these soils.</p> <p>The FCR Plant and product pads is located directly adjacent to the existing concentrator, chrome plant and associated product</p>	-	3	2	1	4	1	<b>21</b>	<b>Low</b>		2	2	1	2	1	<b>10</b>	<b>Low</b>	52.4

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
pads, and new railway line. As a result the majority of the project footprint has already been previously disturbed or impacted by historical activities. The current land use practice for the site is open space. This impact will be confined to the construction area, which is less than 4.5 ha.																	
<p><b>Terrestrial Ecology:</b>  <b>Habitat Loss</b>                      There are two habitat units associated with the proposed FCR Plant and Product Pads (Secondary Dwaalboom and Disturbed Habitat). Additionally, there are areas which have already been cleared/developed which form part of the current mining activities, and as such these are described as transformed areas. Based on the habitat mapping, more than two thirds of the proposed project footprint is identified as Disturbed Habitat or transformed areas. Specialist fieldwork has identified that the Secondary Dwaalboom Thornveld Habitat Unit's ecological integrity within the project footprint (specifically product pad 2) has been degraded and in addition is not a localised/isolated or threatened vegetation type. No floral SCC were encountered during the field assessment, however the floral SCC <i>Stenostelma umbelluliferum</i> (NT) may occur within this habitat unit. No faunal SCC were encountered during the field assessment, however, the faunal SCC <i>Pterocles gutturalis</i> (Yellow-throated Sandgrouse, Threatened) and <i>Python natalensis</i> (Southern African Python, VU) may utilise the habitat in the proposed Product Pad 2 for foraging. It is however unlikely that these species will utilise the habitat within the proposed footprint areas on a permanent basis, and as such the developments pose a limited risk to the ongoing conservation of faunal SCC in the region.                      As a result, the habitat loss within the project footprint is expected to have a limited impact.</p>	-	5	4	2	6	3	60	High	<ul style="list-style-type: none"> <li>The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint;</li> <li>Clearing of vegetation should take place in a phased manner as to keep bare soil areas as small as possible to limit the erosion potential;</li> <li>Implement the existing alien and invasive plant control plan for the mine;</li> <li>Regular dust suppression must be undertaken on bare soils during the construction phase;</li> <li>Prevent all open fires;</li> <li>Provide fire safe zone facilities and suitable fire control measures;</li> <li>Use of trees, shrubs or any vegetation for fire making purposes is strictly prohibited;</li> <li>Contractors will not be allowed to harvest any natural resources;</li> <li>Provide sufficient on site ablution, sanitation and waste management facilities;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation;</li> <li>Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development;</li> <li>No faunal species may be hunted, trapped, snared or captured for any purpose whatsoever;</li> <li>Fences and boundaries must be monitored on a weekly basis in order to locate and remove snares and traps; and</li> <li>All areas of disturbed and compacted soils during construction needs to be ripped, reprofiled and reseeded with indigenous vegetation to prevent the establishment of alien and invasive species.</li> </ul>	4	4	2	4	3	40	Moderate	33.3
<p><b>Freshwater Ecology:</b>  <b>Habitat Loss</b>                      The altered topography within the project area, caused by existing activities such as roads and other infrastructures, have led to altered runoff patterns resulting in ponding of water on the clay-rich soils located in the area. This combined with runoff from the operational areas has led to the ponding of water in the area, resulting in the occurrence of species associated with wetlands. The ponding of water has created an artificial habitat for wetland species. As a result, these areas are not classified as wetland habitats by the wetland specialist. With the implementation of the surface water management measures at the commencement of construction, the ponding of water will be discontinued. As a result, no impacts on</p>							0	#N/A	<ul style="list-style-type: none"> <li>Refer to surface water and hydrology management measures below.</li> </ul>						0	#N/A	#DIV/0!

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
wetland habitats are expected.																	
<p><b>Surface Water &amp; Hydrology:</b>  <u>Deterioration of water quality (turbidity and spills)</u>                      The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. During the clearing and grubbing of the project area, the soils will be exposed and prone to erosion. Surface water runoff within the exposed area will have increased levels of turbidity and suspended solids.                      The proposed FCR plant site falls within the A24F (Bierspruit) quaternary drainage region in the Crocodile (West) Marico Water Management Area. The area slope from East to West towards the Bierspruit. The project area experience summer rainfall with an annual average of 600mm per annum. December - February experience peak rainfall. Stormwater runoff from the site will most likely flow into the surrounding grasslands. It is unlikely that any runoff will make its way to the Bierspruit due to the distance from the plant to the watercourse. Water quality could also be impacted on by hydrocarbon spills as a result of construction vehicles.</p>	-	2	2	2	6	1	20	Low	<ul style="list-style-type: none"> <li>Construction will be limited to the project footprint;</li> <li>Appropriate stormwater management measures will be implemented, including the temporary diversion of upstream run-off from the construction and laydown areas;</li> <li>Surface water management measures, such as stormwater canals, sediment traps and PCDs are to be constructed first to ensure that runoff and dirty water spills are contained;</li> <li>Bunded containment and settlement facilities will be provided for hazardous materials, such as fuel and oil;</li> <li>Spill-sorb or a similar product will be kept on site, and used to clean up hydrocarbon spills in the event that they should occur;</li> <li>Erosion protection measures will be implemented at steep areas;</li> <li>A waste management plan will be developed for the construction phase; and</li> <li>If erosion is evident, water management around the construction areas will be reviewed.</li> </ul>	1	2	2	2	1	6	Low	70.0
<p><b>Surface Water &amp; Hydrology:</b>  <u>Loss of catchment yield</u>                      All water within the plant and product pad footprints are considered to be dirty and will be contained within the designed stormwater management measures. This will result in a loss of runoff to the catchment and therefore an impact on the catchment yield. The reduction in catchment yield will be limited due to the project footprint area being less than 4.5ha. In addition, the project area is located directly adjacent to existing infrastructure.</p>	-	2	2	2	6	2	20	Low		2	2	2	4	2	16	Low	20.0
<p><b>Visual:</b>  <u>Change to visual aesthetics</u>                      The project area is located adjacent to existing mining related infrastructure. The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1) . The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. As a result of the existing land use practices and the proximity to adjacent settlements, it is anticipated that the impact on visual aesthetics will be limited.                      Impacts associated with dust and land use and noise are addressed in the impact table above.</p>	-	2	2	2	6	2	20	Low	<ul style="list-style-type: none"> <li>Apply dust suppressants or vegetate bare areas not being used for construction;</li> <li>Locate soil stockpiles within site boundaries considering the location of potential sensitive receptors and the predominant wind direction;</li> <li>Set speed limits to minimise the creation of fugitive dust within the project boundary; and</li> <li>Continue with the existing Amandelbult air quality monitoring program.</li> </ul>	2	2	2	4	2	16	Low	20.0
<p><b>Noise</b>  <u>Increased noise disturbance</u>                      The project area is located adjacent to existing mining related infrastructure. The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1). The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. All construction activities will be limited to daylight hours. As a result, there will be no noise impacts during night time. It is anticipated that there will be limited to no increase in noise</p>	-	3	2	2	6	1	30	Moderate	<ul style="list-style-type: none"> <li>Construction operations to be limited to day light hours;</li> <li>Machinery will comply with the standard conditions for noise output levels and which will not exceed 85.0dBA at 5m from the source;</li> <li>Equipment and/or machinery which will be used must comply with the manufacturer's specification acceptable noise levels;</li> <li>Ensure high level of equipment maintenance, especially intake and exhaust mufflers;</li> </ul>	2	2	2	4	1	16	Low	46.7

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
levels during the day time at the closest receptors due to the extent and scale of the construction activities.							<ul style="list-style-type: none"> <li>Withdraw equipment for maintenance if change in noise emission characteristics is noticeable; and</li> <li>Maintain complaints and grievance register and act promptly to complaints regarding noise.</li> </ul>										
<p><b>Air Quality</b></p> <p><u>Dust Generation:</u></p> <p>Dust generation associated with construction activities, such as earth moving activities and vehicle entrainment of dust, will be of concern, however, based on the nature of the activities, dust particles will be suspended and thereafter deposited close to the construction activities. Off-site or adjacent sources of dust will also need to be considered for baseline levels of dust as these sources will contribute to the dust generated during pre-construction and construction. However due to the nature of the project, it is anticipated that the construction phase will be less than a year which will reduce the level of impact. Climatic conditions, such as rainfall and wind, may influence the impact of dust generation in and around the project area. If construction takes place from October to April, dust emitted into the air is expected to be relatively low compared to the dry months from May to September. Most prominent wind direction is from South East in the winter, and in summer from the North and North East. The closest sensitive receptor is the Rethabile village, located approximately 230m to the east of the product pad 1, and the mine hostels located approximately 120m to the West of the product pad 1.</p>	-	4	2	2	8	2	48	Moderate	<ul style="list-style-type: none"> <li>Apply dust suppressants or vegetate bare areas not being used for construction;</li> <li>Locate soil stockpiles within site boundaries considering the location of potential sensitive receptors and the predominant wind direction;</li> <li>Set speed limits to minimise the creation of fugitive dust within the project boundary; and</li> <li>Continue with the existing Amandelbult air quality monitoring program.</li> </ul>	2	2	2	4	2	16	Low	66.7
<p><b>Social</b></p> <p><u>Local employment and procurement opportunities due to construction activities</u></p> <p>The Amandelbult complex is located in both the Thabazimbi and Moses Kotane Local Municipalities. The FCR Plant is located in the Thabazimbi Local Municipality. Some of the major challenges in the Moses Kotane Local Municipality are related to employment, in addition the Thabazimbi Local Municipality is generally poor in economic development. This has resulted in a lack of diversity of job opportunities leading to high unemployment rates in the municipalities. The construction phase will create employment opportunities for the appointed contractors. The number of contractors required for the construction phase will only be determined during the implementation phase. These job opportunities will be limited only to the construction phase.</p>	+	2	2	3	4	1	18	Low	<ul style="list-style-type: none"> <li>The applicant project team will share recruitment and procurement opportunities at the Leadership Development Forum and the Community Engagement Forum meetings on a continuous basis;</li> <li>The applicant project team will communicate at the existing forums training and upskilling opportunities so as to manage employment expectations;</li> <li>The applicant project team will discuss opportunities to improve training and upskilling opportunities;</li> <li>The project will prioritise the employment of local communities within the identified zone of influence for all job opportunities during construction;</li> <li>The mine will enforce the contractor management plan, especially relating to local recruitment and procurement;</li> </ul>	2	2	3	6	1	22	Low	-22.2
<p><b>Social</b></p> <p><u>Expectations for local procurement and local employment</u></p> <p>Amandelbult has set local procurement and employment targets as set out in the SLP, however there are existing legacy issues regarding these targets. As a result, all potential new employment opportunities will be closely monitored by key stakeholders within the Amandelbult zone of influence. In addition, there are a number of other mines within the affected Municipalities which may compete with the availability of suitable skills within the region.</p>	-	4	2	3	6	2	44	Moderate	<ul style="list-style-type: none"> <li>The SLP will need to be updated to reflect the training and upskilling of employees related to future skills required;</li> <li>No employment will be made available at the mine gates; and</li> <li>The mine will communicate and implement the employment procedure for work seekers.</li> </ul>	3	2	3	6	2	33	Moderate	25.0

Nature of the impact		Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)		
		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance			
<p><b>Heritage</b></p> <p>A heritage impact assessment exemption was undertaken by a suitably qualified archaeologist. The assessment did not identify any sites of historical significance. As a result, it is anticipated that there will be no impact on historical features. However, if subterranean historical features are unearthed during the construction phase, then management measures are provided to inform the applicant and contractors of the required processes to be followed. In addition, due to the density of the vegetation on the area proposed for the location of the product pads, it is possible that some sites may only be identified during the construction phase. In this event, care should be taken when development commences.</p>	-	2	2	1	4	1	14	Low	<ul style="list-style-type: none"> <li>The following 'Chance find Procedure' should be followed if historical features are identified within the project footprint;</li> <li>Upon finding any archaeological or historical material all work at the affected area must cease;</li> <li>The area should be demarcated in order to prevent any further work there until an investigation has been completed;</li> <li>An archaeologist should be contacted immediately to advise the applicant and contractor of the required processes to be followed;</li> <li>If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist;</li> <li>The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter; and</li> <li>Work on site will only continue after removal of the archaeological/ historical material was done.</li> </ul>	2	2	1	4	1	14	Low	0.0

**Table 14-2: Operational Phase impacts associated with the proposed FCR Plant**

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)		
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance			
<b>Operation of FCR Plant</b>																
<p><b>Soils, Land Use and Land Capability:</b>  <u>Soil Contamination:</u>                      During operation, the FCR Plant will receive tailings from the existing chrome recovery plant. Following processing, secondary tailings will tie into the existing pumping system where tailings will be pumped the existing tailings storage facility. Potential spills could result from the pumping system, resulting on contamination of soils.</p>	3	3	1	4	2	24	Low	<ul style="list-style-type: none"> <li>Weekly inspection and monitoring of pumping system must be undertaken to identify spills or leaks;</li> <li>A spill prevention and emergency spill response plan must be developed and be implemented in order to address clean-up measures should a spill and/or a leak occur; and</li> <li>Clean and dirty water separation systems must be constructed and be maintained to contain spills/leaks.</li> </ul>	2	1	1	2	1	8	Low	66.7
<p><b>Terrestrial Ecology:</b>  <u>Habitat Loss:</u>                      During operation, it is anticipated that there will be no additional impacts on land use and land capability and as a result no additional impacts on habitat loss during the operational phase. However, an increase in alien invasive plants could result in habitat loss.</p>	4	3	2	2	1	28	Low	<ul style="list-style-type: none"> <li>Implement the existing alien and invasive plant control plan for the mine;</li> <li>Regular dust suppression must be undertaken on bare soils;</li> <li>Prevent all open fires;</li> <li>Provide fire safe zone facilities and suitable fire control measures;</li> <li>Use of trees, shrubs or any vegetation for fire making purposes is strictly prohibited;</li> <li>Contractors will not be allowed to harvest any natural resources;</li> <li>Provide sufficient on site ablution, sanitation and waste management facilities;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation;</li> <li>Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development;</li> <li>No faunal species may be hunted, trapped, snared or captured for any purpose whatsoever;</li> <li>Fences and boundaries must be monitored on a weekly basis in order to locate and remove snares and traps; and</li> <li>All areas of disturbed and compacted soils during construction needs to be ripped, reprofiled and reseeded with indigenous vegetation to prevent the establishment of alien and invasive species.</li> </ul>	2	2	2	2	1	12	Low	57.1
<p><b>Surface Water &amp; Hydrology:</b>  <u>Surface water quality</u>                      During operation, the FCR Plant will receive tailings from the existing chrome recovery plant. Following processing, secondary tailings will tie into the existing pumping system where tailings will be pumped the existing tailings storage facility. Potential spills could result from the pumping system, resulting on contamination of surface water runoff, with a consequence of deteriorating the water quality of nearby water courses. However, the closest surface water course is the Bierspruit, which is located more than 500m from the FCR Plant.</p>	3	2	2	8	1	36	Moderate	<ul style="list-style-type: none"> <li>Clean and dirty water separation systems must be constructed and be maintained to contain spills/leaks;</li> <li>All facilities with the potential to generate dirty storm water runoff, effluent or washdown water will be located within the designated dirty water area;</li> <li>Clean runoff will be diverted around the designated dirty areas by means of cut-off canals, sized to accommodate at least the 1:50 year peak flow event;</li> <li>Weekly inspections of stormwater canals and dirty water containment facilities must be undertaken;</li> </ul>	5	2	1	2	1	25	Low	30.6

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Surface Water &amp; Hydrology:</b>  <u>Water Supply:</u>                      As the Amandelbult FCR Plant receives guard cyclone feed slurry and has its own thickener separate from the Concentrator, it will always be water positive. This means there will always be excess process water returned back from the Amandelbult FCR Plant to the Concentrators cloudy water tank. The significance of the impacts associated with the impact on assurance of water supply will be of low (-) significance (without the implementation of mitigation measures), as there is no need for additional potable water to operate the Amandelbult FCR Plant.</p>	3	2	2	8	2	36	Moderate	<ul style="list-style-type: none"> <li>When incidents are identified (such as spills, blockage, siltation, etc), undertake the necessary actions to mitigate;</li> <li>Adequate erosion protection will be provided at the clean canal discharge locations;</li> <li>Update the existing monitoring programme to include additional monitoring points to monitor the impact of the proposed Amandelbult FCR Plant;</li> <li>If erosion is evident, water management around the operational areas will be reviewed;</li> <li>Make allowance for a clean water standby make-up pump; and</li> <li>Install diameter cyclones to clean process water for re-use.</li> </ul>	2	1	1	4	1	12	Low	66.7	
<p><b>Groundwater</b>  <u>Groundwater Quality</u>                      Based on the network of groundwater monitoring points within the mining rights area, the water quality is generally good with elevated groundwater quality levels within the tailing's facility footprint. The tailings facility, concentrator and associated infrastructure has been assessed and authorised under a previous EIA/EMPr process. This project will only focus on the additional surface infrastructure associated with the FCR project. Considering the limited footprint associated with the FCR plant, it is anticipated that the groundwater aquifer quality will not be impacted on during the operational phase. Groundwater impacts associated with the existing Amandelbult operations are assessed as part of the existing approved EMP's and conditions of authorisations.</p>	2	2	2	4	1	16	Low		2	2	2	4	1	16	Low	0.0	
<p><b>Visual:</b>  <u>Change to visual aesthetics</u>                      The project area is located adjacent to existing mining related infrastructure. The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1) . The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. As a result of the existing land use practices and the proximity to adjacent settlements, it is anticipated that the impact on visual aesthetics will be limited.                      Impacts associated with dust and land use and noise are addressed in the impact table above.</p>	2	4	2	4	1	20	Low	<ul style="list-style-type: none"> <li>No management measures required.</li> </ul>	2	4	2	2	1	16	Low	20.0	
<p><b>Noise</b>  <u>Increased noise disturbance</u>                      The project area is located adjacent to existing mining related infrastructure. The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1). The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. The FCR Plant will be enclosed therefore reducing potential noise generation and resulting in a low impact on increase noise disturbance.</p>	-	2	4	2	6	1	24	Low	<ul style="list-style-type: none"> <li>Machinery will comply with the standard conditions for noise output levels and which will not exceed 85.0dBA at 5m from the source;</li> <li>Equipment and/or machinery which will be used must comply with the manufacturer's specification acceptable noise levels. Ensure high level of equipment maintenance, especially intake and exhaust mufflers;</li> <li>Withdraw equipment for maintenance if change in noise emission characteristics is noticeable; and</li> <li>Maintain complaints and grievance register and act promptly to complaints regarding noise.</li> </ul>	2	4	2	4	1	20	Low	16.7



Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation							Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)		
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance	Probability		Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Air Quality</b></p> <p>The FCR Plant will be within an enclosed structure, there will be limited to no dust emission generated from the operation of the plant. In addition, the material being processed is wet, and therefore there will be no dust emitted from the FCR plant. Air Quality impacts associated with the storage of product on the product pads, and rail loading facilities are addressed below.</p>																	
<p><b>Social</b></p> <p><u>Dissatisfaction over number of employment opportunities and conditions of procurement which could potentially lead to community protests and unrests, as well as conflicts within communities</u></p> <p>Community unrest has been experienced from the other sections within the Amandelbult Complex due to employment and procurement opportunities. The Leadership Development Forum has been set up by Amandelbult as a response to the dissatisfaction expressed by stakeholders.</p>	-	4	4	3	6	1	52	Moderate	<ul style="list-style-type: none"> <li>The applicant project team will share recruitment and procurement opportunities at the Leadership Development Forum and the Community Engagement Forum meetings on a continuous basis;</li> <li>The applicant project team will communicate at the existing forums training and upskilling opportunities so as to manage employment expectations;</li> <li>The applicant project team will discuss opportunities to improve training and upskilling opportunities;</li> <li>The project will prioritise the employment of local communities within the identified zone of influence for all job opportunities during construction;</li> <li>The mine will enforce the contractor management plan, especially relating to local recruitment and procurement;</li> <li>The SLP will need to be updated to reflect the training and upskilling of employees related to future skills required;</li> <li>No employment will be made available at the mine gates; and</li> <li>The mine will communicate and implement the employment procedure for work seekers.</li> </ul>	4	2	3	6	1	44	Moderate	15.4
<b>Operation of product pads and railway load out</b>																	
<p><b>Soils, Land Use and Land Capability:</b></p> <p><u>Soil Contamination</u></p> <p>The chromite stock piles will be stored on a concrete bund and will be transported via the railway extension. However due to the fine particle size of the chromite concentrates there is the potential for chromite concentrate to be blown off the stockpiles or during loading, which would then result in the concentrate being in direct contact with the soil leading to potential contamination.</p>	-	4	3	2	6	2	44	Moderate	<ul style="list-style-type: none"> <li>Undertake dust suppression (wet/chemical suppressants);</li> <li>Maintain a moisture content of 8% during the FCR process;</li> <li>When stockpiling ore, the design specification of equipment should be considered to determine a suitable drop height to control the fall of materials which will reduce dust emissions;</li> <li>Continue with the existing Amandelbult air quality monitoring program;</li> <li>The product stockpile must have a concrete liner;</li> <li>Clean and dirty water separation systems must be constructed prior to the utilisation of the product stockpiles; and</li> <li>Run off from the product stockpiles must be directed to the dirty water system for capture and potential re-use.</li> </ul>	3	2	2	2	1	18	Low	59.1
<p><b>Air Quality:</b></p> <p><u>Dust:</u></p> <p>Dust generating activities such as materials handling, and windblown dust will be the major sources of dust during the project, however with the moisture content of the product at 8%, will result in reduced dust emissions.</p>		3	3	2	6	1	33	Moderate		2	2	2	4	1	16	Low	51.5

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Terrestrial Ecology:</b>  <u>Habitat Loss:</u>                      During the construction phase, during clearing activities, most of the habitat loss would have already occurred. However, an increase in alien invasive plants could result in habitat loss and potential further faunal and floral habitat degradation due to edge effects. As Product Pad 2 is located within the secondary Dwaalboom Thornveld, alien invasive will have a greater impact than the area closer to the already disturbed footprints.</p>	4	3	2	6	1	44	Moderate	<ul style="list-style-type: none"> <li>Implement the existing alien and invasive plant control plan for the mine;</li> <li>Regular dust suppression must be undertaken on bare soils;</li> <li>Prevent all open fires;</li> <li>Provide fire safe zone facilities and suitable fire control measures;</li> <li>Use of trees, shrubs or any vegetation for fire making purposes is strictly prohibited;</li> <li>Contractors will not be allowed to harvest any natural resources;</li> <li>Provide sufficient on-site ablution, sanitation and waste management facilities;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation;</li> <li>Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development;</li> <li>No faunal species may be hunted, trapped, snared or captured for any purpose whatsoever;</li> <li>Fences and boundaries must be monitored on a weekly basis in order to locate and remove snares and traps; and</li> <li>All areas of disturbed and compacted soils during construction needs to be ripped, reprofiled and reseeded with indigenous vegetation to prevent the establishment of alien and invasive species.</li> </ul>	2	2	2	4	1	16	Low	63.6	
<p><b>Freshwater Ecology:</b>  <u>Habitat Loss:</u>                      The altered topography within the project area, caused by existing activities such as roads and other infrastructures, have led to altered runoff patterns resulting in ponding of water on the clay-rich soils located in the area. This combined with runoff from the operational areas has led to the ponding of water in the area, resulting in the occurrence of species associated with wetlands. The ponding of water has created an artificial habitat for wetland species. As a result, these areas are not classified as wetland habitats by the wetland specialist. With the implementation of the surface water management measures at the commencement of construction, the ponding of water will be discontinued. As a result, no impacts on wetland habitats are expected.</p>																	
<p><b>Surface Water &amp; Hydrology:</b>  <u>Surface water quality</u>                      As a result of operational activities, there is a potential that spillages may occur during loading and transfer of the chromite product from the loading pads to the rail carts. This may result in the contamination of soils and associated water runoff.</p>	-	4	4	2	6	1	48	Moderate	<ul style="list-style-type: none"> <li>Weekly monitoring of site activities and machinery must be undertaken to identify spills or leaks;</li> <li>A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans should also be implemented;</li> </ul>	2	2	2	4	1	16	Low	66.7

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Groundwater</b>  <u>Groundwater Quality and Quantity</u>                      Based on the network of groundwater monitoring points within the mining rights area, the water quality is generally good with elevated groundwater quality levels within the tailing's facility footprint. The tailings facility, concentrator and associated infrastructure has been assessed and authorised under a previous EIA/EMPr process. This project will only focus on the additional surface infrastructure associated with the FCR project. Considering the limited footprint associated with the FCR plant, it is anticipated that the groundwater aquifer quality will not be impacted on during the operational phase. As per the engineering designs, the product pads will be located on a concrete hard stand, which will prevent any ingress of dirty water to the groundwater receiving environment. Groundwater impacts associated with the existing Amandelbult operations are assessed as part of the existing approved EMPr's and conditions of authorisations.</p>	5	2	1	2	1	25	Low	<ul style="list-style-type: none"> <li>The existing emergency response contingency plan will be implemented to address clean-up measures should a spill and/or a leak occur, as well as preventative measures to prevent ingress;</li> <li>Clean and dirty water separation systems must be implemented and maintained to ensure that any contaminated water does not contaminate the soil and water resources;</li> <li>All facilities with the potential to generate dirty storm water runoff, effluent or washdown water will be located within the designated dirty water area;</li> <li>Clean runoff will be diverted around the designated dirty areas by means of cut-off canals, sized to accommodate at least the 1:50 year peak flow event;</li> <li>Adequate erosion protection will be provided at the clean canal discharge locations;</li> <li>All pipeline routes will be inspected weekly to enable early detection of leaks;</li> <li>Washdown and waste water from the workshops will be passed through oil skimmers before discharging to the storm water system for containment in the PCD and eventual treatment for reuse;</li> <li>An inspection and maintenance plan will be implemented on the storm water system to ensure that all oil skimming and sediment handling facilities are maintained, and that storm water canals and pipelines remain unblocked and free flowing – monthly inspections will be carried out; and</li> <li>Continued implementation of the surface and ground water quality monitoring programme will be undertaken to detect any impacts.</li> </ul>	5	2	1	2	1	25	Low	0.0	
<p><b>Noise</b>  <u>Increased noise disturbance</u>                      The project area is located adjacent to existing mining related infrastructure. The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1). The proposed development is located on a relatively flat terrain, and the infrastructure is confined to a limited footprint. It is anticipated that loading of chromite onto rail carts during operation will result in an increase in ambient noise levels, however the impact will be localised.</p>	-	3	4	2	6	1	36	Moderate	<ul style="list-style-type: none"> <li>Equipment and/or machinery which will be used must comply with the manufacturer's specification acceptable noise levels;</li> <li>Ensure high level of equipment maintenance, especially intake and exhaust mufflers;</li> <li>Withdraw equipment for maintenance if change in noise emission characteristics is noticeable; and</li> <li>Maintain complaints and grievance register and act promptly to complaints regarding noise.</li> </ul>	3	3	2	4	1	27	Low	25.0
<p><b>Air Quality:</b>  <u>Increased dust levels:</u>                      The closest residential area (Rethabile village) is located approximately 230m to the North East, and 100m to the South West of the closest product pad (Product Pad 1). Dust generating activities such as materials handling, and windblown dust will be the major sources of dust during the project, however with the moisture content of the product at 8%, will assist in reducing dust emissions during handling and transfer of the chromite product.</p>	-	3	4	2	6	1	36	Moderate	<ul style="list-style-type: none"> <li>Undertake dust suppression (wet/chemical suppressants);</li> <li>Maintain a moisture content of 8% during the FCR process;</li> <li>When stockpiling ore, the design specification of equipment should be considered to determine a suitable drop height to control the fall of materials which will reduce dust emissions; and</li> <li>Continue with the existing Amandelbult air quality monitoring program.</li> </ul>	5	2	1	2	1	25	Low	30.6

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<b>Waste Management and Handling</b>																	
<b>Soils, Land Use and Land Capability:</b> <u>Soil Contamination</u> Contamination sources are mostly unpredictable and often occur as incidental spills or leaks from operational activities (including flocculants, diesels, oils). Thus, all the identified soils are considered equally predisposed to potential contamination.	-	4	3	1	6	1	40	Moderate	<ul style="list-style-type: none"> <li>Waste will be sorted into different waste streams for recycling;</li> <li>Storage of domestic and hazardous waste should be undertaken within designated waste storage facilities;</li> <li>The area must be clearly marked with signage boards and fenced off;</li> </ul>	4	1	1	2	1	16	Low	60.0
<b>Terrestrial Ecology:</b> <u>Habitat Degradation:</u> It is anticipated that there will be an ongoing limited impact on fauna and flora habitat. Incorrect waste management practices may impact on adjacent faunal and floral habitats.	-	4	3	2	6	1	44	Moderate	<ul style="list-style-type: none"> <li>Waste will be removed off site by a licenced contractor to a suitable licenced facility;</li> <li>Weekly monitoring of site activities and machinery must be undertaken to identify spills or leaks;</li> <li>A spill prevention and emergency spill response plan must be developed and be implemented in order to address clean-up measures should a spill and/or a leak occur;</li> </ul>	2	2	1	2	1	10	Low	77.3
<b>Surface Water &amp; Hydrology:</b> <u>Deterioration of water quality (spills):</u> As a result of operational activities, there is a potential that spillages may occur on or nearby the site. This may result in the contamination of surface water runoff. This impact may occur as a result of, storage of hazardous materials, handling of hazardous materials and accidental spillages of hazardous materials.	-	4	3	2	2	2	28	Low	<ul style="list-style-type: none"> <li>Clean and dirty water separation systems must be constructed and be maintained to contain spills/leaks;</li> <li>All facilities with the potential to generate dirty storm water runoff, effluent or washdown water will be located within the designated dirty water area;</li> <li>Clean runoff will be diverted around the designated dirty areas by means of cut-off canals, sized to accommodate at least the 1:50 year peak flow event;</li> <li>Adequate erosion protection will be provided at the clean canal discharge locations;</li> <li>Bunded containment and settlement facilities will be provided for hazardous materials, such as fuel and oil;</li> <li>Bund sizing will be done at 110% of the largest tank volume minus the volume occupied by any adjacent tanks in the same bund in accordance with SANS 10089-1, with an allowance of an additional 300 mm used for ballast stones placed in the tank bunds;</li> <li>Waste oil will be stored in drums in a bunded storage area;</li> <li>Hazardous waste will be stored according to the applicable regulations under the National Environmental Management: Waste Act (Act 59 of 2008) and the DWS Minimum Requirements;</li> <li>The hazardous waste storage area will, as a minimum, be paved with concrete, covered and provided with bunds and drainage facilities to collect and contain any spills or adversely affected runoff;</li> <li>Spill-sorb or a similar product will be kept on site, and used to clean up hydrocarbon spills in the event that they should occur;</li> <li>All pipeline routes will be inspected on a weekly basis to enable early detection of leaks;</li> <li>Washdown and waste water from the plant will be passed through oil skimmers before discharging to the storm water system for containment in the PCD and</li> </ul>	2	2	1	2	1	10	Low	64.3

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance	
							eventual treatment for reuse, or pumping to existing storm water management infrastructure; <ul style="list-style-type: none"> <li>An inspection and maintenance plan will be implemented on the storm water system to ensure that all oil skimming and sediment handling facilities are maintained, and that storm water canals and pipelines remain unblocked and free flowing – monthly inspections will be carried out;</li> <li>Spill-sorb or a similar type product must be kept on site and used to clean up hydrocarbon spills in the event that they should occur;</li> <li>Continued implementation of the surface and ground water quality monitoring programme should be undertaken to detect any impacts;</li> <li>Sorting of solid waste into recyclable and non-recyclable must be done; and</li> <li>Existing emergency response contingency plan must be implemented to address clean-up measures should a spill and/or a leak occur.</li> </ul>							

**Table 14-3: Closure Phase impacts associated with the proposed FCR Plant**

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<b>Demolition of all surface infrastructure</b>																	
<p><b>Soils, Land Use and Land Capability:</b>  <u>Potential for soil erosion:</u>                      During the closure phase all surface infrastructure will be removed (in line with the closure and rehabilitation plan). The site is located on a relatively flat terrain, which decreases the erosion hazard. While the identified soils display low susceptibility to erosion under current conditions, their susceptibility to erosion is likely to increase once the infrastructure is demolished and the site is cleared of infrastructure, and the soils will inevitably be exposed to wind and stormwater. Potential for soil erosion is expected to be confined to the immediate project footprint area.</p>	-	5	2	1	6	2	45	Moderate	<ul style="list-style-type: none"> <li>Regular dust suppression must be undertaken on bare soils during the closure and decommissioning phase;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation;</li> <li>Storm water management measures should be maintained until rehabilitation is complete;</li> <li>The landscape should be backfilled and reprofiled so as to mimic the natural topography for potential grazing opportunities post closure. If possible ensure a continuation of the pre-development surface drainage pattern;</li> </ul>	2	1	1	6	1	16	Low	64.4
<p><b>Soils, Land Use and Land Capability:</b>  <u>Potential for soil compaction and contamination:</u>                      Heavy equipment traffic during closure and decommissioning activities is anticipated to cause significant soil compaction. The severity of this impact is anticipated to be significant for the identified soil forms due to the high clay content of these soils.                      Contamination sources are mostly unpredictable and often occur as incidental spills or leak related to closure activities. Thus, all the identified soils are considered equally predisposed to potential contamination.                      This impact will however only be confined to the project area, which is less than 4.5 ha for all closure activities.</p>	-	5	2	1	6	2	45	Moderate	<ul style="list-style-type: none"> <li>All disturbed areas should be ripped to alleviate compaction;</li> <li>Stored topsoil should be replaced (if any) and the footprint graded in line with the closure plan;</li> <li>The soil fertility status must be determined by soil chemical analysis after levelling (before seeding/re-vegetation);</li> <li>Soil amelioration should be done according to the soil analyses as recommended by a soil specialist, in order to correct the pH and nutrition status before revegetation;</li> <li>Revegetate with an indigenous grass mix, to re-establish a protective cover, in order to minimise soil erosion and dust emissions;</li> </ul>	2	1	1	6	1	16	Low	64.4
<p><b>Soils, Land Use and Land Capability:</b>  <u>Changes to Land Capability / Land Use</u>                      Post mining, all infrastructure will be demolished (in line with the closure plan), and the infrastructure area will be rehabilitated. As a result, the land use will change from industrial to open space/grazing (in line with the closure plan).</p>	+						10	Low	<ul style="list-style-type: none"> <li>Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring);</li> <li>Storage of domestic and hazardous waste must be undertaken within designated waste storage facilities which is suitable lined and banded;</li> </ul>	4	5	2	6	3	52	Moderate	-420.0
<p><b>Surface Water &amp; Hydrology:</b>  <u>Deterioration of water quality (turbidity and spills):</u>                      During the demolition of infrastructure, the soils will be exposed and prone to erosion. Surface water runoff within the exposed area will have increased levels of turbidity and suspended solids. Water quality could also be impacted on by hydrocarbon spills as a result of demolition vehicles.</p>	-	2	2	2	4	1	16	Low	<ul style="list-style-type: none"> <li>Waste will be removed off site by a licenced contractor to a suitable licenced facility;</li> <li>Regular monitoring of site activities and machinery must be undertaken to identify spills or leaks;</li> <li>A spill prevention and emergency spill response plan must be developed and be implemented in order to address clean-up measures should a spill and/or a leak occur;</li> </ul>	2	1	1	6	1	16	Low	0.0
<p><b>Air Quality</b>  <u>Increase in dust fallout</u>                      During the decommissioning and closure phases, it is expected that all surface infrastructure will be demolished and removed, and the stockpiles on the product pads will be cleared. The areas will be rehabilitated after the demolition and clearing activities, leading into a closure phase. It is anticipated that rehabilitation measures will be implemented once the decommissioning activities are completed. The major dust generating sources during the decommissioning and closure phases will be windblown dust from open and bare areas, materials handling and vehicle entrainment of dust. It is expected that these sources will be emitting until all rehabilitation measures have been implemented.</p>	-	4	2	2	8	1	48	Moderate	<ul style="list-style-type: none"> <li>Clean and dirty water separation systems must be maintained until the end of the rehabilitation phase to ensure that any contaminated water does not contaminate the soil resources;</li> <li>Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring);</li> <li>Additional top soiling and revegetation of affected areas should be undertaken if weekly monitoring identifies the need;</li> </ul>	2	2	2	4	1	16	Low	66.7

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation							Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)		
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance	Probability		Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Terrestrial Ecology:</b>  <u>Habitat Loss:</u>                      During the construction phase, during clearing activities, most of the habitat loss would have already occurred. However, an increase in alien invasive plants could result in habitat loss and potential further faunal and floral habitat degradation due to edge effects. As Product Pad 2 is located within the secondary Dwaalboom Thornveld, alien invasive will have a greater impact than the area closer to the already disturbed footprints. This impact will continue during the demolition of infrastructure.</p>		4	2	2	6	1	40	Moderate	<ul style="list-style-type: none"> <li>Implement the existing alien and invasive plant control plan for the mine;</li> <li>Prevent all open fires;</li> <li>Provide fire safe zone facilities and suitable fire control measures;</li> <li>Use of trees, shrubs or any vegetation for fire making purposes is strictly prohibited;</li> <li>Contractors will not be allowed to harvest any natural resources;</li> <li>No faunal species may be hunted, trapped, snared or captured for any purpose whatsoever; and</li> <li>Fences and boundaries should be controlled weekly in order to locate and remove snares and traps.</li> </ul>	2	2	2	2	1	12	Low	70.0
<p><b>Groundwater</b>  <u>Water quality changes downstream</u>                      No impacts are anticipated on groundwater during the closure phase. However, continued monitoring should take place in line with the closure plan.</p>																	
<p><b>Visual:</b>                      During demolition of the FCR Plant and related infrastructure, all infrastructure will be removed decommissioned and removed off site. As a result, it is anticipated that there will be a positive impact on the visual aesthetics as the closure land use will change from industrial to open space/grazing (in line with the closure plan).</p>	+	4	5	2	4	1	44	Moderate	<ul style="list-style-type: none"> <li>Demolition of the infrastructure to be done in line with the closure and rehabilitation plan.</li> </ul>	4	5	2	4	1	44	Moderate	0.0
<p><b>Noise:</b>  <u>Increased noise levels</u>                      The demolition activities will result in increased noise levels; however it is anticipated that the noise impact will be not audible to very low based on the nature and scale of the activity. The demolition activities will only take place during daylight hours.</p>	-	3	2	2	6	1	30	Moderate	<ul style="list-style-type: none"> <li>Decommissioning and rehabilitation operations to be limited to day light hours;</li> <li>Machinery will comply with the standard conditions for noise output levels and which will not exceed 85.0dBA at 5m from the source;</li> <li>Ensure high level of equipment maintenance, especially intake and exhaust mufflers;</li> <li>Withdraw equipment for maintenance if change in noise emission characteristics is noticeable; and</li> <li>Maintain complaints and grievance register and act promptly to complaints regarding noise.</li> </ul>	2	2	2	4	1	16	Low	46.7
<p><b>Social</b>  <u>Loss of employment and enterprise development opportunities due to decommissioning of plant</u>                      During decommissioning and closure, all activities associated with the FCR plant will cease and therefore employment opportunities will be lost.</p>	-	5	5	3	8	1	80	High	<ul style="list-style-type: none"> <li>Develop and implement the Local and Human Resources Plan (LHRP) that addresses the impacts associated with retrenchment, job losses and reduced demand for local goods and services; and</li> <li>Develop a closure plan which will aim to reinforce the objectives of the SLP by reducing the reliance on Amandelbult Complex for employment by promoting skills transfer to enable alternative livelihoods.</li> </ul>	4	3	3	6	1	48	Moderate	40.0
<b>Active Rehabilitation</b>																	
<p><b>Soils, Land Use and Land Capability:</b>  <u>Potential for soil erosion:</u>                      During the closure phase all surface infrastructure will be removed (in line with the closure and rehabilitation plan). The site is located on a relatively flat terrain, which decreases the erosion hazard. While the identified soils display low</p>	-	5	2	1	6	2	45	Moderate	<ul style="list-style-type: none"> <li>Regular dust suppression must be undertaken on bare soils during the closure and decommissioning phase;</li> <li>Regulated speed limits of 40km/hr must be maintained to minimize dust generation;</li> </ul>	2	1	1	2	1	8	Low	82.2

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
susceptibility to erosion under current conditions, their susceptibility to erosion is likely to increase once the infrastructure is demolished and the site is cleared of mining related infrastructure, and the soils will inevitably be exposed to wind and stormwater. Potential for soil erosion is expected to be confined to the immediate project footprint area.																	
<p><b>Soils, Land Use and Land Capability:</b>  <u>Potential for soil compaction and contamination:</u>                      Heavy equipment traffic during closure and decommissioning activities is anticipated to cause significant soil compaction. The severity of this impact is anticipated to be significant for the identified soil forms due to the high clay content of these soils.                      Contamination sources are mostly unpredictable and often occur as incidental spills or leak related to closure activities. Thus, all the identified soils are considered equally predisposed to potential contamination.                      This impact will however only be confined to the project area, which is less than 4.5 ha for all closure activities associated with the FCR Plant and related infrastructure.</p>	-	4	4	1	6	1	44	Moderate	<ul style="list-style-type: none"> <li>Storm water management measures should be maintained until rehabilitation is complete;</li> <li>The landscape should be backfilled and reprofiled so as to mimic the natural topography for potential agricultural activities and grazing opportunities post mining. If possible ensure a continuation of the <b>premining</b> surface drainage pattern;</li> <li>All disturbed areas should be ripped to alleviate compaction. Stored topsoil should be replaced (if any) and the footprint graded in line with the closure plan;</li> <li>The soil fertility status should be determined by soil chemical analysis after levelling (before seeding/re-vegetation). Soil amelioration should be done according to the soil analyses as recommended by a soil specialist, in order to correct the pH and nutrition status before revegetation;</li> <li>Revegetate with an indigenous grass mix, to re-establish a protective cover, in order to minimise soil erosion and dust emissions;</li> </ul>	2	2	1	4	1	14	Low	68.2
<p><b>Soils, Land Use and Land Capability:</b>  <u>Changes to Land Capability / Land Use</u>                      Post mining, all infrastructure will be demolished (in line with the closure plan), and the infrastructure area will be rehabilitated. As a result, the land use will change from mining to open space/grazing (in line with the closure plan).</p>	+	2	2	1	4	1	14	Low	<ul style="list-style-type: none"> <li>Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring);</li> <li>The footprint of the proposed infrastructure area must be clearly demarcated to restrict vegetation clearing activities within the closure footprint;</li> </ul>	3	4	1	6	1	33	Moderate	-135.7
<p><b>Terrestrial Ecology:</b>  <u>Reinstatement of habitat:</u>                      Following the demolition of the infrastructure, the site will be rehabilitated in line with the closure plan. The provisional closure plan has recommended that post rehabilitation and closure, the proposed land capability will be grazing as defined by the Chamber of Mines.                      This is considered a positive impact as pre-construction the land use was considered transformed and disturbed due to historical activities on site.</p>	+	2	2	1	4	1	14	Low	<ul style="list-style-type: none"> <li>Regular dust suppression must be undertaken on bare soils during the closure phase;</li> <li>Storage of domestic and hazardous waste should be undertaken within designated waste storage facilities which is suitable lined and bunded;</li> <li>Waste will be removed off site by a licenced contractor to a suitable licenced facility;</li> <li>Regular monitoring of site activities and machinery must be undertaken to identify spills or leaks;</li> </ul>	3	4	1	6	1	33	Moderate	-135.7
<p><b>Surface Water &amp; Hydrology:</b>  <u>Deterioration of water quality (turbidity and spills):</u>                      During rehabilitation, the soils will be exposed and prone to erosion. Surface water runoff within the exposed area will have increased levels of turbidity and suspended solids. However, it is unlikely that any runoff will make its way to the Bierspruit (more than 2km away). Water quality could also be impacted on by hydrocarbon spills as a result of vehicle use and movement.</p>	-	2	2	1	4	1	14	Low	<ul style="list-style-type: none"> <li>A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans should also be implemented; and</li> <li>An emergency response contingency plan should be put in place to address clean-up measures should a spill and/or a leak occur, as well as preventative measures to prevent ingress.</li> </ul>	2	1	1	2	1	8	Low	42.9
<p><b>Surface Water &amp; Hydrology:</b>  <u>Reinstatement of catchment yield</u>                      Post mining, all infrastructure will be demolished (in line with the closure plan), and the infrastructure area will be rehabilitated. The catchment from the plant and product pad areas will be made free draining resulting in the reinstatement of the catchment area.</p>	+	2	3	1	2	1	12	Low		4	5	2	6	2	52	Moderate	-333.3
<p><b>Air Quality</b>  <u>Increase in dust fallout</u></p>	-	3	3	2	6	1	33	Moderate		2	2	2	4	1	16	Low	51.5



Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
During the decommissioning and closure phases, it is expected that all surface infrastructure will be demolished and removed. The areas will be rehabilitated after the demolition activities, leading into a closure phase. It is anticipated that rehabilitation measures will be implemented once the decommissioning activities are completed. The major dust generating sources during the decommissioning and closure phases will be windblown dust from open and bare areas, materials handling and vehicle entrainment of dust. It is expected that these sources will be emitting until all rehabilitation measures have been implemented. Once rehabilitation measures are implemented, the air quality will begin to gradually improve, and the impact of the rehabilitation phase will be positive. Continuous air quality monitoring during these phases will determine the improvement in air quality.																	
<b>Groundwater</b> <u>Water quality changes downstream</u> No impacts are anticipated on groundwater during the post closure phase. However, continued monitoring should take place in line with the closure plan.																	
<b>Noise:</b> <u>Increased noise levels</u> The rehabilitation activities will result in increased noise levels; however it is anticipated that the noise impact will be not audible to very low based on the nature and scale of the activity. The rehabilitation activities will only take place during daylight hours.	-	3	2	2	6	1	<b>30</b>	<b>Moderate</b>	<ul style="list-style-type: none"> <li>Decommissioning and rehabilitation operations to be limited to day light hours;</li> <li>Machinery will comply with the standard conditions for noise output levels and which will not exceed 85.0dBA at 5m from the source;</li> <li>Ensure high level of equipment maintenance, especially intake and exhaust mufflers;</li> <li>Withdraw equipment for maintenance if change in noise emission characteristics is noticeable; and</li> <li>Maintain complaints and grievance register and act promptly to complaints regarding noise.</li> </ul>	2	2	2	4	1	<b>16</b>	<b>Low</b>	46.7

**Table 14-4: Post Closure Phase impacts associated with the proposed FCR Plant**

Nature of the impact	Significance of potential impact <b>BEFORE</b> mitigation						Mitigation Measures	Significance of potential impact <b>AFTER</b> mitigation						degree of mitigation (%)			
	Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance		Probability	Duration	Extent	Magnitude	Loss of Resources (%)	Significance				
<p><b>Soils, Land Use and Land Capability:</b> After closure, all surface infrastructure has been removed and the site has been rehabilitated (in line with the closure and rehabilitation plan). There is a potential for soil erosion of the rehabilitated areas post closure.</p>	-	3	3	1	6	1	30	Moderate	<ul style="list-style-type: none"> <li>Undertake inspection of rehabilitated area to ascertain level of success of rehabilitation efforts and effectiveness (vegetation growth, erosion monitoring);</li> <li>Additional top soiling and revegetation of affected areas should be undertaken if required;</li> <li>Continue monitoring of rehabilitation activities for a period of 5 years following the mine closure (in line with closure plan);</li> <li>Undertake water quality monitoring in line with the closure plan; and</li> <li>Implement all recommendations as per the mine closure plan.</li> </ul>	2	2	1	4	1	14	Low	53.3
<p><b>Terrestrial Ecology:</b> After closure, all surface infrastructure has been removed and the site has been rehabilitated (in line with the closure and rehabilitation plan). There is a potential for an impact on vegetation reestablishment of the rehabilitated areas post closure.</p>	-	3	3	1	6	1	30	Moderate		2	2	1	4	1	14	Low	53.3
<p><b>Surface Water &amp; Hydrology:</b> Water quality changes downstream No impacts are anticipated on surface water during the post closure phase. However, continued monitoring should take place in line with the closure plan.</p>																	
<p><b>Groundwater</b> Water quality changes downstream No impacts are anticipated on groundwater during the post closure phase. However, continued monitoring should take place in line with the closure plan.</p>																	

## 15 Methodology used in determining the significance of environmental impacts

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

Based on the impacts presented in section 14, the EIA methodology will require that each potential impact identified is clearly described (providing the nature of the impact) and be assessed in terms of the following factors:

- Extend (spatial scale) - will the impact affect the national, regional or local environment, or only that of the site?
- Duration (temporal scale) - how long will the impact last?
- Magnitude (severity) - will the impact be of high, moderate or low severity?; and
- Probability (likelihood of occurring) - how likely is it that the impact may occur?

To enable a scientific approach for the determination of the environmental significance (importance) of each identified potential impact, a numerical value has been linked to each factor. The ranking scales applicable are shown in Table 15-1.

**Table 15-1: Significance rating methodology**

Occurrence	Duration	Probability
	5 – Permanent	5 – Definite/don't know
	4 - Long-term (ceases with the operational life)	4 – Highly probable
	3 - Medium-term (5-15 years)	3 – Medium probability
	2 - Short-term (0-5 years)	2 – Low probability
	1 – Immediate	1 – Improbable
	0 – None	
Severity	Extent/Scale	Magnitude
	5 – International	10 – Very high/uncertain
	4 – National	8 – High
	3 – Regional	6 – Moderate
	2 – Local	4 – Low
	1 – Site only	2 – Minor
0 – None		

Once the above factors had been ranked for each identified potential impact, the environmental significance of each impact can be calculated using the following formula:

$$\text{Significance} = (\text{duration} + \text{extend} + \text{magnitude}) \times \text{probability}$$

The maximum value that can be calculated for the environmental significance of any impact is 100.

The environmental significance of any identified potential impact is then rated as either: high, moderate or low on the following basis:

- More than 60 significance value indicates a high (H) environmental significance impact;
- Between 30 and 60 significance value indicates a moderate (M) environmental significance impact; and
- Less than 30 significance value indicates a low (L) environmental significance impact.

In order to assess the degree to which the potential impact can be reversed and be mitigated, each identified potential impact will need to be assessed twice.

- Firstly, the potential impact will be assessed and rated prior to implementing any mitigation and management measures; and
- Secondly, the potential impact will be assessed and rated after the proposed mitigation and management measures have been implemented.

The purpose of this dual rating of the impact before and after mitigation is to indicate that the significance rating of the initial impact is and should be higher in relation to the significance of the impact after mitigation measures have been implemented.

In order to assess the degree to which the potential impact can cause irreplaceable loss of resources, the following classes (%) are utilised (note that the Loss of Resources aspect will not affect the overall significance rating of the impact):

- 5 100% - Permanent loss;
- 4 75% - 99% - significant loss;
- 3 50% - 74% - moderate loss;
- 2 25% - 49% - minor loss; and
- 1 0% - 24% - limited loss.

The spatial extent of the cumulative impacts will vary from project to project. Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant, but may become significant when added to the existing or potential impacts eventuating from similar or diverse activities or undertakings in the area.

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

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

Alternatives considered are discussed in Section 9 of this document.

Table 15-2 details some of the alternative activities considered for the proposed project and lists the positive and negative impacts of each alternative activity. The comments and concerns raised by stakeholders will be captured into the comments and response report in Table 10-3. These comments will be taken into consideration and will inform the high-level mitigation measures that will be outlined in the EIA/EMP once all specialist studies have been done. Detailed mitigation measures will be further developed as part of the impact assessment phase.

**Table 15-2: Positive and negative impacts regarding project alternatives**

Positive Impacts	Negative impacts
Transportation of chromite product	
<b>Rail (preferred option)</b>	
<ul style="list-style-type: none"> <li>• Use of existing rail networks, with only an extension of the rail load out facility required.</li> </ul>	<ul style="list-style-type: none"> <li>• No significant negative impacts associated with this option.</li> </ul>
<b>Trucking (alternative)</b>	
<ul style="list-style-type: none"> <li>• Use of existing road networks, with only extension to connect.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase of traffic volumes on existing road networks.</li> <li>• Increased possibilities for road accidents involving vehicles and pedestrians.</li> <li>• Deterioration of existing road network due to additional heavy vehicles.</li> </ul>
<b>Operational activities</b>	
<ul style="list-style-type: none"> <li>• Extend the life of the existing Tailings Storage Facility</li> </ul>	

Positive Impacts	Negative impacts
<ul style="list-style-type: none"> <li>The development of a new Tailings Storage Facility will not be required.</li> <li>Reduced chrome levels to be disposed on the existing approved Tailings Storage Facility</li> </ul>	
<b>Socio-Economic</b>	
<ul style="list-style-type: none"> <li>Increased employment opportunities;</li> <li>Additional income will be generated by the proposed project for the increased chromite production, which will benefit the longevity of the Amandelbult Complex.</li> </ul>	<ul style="list-style-type: none"> <li>Limited employment opportunities will be created.</li> </ul>
<b>Technology and Invention</b>	
<ul style="list-style-type: none"> <li>Exploring new technology options for processing of fine chromite. This will have further benefits on other AAP operations.</li> </ul>	<ul style="list-style-type: none"> <li>The new technology proposed for this project has not been proven yet. As part of this project trial plants will be commissioned to test the technology.</li> </ul>

## 15.2 The possible mitigation measures that could be applied and the level of risk

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

Appropriate and site-specific management objectives will be determined and suggested for each activity. These objectives and outcomes will meet regulatory requirements, applicable standards, management requirements outlined in sector plans and tools. SRK will also employ the mitigation hierarchy wherever possible for risks and impacts to be minimized. Additionally, the management objectives and outcomes will be discussed with closure requirements in mind.

Management objectives for each activity will take into consideration the environmental and social context and features identified and be developed with closure in mind. SRK will also consider management measures identified through the stakeholder engagement process.

Management objectives and outcomes will be worded in a way that is auditable, logical and site specific and will include pragmatic undertakings for the applicant and realistic timeframes.

The comments and concerns raised by stakeholders will be captured into the comments and response report in Table 10-3. These comments will be taken into consideration and will inform the high-level mitigation measures that will be outlined in the EIA/EMP once all specialist studies have been done. Detailed mitigation measures will be further developed as part of the impact assessment phase.

## 15.3 Motivation where no alternative sites were considered.

Alternatives considered are discussed in Section 9 of this document.

## 15.4 Statement motivating the preferred site

*(Provide a statement motivating the final site layout that is proposed).*

Alternatives relating to technology and product transportation are being considered for the authorisation. However, the location of the proposed project is constrained to the location of the mineral resource, and proven reserve, as well as the location of the existing Concentrator and Chrome Plant. As such, no property alternatives were deemed viable for consideration by the project.

The preferred alternative currently being considered is a small footprint area located in close proximity to the existing infrastructure.

## 16 Process undertaken to identify, assess and rank the impacts

*(Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity including:*

- i. a description of all environmental issues and risks that were identified during the environmental impact assessment process and*
- ii. an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).*

All the anticipated impacts as well as significance for the proposed project during the life of the project have been included in the impact assessment tables in Section 1.

Mitigation measures associated with each impact and risk are also included in these tables.

Potential impacts were identified using a standardised method that forms part of methodology that the EAP utilised as described in Section 11. This process involved:

- Observations based on the site visits;
- Input from the specialist surveys, baseline assessments and recommendations;
- Input from stakeholder engagement;
- Input from the desktop analysis of relevant sector plans and available land use planning tools;
- Consultation and discussions with the project team; and
- Application of previous knowledge and experience by the EAP for these types of projects in the Limpopo province.

Additionally, the EAP has provided inputs into the planning process and assisted in highlighting potential risks, and continued to do so during the EIA process. This included the identification and discussion of project impacts from various disciplines involved in the project. Environmental and social impacts have been incorporated into this process throughout the duration of the EIA process. Currently this process has resulted in a positive influence on the design and proposed layout based on environmental and social impacts, as well as the proposed future mining projects of Haakdoorndrift.

The first stage of impact assessment was the identification of environmental activities, aspects and impacts. This was supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are as follows:

- An activity is a distinct process or task undertaken by an organization for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are controlled by an organisation;
- An environmental aspect is an 'element of an organizations activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact;
- Environmental risks/impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is:
- Receptors comprise, but are not limited to people or man-made structures;
- Resources include components of the biophysical environment;
- Frequency of activity refers to how often the proposed activity will take place;

- Frequency of impact refers to the frequency with which a stressor (aspect) will impact on the receptor;
- Severity refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact; controversy potential and precedent setting; threat to environmental and health standards;
- Spatial scope refers to the geographical scale of the impact; and
- Duration refers to the length of time over which the stressor will cause a change in the resource.

The significance of the impact was then assessed by rating each variable according to defined criteria. The purpose of the rating was to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring. The likelihood and consequence of the impact were then read off a significance rating matrix to determine the significance of the impact and whether mitigation is necessary.

The assessment of significance was undertaken twice. Initial significance was based only on natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment took into account the recommended management measures required to mitigate the impacts. Measures such as demolishing infrastructure, and rehabilitation of land, were considered post-mitigation.

## 17 Assessment of each identified potentially significant impact and risk

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

*The supporting impact assessment conducted by the EAP must be attached as an Appendix)*

The listed activities associated with the FCR Plant project is provided in Table 3-1.



## 18 Summary of specialist reports

*(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form).*

### 18.1 Description of Specialist Recommendations

A number of specialist studies were undertaken as part of the Environmental Authorisation process. The specialist studies included baseline assessments, impact identification and related management measures, and recommendations for monitoring. Recommendations from the specialist studies have been included in the impact tables in Section 12. Specialist studies have been finalised and are included as Appendix 6 to this EIA/EMPr report.

**Table 18-1: Summary of specialist reports**

Specialist Study	Recommendation	Included in EIA Report	Reference Report
<i>List of studies undertaken</i>	<i>Recommendation of specialist reports</i>	<i>Specialist recommendation that have been included in the EIA report (Mark with X were applicable)</i>	<i>Reference to applicable section of report where specialist recommendations have been included</i>
Terrestrial Ecology	<ul style="list-style-type: none"> <li>• Proliferation of alien and invasive plant species are expected within any disturbed area. These species should be removed and controlled as per an AIP control plan, to prevent further spread and proliferation of these species.</li> <li>• Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. All prescribed quantities and instructions provided for use of specific herbicides must be adhered to;</li> <li>• Footprint areas should be kept as small as possible when removing alien and invasive plant species so as to minimise exposed soils; and</li> <li>• Should any floral SCC be encountered, relocation of individuals to a suitable similar habitat outside of the disturbance footprint should occur. All relocation activities should be overseen by a suitably qualified specialist and where applicable, the relevant authorities must be informed, and relevant permits obtained.</li> <li>• Should any SCC or other threatened or protected faunal species be noted within the proposed footprint areas, a suitably qualified faunal specialist is to be consulted in order to determine the best way forward; and</li> <li>• No trapping or hunting of fauna is to take place</li> </ul>	x	Section 14
Soils, Land Use and Land Capability	<ul style="list-style-type: none"> <li>• The footprint of the proposed infrastructure area should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible;</li> <li>• If possible, vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive stormwater and wind are anticipated to be low;</li> <li>• Bare soils can be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast;</li> <li>• All disturbed areas adjacent to the infrastructural areas can be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission;</li> <li>• Temporary erosion control measures may be used to protect the disturbed soils during the construction phase until adequate vegetation has established</li> <li>• Infrastructure sites should be accessed through existing road network, where feasible to avoid unnecessary excavation;</li> </ul>	x	Section 14

Specialist Study	Recommendation	Included in EIA Report	Reference
	<ul style="list-style-type: none"> <li>• Excavation and long-term stockpiling of soil should be limited within the demarcated areas as far as practically possible;</li> <li>• Separate stripping, stockpiling and replacing of soil horizons (A and B horizon) in the original natural sequence to combat hardsetting and compaction, and maintain soil fertility;</li> <li>• Stockpile should not exceed three (3) meters in height and should be treated with temporary soil stabilization and erosion control measures;</li> <li>• Stockpiles should be revegetated to establish a vegetation cover as an erosion control measure. These stockpiles should also be kept alien vegetation free at all times to prevent loss of soil quality;</li> <li>• Temporary berms can be installed, if necessary, around stockpile areas whilst vegetation cover has not established to avoid soil loss through erosion;</li> <li>• The recovered soils should be re-used to rehabilitate the mine footprint following mine closure;</li> <li>• Soil resources of similar characteristics must be imported back to the site to compensate for soil loss that will occur during activities associated with mining: and</li> <li>• The landscape should be reprofiled as to mimic the natural topography, in a manner that allows water to freely drain to the downgradient receiving environment post closure to avoid water ponding which will subsequently lead to water logging conditions.</li> </ul>		
Air Quality	<ul style="list-style-type: none"> <li>• Based on the findings of the assessment undertaken by SRK, the following are recommended:</li> <li>• The current air monitoring network is to be maintained during the proposed operations for FCR to determine if there is any change in ambient concentrations. AOL should consider installing particulate matter monitors (i.e. PM10 and PM2.5) at the mine.</li> <li>• During pre-construction and construction activities the following management measures should be implemented:</li> <li>• Apply dust suppressants or vegetate bare areas not being used for construction.</li> <li>• Locate soil stockpiles within site boundaries considering the location of potential sensitive receptors and the predominant wind direction.</li> <li>• Set speed limits to minimise the creation of fugitive dust within the project boundary.</li> <li>• In terms of operational activities, the following should be implemented:</li> <li>• Maintain a moisture content of 8% during the FCR process;</li> <li>• Attend to dust control when loading rail wagons by minimising drop heights to a suitable height above the rail wagon and prevention of over loading.</li> <li>• Limit load size to reduce spillage and cover final product loads with tarpaulins, if needed.</li> <li>• When stockpiling ore, the design specification of equipment should be considered to determine a suitable drop height to control the fall of materials which will reduce dust emissions.</li> <li>• Conduct routine site inspections to ensure that dust management measures are working efficiently</li> </ul>	x	Section 14

Specialist Study	Recommendation	Included in EIA Report	Reference
Heritage	<ul style="list-style-type: none"> <li>Due to the mentioned factors, the chances therefore of finding any heritage related features are indeed extremely slim. It is therefore believed that an additional Heritage Impact Assessment (HIA) is not needed for this project and any of the alternatives can be used. This letter serves as an exemption request to the relevant heritage authority.</li> <li>The developer should however note that due to the nature of archaeological material, such sites, objects or features, as well as graves and burials may be uncovered during construction activities on site. In such a case work should cease immediately and an archaeologist should be contacted as a matter of urgency to assess such occurrences.</li> </ul>	x	Section 14
Surface Water	<ul style="list-style-type: none"> <li>There is no flow in the Bierspruit for most of the year due to its non-perennial character. However, occasional flash flooding (flows shorter than four hours in duration) may occur following periods of heavy rainfall in the catchment. The use of water in the Bierspruit within or downstream of Amandelbult is limited to wildlife watering in the mine's nature reserve and the aquatic ecology. Aquatic ecology is supported in the Bierspruit as pools are formed in the non-perennial tributary.</li> <li>Mining and related activities have impacted negatively on the surface water quality and aquatic habitat of the Bierspruit. The significance of many of the surface water related environmental impacts associated with the proposed Amandelbult FCR are considered to be of moderate (-) significance, in the absence of appropriate mitigation measures. With the implementation of appropriate management measures, these impacts can be further reduced to low (-) significance.</li> <li>It is therefore envisaged that it will be possible to effectively manage any identified surface water impacts in accordance with national and international industry standards.</li> </ul>	x	Section 14

## 18.2 Environmental Impact Statement

### 18.2.1 Summary of key findings of the environmental impact assessment

The impact assessment confirmed that the proposed activities (without mitigation) are expected to have impacts of mostly moderate significance rating in relation to: soils; land use and land capability; noise; surface water and socio-economic conditions.

After mitigation measures are applied, most impacts will be considered low with the exception of socio-economic aspects. A number of positive impacts were also identified. Section 12 outlines all identified impacts for the FCR Project.

It is recommended that additional surface water monitoring points be included in the monitoring plan to obtain more detailed baseline information downstream from the proposed FCR Plant and associated product pads location.

### 18.2.2 Final site map

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

A map that includes all proposed activities, associated infrastructure and sensitive receptors is included as Appendix 8. All environmental and social aspects have been included to identify project area sensitivities.

### 18.2.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Impact identification, mitigation and management measures associated with the project is included in Section 12.

## 18.3 Proposed impact management objectives and the impact management outcomes for inclusion in the EIA

*(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation).*

Identified negative environmental impacts are managed and mitigated whilst positive impacts are enhanced through the implementation of the EMPr. Amandelbult Complex is responsible for ensuring that all environmental obligations are met. The implementation of the EMPr and meeting the environmental objectives and targets is also a responsibility of Amandelbult Complex.

The implementation of the environmental mitigation and management measures is monitored through the EMPr Performance Assessment process, which is reported on to the DMR.

Amandelbult Complex is actively involved in the community whereby funds are made available for the development of local infrastructure and social upliftment through CSI projects and SLP commitments.

## 18.4 Final proposed alternatives

*(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment).*

Refer to Section 16.

## 18.5 Aspects for inclusion as conditions of Environmental Authorisation

*(Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation).*

The following conditions should be included in the environmental authorisation for the FCR Plant project:

- To ensure compliance with, and implementation of the EMP by -
  - Appointing of a suitably qualified individual to oversee implementation of the EMP during all phases of the project
  - Appointing a suitably qualified Environmental Control Officer/Superintendent to undertake audits on a regular basis throughout the construction phase;
- To ensure that all staff, contractors and sub-contractors are aware of and understand the requirements of the EMP and environmental issues in relation to their individual areas of work by-
  - Developing an induction and training program covering the EMP, environmental awareness, dealing with environmental incidents and waste management
  - Advising staff commissioned during pre-construction and construction, including sub-contractors, of EMP requirements through the induction program as well as on notice boards at the contractor's camps during construction and notice boards during operation. These notice boards should cover the EMP, environmental awareness, dealing with emergencies and waste management;
- Implementing an Environmental Emergency Preparedness Procedure and the non-conformance and compiling the corrective action procedure for the projects. This is to be implemented in emergency situations such as oil or fuel leaks and spills, fires, sewage spillage. The Emergency preparedness procedure must include requirements to contact the Environmental Coordinator following an emergency or incident;
- Potential impacts identified should be monitored during all phases of the projects. Monitoring will form an important aspect of the mine's operations. Management measures will be amended to address the impacts if analysis of monitoring trends indicates this may be necessary. Monitoring of the operations, in accordance with their operating plans and protocols, will also form an important activity to ensure their long-term sustainability;
- Through the Amandelbult Complex internal auditing and reporting processes and environmental audits (as per the requirements of NEMA EIA Regulations, 2014 and NEMA Closure Regulations, 2015) and other legislated reporting, Amandelbult Complex should continue to examine the proposed management commitments for the life of mine with a view to continually improve and reduce negative impacts and enhance positive impacts where achievable;
- As it is almost impossible to locate all the cultural resources in a given area, the following Chance Find Procedure must be adhered to, should a heritage site be uncovered -
  - Stop all work on site
  - Demarcate area so that access is restricted for contractors and the general public
  - Contact heritage specialist to assess the site
  - Document the following:
    - Photograph of find
    - GPS coordinates
    - Basic description (e.g. graves, stone walling, stone tools)
    - If graves, try to include number of graves as well as oldest and youngest date of death indicated
  - Await feedback from heritage specialist and SAHRA prior to commencing with activities; and
- A water use licence application should be applied for and granted, prior to the commencement of the operational activities proposed project.

## 18.6 Description of any assumptions, limitations, uncertainties and gaps in knowledge

*(Which relate to the assessment and mitigation measures proposed).*

The following assumptions and limitations have been identified with regards to the environmental baseline, impacts and mitigation measures:

- All the technical data, project description and information provided by the client project team to the EAP and specialists is pre-feasibility level. The EAP and specialists have identified all possible impacts based on the information provided and these have been assessed and rated accordingly;
- All specialist modelling undertaken for this authorisation process is predictive modelling based on qualitative data and therefore will need to be updated once quantitative data becomes available during the feasibility and construction stages, as well as during construction and operation phase;
- The public participation process has sought to involve key stakeholders and individual landowners. It is assumed that where participation has been sought from the organizational representative/s, that these parties have the authority to comment on behalf of their organisation;
- The public participation process provided ample opportunity for stakeholders to express any issues and concerns;
- All comments received from the authorities are included and considered;
- Amandelbult Complex and its contractors will implement the management measures contained in the EMP;
- A monitoring and evaluation system, including auditing, will be established in line with this EMP to track the implementation of this specific EMP to ensure that management measures are effective to avoid, minimize and mitigate impacts; and that corrective action is being undertaken to address shortcomings and/or non-performances;
- Amandelbult Complex will adopt a process of continual improvement when managing and/or mitigating negative environmental impacts arising from the project. The EMP will be used as the basis of environmental management and will be improved and refined regularly; and
- Project monitoring will determine the validity and accuracy of the predictions made. Any exceedances of parameters or complaints from stakeholders will be investigated and remedied by the mine when required to do so.

## 18.7 Reasoned opinion as to whether the proposed activity should or should not be authorised

### 18.7.1 Reason why the activity should be authorised or not

There were no fatal flaws identified for the FCR Plant project during the EIA process. However, several environmental and social impacts are envisaged from construction phase through to post-closure, which require careful mitigation and monitoring. It is the opinion of the EAP that all major impacts have been identified and have been assigned appropriate management measures. Most Moderate negative impacts with mitigation, are reduced to a Low significance, and can be managed accordingly.

It is recommended by the EAP that the proposed FCR Plant project could be authorised, on the assumption that the environmental and social management commitments included in this EIA/EMP are adhered to and that the project description reflects what is provided in this document.

It is recommended that additional surface water monitoring points be included in the monitoring plan to obtain more detailed baseline information downstream from the proposed FCR Plant and associated product pads location.

### 18.7.2 Conditions that must be included in the authorisation

Refer to Section 18.5 for conditions to be included in the EA.

### 18.7.3 Specific conditions to be included into the compilation and approval of EMPr

Refer to Section 18.5 for conditions to be included in the EA.

### 18.7.4 Rehabilitation Requirements

Refer to Section 18.5 for conditions to be included in the EA.

## 18.8 Period for which the Environmental Authorisation is required

It is estimated that adequate reserves remain for the LOM extending to at least 2050. As the FCR Plant will receive its tailings from the concentrator for secondary processing, the project should be authorised until the end of LoM. It is envisaged that the construction of the projects will take approximately 1 year. The operational, closure and post-closure timeframes associated with these projects will be in line with the current LOM of 2050.

## 18.9 Undertaking

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

The EAP undertakes that the information provided in PART A of this document is correct, and that the comments and inputs from stakeholders have been correctly recorded in the report. Refer to Part B, Section 18.7 for the EAP's signed undertaking.

## 18.10 Financial Provision

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

The mining of the FCR Plant will increase the existing liability associated with R 4 553 981.08, a detailed breakdown is provided for in Table 19-4.

### 18.10.1 Financial provision methodology

The liability for closure of the aspects associated with the proposed FCR Plant project has been determined using the approach advocated in the Department of Minerals and Energy (DME) now the Department of Mineral Resources (DMR) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions Provided by a Mine (2005).

The approach to calculating the closure quantum as specified in the DMR Guideline which was utilised in this assessment is as summarised as follows and is reported in Table 2-2:

- Step 1: Determine the Mineral Mined
  - In the first step the mineral mined has been identified in the tables provided in the DMR guideline (Table B.12) as "Platinum Group Metals (PGM)";
- Step 2A: Determine Primary Risk Class
  - The "Primary Risk Class" has been determined from Table B.12 of the DMR Guideline as "B (Medium Risk)" (underground mines have a minimum risk rating of B);
- Step 2B: Revision of Primary Risk Class
  - The Primary Risk Class can be revised on the basis of saleable by-products if required.
- Step 3: Determine Environmental Sensitivity;
  - The "Environmental Sensitivity" has been determined by reference to Table B.4 of the DMR Guideline as "Medium";
- Step 4.4 determination of weighting factors;
  - Weighting Factor 1: The nature of the terrain where the operation is located is flat; and
  - Weighting Factor 2: The proximity of the operation to an urban centre. In this instance the proposed proposed FCR Plant project is considered peri urban.



## 18.10.2 Confirmation of financial provision value

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

In terms of Section 41, Regulations 53 and 54 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), Amandelbult Complex is required to make financial provision for the interim and final rehabilitation activities on the site. This provision is reviewed annually for adequacy and amended to compensate for new activities and/or inflation. During the annual review, confirmation will be provided that this amount can be provided for from operating expenditure.

Amandelbult Complex will provide for the closure liability associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.

## 18.11 Deviations from the approved scoping report and plan of study

*(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).*

### 18.11.1 Motivation for the deviation

As mentioned in Section 4.1, the listed activities table has been amended from the application and scoping phase to exclude the following:

- Railway extension – GNR 983, Activity 64;
- Identification of sensitive area – GNR 983, Activity 30; and
- Land use – GNR 985, Activity 15.

In addition, the project footprint area has increased from 4.5ha to 10.85ha (related to GNR 983, Activity 27).

#### Product Pads

During the application phase, the project description included only one product pad, however during the engineering design refinement, it was identified that additional product pad storage area is required. As a result, additional storage pads have been included as part of the EIA/EMPr, and specialist study phase.

The additional product storage pads are located directly adjacent to the location of the proposed FCR Plant, and will allow loading onto the new railway line. The mitigation measures associated with the proposed additional product storage pads are the same as the initial proposed product storage pads.

The project footprint during the application and scoping phase was approximately 4.5ha (combined). With the above mentioned additions, the footprint has expanded to approximately 9ha.

The project footprint is still confined within the farm Amandelbult 383 KQ, Portion 0.

#### Railway line

During the application phase, the extension of the railway line was included in the project description and as a listed activity. The railway line however is included in a separate EIA/EMPr that was submitted in September 2017. The FCR Plant project description will therefore only require a loading area associated with the railway line.

## 18.12 Other information required by the Competent Authority

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

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

*(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix and confirm that the applicable mitigation is reflected herein).*

Socio-economic impacts and management measures are provided in Section 1.

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

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

A heritage impact exemption was undertaken for the projects. According to this study, no sites, features or objections of cultural significance have been identified within the project area. Therefore no heritage impacts have been identified. A chance find procedure for heritage resources is included in Section 1.

### 18.12.3 Other matters required in terms of Sections 24(4)(a) and (b) of the Act

*(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix).*

Not applicable.

## Part B

# Environmental Management Programme Report

## 19 Environmental Management Programme Report

### 19.1 Details of EAP

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

The EAPs involved in the compilation of this EMPr consolidation Report and their contact details are provided in Section 2.1.

### 19.2 Description of the Aspects of the Activity

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

Refer to Section 8 of the report that detailed the aspects related to this activity.

### 19.3 Composite Map

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

Refer to Figure 4-3 for the location of the proposed FCR Plant Project and the sensitivity map.

### 19.4 Description of Impact management objectives including management statements

Impact identification, mitigation and management measures associated with the project is included in Section 12.

### 19.5 Determination of closure objectives

The overall closure goal for the project area is to progressively re-instate an area that is safe, stable and non-polluting with the final landform not adversely affecting water resources and land uses.

The vision is underpinned by the objectives listed below:

- Rehabilitate all disturbed land to a condition that facilitates compliance with applicable environmental quality objectives (e.g. air and water quality objectives);
- Reduce the visual impact of the mine components through rehabilitation of all disturbed land;
- Rehabilitate all disturbed land to a condition where post-closure management is minimised;
- Adhere to all statutory and other legal requirements;
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks;
- Ensure that closure supports productive uses considering pre mining conditions and are in agreement with commitments to stakeholders;
- Physically and chemically stabilise remaining structures to minimise residual risks;
- Promote bio-diversity and biological sustainability to the maximum extent practicable; and
- Utilise closure strategies that promote a self-sustaining condition with little or no need for on-going care and maintenance.

## 19.6 Process to managing any environmental damage, pollution as a result of undertaking a listed activity

The sources that could potentially impact on the water resource within the FCR Plant Project area and the potential mechanism of impacts are indicated in Table 19-1.

**Table 19-1: Potential pollution sources of the FCR Plant project**

Potential pollution source	Description	Potential mechanism of impact
<b>Construction Phase</b>		
General earthworks	Stripping of topsoil and civil works undertaken	<ul style="list-style-type: none"> <li>Increased turbidity and suspended solids enters watercourses</li> </ul>
Construction vehicles	Movement of construction vehicles	<ul style="list-style-type: none"> <li>Increased turbidity and suspended solids</li> </ul>
	Servicing of construction vehicles	<ul style="list-style-type: none"> <li>Increase in hydrocarbon concentrations</li> </ul>
<b>Operational Phase</b>		
Operation of FCR Plant	The FCR plant will be a wet process, and the final product will be stockpiled for rail transport.	Potential destruction of or damage to sensitive wetlands
Pollution control dams and associated silt traps	Lined facilities	<ul style="list-style-type: none"> <li>Seepage to aquifers if liner integrity is compromised.</li> <li>Spillage will be captured in dirty water management system and could result in an impact if not contained.</li> </ul>
Dirty water management system	Concrete lined canals	<ul style="list-style-type: none"> <li>Seepage to aquifers if integrity is compromised.</li> <li>Potential spillage into watercourses if design capacity is breached due to lack of maintenance.</li> </ul>
Workshops	Oil and silt traps	<ul style="list-style-type: none"> <li>Local hydrocarbon impact if compromised</li> </ul>
Bulk fuel & oil storage facilities	Bunded areas	<ul style="list-style-type: none"> <li>Local hydrocarbon impact if compromised</li> </ul>
Spill from PCD	In excess of 1:50 year flood event	<ul style="list-style-type: none"> <li>Deterioration in water quality</li> </ul>
<b>Closure Phase</b>		
Removal of infrastructure	All material and infrastructure removed for reuse, or for disposal at an appropriately licensed facility. Rehabilitation of the footprint.	<ul style="list-style-type: none"> <li>Increased turbidity and suspended solids</li> </ul>
Demolition vehicles	Movement of demolition vehicles	<ul style="list-style-type: none"> <li>Increased turbidity and suspended solids</li> </ul>
	Servicing of demolition vehicles	<ul style="list-style-type: none"> <li>Increase in hydrocarbon concentrations</li> </ul>

## 19.7 Potential risk of acid mine drainage

The mineralogy indicate that no potentially acid forming sulphidic minerals are detected. This was confirmed through the Acid Base Accounting previously conducted, which indicated that the samples contain an excess of neutralising minerals relative to potentially acid forming minerals indicating that the samples geochemically classify as non-acid forming. Therefore, there is no potential risk for Acid Mine Drainage associated with this project.

## 19.8 Has a water use licence has been applied for?

The Amandelbult Complex operates under Water Use License (WUL) No. 03/A24F/ABCEFGIJ/3684, with File number: 27/2/2/A324/4/9.

The proposed project will require additional activities to be authorised. A WULA process has been initiated with the Department of Water and Sanitation (DWS) for Section 21 (g) relating to the proposed dirty water containment facility.

The WULA process is due for final submission in July/August 2019.

## 19.9 Impacts to be mitigated in their respective phases

Impact identification, mitigation and management measures identified for each phase of the FCR Plant projects are Section 12. Compliance standards that are applicable to the identified impacts are included in Table 19-2.

**Table 19-2: Compliance Standards to be achieved with regards to environmental aspects**

Environmental aspect	Phase/Time period	Standard to be achieved	Compliance with standards
Soils, Land Use and Land Capability	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>To prevent soil contamination by implementation of:</li> <li>Inspection and maintenance Plan;</li> <li>Leak/Spill Procedure'</li> <li>Emergency Preparedness Plan;</li> <li>Waste Management; and</li> <li>GN704 Audit Report.</li> </ul>	<ul style="list-style-type: none"> <li>Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331).</li> <li>Anglo American Policies and Guidelines to manage and remediate spills.</li> </ul>
Terrestrial Ecology	Continuous during construction, operations and closure.	<p>To demonstrate active stewardship of land and biodiversity by:</p> <p>Identifying and removing relevant species if necessary; and</p> <p>Implementing the Biodiversity Action Plan</p>	<p>Anglo American Biodiversity Performance Standards</p> <p>Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331).</p> <p>Anglo American Policies and Guidelines to manage and remediate spills.</p> <p>GNR 893 Minimum Emission Standards.</p> <p>Anglo American Air Quality Performance Standards.</p> <p>Highveld Priority Area Air Quality Management Plan.</p>
Surface water	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>To avoid or where not possible, minimise and remedy pollution of water</li> <li>Implementing a Leak/Spill Procedure;</li> <li>Continuously implementing the surface water monitoring programme;</li> <li>Compiling monitoring report;</li> </ul>	<ul style="list-style-type: none"> <li>Drinking water standards (SANS241:2011)</li> <li>Anglo American Policies and Guidelines to manage and remediate spills.</li> </ul>

Environmental aspect	Phase/Time period	Standard to be achieved	Compliance with standards
		<ul style="list-style-type: none"> <li>Implementing the Stormwater Management Plan; and</li> <li>Responding to complaints and implementing a grievance mechanism.</li> </ul>	
Groundwater	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>No dirty water spillage to the catchment thereby preventing contamination of waterbodies downstream by:</li> <li>Continuously implementing the groundwater monitoring programme and model; and</li> <li>Responding to complaints and implementing a grievance mechanism with regards to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>Anglo American Policies and Guidelines to manage and remediate spills.</li> <li>Water Quality Objectives as specified in the Water Use License issued by DWS \South African National Standard (SANS) 241:2011 Drinking Water Standards</li> <li>Complaints register to record complaints regarding groundwater</li> </ul>
Air Quality	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>To minimise the entrapment potential of dust.</li> <li>To keep PM10 (and in the future, PM2.5) and dust fallout levels at key receptor sites around the project area within guideline levels. As the guidelines vary depending on the priority area and year, the South African Air Quality Information System (<a href="http://www.saaqis.org.za/">http://www.saaqis.org.za/</a>) will be consulted for the most recent guidelines.</li> <li>These aforementioned standards will be achieved by:</li> <li>Continuously implementing the dust monitoring programme; and</li> <li>Providing evidence of dust suppression.</li> </ul>	<ul style="list-style-type: none"> <li>GNR 893 Minimum Emission Standards.</li> <li>Anglo Air Quality Performance Standards.</li> </ul>
Noise	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>To minimise noise impacts on sensitive receptors by:</li> <li>Developing a complaints register to record complaints regarding noise.</li> <li>To maintain noise levels at the standards for suburban areas (SANS 10103) as far as practicable.</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, the national standard for the calculating and predicting of road traffic noise</li> <li>SANS 10328 of 2008</li> <li>Noise Control Regulations – General Notice R154 of 10 January 1992</li> </ul>
Heritage	Continuous during construction, operations and closure.	<ul style="list-style-type: none"> <li>To ensure heritage resources are not damaged during the mining process</li> </ul>	<ul style="list-style-type: none"> <li>Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925).</li> </ul>
Social	Continuous during construction,	<ul style="list-style-type: none"> <li>To enhance benefits from the development of the Project;</li> </ul>	<ul style="list-style-type: none"> <li>Anglo American Closure Toolbox.</li> <li>Anglo American Social Way</li> </ul>

Environmental aspect	Phase/Time period	Standard to be achieved	Compliance with standards
	operations and closure	<ul style="list-style-type: none"> <li>• To maximize opportunities for local residents;</li> <li>• To facilitate employment of local labour on the Mine; and</li> <li>• To avoid creating unrealistic expectations.</li> <li>• These standards will be achieved by the implementation of the SLP.</li> <li>• To ensure that retrenched employees can pursue alternative livelihoods by:</li> <li>• Developing a Closure Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Anglo American Environmental Way</li> </ul>

## 19.10 Financial Provision

### 19.10.1 Determination of Financial Provision

The baseline conditions of the project study area were taken into consideration during the compilation of the financial provision calculations. The detailed Closure Report is attached as Appendix 6. The closure objectives were considered in Section 18.5. These objectives were used to inform the financial provision calculations.

### 19.10.2 Informing Stakeholders of Closure Objectives

Stakeholder engagement during the Impact Assessment Phase involves the availability of the EIA/EMPr for public review and meetings with stakeholders to provide information on the following:

- The project description (site layout, alternatives investigated) and the surrounding baseline environment;
- Findings from the specialist studies undertaken;
- Potential biophysical and socio-economic impacts during construction, operations, closure and post-closure phases of the project;
- Management/mitigation measures developed to address the potential impacts;
- The closure objectives, plan and financial provision; and
- Details on how stakeholders can comment on the EIA/EMPr.

### 19.10.3 Rehabilitation Plan

The rehabilitation actions that the mine intends undertaking at the end of the life of mining activities for the FCR Plant project are described below.

#### Infrastructure

All infrastructures will be decommissioned and the footprints rehabilitated for the establishment of vegetation.

Material inventories will be managed near the end of operations to minimize any surplus materials at closure. Fuel, lubricants and other materials needed to support the closure activities will be utilized during the closure period.

All equipment will be rinsed with raw water and rinsate will be captured in the internal water management infrastructure for evaporation.

Where practicable, equipment and materials with value not needed for post-closure operations will be sold and removed from the site. All other equipment will be demolished and disposed of on-site. Equipment with scrap or salvage value will be removed from the plant and stored either in the existing salvage yard or in a facility designated for this purpose during the closure period.

A soil contamination investigation will be conducted on completion of demolition activities, particularly in excavations remaining open following decommissioning. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil closure criteria are obtained.

Excavations remaining following demolition and foundation and slab removal and those where contamination remediation has been undertaken will be filled with waste rock and covered with 300 mm of growth medium.

Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any demolition works;
- All remaining inert equipment and demolition debris will be placed in the base of the box cut or failing this into the nearest general waste disposal facility;
- Salvageable equipment will be removed and transported offsite prior to the commencement of demolition;
- All fittings, fixtures and equipment within buildings will be dismantled and removed to designated temporary disposal yards;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;
- All above ground electrical, water and other service infrastructure and equipment to be removed and placed in mine void or the designated temporary salvage yards;
- Electrical, water and other services that are more than 400 mm below ground surface will remain;
- All pipes and structures deeper than 400 mm need to be sealed to prevent possible ingress and ponding of water;
- Non-hazardous concrete slabs and footings will be broken. This concrete (and metal) will be broken up and disposed of in the box cut;
- All concrete below 500 mm depth will remain underground with the invert of all structures broken/sealed to prevent possible ingress and ponding of water; and
- All excavations resulting from demolition of buildings, roads, conveyor platforms, etc. and earth structures will be left in a safe manner.

The yard areas (e.g. platforms created for buildings, laydown areas, salvage yards, and other disturbed areas) will be closed and re-graded to control storm water runoff and erosion. Once the structures and foundations are demolished, removed, or buried, the yard areas will be inspected for any areas of hydrocarbon contamination. Growth medium covers will be placed with the thickness of the covers dependent on the Post Closure Land Use (PCLU) as well as on the volume of material available for closure.

### **Roads and parking areas**

Mine roads that are not needed for closure and post-closure uses at the site (e.g. security and monitoring) will be closed. Closure actions will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.;
- All 'hard top' surfaces to be ripped and bitumen/concrete removed along with any culverts and concrete structures;
- All concrete lined drainage channels and sumps will be broken up and removed;
- All potentially contaminated soils are to be identified and demarcated for later remediation; and



- All haul routes that have been treated with saline dust suppression water need to be treated as “sealed” roads with the upper surface ripped and removed to designated contaminant disposal areas.

### **Stormwater management**

Prior to closure, a water management plan will be prepared to identify which structures are required at closure and which can be decommissioned. Ditches decommissioned will be closed by backfilling the excavations with the material removed, and placed adjacent to the structures, during construction. Bunds not required will be flattened by redistributing the material across the footprint used to borrow the material for construction.

### **Fencing and walling**

Various areas at the site are enclosed by a perimeter fencing and walls. Due to the maintenance costs associated with retaining a fence, it will be removed as the areas are reclaimed. Service roads providing access to the fences will be rehabilitated.

### **Remediation of contaminated areas**

Contaminated soils will be handled as follows:

- All soil, contaminated with hydrocarbons, will be identified, excavated, if possible to at least 200 mm below the contaminated zone and then treated by land farming;
- All tanks, pipes and sumps containing hydrocarbons will be flushed or emptied; and
- Removed soils will be managed as determined by the nature and extent of the contamination.

### **Vegetation and wildlife**

Successful revegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams utilizing non-invasive plants that fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided and the area will be managed to control the spread of these species in accordance with the Biodiversity Action Plan (BAP).

The slopes at the mine residue facilities are likely to be susceptible to erosion, even after vegetation establishment. To counter the effects of erosion, naturally occurring grassland species will be planted on the slopes and tops of the facilities. At this time, these species will provide soil holding capacity and reduce runoff velocity. The composition of the natural species and their planting strategy will be detailed in the BAP.

The flatter areas will be re-vegetated with the objective of creating a sustainable ecosystem similar to an analogues reference plot.

### **Waste management**

Waste management activities will include:

- Hazardous waste will be managed as per the operational Waste Management Plan and will be disposed of off-site;
- Non-hazardous demolition rubble will be disposed of in the base of the pits;
- The waste and scrap yard will be retained for the disposal of mobile equipment, structural steel and mechanical equipment. Only once this material has been taken out of the yard will the yard be demolished; and
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.

### **Threats, opportunities and uncertainties**

As the closure plan is currently being developed early in the mine life cycle and the plan is based on predicted risks rather than actual risks measured during operations, there are a number of

assumptions that have been made around the biophysical and socio economic environment that will exist at the end of the life of operations. These assumptions represent uncertainties and threats that cannot at this stage be adequately defined. The guideline in the regulations requires that a list of these uncertainties and threats and opportunities be identified and maintained during subsequent revisions of the closure plan. SRK understands that the purpose of this list is to inform future revisions of the plan relating to the focus of resource. During these revisions, it is expected that resources can be focused to determine whether either the threats or opportunities are realised and whether uncertainties are addressed. The uncertainties, threats and opportunities are reflected in Table 19-3.

**Table 19-3: Uncertainties, Threats and Opportunities**

Uncertainty	Threat
<ul style="list-style-type: none"> <li>• Stakeholder requirements at closure</li> </ul>	<ul style="list-style-type: none"> <li>• Overgrazing</li> <li>• Climate change</li> <li>• Changing political environment</li> <li>• Varied land owners</li> <li>• High dependency on mining</li> </ul>
Opportunity	
<ul style="list-style-type: none"> <li>• Well defined rehabilitation practices</li> <li>• Time to develop water management alternative</li> <li>• Existing stakeholder engagement forums</li> <li>• SLP to manage social impacts</li> </ul>	

**19.10.4 Quantum of Financial Provision**

The mining of the FCR Plant will increase the existing liability associated with R 4 553 981.08, a detailed breakdown is provided for in Table 19-4.

In terms of Section 41, Regulations 53 and 54 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), Amandelbult is required to make financial provision for the interim and final rehabilitation activities on the site. This provision is reviewed annually for adequacy and amended to compensate for new activities and/or inflation. During the annual review, confirmation will be provided that this amount can be provided for from operating expenditure.

Amandelbult will provide for the closure liability associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.

**Table 19-4: Financial Provision for FCR Plant**

	Description	Units	Amount	Master Rate	DMR Multiplication Factor	Weighing Factor 1	Amount	
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m <sup>3</sup>	2 000	15.96	1.00	1.00	R 31 929.38	
2 (A)	Demolition of steel buildings and structures	m <sup>2</sup>	200	222.31	1.00	1.00	R 44 461.49	
2(B)	Demolition of reinforced concrete buildings and structures	m <sup>2</sup>	5 000	327.61	1.00	1.00	R 1 638 054.82	
3	Rehabilitation of access roads	m <sup>2</sup>		39.78	1.00	1.00	R 0.00	
4(a)	Demolition and rehabilitation of electrified railway lines	m		386.32	1.00	1.00	R 0.00	
4(b)	Demolition and rehabilitation of non-electrified railway lines	m	1 000	210.61	1.00	1.00	R 210 607.05	
5	Demolition of housing and facilities	m <sup>2</sup>		444.61	1.00	1.00	R 0.00	
6	Opencast rehabilitation including final voids and ramps	ha		226 282.66	0.04	1.00	R 0.00	
7	Sealing of shafts, adits and inclines	m <sup>2</sup>		119.34	1.00	1.00	R 0.00	
8(a)	Rehabilitation of overburdens and spoils	ha		155 379.19	1.00	1.00	R 0.00	
8(b)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt producing waste)	ha	0.31	193 521.99	1.00	1.00	R 59 991.82	
8(c)	Rehabilitation of processing waste deposits and evaporation ponds (acid, metal rich waste)	ha		562 079.56	0.59	1.00	R 0.00	
9	Rehabilitation of subsided areas	ha		123 086.53	1.00	1.00	R 0.00	
10	General surface rehabilitation, including grassing of all denuded areas	ha	7.52	123 086.53	1.00	1.00	R 925 610.72	
11	River diversions	ha		12 308.73	1.00	1.00	R 0.00	
12	Fencing	m		140.78	1.00	1.00	R 0.00	
13	Water management (separating clean and dirty water, managing polluted water and managing the impact on ground water, including treatment when required)	ha	7.52	46 925.10	0.60	1.00	R 211 726.06	
14	2 to 3 years of maintenance and aftercare	ha	7.52	16 423.78	1.00	1.00	R 123 506.81	
<b>Sub Total 1 (At Closure)</b>							<b>R 3 245 888.15</b>	
						Weighting Factor 2	1.00	
							R 3 245 888.15	
1	Preliminary and General	12% of Sub Total 1 if less than R100 mill 6% of Sub Total 1 if more than R100 mill						R 389 506.58
2	Contingency	10% of Sub Total 1						R 324 588.82
Sub Total 2							R 714 095.39	
Sub Total 3							R 3 959 983.54	
VAT @ 15%							R 593 997.53	
<b>Grand Total - Sub Total 3</b>							<b>R 4 553 981.08</b>	

## 19.11 Monitoring Plan

Ongoing environmental monitoring is being conducted at the Amandelbult Complex as indicated in the remainder of this section. These points may however vary based on management requirements, additional infrastructure requirements, closing and care and maintenance of infrastructure, and requirements in terms of the WUL.

The Amandelbult Complex Environmental Coordinator will be responsible for ensuring that all necessary environmental monitoring required for the projects is undertaken as per the monitoring programmes. See Table 19-5 for environmental components to be monitored and the frequency of the monitoring proposed.

A formal compliance and performance assessment of the EMPr will take place every two (2) years as stipulated in in the Amandelbult EMPr Environmental Authorisations. It is recommended that an internal audit is undertaken every alternate year to ensure ongoing compliance and to identify potential areas requiring improvement.

**Table 19-5: Environmental components to be monitored and frequency of monitoring**

Aspect	Component	Data collection frequency	Phase of project	Reporting frequency
Surface water	Water quality	Monthly sampling	All phases (construction, operation, closure, post closure)	Quarterly reporting
Groundwater	Water quality	Quarterly monitoring	All phases (construction, operation, closure, post closure)	Quarterly reporting
	Borehole level	Annually	All phases (construction, operation, closure, post closure)	Annual reporting
Air quality	Dust fallout	Monthly sampling	All phases (construction, operation, closure)	Annual reporting
Noise	Noise levels	Annual	Operation	Annual reporting
Closure and rehabilitation	Concurrent rehabilitation	Annually	All phases (construction, operation, closure, post closure)	Annually reporting

### 19.11.1 Surface water

As part of the Amandelbult Complex Water Monitoring Program, surface water resources are monitored on a monthly basis using 32 monitoring localities (e.g. dams, waste streams, canals, pipelines and streams/rivers) as shown in Figure 19-1. Water sampling is conducted according to recognised standards and procedures (SABS/ISO and DWA BPG's). Water quality analyses are performed by the Aquatico Laboratory in Garsfontein, Pretoria. Aquatico is a SANAS Accredited Testing Laboratory, No T0685. Water quality reporting is conducted on a monthly, quarterly and annual frequency.

It is recommended that additional surface water monitoring points be included in the monitoring plan to obtain more detailed baseline information downstream from the proposed FCR Plant and associated product pads location.

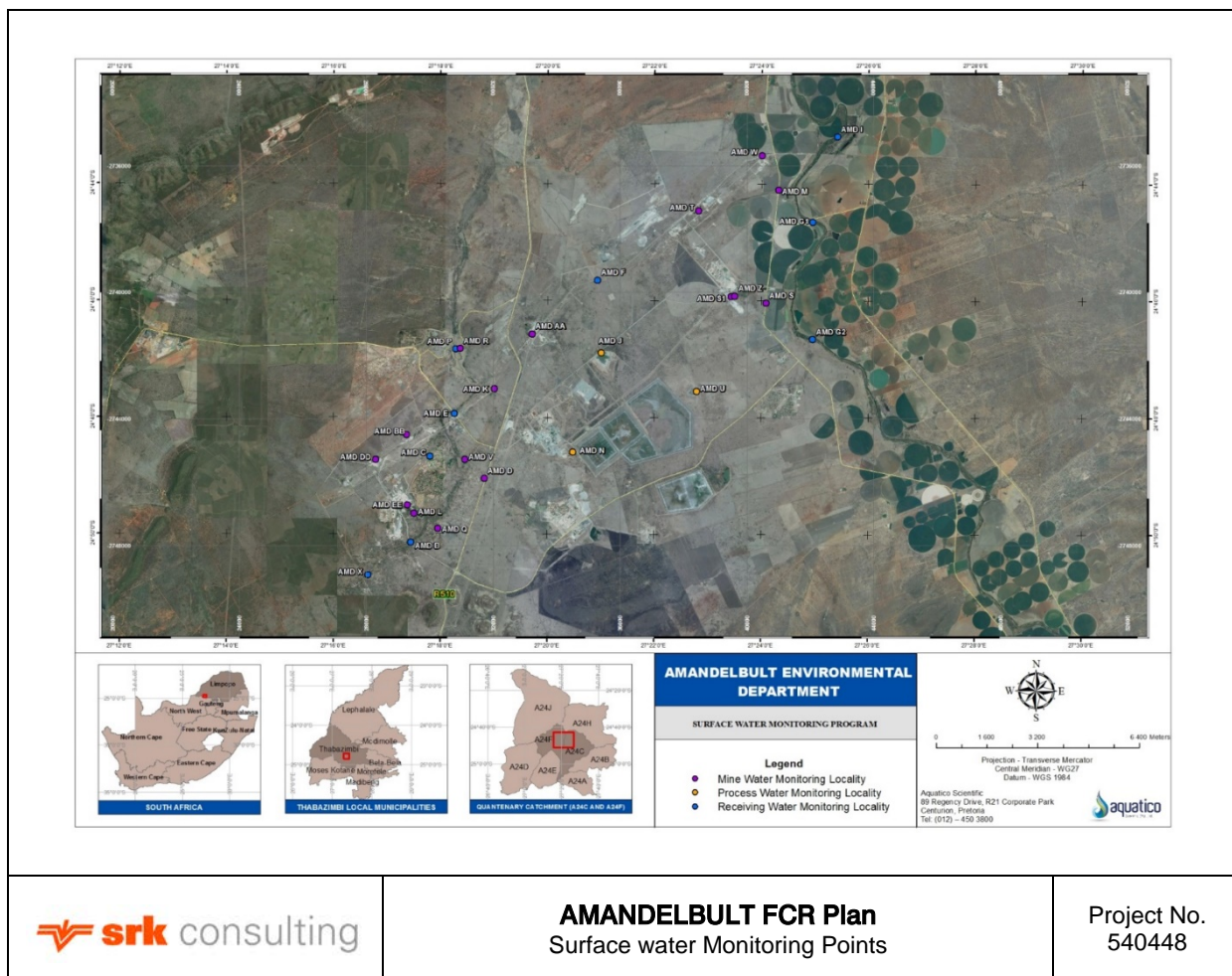
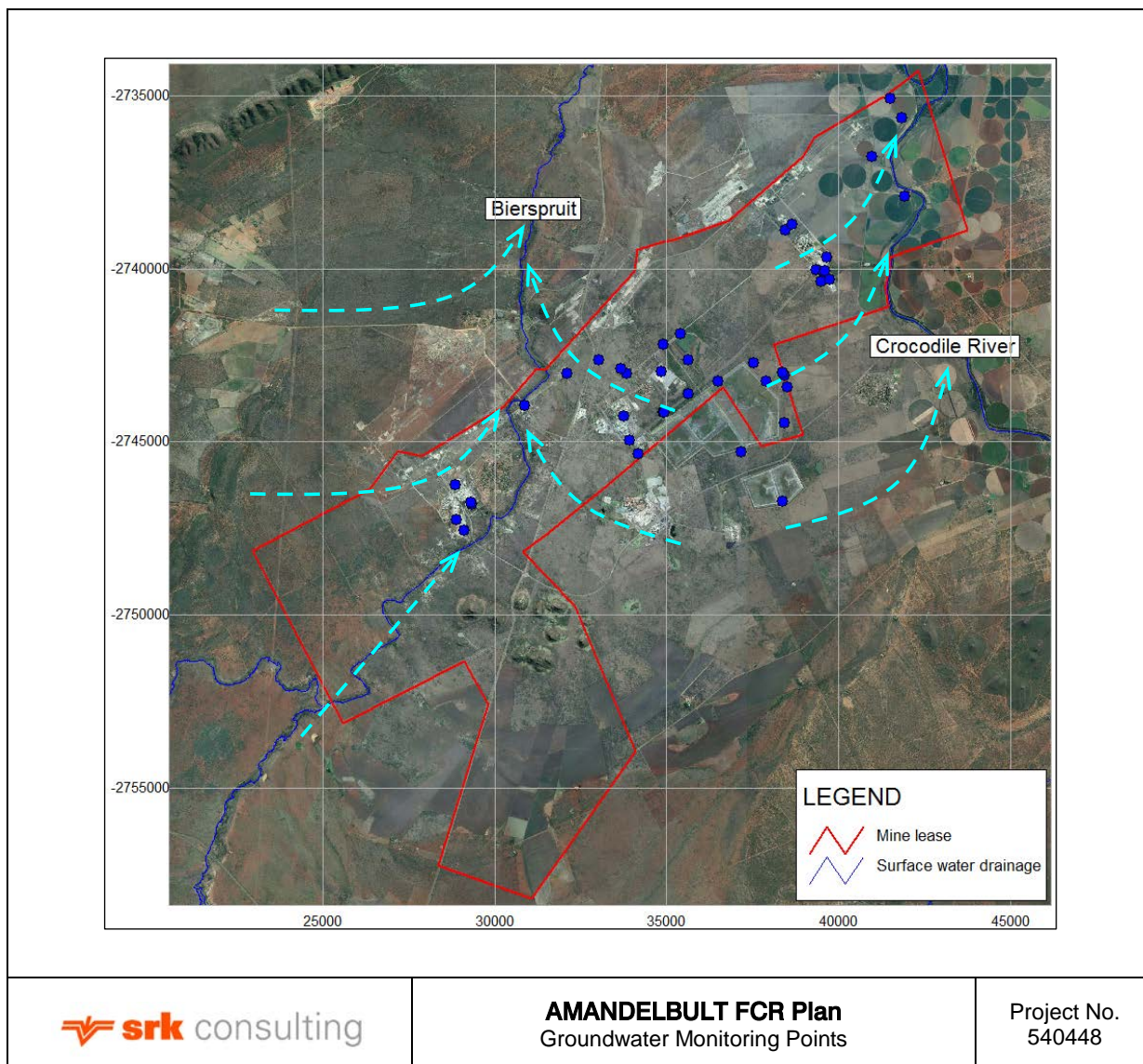


Figure 19-1: Surface and process water monitoring points

19.11.2 Groundwater

As part of the Amandelbult Complex Water Monitoring Program, 42 groundwater localities are currently being monitored on a quarterly frequency. Water sampling is conducted according to recognised standards and procedures (SABS/ISO and DWA Best Practice Guidelines (BPGs)). Water quality analyses are performed by the Aquatico Laboratory in Garsfontein, Pretoria. Aquatico is a SANAS Accredited Testing Laboratory, No. T0685. Water quality reporting is conducted on a monthly, quarterly and annual frequency. The monitoring locations are provided for in Figure 19-2.



**Figure 19-2: Amandelbult Complex Groundwater Monitoring Points**

### 19.11.3 Air Quality

Ambient dust fallout monitoring has been undertaken by SGS on behalf of Amandelbult. The data was compared against the relevant NAAQS for dust fallout. The locations of the dust fallout monitoring points are presented in Table 19-6 and presented in Figure 19-3.

**Table 19-6: Dust fallout monitoring location**

Mine Site	Field ID	Co-ordinates	
Dishaba Opencast Mining	Dishaba West	24°44'35.05"S	27°22'33.05"E
	Dishaba Northwest	24°44'29.01"S	27°22'41.03"E
	Dishaba North	24°44'21.04"S	27°22'49.02"E
	Dishaba North East	24°44'7.02"S	27°23'26.09"E
	Dishaba East	24°44'13.08"S	27°23'17.01"E
	Dishaba South	24°44'38.08"S	27°22'53.04"E
	Dishaba South West	24°44'44.03"S	27°22'46.03"E
	Dishaba Opencast	24°44'32.09"S	27°22'46.02"E
	Dishaba 7A Block 1	24°44'23.80"S	27°23'01.60"E

Mine Site	Field ID	Co-ordinates	
	Dishaba 7A 50 Shaft	24°44'15.20"S	27°22'59.50"E
	Dishaba 7A Stockpile	24°44'04.20"S	27°23'13.70"E
	Dishaba 7A Security Gate	24°44'06.60"S	27°23'18.50"E
	Dishaba 37E Main Entrance	24°45'09.50"S	27°21'50.20"E
	Dishaba 37E West	24°45'26.20"S	27°21'36.40"E
	Dishaba 37E Southwest	24°45'52.60"S	27°21'36.30"E
	Dishaba 37E South Entrance	24°45'30.90"S	27°22'00.70"E
	Dishaba 37E East	24°45'19.20"S	27°22'14.50"E
	Dishaba 37E North	24°45'06.60"S	27°21'57.10"E
Amandelbult Section	Village	24°14'47.2"S	27°23'51.3"E
	Lapa	24°49'06.4"S	27°21'29.3"E
	Northam Tailings	24°48'53.97"S	27°22'42.25"E
	Tailing 3B NW	24°47'19.7"S	27°22'03.4"E
	Tailings 2	24°47'48.0"S	27°21'22.7"E
	Return water dam	24°46'55.3"S	27°20'59.7"E
	Contract dam	24°48'35.2"S	27°20'00.5"E
	Tailings A	24°49'21.6"S	27°21'14.4"E
	Hostels decommissioned	24°48'05.2"S	27°20'13.2"E
	Tailings offices	24°48'25.1"S	27°20'21.1"E
	Pump house	24°47'35.5"S	27°22'46.7"E
	Parking (School Fence)	24°48'19.0"S	27°19'50.0"E
	Hostel 1	24°48'02.4"S	27°20'07.6"E
	Rethabile Village 1	24°47'58.6"S	27°20'24.0"E
Rethabile Village 2	24°47'48.2"S	27°20'13.6"E	
Tumela Opencast	Tumela 1 (Opencast)	24°46'49.40" S	27°19'26.50"E
	Tumela 2 (W)	24°46'38.50"S	27°19'30.80"E
	Tumela Stockpile	24°46'40.00"S	27°19'51.70"E
	Tumela 4 Entrance (N)	24°46'33.90"S	27°19'43.80"E
	Tumela 5 (S)	24°46'48.60"S	27°19'41.40"E
	Zizwe North	24°45'31.1"S	27°20'28.5"E
	Zizwe West	24°45'44.9"S	27°20'15.8"E
	Zizwe South	24°45'55.4"S	27°20'25.2"E
	Zizwe East	24°45'47.9"S	27°20'27.9"E
	Zizwe North East	24°45'36.0"S	27°20'32.2"E

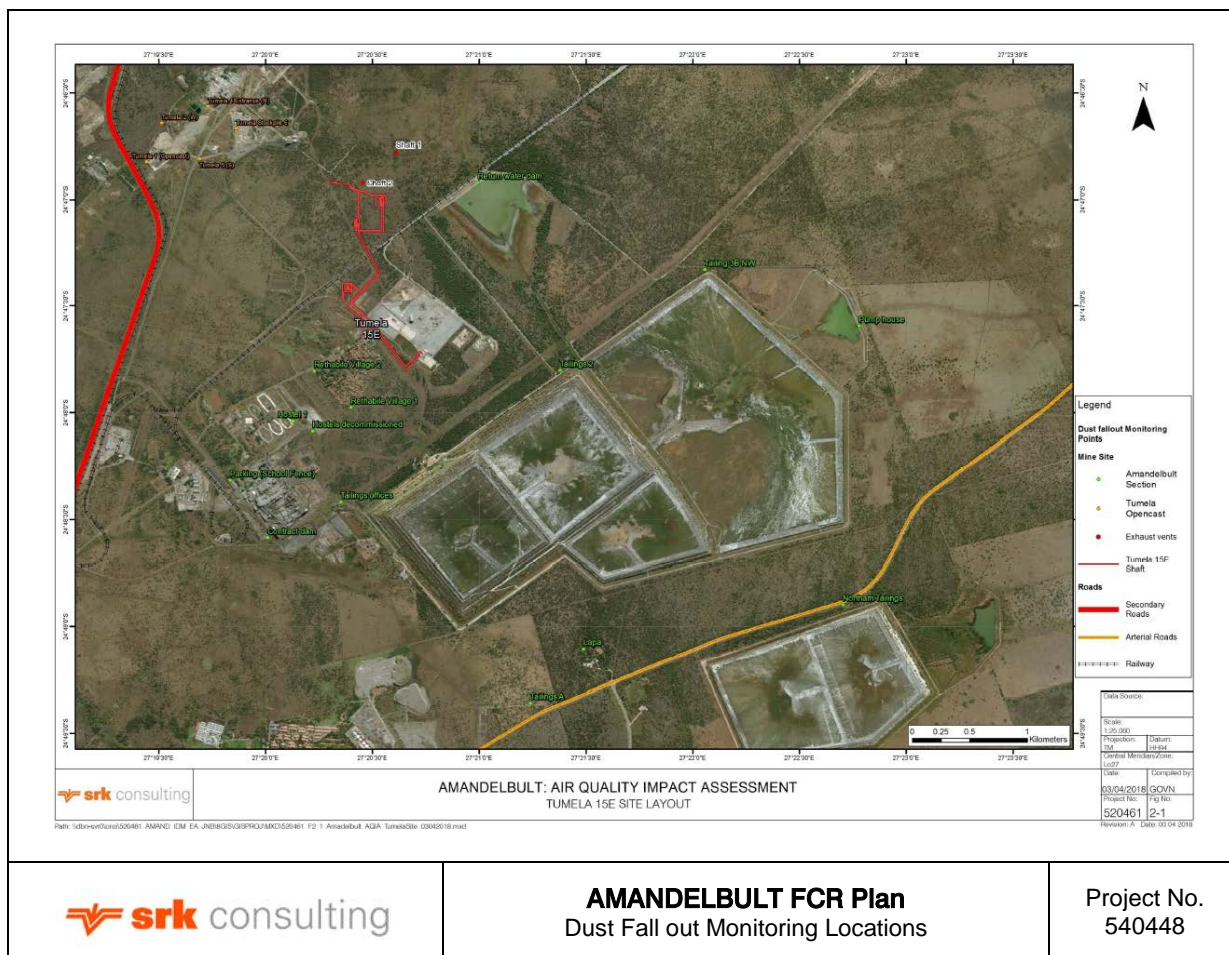


Figure 19-3: Dust Fall out Monitoring Locations Tumela section

### 19.11.4 Post-rehabilitation monitoring and maintenance

The objective of the monitoring programme will be to track the recovery of the site towards the long-term post-closure land capability goals, in accordance with the overall closure objectives. The monitoring programme will be designed to collect information to demonstrate that the Relinquishment criteria have been achieved. The anticipated monitoring will include:

- **Surface water:** Quality monitoring against parameters as required by the WUL. Sampled monthly for a five-year post-closure period;
- **Groundwater:** Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled quarterly for a five year post-closure period;
- **Erosion monitoring:** This will take the form of developing a representative reference site on the disturbed footprints and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken once a year at the end of the wet season for a five year post-closure period;
- **Vegetation establishment:** Vegetation condition will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference analogue site established in a similar ecotype, conducted annually for a five year post-closure period;
- **Bio-monitoring:** upstream and downstream of the mining activities. A long-term operational bio-monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within the mining area, which will be extended into the closure period. Appropriate biological index will be included in order to quantify and classify the longer-term changes in biotic integrity, with monitoring being undertaken annually; and
- Photographic records should be maintained together with findings, follow up actions and close out records as part of the Amandelbult Complex’s Environmental Management System.



Annual reports will be prepared to document the results of the monitoring during the closure and post-closure phases. These reports will provide important information required to manage the on-going closure activities, with the data and reports being used to:

- Provide recommendations for improving subsequent rehabilitation activities;
- Indicate where rehabilitation and closure activities have not been successful, requiring a potential change in design criteria;
- Provide information where care and maintenance is required during the post-closure period; and
- Indicate if relinquishment criteria have been achieved.

## **19.12 Indicate the frequency of the submission of the performance assessment report**

The EMP performance assessment (audit) must be undertaken every two (2) years by an external auditor, and a report must be compiled and submitted to the competent authority.

An internal peer audit should be undertaken every alternate year by Anglo American Environmental Services. This involves environmental personnel from other mines coming to audit the mine on the Environmental Management Systems (EMS) and other environmental parameters.

## **19.13 Environmental Awareness Plan**

### **19.13.1 Informing employees of any environmental risk**

Environmental requirements are included in any operational contracts, thereby making contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles will apply to the Environmental Awareness Plan (safety, health and environmental (SHE) training):

- All personnel are as a minimum, undergo general SHE induction and awareness training;
- An Environmental Management Systems (EMS) coordinator has been appointed;
- The EMS coordinator will identify the SHE training requirements for all personnel and contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and contractors. The training matrix is administered by the Environmental Co-ordinator;
- Development of Training Programme; and
- General Awareness Training.

#### **Personnel**

All employees, current, new and contractors are to undergo induction, a part of which is environmental awareness training. At the end of this training, personnel are required to complete the awareness test and the level of awareness assessed by the Training Department. Re-testing or induction may be required.

All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above, i.e. operators, artisans.

#### **Type**

Awareness training will include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities.

Training is appropriate to the activity of individual employees.

Monthly environmental topics are generated to raise awareness of employees on environmental issues.

## **Evaluation**

Evaluation of awareness and competency training are carried out through questionnaires or post-training tests conducted during training sessions and are also done through questioning of employees during audits.

### **19.13.2 Manner in which risks will be dealt with to avoid pollution or the degradation of the environment**

Prior to the commencement of construction, the applicant will compile an Emergency Preparedness Response Plan (EPRP) for the proposed project. The EPRP provides guidance on emergency procedures and should be updated for the operational phase following detailed engineering design of the project. The operational EPRP needs to provide comprehensive and site-specific measures and information for successful response to, and management of, emergencies arising from either internal or external factors. The EPRP applies to emergencies within the proposed project area, and as such encompasses incidents affecting the facilities, infrastructure and operations. It further pertains to transportation of goods, raw material and finished products to and from the mining area. The scope of the EPRP also extends to natural disasters, as well as to manmade and third party events with potential to impact on health and safety within the mine area. It furthermore covers emergencies arising from all mine phases, namely the construction, operation, closure and post-closure.

The EPRP will be subject to annual review and updating with records being retained of key changes, and those responsible for changes. A protocol for distribution and accessibility of components of the plan will need to be developed should aspects of the plan require confidentiality, such as for security reasons.

A description of the ongoing monitoring and management measures to be implemented, to provide the early warning systems necessary to avoid environmental emergencies.

Sound environmental management is a priority for the proposed project. A key component of implementing strong environmental practice will be the development of an environmental management system, which includes the EPRP and Occupational Health and Safety Plan (OHSP). In the event of an environmental emergency, these plans link to each other with actions commencing in terms of the relevant individual business unit emergency preparedness plans and procedures and escalating upwards to the corporate level.

Standard operating procedures (SOPs) should be developed for the following potential risk sources: accidents involving mine vehicles resulting in human injuries, accidental leaks and chemical and/or hydrocarbon spills. These SOPs should be reviewed annually to:

- Determine their effectiveness;
- Injuries or fatalities during all mining phases;
- Fires and/or explosions due to the lack of hydrocarbon management;
- Failure of the overburden facility;
- Subsidence of land; and
- Flooding of the mine.

Training will be an important activity supporting the implementation of a management system in the form of induction training on general environmental management and job specific training such as control and clean-up of hydrocarbon spills. The objective of an environmental training program should be to develop a culture of environmental awareness, accountability, responsibility and prevention. Personnel at all levels should have sufficient knowledge and authority to proactively identify and prevent a situation that could potentially result in an environmental or safety emergency.

In addition, figures of the site layout with emergency response information for key areas will be made available to all personnel. Furthermore, a generic description of the dangers associated with being exposed to hazardous chemicals or materials will be developed as well as a description on the procedures to be implemented to help control hazardous substance releases.

Emergency response procedures will be developed for:

- Flammable and combustible materials;
- Corrosive materials;
- Oxidizing materials;
- Reactive materials;
- Biological and infectious materials; and
- Gaseous releases.

Environmental and social emergency planning and response requires the involvement of local communities, authorities and other external stakeholders in the EPRP. At present there is likely to be a very limited level of resources and capacity within the local communities and amongst local authorities in the greater project area to deal with emergency response.

### 19.14 Specific information required by the Competent Authority

Amandelbult commit to undertake the following actions with regards to ongoing identification and management of impacts relating to their operational activities:

- Annual Performance Assessment Reviews;
- Annual update of groundwater model;
- Annual update of Financial Provision for Closure; and
- Ongoing monitoring of:
  - Water quality
  - Dust/air quality
  - Noise
  - Soils
  - Biomonitoring
  - Post rehabilitation
  - Biodiversity
  - Toxicity Testing.

### 19.15 Undertaking Regarding Correctness of Information.

I, Beth Candy herewith confirm:

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and Interested and Affected parties;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

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Beth Candy

20 June 2019

## 20 Statement of the SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no prior association with RPM in regard to the mineral assets that are the subject of this Report. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

## 21 Conclusions and Recommendations

### 21.1 Conclusion

Anglo American Platinum Rustenburg Platinum Mines (RPM) Amandelbult Section is an existing platinum mine located near Northam in the Limpopo Province. The Fine Chrome Recovery (FCR) initiative forms part of the “Making Amandelbult Investable Again” programme and the Amandelbult journey towards “P101”. The Amandelbult Concentrator Complex has an existing approved and operational Chrome Recovery Plant. However, this existing Chrome Recovery Plant is not designed to recover fine chromite (-100 µm fraction).

An initiative was therefore identified in which an increased recovery of chromite can be realised at Amandelbult through the beneficiation of fine chromite from the Concentrator tailings. It is envisaged that the additional recovery of metallurgical and/or chemical grade chromite will result in an increased yield of chromite for Amandelbult, as well as reduced water losses associated with the existing approved tailings dams. The tailings streams from both the UG2 #1 and UG2 #2 Concentrators as well as the Merensky Concentrator tailings stream will feed the proposed FCR Plant to realize the full benefit of fine chromite recovery.

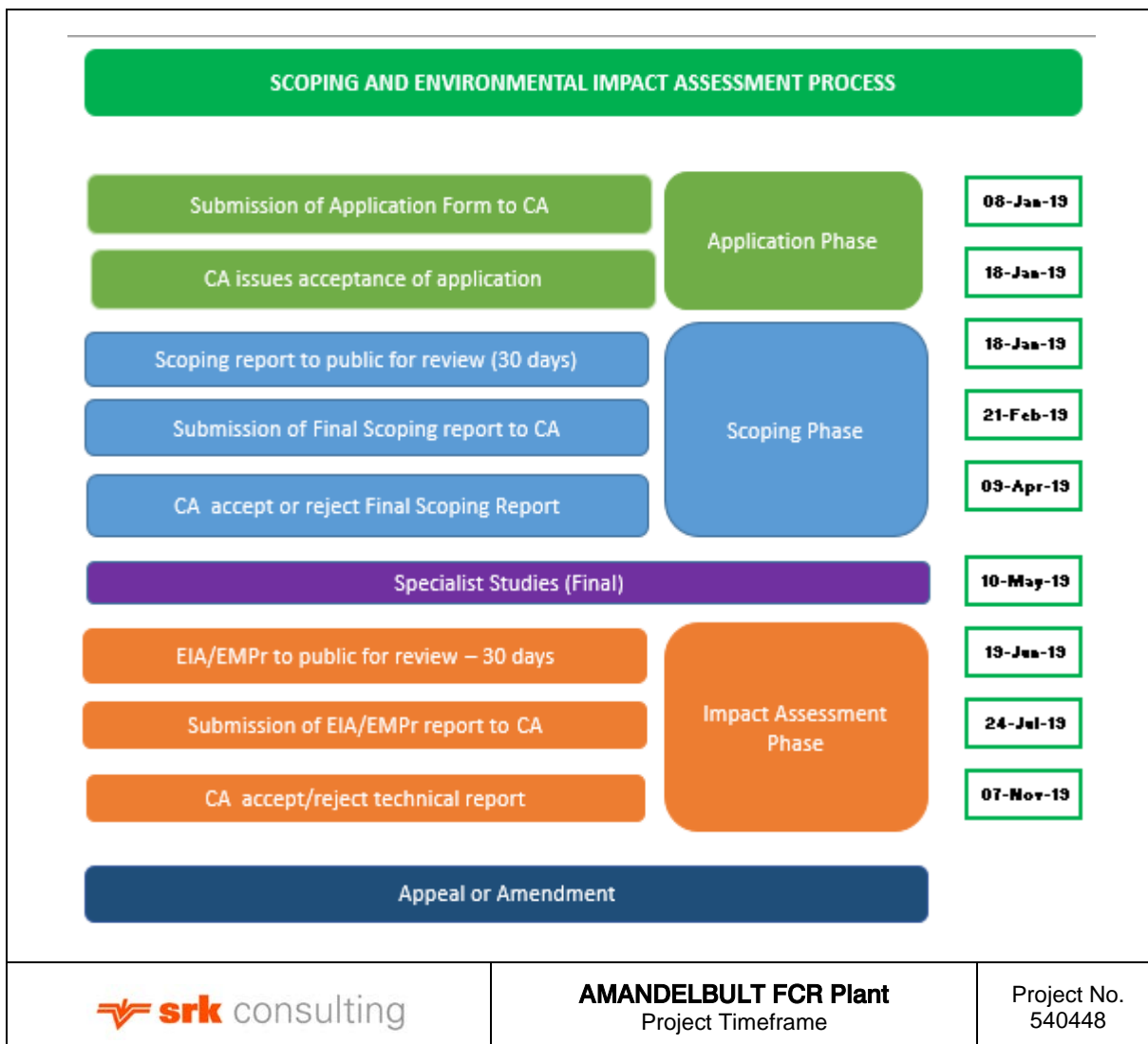
#### 21.1.1 EA Process and Timeframe

The proposed FCR Plant project follow a Scoping and Environmental Impact Report (S&EIR) process in terms of NEMA Regulation 982. The newly promulgated regulations enforce a strict timeframe and require a decision by the competent authority within 300 days from submission of the environmental authorisation application.

The environmental authorisation application form was submitted to the DMR on 8 January 2019. The first phase of an S&EIR process is the scoping phase, which was undertaken from January 2019 to April 2019. During this phase, various stakeholder groups were identified and stakeholders were encouraged to participate in the project so that significant issues requiring further investigation and assessment by specialists could be identified. Stakeholders had the opportunity to comment on the Scoping Report for a period of 30 days from 18 January 2019 to 20 February 2019. The Scoping Report was submitted to the competent authority, the DMR and other commenting authorities on 21 February 2019. The Scoping Report was approved by the DMR on 9 April 2019.

The second phase of the S&EIR process is the impact assessment phase. The impact assessment phase includes specialist investigations, the assessment of impacts, and the preparation of an environmental management programme. Stakeholders are invited to participate in the public review period of the impact assessment phase of the project to ensure that the assessment of impacts and proposed management of impacts have addressed their concerns.

The EIA/EMPr will be made available for public comment from 19 June 2019 to 20 July 2019 at various public places. After the public review period, the EIA/EMPr report will be updated with comments received from stakeholders during the impact assessment phase.



**Figure 21-1: FCR Plant Timeframe**

The updated EIA/EMP will be submitted to the competent authority (DMR) and other commenting authorities for review during 24 July 2019. The DMR will consider the findings in consultation with various other authorities. After reviewing the document, the DMR will make a decision whether environmental authorisation should be granted for the proposed FCR Plant project. A decision is expected by 7 November 2019.

This report is titled “Draft Environmental Impact Assessment and Environmental Management Programme Report (EIA/EMPr) for Stakeholder Review” and fulfils the requirements for a Draft EIA/EMPr Report as contemplated in the NEMA regulations.

## 21.2 Recommendations:

It is recommended that additional surface water monitoring points be included in the monitoring plan to obtain more detailed baseline information downstream from the proposed FCR Plant and associated product pads location.

Prior to the development of the proposed project, an environmental authorisation is required to be granted by the Department of Mineral Resources (DMR) and a Water Use Licence (WUL) to be issued by the Department of Water and Sanitation (DWS). RPM appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) as the independent Environmental Assessment Practitioner (EAP) to manage and facilitate the environmental authorisation process and associated stakeholder engagement process.

## 22 References

The following references were utilised for the compilation of this EIA/EMPr:

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Darryll Kilian  
Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.



# Appendices

## **Appendix 1: EAP Qualifications**

## **Appendix 2: EAP Curricula Vitae**

## **Appendix 3: Locality Map**

## **Appendix 4: Engineering Layout**

## **Appendix 5: Stakeholder Engagement Documentation**

## **Appendix 5-1: Stakeholder Database**

## **Appendix 5-2: Pre-announcement meetings**



## **Appendix 5-3: Background information letter**

## **Appendix 5-4: Advertisement and site notices**

## **Appendix 5-5: Site Notice Proof of Placement**

## **Appendix 5-6: DMR AoR of FSR**

## **Appendix 6: Specialist Studies**

## **Appendix 6-1: Surface water**

## **Appendix 6-2: Soils Land Capability**

## **Appendix 6-3: Terrestrial**



## **Appendix 6-4: Heritage**

## **Appendix 6-5: Air quality**

## **Appendix 6-6: Closure**

## SRK Report Distribution Record

Report No. 540448\_Scoping Report – Authority Review

Copy No.

Name/Title	Company	Copy	Date	Authorised by
Emily Mulaudzi	DMR (Limpopo – Polokwane)	1	21 February 2019	Darryll Kilian
Thabazimbi Local Municipality	Thabazimbi Local Municipality	2	21 February 2019	Darryll Kilian
Waterberg District Municipality	Waterberg District Municipality	3	21 February 2019	Darryll Kilian
Moses Kotane District Municipality	Waterberg District Municipality	4	21 February 2019	Darryll Kilian
Northarm Public Library	Northarm Public Library	5	21 February 2019	Darryll Kilian
Amandelbult Complex Safety Office	Amandelbult Complex Safety Office	6	21 February 2019	Darryll Kilian
SRK Library	SRK Consulting	7	21 February 2019	Darryll Kilian

Approval Signature:



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