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# Kareerand Tailings Storage Facility Expansion Project Scoping Report

Version - Draft for Authority and Public Comment

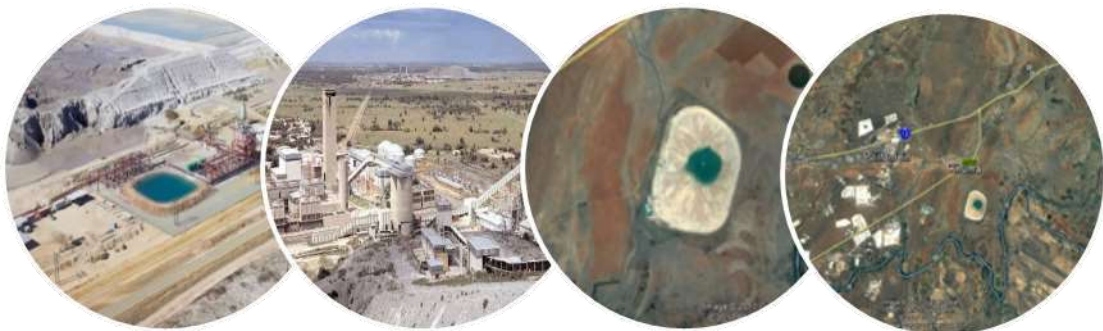
24 January 2020

Mine Waste Solutions (Pty) Ltd

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Mine Waste Solutions (Pty) Ltd



# Kareerand Tailings Storage Facility Expansion Project Scoping Report

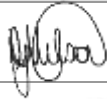


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**Mine Waste Solutions (Pty) Ltd**

17-0026

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## EXECUTIVE SUMMARY

### Background

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), has been in business since 1964, and conducts its operations over a large area of land to the east of Klerksdorp, within the area of jurisdiction of the City of Matlosana and JB Marks Local Municipalities (LM), which fall within the Dr Kenneth Kaunda District Municipality (DM) in the North-West Province.

The Kareerand Tailings Storage Facility (TSF) was designed with an operating life of 14 years, taking the facility to 2025, and total design capacity of 352 million tonnes. Subsequent to commissioning of the TSF, MWS was acquired by AngloGold Ashanti and tailings production target has increased by an additional 485 million tonnes, which will require operations to continue until 2042. The additional tailings therefore require expansion of the design life of the TSF.

This project entails the expansion of the current Kareerand TSF to accommodate the increased tailings and final design capacity, along with additional pump stations and pipelines. The TSF expansion is proposed on the western edge of the current facility, and the final height of the combined facility (both expansion and current) will be 122 m. The expansion footprint will add 380 hectares (ha) to the TSF and approximately 93 additional ha will be cleared for supporting infrastructure.

*This TSF expansion requires an Integrated Environmental Assessment process under the National Environmental Management Act NEMA (Act 107 of 1998, as amended) and the National Environmental Management: Waste Act NEMWA (Act 59 of 2008, as amended).*

### Project Motivation

The expansion of the existing TSF will enable the reclamation of additional tailings dams and deposition of the tailings in an expanded facility complete with a geofabric liner and appropriate seepage mitigation measures reducing the total seepage into the Vaal River.

The project will support concurrent rehabilitation of the existing TSF and the expansion TSF, thereby reducing the risk of windborne dust and storm water management. Removing and consolidating the tailings in the KOSH area on a single mega tailings storage facility will in the long term, positively impact the surrounding environment and Vaal River.

Specialist studies have been commissioned to assess the impacts of the TSF expansion on identified aspects of biophysical and socio-economic receptors within the area. Mitigation, management, and rehabilitation designs will be informed by a team of specialists and engineers.

In addition, the extended Life of Mine (LoM) of the reclamation operations will create employment for a longer period and thus bring associated socio-economic benefits to the towns and settlements in the area.

### Draft Scoping Report

This Draft Scoping Report provides a summary of the receiving environment and discusses the potential impacts on biophysical and socio-economic conditions within the study area. A Plan of Study for the EIA Phase indicates the specialist studies that have been identified to investigate the potential impacts generated by the TSF expansion.

### Public Participation Process

A public announcement was published in November 2019, through advertisements, site notices and Background Information Documents. A stakeholder database has been compiled and will be updated as the process unfolds and as more Interested and Affected Parties (I&As) register.

All comments which will be received during the integrated application process will be captured in a Comments and Responses Report (CRR). The CRR will be updated on a continuous basis and will be presented to the authorities and other I&As together with the consultation and final reports as a full record of issues raised, including responses on how the issues were considered during the integrated application process.

The availability of the Draft Scoping Report will be announced through advertisements and personal emails, notices at selected libraries and notification letters to registered I&As. Stakeholder meetings will be held during the review period of the Draft Scoping Report. A record of the deliberations at the meetings will be included as part of the CRR, which will be made available with the Final Scoping Report.



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CONTENTS OF THE SCOPING REPORT	RELEVANT SECTION IN THE REPORT
Details of - <ul style="list-style-type: none"> <li>i. The EAP who prepared the report; and</li> <li>ii. The expertise of the EAP, including a curriculum vitae</li> </ul>	Section 1.3
The location of the activity, including - <ul style="list-style-type: none"> <li>i. The 21 digit Surveyor General code for each cadastral land parcel;</li> <li>ii. Where available, the physical address and farm name;</li> <li>iii. Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</li> </ul>	Section 1.2
A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is - <ul style="list-style-type: none"> <li>i. A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</li> <li>ii. On land where the property has not been defined, the coordinates within which the activity is to be undertaken</li> </ul>	Section 1.1
A description of the scope of the proposed activity, including - <ul style="list-style-type: none"> <li>i. All listed and specified activities triggered;</li> <li>ii. A description of the activities to be undertaken, including associated structures and infrastructure;</li> </ul>	Section 0
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	Section 1.5
A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 2.1
A full description of the process followed to reach the proposed preferred activity, site and location within the site, including - <ul style="list-style-type: none"> <li>i. Details of all alternatives to be considered;</li> <li>ii. Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</li> <li>iii. A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</li> <li>iv. The environmental attributes associated with the alternatives focusing on geographical, physical, biological, social, economic, heritage and cultural aspects;</li> <li>v. The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts -                             <ul style="list-style-type: none"> <li>aa. can be reversed;</li> <li>bb. may cause irreplaceable loss of resources; and</li> <li>cc. can be avoided, managed or mitigated;</li> </ul> </li> <li>vi. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</li> <li>vii. Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</li> <li>viii. The possible mitigation measures that could be applied and level of residual risk;</li> <li>ix. The outcome of the site selection matrix;</li> </ul>	Sections 3 - 5, Section 7

<ul style="list-style-type: none"> <li>x. If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</li> <li>xi. A concluding statement indicating the preferred alternatives, including preferred location of the activity</li> </ul>	
<p>A plan of study for undertaking the environmental impact assessment process to be undertaken, including -</p> <ul style="list-style-type: none"> <li>i. A description of the alternatives to be considered and assessed with the preferred site, including the option of not proceeding with the activity;</li> <li>ii. A description of the aspects to be assessed as part of the environmental impact assessment process;</li> <li>iii. Aspects to be assessed by specialists;</li> <li>iv. A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;</li> <li>v. A description of the proposed method of assessing duration and significance;</li> <li>vi. An indication of the stages at which the competent authority will be consulted;</li> <li>vii. Particulars of the public participation process that will be conducted during the environmental impact assessment process; and</li> <li>viii. A description of the tasks that will be undertaken as part of the environmental impact assessment process;</li> <li>ix. Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored</li> </ul>	Section 6
<p>An undertaking oath or affirmation by the EAP in relation to -</p> <ul style="list-style-type: none"> <li>i. The correctness of the information provided in the report;</li> <li>ii. The inclusion of comments and inputs from stakeholders and interested and affected parties; and</li> <li>iii. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties;</li> </ul>	Section 9
<p>An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;</p>	Section 9
<p>Where applicable, any specific information required by the competent authority; and</p>	N/A
<p>Any other matter required in terms of section 24(4)(a) and (b) of the Act.</p>	N/A

## 1 BACKGROUND AND INTRODUCTION

### 1.1 Background

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), has been in business since 1964, and conducts its operations over a large area of land to the east of Klerksdorp, within the area of jurisdiction of the City of Matlosana and JB Marks Local Municipalities (LM), which fall within the Dr Kenneth Kaunda District Municipality (DM) in the North-West Province. The MWS Operations are located primarily to the south of the N12, east of the town of Stilfontein. The closest town is Khuma, located about 3km northwest of the facility, and other nearby towns include Stilfontein (10km from facility) and Klerksdorp (19 km from facility).

The operations at Mine Waste Solutions entail the reclamation and processing of gold mine tailings that were previously deposited on tailings storage facilities (TSFs) in order to extract gold and uranium. High pressure water cannons are used to slurry the tailings on the Source TSFs, then slurry is pumped by a number of pump stations and pipelines to the MWS Processing Plant (indicated in dark green in Figure 1-1), and the residues from the Processing Plants are pumped to the current Kareerand TSF (indicated in yellow in Figure 1-1). Once a TSF has been completely recovered, it is cleaned-up and rehabilitated. See Figure 1-1 for an overview of the existing infrastructure used for this process.

### 1.2 Brief Project Description

The current Kareerand TSF was designed with an operating life of 14 years, taking the facility to 2025, and total design capacity of 352 million tonnes. Subsequent to commissioning of the TSF, MWS was acquired by AngloGold Ashanti and tailings production target has increased by an additional 485 million tonnes, which will require operations to continue until 2042. The additional tailings therefore require expansion of the design life of the current Kareerand TSF.

This project entails the expansion of the current Kareerand TSF to accommodate the increased tailings and final design capacity, along with additional pump stations and pipelines. The TSF expansion is proposed on the western edge of the current facility, and the final height of the combined facility (both expansion and current) will be 122 m. The expansion footprint will add 380 hectares (ha) to the current Kareerand TSF and approximately 93 additional ha will be cleared for supporting infrastructure. Figure 1-2 depicts the site layout of all additional infrastructure across the operational footprint, while Figure 1-3 depicts the TSF expansion and its associated infrastructure.

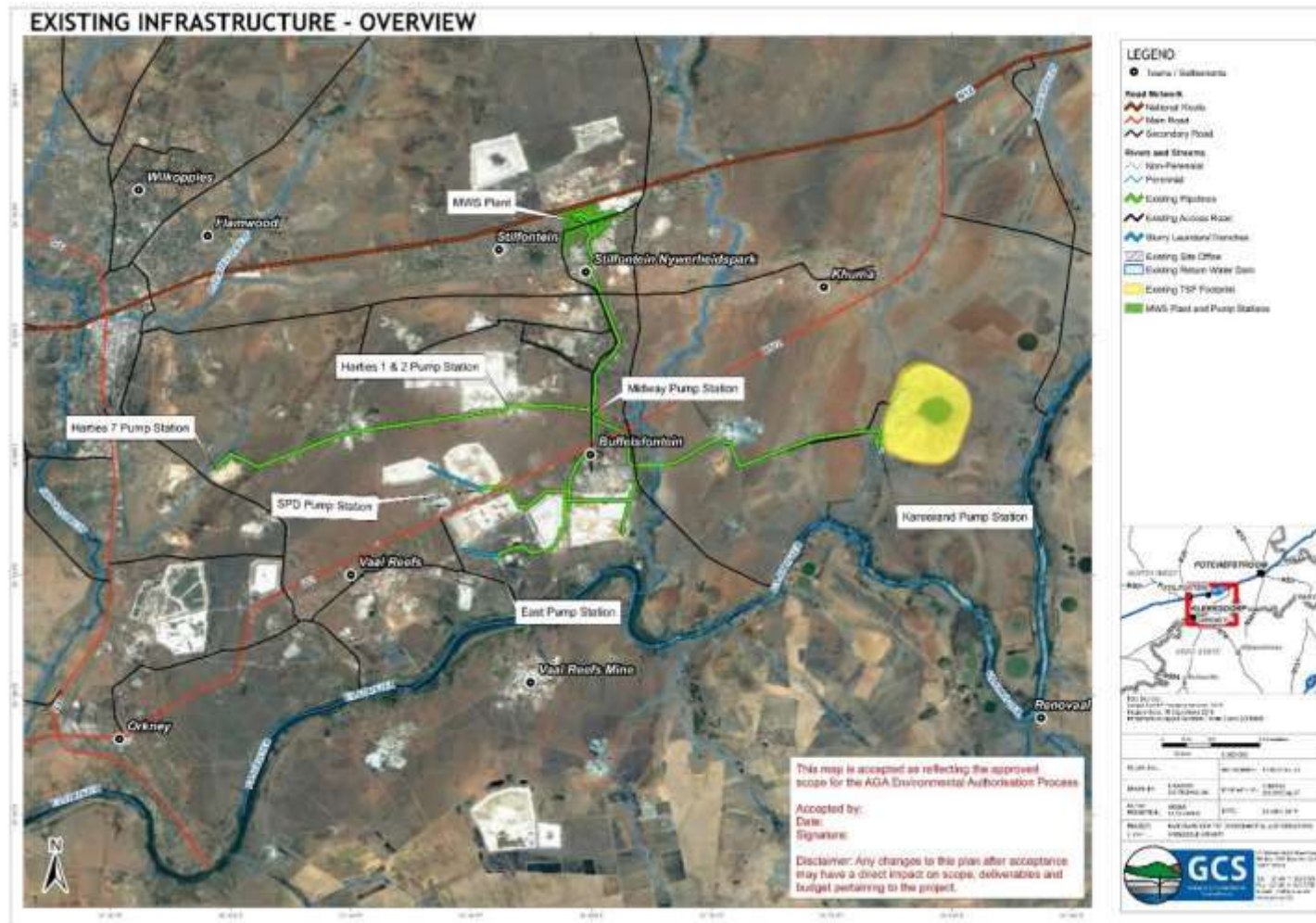
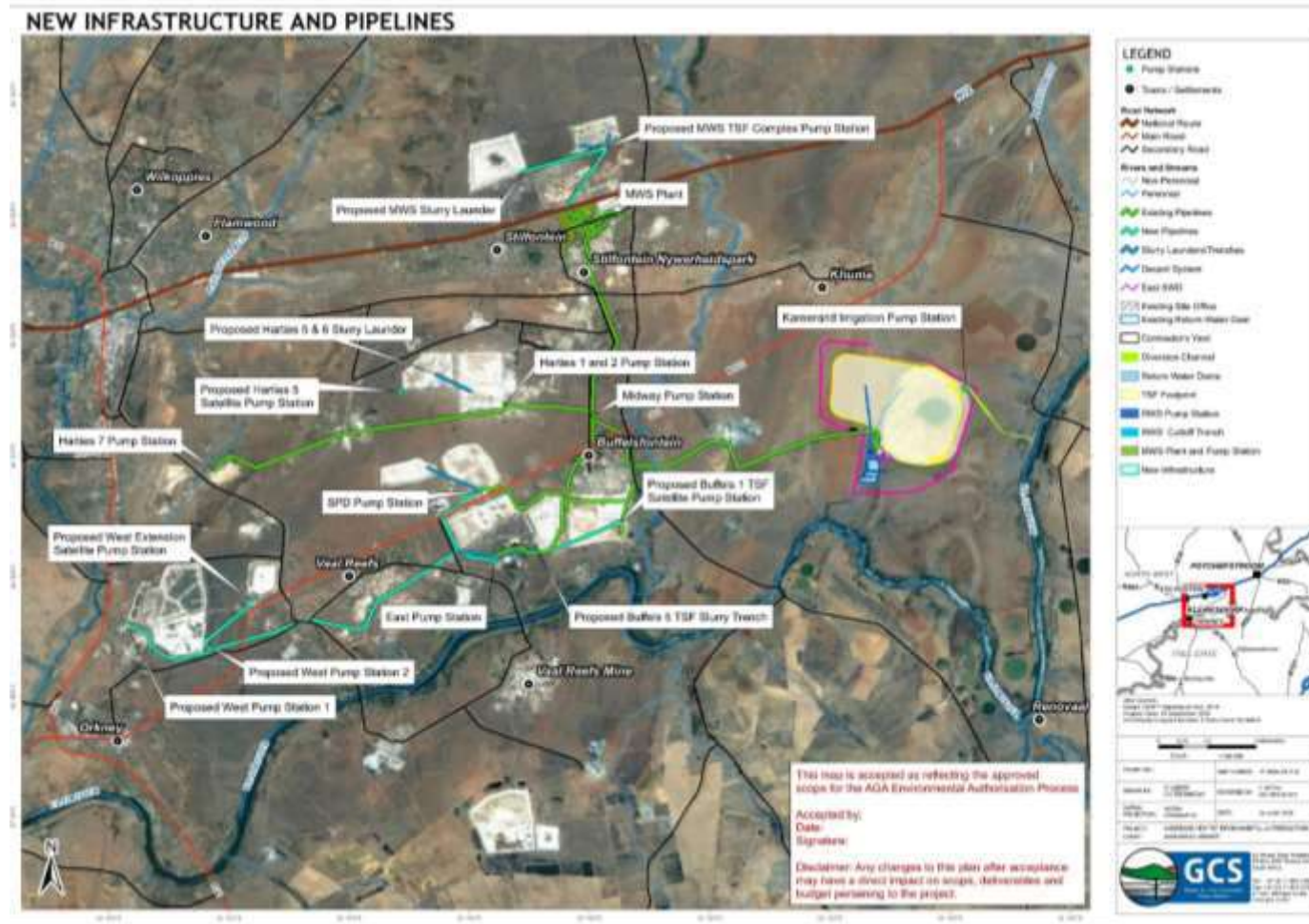


Figure 1-1: Existing Infrastructure servicing current Kareerand TSF





**Figure 1-2: Site layout across operational footprint and TSF expansion footprint**  
 The new infrastructure is noted by the word “proposed”, and the new pipelines are indicated in bright blue (as opposed to existing pipelines indicated in green).

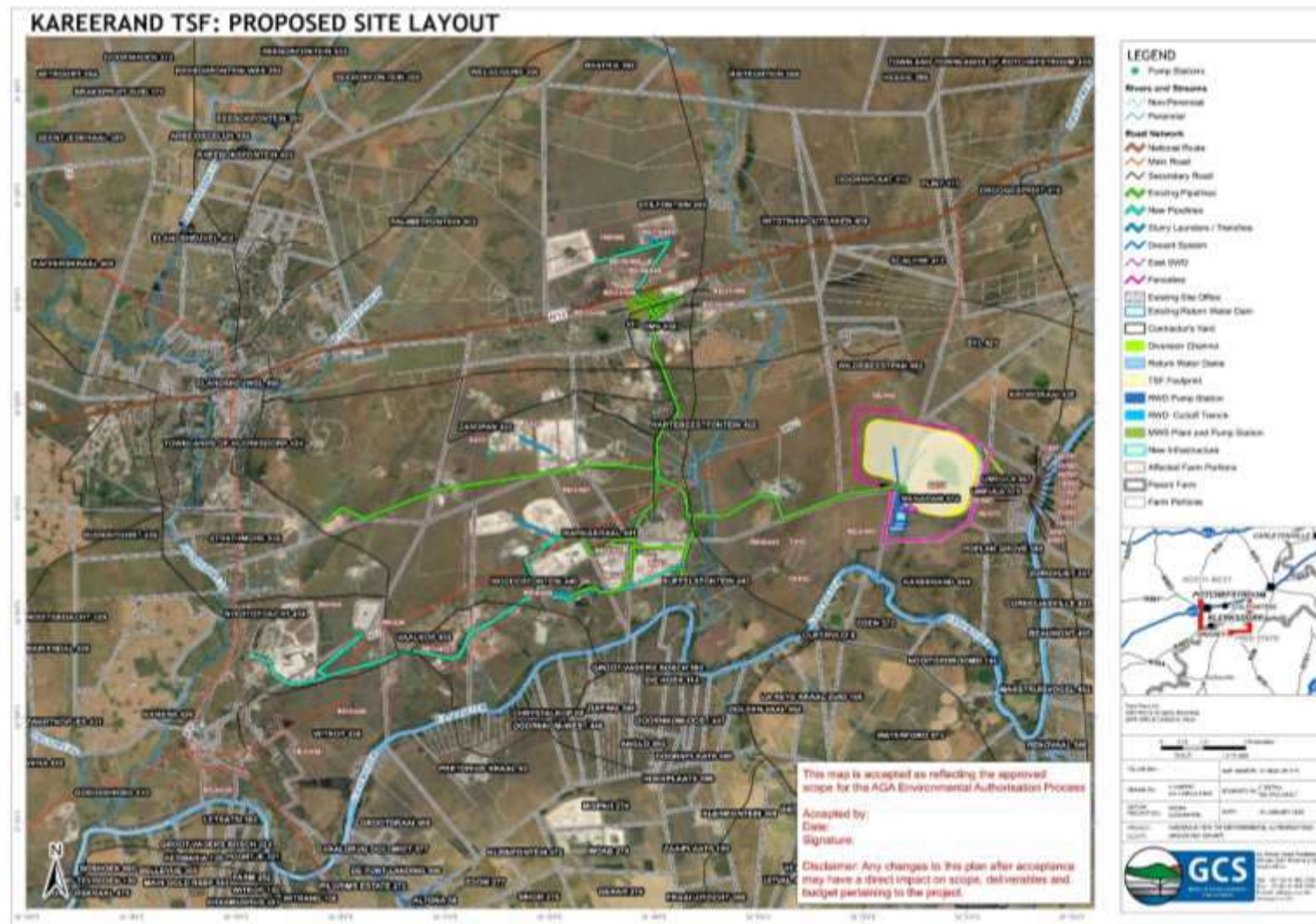


Figure 1-3: Kareerand TSF expansion site layout

### 1.3 Details of the Applicant and EAP

The details of the applicant are provided in Table 1.1.

**Table 1.1: Name and Address of Applicant**

ITEM	COMPANY CONTACT DETAILS
Company Name:	Mine Waste Solutions (Pty) Ltd
Company Representative:	Duran Archery
Contact Persons:	Nicky Strydom/Charl Human
Telephone No.:	011 637 6691/ 018 478 6519
Facsimile No.:	NA
E-mail Address:	<a href="mailto:nstrydom@anglogoldashanti.com">nstrydom@anglogoldashanti.com</a> <a href="mailto:chuman@anglogoldashanti.com">chuman@anglogoldashanti.com</a>
Postal Address:	Mine Waste Solutions, 3 Stilfontein Road, Stilfontein, 2551

GCS Water and Environment (Pty) Ltd (GCS) have been appointed as the independent Environmental Assessment Practitioners (EAP) to undertake the environmental processes required to obtain approval for the proposed listed activities, as requested by the relevant competent authorities. The contact details of the EAP are provided in Table 1.2.

**Table 1.2: Name and address of environmental assessment practitioner.**

ITEM	COMPANY CONTACT DETAILS
Company Name:	GCS Water and Environment (Pty) Ltd
Company Representative:	Sharon Meyer
Telephone No.:	+27 (0)11 803 5726
Facsimile No.:	+27 (0)11 803 5745
E-mail Address:	sharonm@gcs-sa.biz
Postal Address:	PO Box 2597, Rivonia, 2128

### 1.4 Project Location

The proposed TSF expansion project is located in the western portion of the Witwatersrand Basin, approximately 160 kilometres (km) from Johannesburg in the North-West Province of South Africa. The closest town to the proposed expansion project is Khuma, located about 3km northwest of the TSF. Other nearby towns include Stilfontein (10km from TSF) and Klerksdorp (19km from facility). The project is situated in the City of Matlosana and JB Marks Local Municipalities, within the Dr Kenneth Kaunda District Municipality (Figure 1-4).





The proposed expansion is located on various farm portions as detailed in Table 1.3 and depicted in Figure 1-3.

**Table 1.3: Farm portions associated with the proposed Kareerand TSF expansion project.**

PARENT FARM	FARM PORTION	AREA(HA)	OWNER
STILFONTEIN 408 IP	RE/10	241.47	CHEMWES PTY LTD
	RE/15	189.26	CHEMWES PTY LTD
	RE/21	66.66	CHEMWES PTY LTD
	RE/30	78.33	CHEMWES PTY LTD
	RE/31	118.8	CHEMWES PTY LTD
	RE/33	16.83	CHEMWES PTY LTD
	RE/66	254.79	CHEMWES PTY LTD
	140	197.73	CHEMWES PTY LTD
ZANDPAN 423 IP	3	777.88	TEMOTUO REHABILITATION CO
	4	627.72	NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA
NOOITGEDACHT 434 IP	200	1850.7	ANGLOGOLD ASHANTI LTD
WITKOP 438 IP	RE/1	600.82	ANGLOGOLD ASHANTI LTD
	RE/2	681.4	ANGLOGOLD ASHANTI LTD
	RE/4	222.38	ANGLOGOLD ASHANTI LTD
VAALKOP 439 IP	RE	332.12	ANGLOGOLD ASHANTI LTD
	RE/3	1473.75	ANGLOGOLD ASHANTI LTD
MODDERFONTEIN 440 IP	RE/4	2572.08	ANGLOGOLD ASHANTI LTD
MAPAIKRAAL 441 IP	RE	144.91	ANGLOGOLD ASHANTI LTD
	RE/1	201.32	AFRICAN RAINBOW MINERALS LTD
	RE/2	120.82	ROCHA MARIA INES DA
WILDEBEESTPAN 442 IP	RE	1067.1	WILDEBEESTPAN (PORTION 9 & 10) COMMUNAL PROPERTY ASSOCIATION
BUFFELSFONTEIN 443 IP	RE/2	362.6	CHEMWES PTY LTD
	RE/6	362.04	CHEMWES PTY LTD
	7	2.2	CHEMWES PTY LTD
	9	326.8	CHEMWES PTY LTD
	15	601.09	CHEMWES PTY LTD
MEGADAM 574 IP	0	977.1	CHEMWES PTY LTD
UMFULA 567 IP	8	5.23	TWO PALMS TRUST
	9	5.18	TWO PALMS TRUST
	10	5.22	TWO PALMS TRUST
	11	5.17	TWO PALMS TRUST
	12	4.93	TWO PALMS TRUST
	13	4.66	TWO PALMS TRUST
	14	4.39	TWO PALMS TRUST
	15	4.19	TWO PALMS TRUST
	16	4.06	TWO PALMS TRUST
	17	4.00	TWO PALMS TRUST
	18	3.90	TWO PALMS TRUST
19	5.00	TWO PALMS TRUST	
UMFULA 575 IP	0	352.53	CHEMWES PTY LTD

## 1.5 Legislative Background

The policy and legislative context applicable to the Kareerand TSF expansion project is summarised in Table 1.4 and penalties applicable to non-compliance to the legislation are detailed in Table 1.5.

**Table 1.4: Legislation and guidelines applicable to the TSF expansion project**

LEGISLATION/ GUIDELINES	APPLICABILITY
<p>The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</p>	<p>The Constitution is the supreme act to which all other acts must speak to and sets out the rights for every citizen of South Africa and aims to address past social injustices. With respect to the environment, Section 24 of the constitution states that:                      “Everyone has the right:                      a) To an environment that is not harmful to their health or well-being;                      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”.</p> <p>iv.</p>
<p>National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</p>	<p>Framework law giving effect to the constitutional environmental right. Provides the framework for regulatory tools in respect of environmental impacts, including mining and mine closure. Section 24 of NEMA regulates environmental authorisations, with Sections 24P, 24Q, 24R and 24S being directly relevant to mine closure. Section 24P of NEMA sets out the requirements for financial provision for remediation of environmental damage, Section 24Q refers to the monitoring and performance assessments required for those holding an environmental authorization (thereby including permit holders who have been given a closure EA), Section 24R speaks specifically to environmental authorisation for mine closure and Section 24S establishes that residue stockpiles and deposits should be managed according to NEM:WA.</p> <p>Section 28(1) states that “Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment”.</p> <p><i>MWS will be responsible for the rehabilitation of the Kareerand Tailings Storage Facility and the expansion thereof, in accordance with the NEMA Regulations. MWS will be responsible for the Duty of Care of the affected receiving environment during the construction, operation, decommissioning and closure phases of the project.</i></p>

LEGISLATION/ GUIDELINES	APPLICABILITY
<p>National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) (NEM:WA)</p>	<p>Regulates inter alia the duty of care, management, transport and disposal of waste including mining waste such as residue deposits and residue stockpiles. Furthermore, this Act regulates the rehabilitation of contaminated land and waste disposal facilities including mining waste facilities. Section 16(1) of the NEM:WA provides that:</p> <p>“A holder of waste must, within the holder’s power, take all reasonable measures to -</p> <ul style="list-style-type: none"> <li>a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;</li> <li>b) reduce, re-use, recycle and recover waste;</li> <li>c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;</li> <li>d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;</li> <li>e) prevent any employee or any person under his or her supervision from contravening this Act; and</li> <li>f) prevent the waste from being used for an unauthorised purpose.”</li> </ul> <p>The NEM:WA also provides for a licensing regime specific to waste management activities. Category A activities require a BA process to be undertaken, whilst Category B activities require a S&amp;EIR process to be undertaken.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA)</p>	<p>Regulates activities which may have a detrimental effect on ambient air quality including certain processes and dust generating activities such as tailings deposition. However, an Air Emissions License is not required.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</p>	<p>Regulates the protection of biodiversity and the management of invasive species, including the use of alien and invasive species on mining sites. Section 73 speaks to duty of care with respect to listed invasive species and states that “A person authorised by permit in terms of section 71(1) to carry out a restricted activity involving a specimen of a listed invasive species must take all the required steps to prevent or minimise harm to biodiversity”. A permit will only be required should there be a direct impact to a conservation area or protected species.</p>
<p>Conservation of Agricultural Resources Act 43 of 1983 (CARA)</p>	<p>Regulates the eradication of weeds and invader plants, including those occurring on development sites.</p>

LEGISLATION/ GUIDELINES	APPLICABILITY
National Water Act, 1998 (Act No. 36 of 1998) (NWA)	<p>Regulates the protection of the water resources and the use of water, including on inter alia mining areas. Furthermore, the Act contains provisions relevant to mine closure with regard to water resource protection from pollution and environmental degradation.</p> <p>Section 19(1) states that “An owner of land, a person in control of land or a person who occupies or uses the land on which -</p> <p>a) any activity or process is or was performed or undertaken; or</p> <p>b) any other situation exists,</p> <p>which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.”</p>
The National Heritage Resources Act, (Act No. 25 of 1999) (NHRA)	<p>Section 34(1) of NHRA states that “No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.” This needs to be taken into account when demolishing mine infrastructure.</p>
Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (SPLUMA)	<p>The aim of SPLUMA is to provide a uniform system of spatial planning and land use management throughout the country. SPLUMA places emphases on the fundamental role municipal planning and municipalities have on effective spatial planning and development. In 2012, a judgement handed down by the Constitutional Court found that mining constitutes a land use and can only be conducted lawfully if the said activity corresponds with the purpose for which land has been zoned in terms of the application Town Planning/Land Use Management Scheme (the “Scheme”). Based on the above use is primarily governed by the applicable land use or zoning scheme and land may not be used in contravention of such a scheme. Despite any issued environmental authorisation, mining and associated activities can only be executed on land with the appropriate zoning permitting such activities.</p>
Guidelines	<p>Handbook of Guidelines for Environmental Protection, Chamber of Mines (CEM (SA)) (Chamber of Mines of South Africa, 1979)</p> <ul style="list-style-type: none"> <li>• Volume 2/1979: The vegetation of residue deposits against water and wind erosion;</li> </ul> <p>Volume 7: Statutory requirements for environmental management.</p>
	<p>Mine Residue - Code of Practice (SABS 0286:1998).</p>
	<p>Framework for the Management of Contaminated Land, DEA 2010.</p>
	<p>Mining and Biodiversity Guideline - Mainstreaming biodiversity into the mining sector, 2013 (DEA, DMR, CM, South African Mining and Biodiversity Forum and South African National Biodiversity Institute, 2013).</p>



LEGISLATION/ GUIDELINES	APPLICABILITY
	<p>Water Conservation and Water Demand Management (WC/WDM) Guideline for the Mining Sector in South Africa, June 2011 (DWA, 2011).</p> <p>Guideline Document for the implementation of Regulations on use of water for Mining and related activities aimed at the protection of Water Resources, Second Edition, May 2000.</p> <p>Best Practice Guidelines for Water Resource Protection in the South African Mining Industry (Department of Water Affairs, 2006):</p> <p>Series A: Best Practice (BP) Guidelines</p> <ul style="list-style-type: none"> <li>• A2: Water Management for Mine Residue Deposits, July 2008;</li> <li>• A4: Pollution Control Dams, August 2007;</li> </ul> <p>Series G: BP Guidelines</p> <ul style="list-style-type: none"> <li>• G1: Storm Water Management, August 2006;</li> <li>• G2: Water and Salt Balances, August 2006;</li> <li>• G3: Water Monitoring Systems, July 2007;</li> <li>• G4: Impact Prediction, December 2008;</li> <li>• G5: Water Management Aspects for Mine Closure, December 2008;</li> </ul> <p>Series H: BP Guidelines</p> <ul style="list-style-type: none"> <li>• H1: Integrated Mine Water Management, December 2008;</li> <li>• H2: Pollution Prevention &amp; Minimization of Impacts, July 2008;</li> <li>• H3: Water Reuse &amp; Reclamation, June 2006; and</li> <li>• H4: Water Treatment, September 2007.</li> </ul>

**Table 1.5: Penalties applicable to non-compliances under the legislation tabulated above**

LEGISLATION	SECTION	FINE
NEMA	Section 49A (1) (a), (b), (c), (d), (e), (f) and (g)	Fine not exceeding R 10 million or imprisonment for a period not exceeding 10 years, or both such fine and such imprisonment.
	Section 49A (1) (i), (j) or (k)	Fine not exceeding R 5 million, or imprisonment for a period not exceeding 5 years. In the case of a second or subsequent conviction: fine not exceeding R 10 million, or to imprisonment for a period not exceeding 10 years. Or in both instances to both such fine and such imprisonment.
	Section 49A (1) (h), (l), (m), (n) (o) or (p)	Fine or imprisonment for a period not exceeding one year, or to both a fine and such imprisonment.
NWA	Section 15 and Item 31 of Schedule 4	<u>First conviction:</u> Fine or imprisonment for a period not exceeding 5 years, or both a fine and such imprisonment. <u>Second or subsequent conviction:</u> Fine or imprisonment for a period not exceeding 10 years, or both a fine and such imprisonment.
NEM:WA	Section 67 (1) (a), (g) or (h)	Fine not exceeding R 10 million or imprisonment for a period not exceeding 10 years, or both such fine and such imprisonment, <u>in addition to</u> other penalties that may be imposed in terms of NEMA.
	Section 67 (1) (b), (c), (d), (e), (f), (i), (j), (k) or (l), and Section 67 (2) (a), (b), (c), (d) or (e)	Fine not exceeding R 5 million or imprisonment for a period not exceeding 5 years, or both such fine and such imprisonment, <u>in addition to</u> other penalties that may be imposed in terms of NEMA.
	Section 67 (1) (m)	Fine or imprisonment for a period not exceeding 6 months or both a fine and such imprisonment.

## **1.6 Listed and specified activities**

The Kareerand TSF expansion project triggers listed activities in terms of the NEMA, as contained in the amended 2014 EIA Regulations. The identified listed activities are presented in Table 1.6 and require that a Scoping and Environmental Impact Reporting (S&EIR) process is followed in order to obtain the necessary Environmental Authorisation (EA) in terms of the NEMA.

The Kareerand TSF expansion project also triggers listed waste management activities in terms of the NEM:WA “List of waste management activities that have, or are likely to have, a detrimental effect on the environment”, and thus requires a Waste Management License (WML) (Table 1.7).

**Table 1.6: NEMA Listed Activities triggered by the Kareerand TSF expansion project.**

LISTING NOTICE	ACTIVITY NO	ACTIVITY DESCRIPTION	PROJECT ACTIVITY WHICH TRIGGERS THE LISTED ACTIVITY:
Listing Notice 1: Government Notice R983 in Government Gazette 38282 of 4 December 2014 and amended by:			
<ul style="list-style-type: none"> <li>GN 327 GG 40772 20170407 w.e.f. 7 April 2017</li> <li>GN 706 GG 41766 20180713 w.e.f. 13 July 2018</li> </ul>			
LN1	12	The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	New RWDs = 60.6Ha; will impact a small watercourse.  Development of the TSF within the watercourse.  Development of new pump stations
LN1	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	TSF expansion will be conducted on the site of a small watercourse
LN1	24	The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres.	The development of 8 m wide roads to the TSF. The combined distance of the new roads will be 11 km.
LN1	28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or	Commercial development which will occur on land that was used for agriculture; TSF and associated dams will be 473 ha in size, plus the footprint of the six (6) pump stations (unknown at this stage).

LISTING NOTICE	ACTIVITY NO	ACTIVITY DESCRIPTION	PROJECT ACTIVITY WHICH TRIGGERS THE LISTED ACTIVITY:
		(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare	
LN1	31	The decommissioning of existing facilities, structures or infrastructure for- (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014.	During the first ten years of the expansion operation, some of the pump stations and associated infrastructure will be decommissioned.
LN1	46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more.	Process water and slurry pipelines will range from 0.5 m to 0.6 m in diameter and pipeline network will be cumulatively expanded by approximately 30 km.
LN1	48	The expansion of- (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more.	The TSF expansion footprint will be approximately 380 Ha; expansion will occur over a small watercourse. RWD expansion.
Listing Notice 2: Government Notice R984 in Government Gazette 38282 of 4 December 2014 and amended by: <ul style="list-style-type: none"> <li>• GN 327                      GG 40772                      20170407                      w.e.f. 7 April 2017</li> <li>• GN 706                      GG 41766                      20180713                      w.e.f. 13 July 2018</li> </ul>			
LN2	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The total footprint that will be cleared for the proposed project is approximately 473 + footprints of six (6) pump stations (unknown at this stage)

**Table 1.7: NEM:WA Listed Activities triggered by the proposed project.**

CATEGORY	ACTIVITY NO	ACTIVITY DESCRIPTION	PROJECT ACTIVITY WHICH TRIGGERS WASTE MANAGEMENT ACTIVITY
B	(3)	The recovery of waste including refining, utilization, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	Additional tailings will be processed and deposited on the new TSF.
B	(7)	The disposal of any quantity of hazardous waste to land.	The Kareerand TSF will cater to the disposal of tailings.
B	(11)	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	Tailings will be reclaimed from existing old TSF's

## 2 SCOPE OF WORK

The aims of this Scoping Report are:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location and layout;
- Identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking processes;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification 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;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken; and
- 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.

### 2.1 Motivation

The expansion of the existing TSF will enable the reclamation of additional tailings dams and deposition of the tailings in an expanded facility complete with geofabric liner and appropriate seepage mitigation measures reducing the total seepage into the Vaal River.

The project will support concurrent rehabilitation of the current Kareerand TSF and the expansion, thereby reducing the risk of windborne dust and storm water management. Removing and consolidating the tailings in the KOSH area on a single tailings storage facility will in the long term, positively impact the surrounding environment and Vaal River.

Specialist studies have been commissioned to assess the impacts of the TSF expansion on identified aspects of biophysical and socio-economic receptors within the area. Mitigation, management, and rehabilitation designs will be informed by a team of specialists and engineers.

In addition, the extended Life of Mine (LoM) of the reclamation operations will create employment for a longer period and thus bring associated socio-economic benefits to the towns and settlements in the area.

## 3 PROJECT ALTERNATIVES

### 3.1 TSF Site Selection

#### 3.1.1 Risk Assessment

The project entails the expansion of the current Kareerand TSF as well as extension of pipelines and addition of infrastructure associated with the TSF expansion. Below is a summary of the site selection process for the expansion. The detailed risk assessment of alternatives will be presented in the EIA Report.

The scope of work covered by the site selection report (Golder, 2016) and the risk report (GCS, 2017) includes:

- Site selection and risk analysis on identified options;
- Identification and quantification of potential latent environmental risks related to post closure of each option;
- Discussion of risk management approaches; and
- Quantification of potential liabilities associated with management of the risks.

#### 3.1.2 Site Options

##### 3.1.2.1 Option 1

This site is located on the existing Buffelsfontein TSF footprint (shown in dark red in Figure 3-1). Site area is 300 Ha, can accommodate 230Mt, 70 m high at a deposition rate of 10Mt/a. Located on dolomite. Area required for expansion incorporates the current Buffelsfontein Gold Plant which is not owned by MWS.

##### 3.1.2.2 Option 2

This site is located directly north of the existing MWS plant, on a TSF footprint area (shown in orange in Figure 3-1). Consists of 4 cells: 2a, b, c, and d; of which 2b is a greenfields site and 2c is an existing TSF, still to be reclaimed. The entire footprint area can accommodate 560Mt at 70m high at a deposition rate of 30 Mt/a. Located on dolomite. Land mostly owned by MWS.

##### 3.1.2.3 Option 3

This site is located north of the existing MWS plant, on a greenfields area (shown in dark yellow in Figure 3-1). The entire footprint area can accommodate 560 Mt at 70m high at a deposition rate of 30 Mt/a. Located on dolomite. Land mostly owned by MWS.



3.1.2.4 Option 4

This site is a greenfields site located directly west of the current Kareerand TSF (shown in pale yellow in Figure 3-1). An area of 615 Ha is available, which caters for 456 - 584 Mt at a deposition rate of >30 Mt/a. The land is owned by and leased from the community. Site is not located on dolomite.

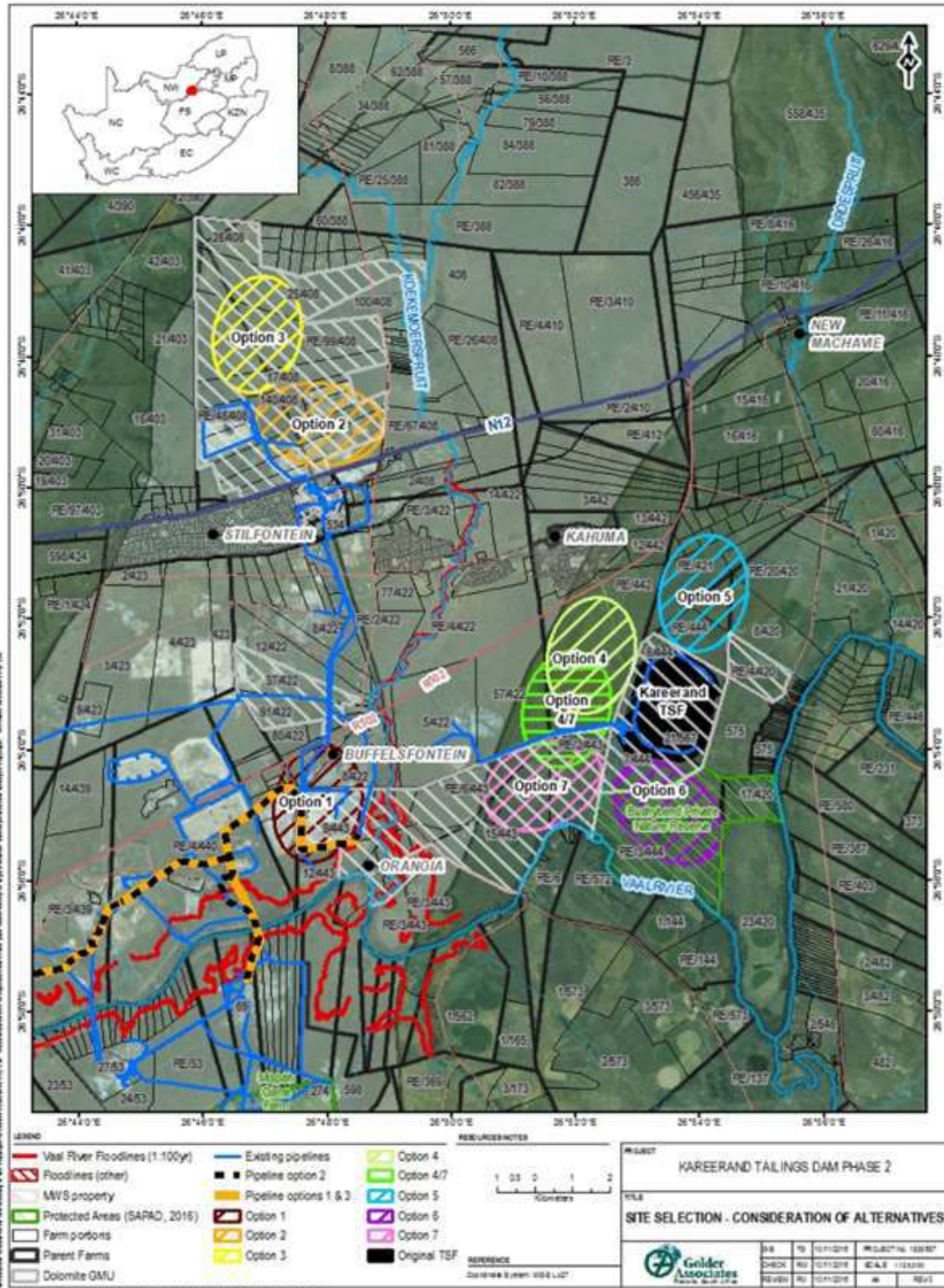


Figure 3-1: The seven alternatives investigated to identify the best site for the TSF expansion project (Golder Associates, 2016)

#### 3.1.2.5 Option 5

This site is a greenfields site located north of the current Kareerand TSF (shown in blue in Figure 3-1). An area of 560 Ha is available. The land is owned by a private landowner. Site is not located on dolomite. The expected tonnages available at this site option were not calculated.

#### 3.1.2.6 Option 6

This site is a greenfields site located directly to the south of the current Kareerand TSF (shown in purple in Figure 3-1). An area of 730 Ha is available. The land belongs to a private landowner. Site is not located on dolomite. The TSF footprint would be located within the 500 m buffer zone of the Vaal River. The expected tonnages available at this site option were not calculated.

#### 3.1.2.7 Option 7

This site is a greenfields site located southwest of the current Kareerand TSF (shown in pink in Figure 3-1). An area of >510 Ha is available. The land belongs to MWS. Site is not located on dolomite. The TSF footprint would be located within the 500 m buffer zone of the Vaal River. The expected tonnages available at this site option were not calculated.

### 3.1.3 Site Alternative Risk Matrix

Using the matrix-based risk approach, identified risks were subjected to mitigation strategies to determine the possibility of reducing the risk rating. For certain aspects under assessment, risks were able to be mitigated, but for others- such as dolomite structures underneath the tailings facility- these risks had to be accepted.

In conclusion, two options (options 4 and 5) were identified as least disruptive according to the environment, social and technical criteria used. Thereafter, option 4 was chosen as the preferred site for the following reasons:

- Expansion to current facility, containing the impact to a single site, which makes it easier to manage and mitigate;
- Area is not underlain by dolomite;
- Land is on a 99-year lease to the applicant; and
- Existing infrastructure will be used by the expanded facility.

Risk focus needs to be placed on ownership. Negotiations with surface right owners is key in ensuring access to build the expanded facility.

## 4 BASELINE ENVIRONMENTAL DESCRIPTION

The baseline environment is described within this Chapter. The baseline environment provides a status against which to assess the proposed project activities and potential impacts.

### 4.1 Geology

The site is underlain by the following geological units (Figure 4-1), as per the regional geological map “Far West Rand, 1:250 000, South African Geological Survey, 1981”:

- Vmd - Dolomite, chert and remnants of chert breccia;
- Vt - Ferruginous shale, hornfels, ferruginous quartzite;
- Vh - Andesitic lava, subordinate pyroclastic rocks, minor quartzite, shale and conglomerate;
- Vs - Ferruginous shale and quartzite;
- Vd - Quartzite and shale, ferruginous in places;
- Vdi - Diabase; and
- A - Alluvial deposits along Vaal River.

The western half of the proposed site is underlain by Andesitic Lava of the Pretoria Group of the Transvaal Sequence and the eastern part of the site by Diabase of the Hekpoort Formation. The Hekpoort Formation of the Pretoria Group is a sequence of basaltic lava turning to andesitic and tuff formations, as well as conglomerates. Andesite is an igneous, volcanic rock of intermediate composition (between basalt and felsite). It is porphyritic and consists of coarse crystals (phenocrysts) embedded in a granular or glassy matrix (groundmass). Diabase is an intrusive rock. Typically, these greenish coloured rocks occur in shaley horizons of the Transvaal Sequence at or near their contact with quartzite. The diabase sills vary in thickness from 1 - 300m. Chemical decomposition is usually far advanced and residual soils relatively deep.

The development of the soil profile is remarkably close to that of the Hekpoort andesites. These soils are highly expansive and susceptible to heave. The geological units, as described above, dip at an angle of about 50 degrees (°) in a south eastern direction. The strike of the geological units is north east to south west. Most of the faulting (a fault is a natural fracture that cuts through the rock) in the area trends in a south-west to north-east direction and is normal, with displacement both to the north and south of between 10 - 250 m. The geological map indicates a major fault zone that runs from south-west to north-east in the western part of the investigation area, approximately 1.5 km west of the proposed TSF expansion site.



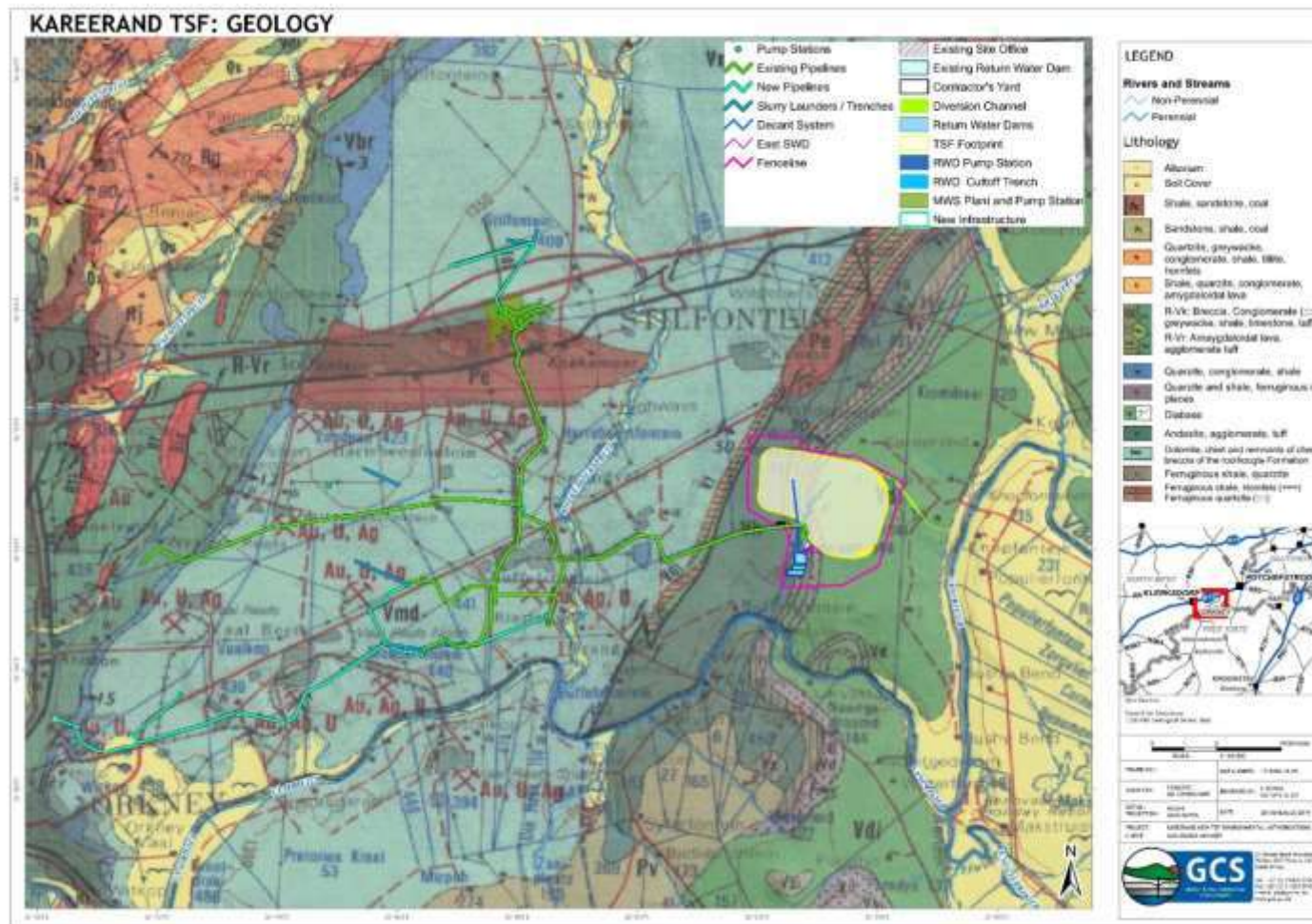


Figure 4-1: Map showing the geology underlying the proposed TSF expansion site

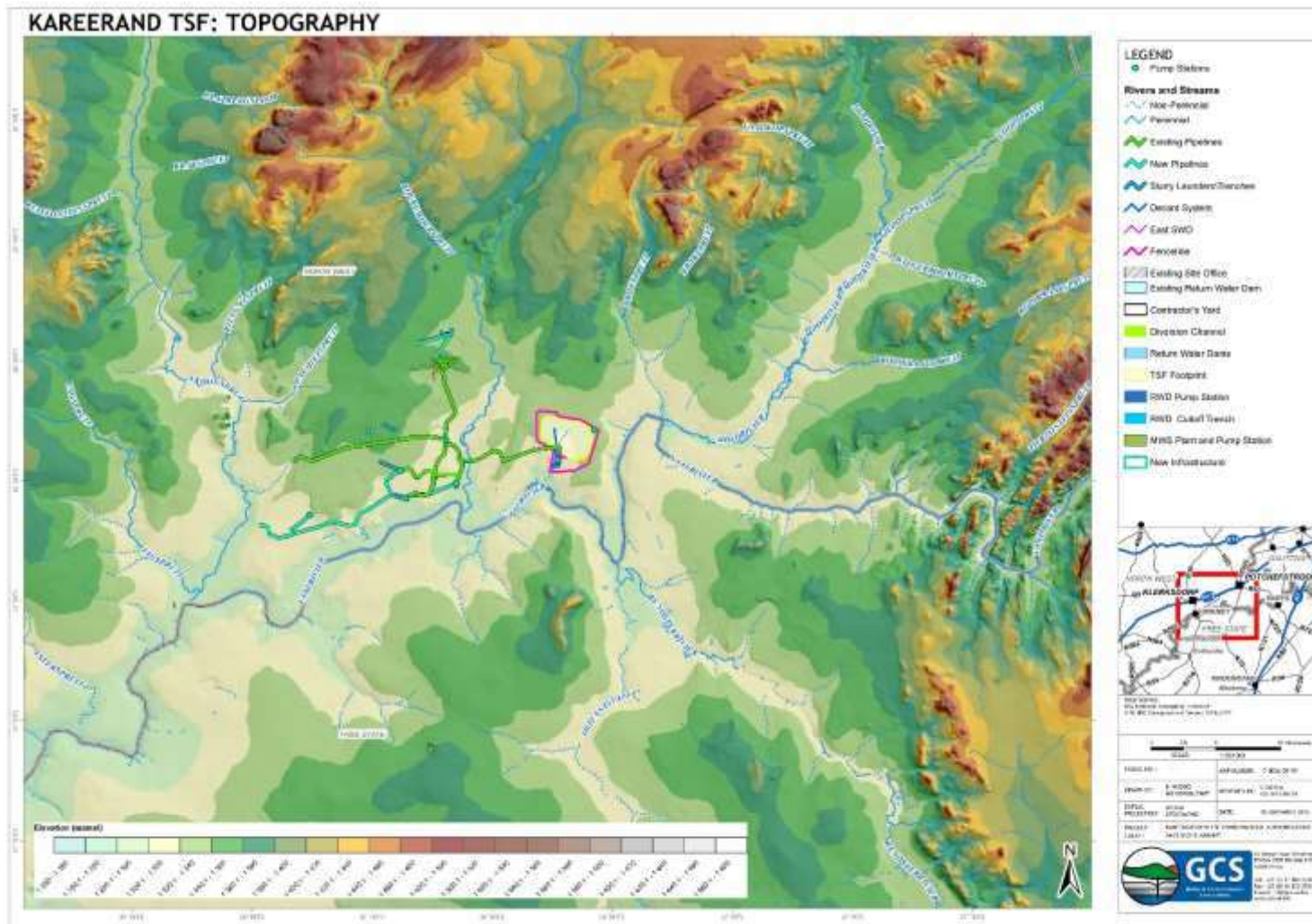


Figure 4-2: Map showing the topography of the area where the proposed TSF expansion is located

## 4.2 Topography

The regional elevation ranges between 1 350 metres above mean sea level (mamsl) in the north western part of the investigation area and 1 290 mamsl in the south and east, where the Vaal River flows in a westerly direction (Figure 4-2).

The study area is located within the quaternary catchments (C24A, C24B and C24H). The receiving water body for the proposed site is the Vaal River. The topography of this area does not vary significantly in height and is therefore suited to TSF construction.

## 4.3 Climate

### 4.3.1 Precipitation

Rainfall is important to air pollution studies since it represents an effective removal mechanism of atmospheric pollutants. Monthly rainfall obtained from the measured Klerksdorp station data is presented in Figure 4-3. Total annual rainfall from January 2016 to December 2016 amount to 479 mm.

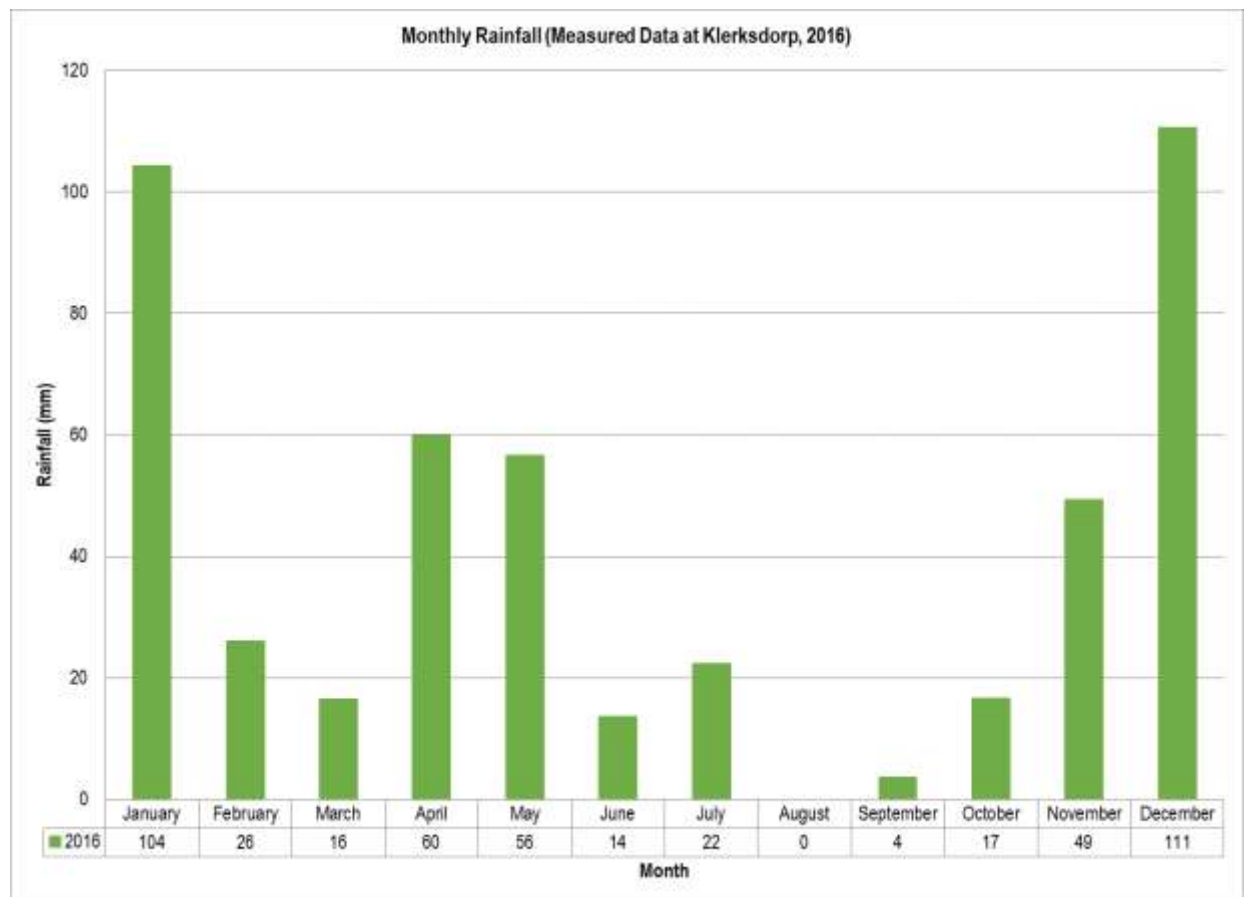


Figure 4-3: Monthly rainfall (Measured data at Klerksdorp, January 2016 to December 2016)



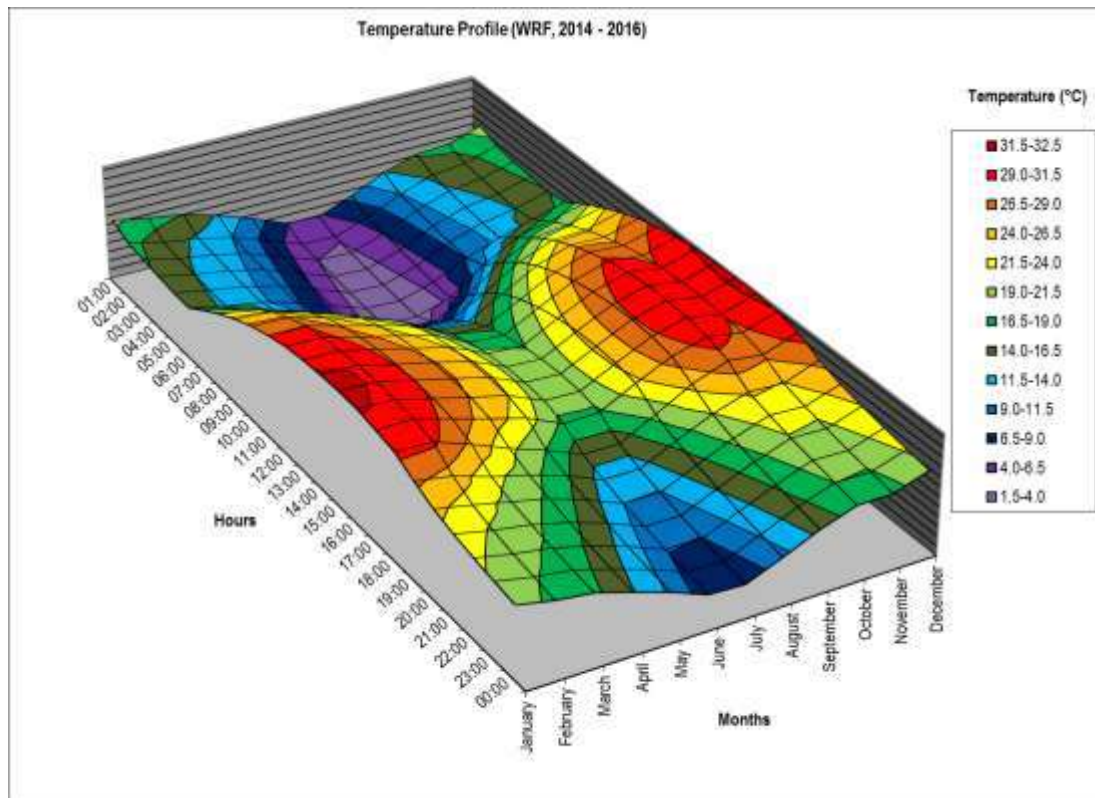
**4.3.2 Temperature**

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the emissions plume and the ambient air, the higher the plume can rise), and determining the development of the mixing and inversion layers.

Monthly mean, maximum and minimum temperatures are given in Table 4-1. Diurnal temperature variability is presented in Figure 4-4. Temperatures ranged between -4 °C and 41 °C. The highest temperatures occurred in January and the lowest in June. During the day, temperatures increase to reach maximum at around 14:00 in the afternoon. Ambient air temperature decreases to reach a minimum at around 06:00 i.e. just before sunrise.

**Table 4-1: Monthly temperature summary (WRF data, January 2014 to December 2016)**

Monthly Minimum, Maximum and Average Temperatures (°C)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Average	24	23	21	18	15	11	11	15	19	22	22	25
Hourly Maximum	41	37	35	34	30	27	25	32	35	37	38	39
Hourly Minimum	11	7	4	2	2	-4	-3	-3	1	1	4	12



**Figure 4-4: Diurnal temperature profile (WRF data, January 2014 to December 2016)**

## 4.4 Soils, Land Use and Land Capability

### 4.4.1 Soil Types

The major soil types encountered include those of the orthic phase Hutton, Clovelly, Griffin, shallow Mispah and Glenrosa Form soils (**Figure 4-5**). These cover large parts of the surveyed area, while significantly large areas of structured and hydromorphic form soils associated with the Kromdraaispruit and its tributaries and the floodplains of the Vaal River on the southern boundary of the site have been identified. These soils vary from hydromorphic soils as extreme as deep Avalon and Pinedene to shallow Avalon, Bainsvlei, Westleigh, and Kroonstad Forms and highly structured Katspruit, along with gleycutanic and vertic Rensburg and Arcadia Forms.

### 4.4.2 Land Use

Land use in the area surrounding the proposed TSF expansion project consists mainly of agriculture, residential and mining (**Figure 4-6**).

### 4.4.3 Land Capability

The land capability of the area in question ranges from moderate to very poor-quality arable soils with areas of moderate to low economic potential, wilderness and wetlands. The strong correlation between soil depth and structure and the capability of the land is evident across the study area, with the shallow and sensitive soils being confined to low intensity grazing and wilderness-related activities such as game farming. Deeper and less sensitive soils are therefore utilized for better quality (higher density) grazing and some cultivation of annual crops. The land capability of the study area was classified into four classes: wetland, arable land, grazing land and wilderness (**Figure 4-7**).



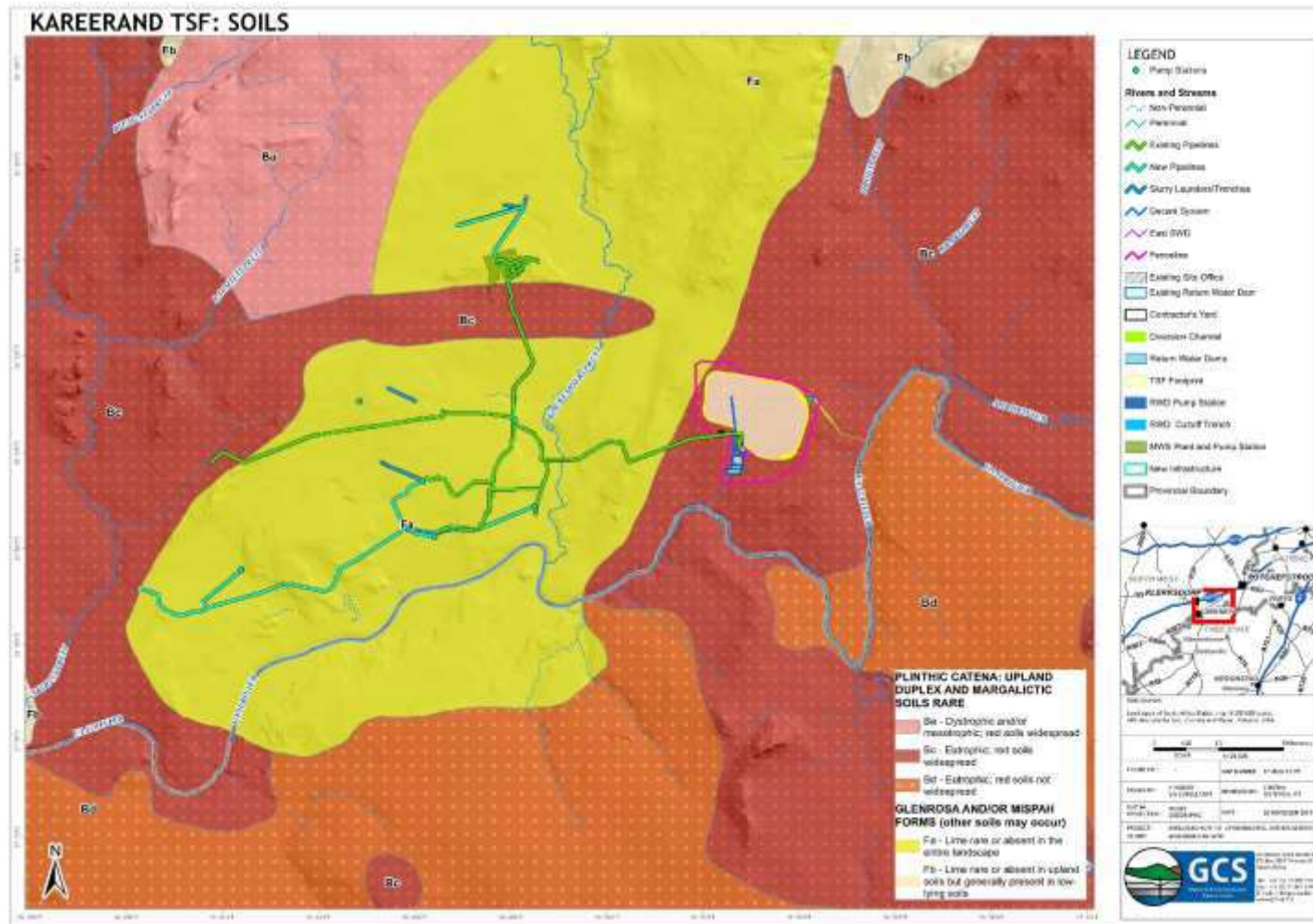


Figure 4-5: Map showing the soil forms of the area where the proposed TSF expansion is located





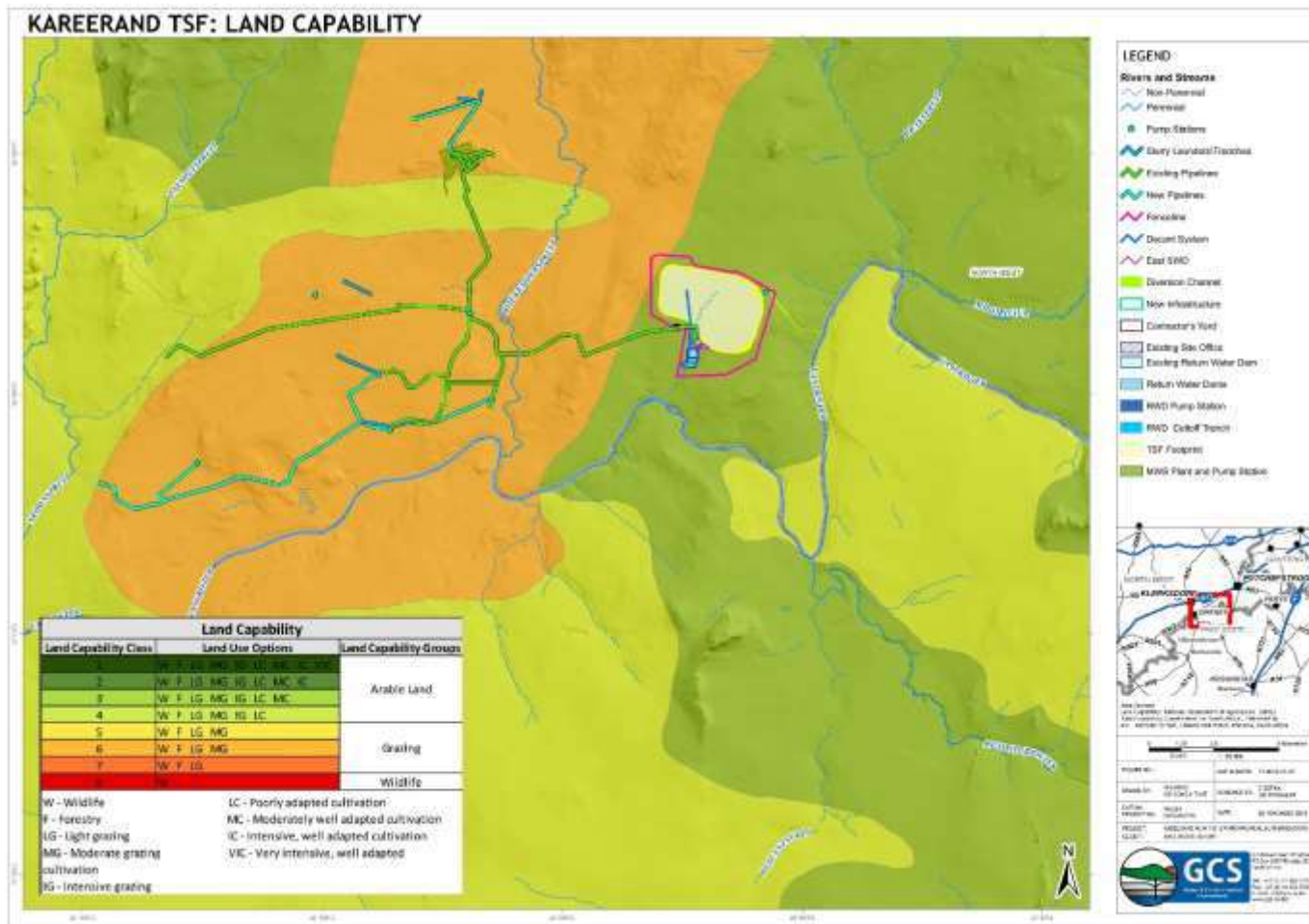


Figure 4-7: Map showing the land capabilities of the area where the proposed TSF expansion is located. The land capability increases from the red end of the scale (low) towards the dark green end (high).

#### **4.5 Hydrology**

The study area falls within quaternary catchments C24A, C24B, C24H and C23L (**Figure 4-8**). The Vaal River is situated approximately 1 km to the south of the proposed TSF expansion. According to the natural contour elevations, surface runoff from this site will naturally flow towards the Vaal River. There is a small non-perennial river that runs along the western side of the current TSF.

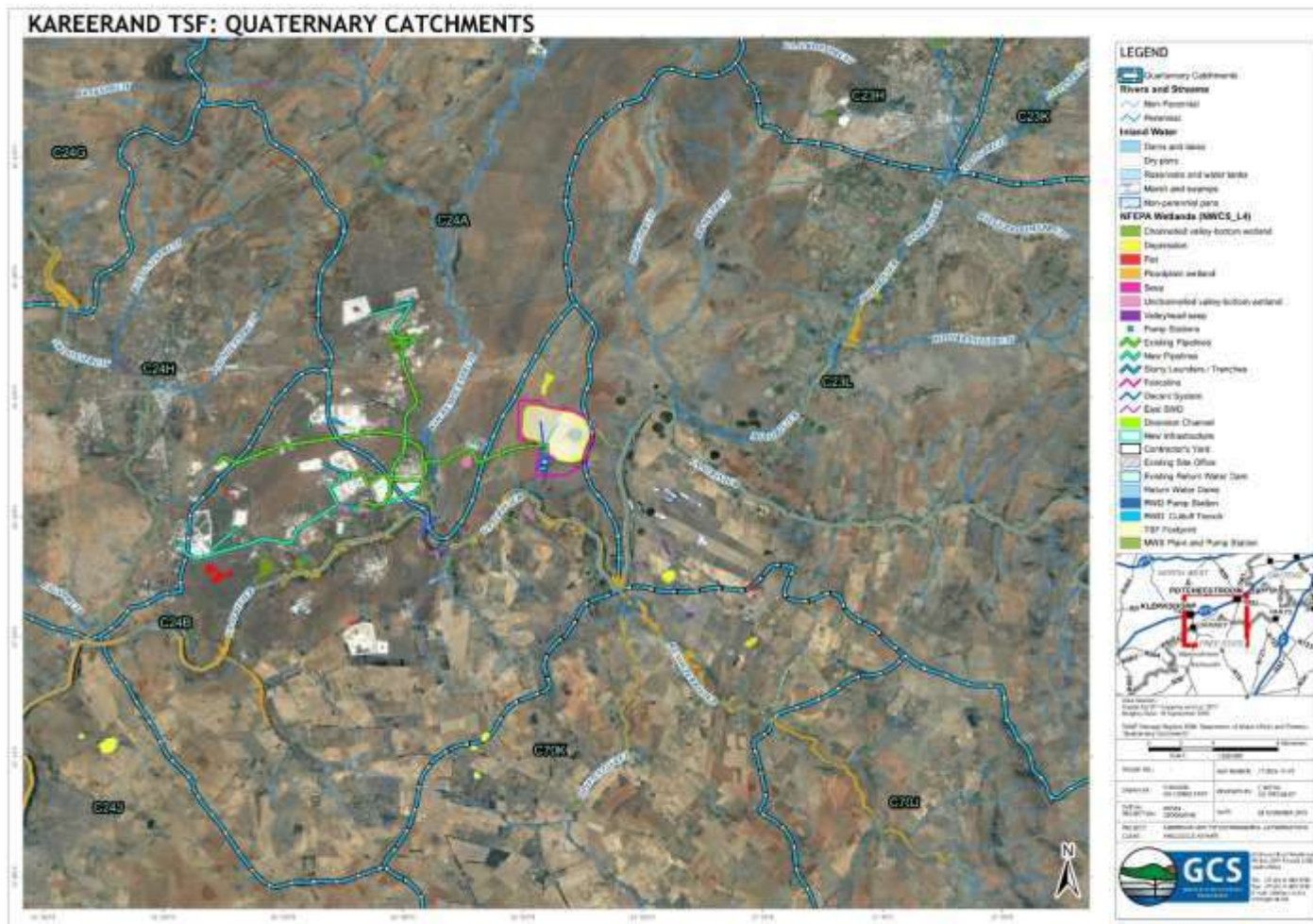


Figure 4-8: Map showing the quaternary catchment units within which the proposed TSF expansion is located

## 4.6 Geohydrology

### 4.6.1 Hydrocensus

The 2018 hydrocensus carried out as part of the existing TSF Water Use License study shows that 31 existing farm boreholes have been located within the surrounding area. Most of these sites are not in use; only the farms further to the north east, south east and the game farm (south west) have active boreholes. These active boreholes are mainly used for stock watering, irrigation and domestic use.

### 4.6.2 Geophysical Survey

Three types of geophysical applications were introduced between 2008 and 2017, specifically magnetic surveys, electromagnetic (EM) surveys and resistivity surveys. Approximately 35 km of EM and magnetic surveys were completed in October 2017 around the current Kareerand TSF.

### 4.6.3 Aquifer System

Site-specific hydrogeological conditions are presented in the recent geophysical survey and percussion drilling projects at the current Kareerand TSF. In summary, the local geology comprises geological zones alternating with heterogeneous zones of inter-layered rocks of both sedimentary and igneous origin. There is a clear differentiation between the underlying foundation conditions from east to west.

The rocks underlying the current Kareerand TSF are characterized by well-developed igneous layering (diabase sill). The competent (fresh) diabase is overlain by a 5 to 25 m weathered zone, while surficial unconsolidated sediments of clayey sand range between -1 to -3 m in thickness.

### 4.6.4 Drilling of observation and test boreholes

A total number of 58 test and observation boreholes have been drilled over the past 10 years.

The following basic deductions were made from drilling data:

- Boreholes were generally drilled to depths between 6 and 54 m below ground level (max 3 to 6 m into bedrock), weathering and change of lithology were considered;
- Penetration rates were measured during drilling. This supplies an indication of weathering, clay content, consistency of rock material (hard or soft) and fracturing;
- Field observed airlift yields were measured and range between 0 (dry) and 15 l/sec. Generally, boreholes drilled within shales, andesite and dolomites (dolomites only occur much further westwards) indicated dry to low airlift yields. Shale is a sedimentary rock that has high porosity but low permeability, therefore the

transmission of water will be low which will result in low storage (or low effective porosity) of water in the aquifer;

- Boreholes drilled within deep weathered diabase indicate medium to high airlift yields. These zones are usually known for their higher permeability and high storage characteristics.

#### **4.6.5 Groundwater Levels**

Groundwater level data was obtained from the drilled boreholes and the routine water monitoring data. The following can be derived from the available data:

- Groundwater levels were in the order of 15 to 20 m below ground level prior to deposition (GCS, 2008). Groundwater levels have increased by an average of 10 to 15 m downstream of the current Kareerand TSF over time which has reduced the thickness of the unsaturated zone.
- The areas further to the west, where andesite and dolomite intersect, indicated much deeper groundwater levels (>30 m) which have not changed significantly over time.

#### **4.6.6 Groundwater Quality**

Generally, elevated TDS and sulphate concentrations were observed within the direct vicinity of the current Kareerand TSF. The lab results indicate that generally calcium (Ca) and magnesium (Mg) were dominant in most of the samples. Some parameters elevated above the target water quality guidelines (SANS) in some of the boreholes included chlorine (Cl), nitrate (NO<sub>3</sub>), sodium (Na), iron (Fe), aluminium (Al) and manganese (Mn). Manganese occurred above target levels at most of the sites. Neutral pH levels were recorded at all sites.

#### **4.6.7 Vaal River Water Quality**

The up- and down-stream sulphate concentrations fluctuated with seasonal rainfall and were generally similar to each other (between 50 and 200 mg/l). Slightly elevated sulphate concentrations were measured in October/November of both 2016 and 2017.

#### **4.6.8 Source Quality Aspects**

The geochemical data and analyses conducted between 2008 and 2016 from the current Kareerand TSF suggest that seepage falls within a sulphate concentration range of 1500 to 4000 mg/l. Samples obtained from the existing and redundant Daggafontein Cyclone TSF on the East Rand of Gauteng (GCS, 2009), which is similar to the TSF in question on this site, indicated a maximum sulphate concentration of 4350 mg/l, a minimum pH of 4.5, with the main metals leached from the tailings including iron and manganese.

#### 4.6.9 Source Quantity Aspects

Available data suggests that current seepage volumes from the current Kareerand TSF are in the order of 5000 to 7000 m<sup>3</sup>/day. A number of scavenger wells/inception boreholes have been drilled and equipped to intercept seepage from the TSF and returned to the pollution control dam.

#### 4.6.10 Groundwater Monitoring

A comprehensive groundwater monitoring network is in place with both quarterly and bi-annual monitoring undertaken. The monitoring programme is revised on an annual basis.

### 4.7 Wetlands

The November 2017 site survey confirmed the presence of wetland habitat within the immediate area and along headwater drainage lines. Recorded wetland indicators included hydromorphic features, such as gleying, low chroma matrix colours, spots of iron depletion and mottling, while hydrophyte and hygrophyte species were also identified.

Natural wetlands were classified into four different types of hydro-geomorphic (HGM) units, while identified man-made wetlands were classified as artificial systems:

- Unchanneled valley bottom wetlands;
- Channeled valley bottom wetlands;
- Seep wetlands;
- Pan (depression) wetland; and
- Artificial wetlands.

### 4.8 Ecology

#### 4.8.1 Fauna

With regards to red data species of the region, eighteen (18) species are predicted to be potential inhabitants of this area. Additionally, two (2) species are expected as likely inhabitants of the site. These include:

- Honey Badger (*Mellivora capensis*)
  - Near Threatened (NT);
  - Found in most major habitats in southern Africa;
  - Feeds on wide variety of food items, but insects, other invertebrates and rodents are most important; and
  - The diversity of habitat found in the area as well as the close proximity of the Vaal River creates a higher likelihood of occurrence of the species.
- Lesser Kestrel (*Falco naumanni*)
  - Vulnerable (VU);



- Found in open grassland, mainly on highveld, usually near towns or farms;
- Highly gregarious and often found in large flocks, feed mainly on insects and less often small birds, lizards and rodents;
- Does not breed in the southern African subregion, only important habitat requirements of the species in the subregion are associated with roosting and feeding; and
- Large trees found on the banks of the Vaal River are ideal roosting sites and diversity and quality of habitat found at the site is likely to provide more food items (both invertebrates and small vertebrates) - as a result it is estimated that the species is likely to occur at the site.

#### 4.8.2 Flora

A large portion of proposed TSF site comprises the Rand Highveld Grassland vegetation type (Figure 4-9). This is a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species rich with wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. Most common grasses on the plains belong to the genera *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*. High diversity of herbs, many of which belong to the Asteraceae, is also a typical feature. The Rand Highveld Grassland vegetation type is classified as *Endangered*; it is poorly conserved in statutory reserves and in private reserves. Almost half of this vegetation type has been transformed by cultivation, plantations, urbanisation and dam-building. Cultivation may also have had an impact on the surface area of the unit where old lands are currently classified as grasslands in land cover classifications and poor land management has led to degradation of significant portions of the remainder of this unit.

#### 4.8.3 Biodiversity

The North West Department: Rural, Environment and Agricultural Development (NWREAD) Department of Agriculture, Conservation, Environment and Rural Development has developed the North West Biodiversity Sector Plan (NW BSP) to indicate areas of conservation concern in the province. Two important maps have been developed: one for terrestrial biodiversity and the other for freshwater/aquatic biodiversity. The NW BSP divides the terrestrial ecosystems of the North West into four main categories:

- Critical Biodiversity Areas (CBAs) - areas of high biodiversity value, needed to meet biodiversity targets. These areas should be maintained in natural or near natural state;
- Ecological Support Areas (ESAs) - these areas support CBAs, but are not essential for meeting conservation targets;

- Other Natural Areas - these areas have natural characteristics and perform a range of biological as well as ecological functions but have not been earmarked as priority areas for conservation; and
- Heavily Modified Areas - areas which have been drastically impacted and have had a significant or complete loss of natural habitat and ecological function.

According to the terrestrial NWBSP, the site crosses a terrestrial CBA2 (**Figure 4-10**) and some portions are listed as Ecological Support Areas (ESAs). The CBA2 and ESAs encompass important terrestrial features, including critical patches associated with threatened ecosystems, important habitat for fauna (including vultures), kloofs, hills and ridges, important bird areas, ecological corridors and corridor systems, and buffers for Protected Areas.

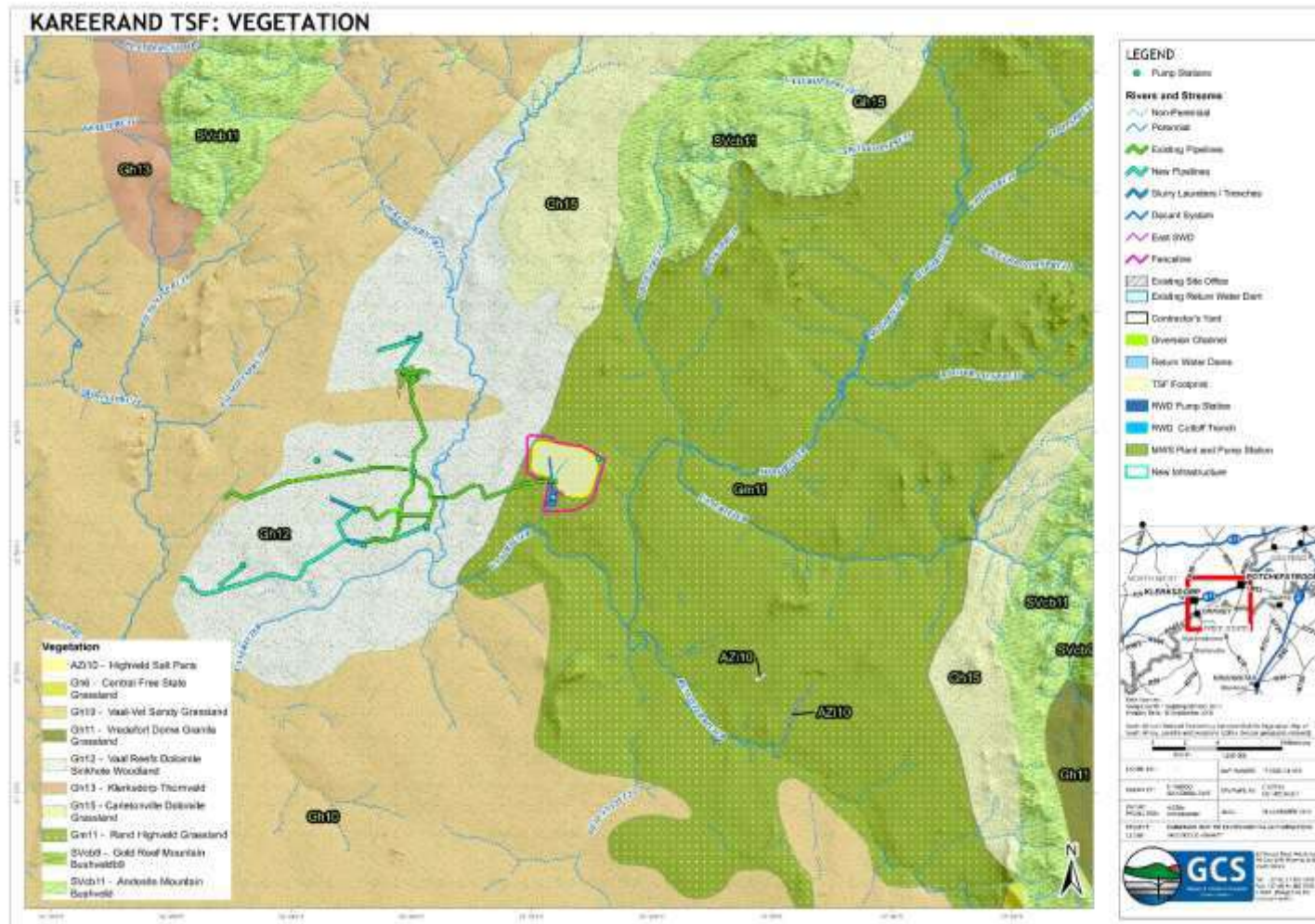


Figure 4-9: Vegetation types found surrounding the proposed TSF expansion site

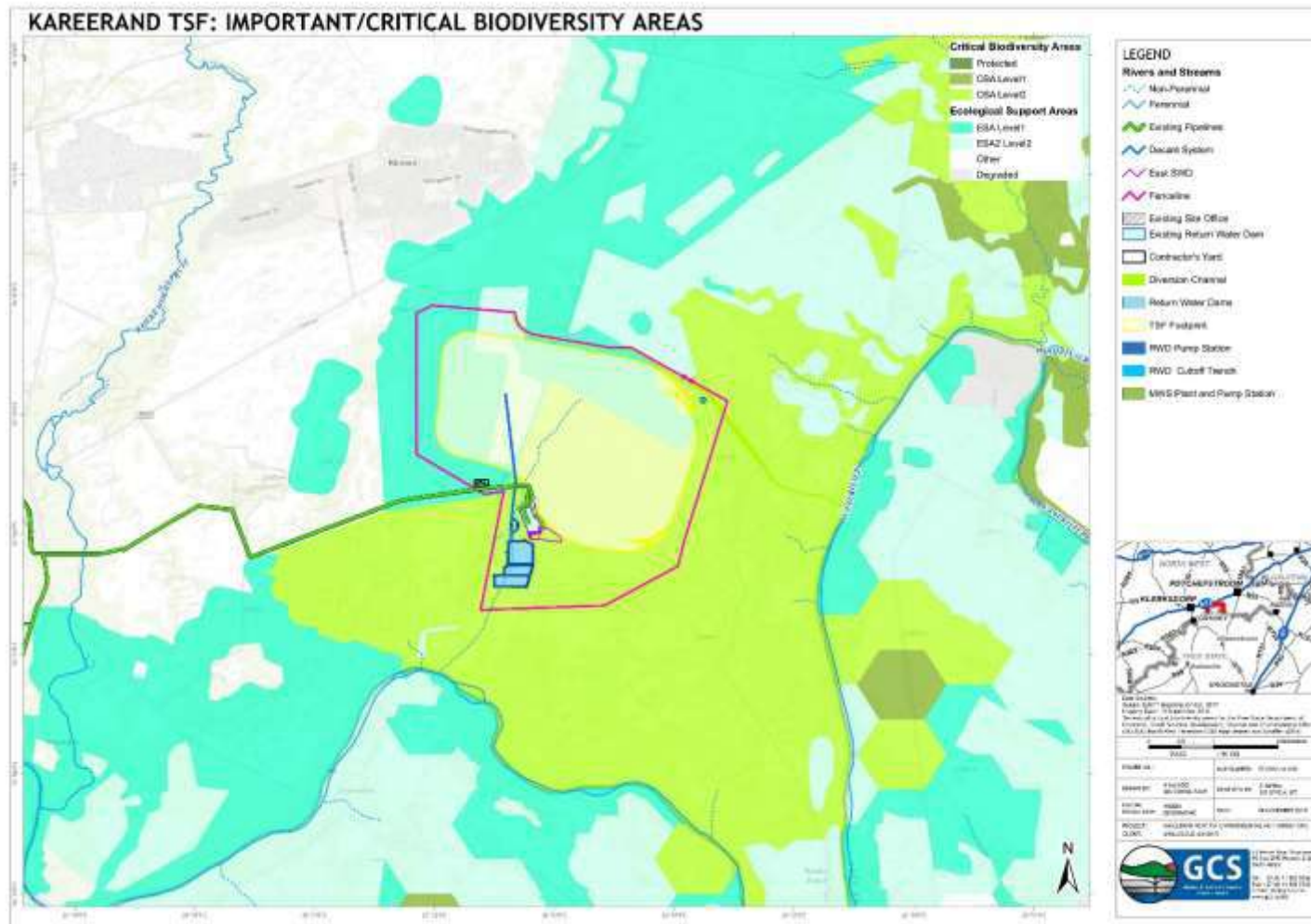


Figure 4-10: Biodiversity importance and NWBSP ecosystem classification of the proposed TSF expansion site

## 4.9 Air Quality

The study area for the baseline air quality includes a radius of approximately 5km from the edge of the current Kareerand TSF.

Air emissions during the current activities result from a variety of air emission sources which include material transfer, wheel entrainment, vehicle exhaust emissions and processing activities. Airborne particulates are the most significant of these emissions and may contain airborne particulate sizes up to about 100 micron in diameter. Particles of sizes larger than about 75 micron tend to deposit out of the plume relatively nearby their source of emission. Particles less than about 20 micron, on the other hand, can be carried for considerable distances before depositing out.

Dust emissions are produced from the mechanical movement of large volumes of material, as well as by the movement of mobile equipment and trucks, both within the areas being reclaimed and along the unsealed roadways adjacent to these areas.

### 4.9.1 Local Wind Field

The vertical dispersion of pollution is largely a function of the wind field. The wind speed determines both the distance of downward transport and the rate of dilution of pollutants. The generation of mechanical turbulence is similarly a function of wind speed, in combination with surface roughness (Tiwary & Colls, 2010). The period wind field and diurnal variability in the wind field is shown in Figure 4-11, while the seasonal variations are shown in Figure 4-12.

The wind field is dominated by winds from the north-northwest. The strongest winds (>6 m/s) occurred mostly from the north-west, north-north-west and north. Calm conditions occurred approximately 4% of the time, with the average wind speed over the period of 3.9 m/s. Wind speeds increased during the day with a slight decrease in calm conditions (from 4.5% during the day to 4% during the night). Strong winds in excess of 6 m/s occurred most frequently during spring months. Calm conditions occurred most frequently during autumn and winter months.

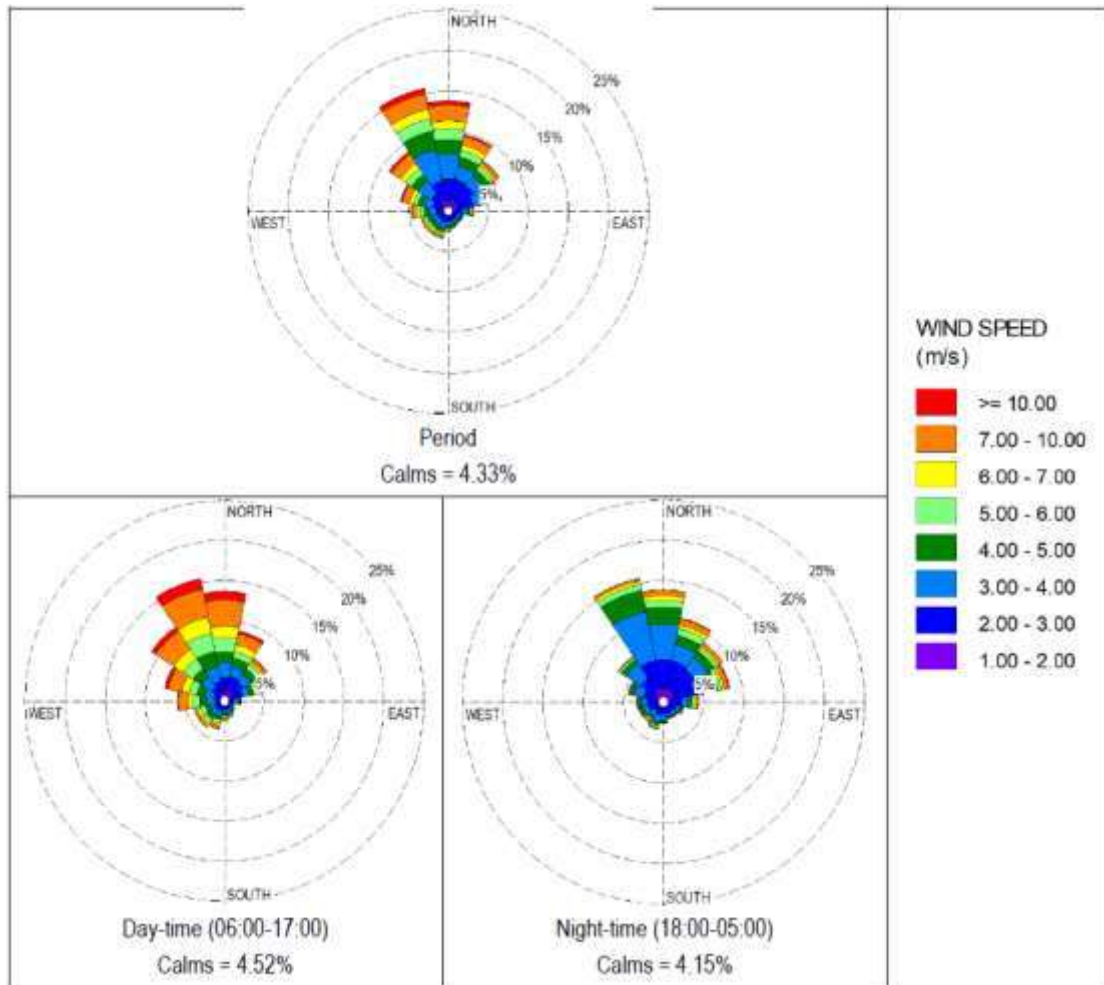


Figure 4-11: Period, day- and night-time wind roses (WRF data, January 2014 to December 2016).



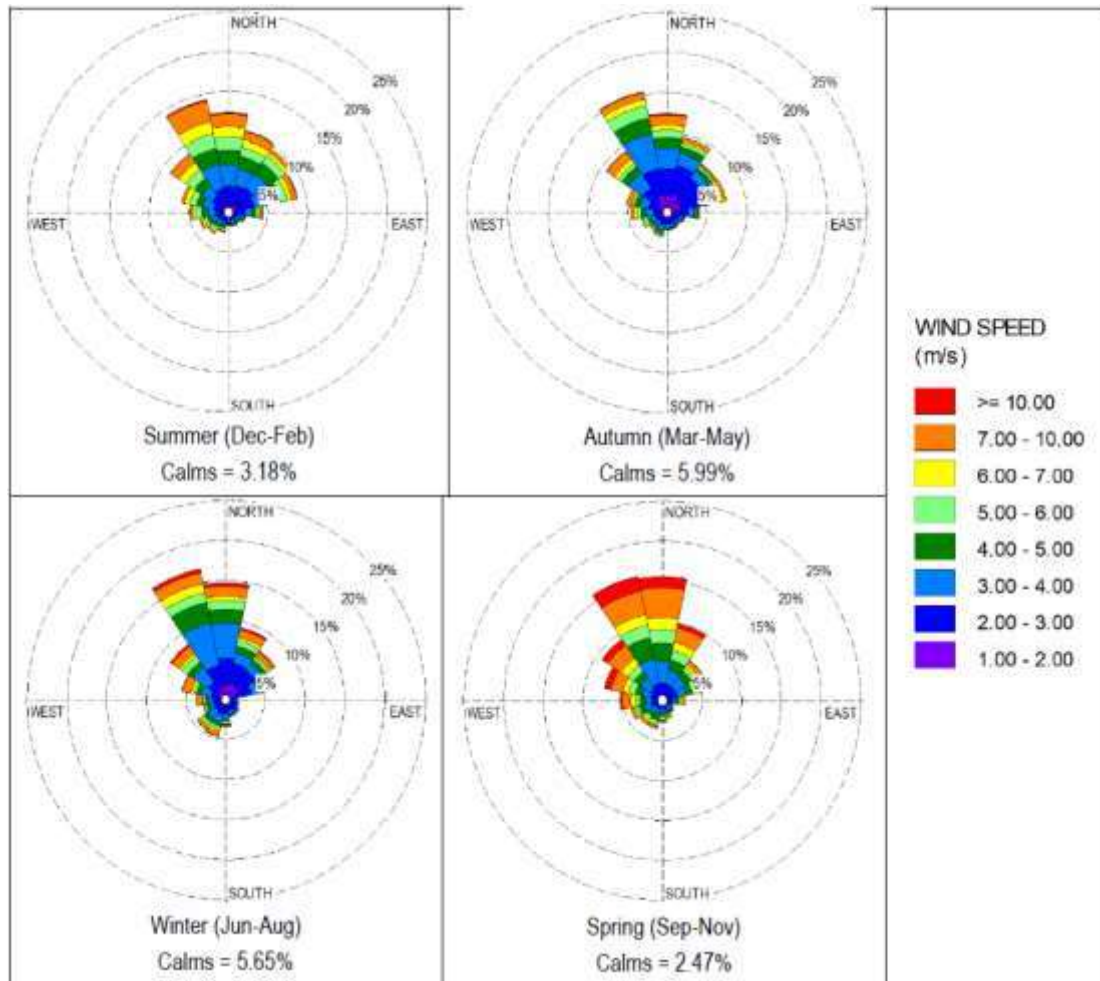


Figure 4-12: Seasonal wind roses (WRF data, January 2014 to December 2016).

#### 4.9.2 Existing Air Quality

Only dustfall rates measured near the project site were available for analysis. The current air quality in the study area is mostly influenced by farming activities, domestic fires, vehicle exhaust emissions, and dust entrained by vehicles. These emission sources vary from activities that generate relatively coarse airborne particulates (such as farmland preparation, dust from paved and unpaved roads, and the mine sites) to fine PM (particulate matter) such as that emitted by vehicle exhausts, diesel power generators and processing operations.

#### 4.10 Noise

In order to assess the existing noise climate in the area surrounding the current Kareerand TSF facility, ambient noise monitoring was conducted at four on-site locations (historical monitoring locations) and at three residential receptor locations surrounding the site (**Figure 4-13**).



**Figure 4-13: Noise monitoring locations around the current Kareerand TSF.**

Baseline monitoring indicated current day-time noise levels at all seven monitoring locations are compliant with the South African National Standards (SANS) guideline rating levels. The main sources of noise identified at the on-site locations were pumps, trucks, intermittent vehicles and activity of people with the highest LAeq (equivalent continuous sound pressure level) noise level recorded at KR01 (on site).

The R502 road is currently the main source of noise identified at both KR05 (Khuma) and KR06 (Hostel), while very quiet conditions were noted at KR07 (house south of the current Kareerand TSF site). Livestock and the R502 road were the dominant source of noise at the residential area (KR07). Noise levels at all other locations remained well below their respective guideline levels. Due to safety concerns at night, monitoring could not be undertaken at KR05 (Khuma) and KR06 (Hostel) and as such there is no night-time data to present for these locations.



#### 4.11 Heritage sites

An archival and historical desktop study was undertaken to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical topographical maps and an assessment of previous archaeological and heritage studies completed for the study area and surrounding landscape.

The desktop study revealed that the study area is located in surroundings characterised by a long and significant history. Thereafter, fieldwork in the form of site walkthroughs were conducted as part of pre-feasibility resulting in the identification of 48 archaeological and heritage sites (**Figure 4-14**). These identified heritage sites are summarised in the table below (**Table 4.2**).

It is important to note that the desktop study and initial field investigation were carried out to inform the footprint and design of the proposed TSF expansion in order to avoid impact to these sites.

**Table 4.2: Initial heritage sites identified.**

SITE	DESCRIPTION	SIGNIFICANCE	CO-ORDINATES
AGA-MWS-HBF-5	Possible grave	High/Medium	S 26° 52' 56.09" E 26° 51' 23.98"
AGA-MWS-HBF-6	A rectangular stone structure (jackal proof fenced camp), brick-built reservoir	Low	S 26° 53' 08.54" E 26° 51' 19.72"
AGA-MWS-WBP-1	Rectangular cement foundation structure, possible dwelling, possibility of stillborn babies' graves	High/Medium	S 26° 52' 54.12" E 26° 51' 48.07"
AGA-MWS-WBP-2	Brick-built reservoir with a drinking trough and number of irregularly shaped structures, possibility of stillborn babies' graves	High/Medium	S 26° 52' 42.37" E 26° 51' 50.92"
AGA-MWS-WBP-3	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 52' 23.53" E 26° 51' 40.16"
AGA-MWS-WBP-4	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 52' 17.02" E 26° 51' 42.97"
AGA-MWS-WBP-5	Low density surface occurrence of Middle and Later Stone Age lithics	Medium	S 26° 52' 12.23" E 26° 51' 41.09"
AGA-MWS-WBP-6	Small cemetery	High/Medium	S 26° 52' 10.07" E 26° 51' 39.78"
AGA-MWS-WBP-7	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 52' 04.76" E 26° 51' 47.98"
AGA-MWS-WBP-8	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 58.86" E 26° 51' 51.55"
AGA-MWS-WBP-9	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 54.93" E 26° 51' 55.85"

SITE	DESCRIPTION	SIGNIFICANCE	CO-ORDINATES
AGA-MWS-WBP-10	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 53.27" E 26° 51' 56.57"
AGA-MWS-WBP-11	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 50.77" E 26° 51' 56.25"
AGA-MWS-WBP-12	Small cemetery	High/Medium	S 26° 51' 50.52" E 26° 51' 52.33"
AGA-MWS-WBP-13	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 42.41" E 26° 52' 02.21"
AGA-MWS-WBP-14	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 51' 43.28" E 26° 52' 06.14"
AGA-MWS-WBP-15	Possible grave	High/Medium	S 26° 51' 40.55" E 26° 52' 05.56"
AGA-MWS-WBP-16	Two rectangular stone foundation structures, likely the dwellings of farmworkers, possibility of stillborn babies' graves	High/Medium	S 26° 51' 37.74" E 26° 52' 24.42"
AGA-MWS-WBP-17	Poorly preserved remains of a farmstead	Low	S 26° 51' 41.72" E 26° 52' 22.36"
AGA-MWS-WBP-18	Four formally built stone features which may be graves	High/Medium	S 26° 51' 42.50" E 26° 52' 26.09"
AGA-MWS-WBP-19	Three possible graves	High/Medium	S 26° 51' 22.44" E 26° 53' 19.29"
AGA-MWS-KRD-1	Rectangular fenced area	High/Medium	S 26° 52' 55.50" E 26° 54' 40.70"
AGA-MWS-UMF-1	Rectangular stone foundation	Low	S 26° 53' 34.07" E 26° 55' 25.62"
AGA-MWS-UMF-2	Low density surface occurrence of Later Stone Age and Middle Stone Age lithics	Medium	S 26° 53' 35.51" E 26° 55' 20.77"
AGA-MWS-UMF-3	Historic farmstead	Low	S 26° 53' 38.44" E 26° 54' 53.49"
AGA-MWS-UMF-4	Medium-sized cemetery containing a total of 24 graves	High/Medium	S 26° 53' 19.98" E 26° 54' 43.74"
AGA-MWS-UMF-5	Extensive area which had been used as farm worker accommodation, possibility of stillborn babies' graves	High/Medium	S 26° 53' 26.26" E 26° 54' 39.28"
AGA-MWS-MGD-1	Three rectangular stone enclosures	Low	S 26° 53' 52.3" E 26° 52' 32.9"
AGA-MWS-MGD-2	Densely overgrown stone concentrations	High/Medium	S 26° 53' 52.9" E 26° 52' 36.1"
AGA-MWS-MGD-3	Cemetery comprising four graves and two circular stone structures	High/Medium (graves), low (stone structures)	S 26° 53' 59.1" E 26° 52' 36.1"
AGA-MWS-MGD-4	Foundation remains of two stone structures, possibility of stillborn babies' graves	High/Medium	S 26° 53' 57.6" E 26° 52' 32.3"
AGA-MWS-MGD-5	Extensive historic traditional homestead with two possible graves and possibility of stillborn babies' graves	High/Medium	S 26° 54' 13.3" E 26° 52' 33.8"
AGA-MWS-MGD-6	Historic traditional homestead, one possible grave and possibility of stillborn babies' graves	High/Medium	S 26° 54' 36.62" E 26° 52' 45.12"

SITE	DESCRIPTION	SIGNIFICANCE	CO-ORDINATES
AGA-MWS-MGD-7	Two attached stone concentrations with appearance of graves	High/Medium	S 26° 54' 28.37" E 26° 52' 45.85"
AGA-MWS-MGD-8	Possible grave	High/Medium	S 26° 54' 07.12" E 26° 52' 34.17"
AGA-MWS-MGD-9	Possible graves	High/Medium	S 26° 54' 16.06" E 26° 53' 39.93"
AGA-MWS-BFF-7	Cemetery comprising 29 graves.	High/Medium	S 26° 55' 01.6" E 26° 51' 30.3"
AGA-MWS-BFF-8	Lane of eucalyptus trees that was planted to create a wind break.	Medium	S 26° 54' 48.8" E 26° 51' 54.5"
AGA-MWS-BFF-9	Historic traditional homestead, possible grave and possibility of stillborn babies' graves	High/Medium	S 26° 53' 44.1" E 26° 52' 26.8"
AGA-MWS-BFF-10	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 53' 44.48" E 26° 52' 30.14"
AGA-MWS-BFF-11	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 53' 51.2" E 26° 52' 30.1"
AGA-MWS-BFF-12	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 53' 53.3" E 26° 52' 29.8"
AGA-MWS-BFF-13	Historic traditional homestead, possibility of stillborn babies' graves	High/Medium	S 26° 53' 54.6" E 26° 52' 29.7"
AGA-MWS-BFF-14	Low density surface occurrence of primarily Middle Stone Age lithics	Medium	S 26.901044 E 26.870856
AGA-MWS-BFF-15	Low density surface occurrence of Middle Stone Age lithics	Medium	S 26.907061 E 26.869061
AGA-MWS-BFF-16	Low density surface occurrence of Middle Stone Age lithics	Medium	S 26.910178 E 26.865273
AGA-MWS-BFF-17	Low density surface occurrence of Middle Stone Age lithics	Medium	S 26.908039 E 26.860179
AGA-MWS-BFF-18	Low density surface occurrence of Later Stone Age and Middle Stone Age lithics	Medium	S 26.904346 E 26.860307



#### 4.12 Socio-Economic Conditions

The proposed TSF expansion project is located within Dr Kenneth Kaunda Local Municipality, midway between Potchefstroom JB Marks Local Municipality and Klerksdorp/Orkney (City of Matlosana Local Municipality- CMLM) in the North West and bordering the Free State south of the Vaal River. Greater Stilfontein forms part of the KOSH area (Klerksdorp, Orkney, Stilfontein, Hartebeesfontein) which is known for its proliferation of gold mines and is home to some of the most prominent gold mines in the world, as well as one of the oldest meteor impact sites in the world. It is a region with a rich and diverse natural and cultural heritage, with the potential for sustained economic growth.

The predominantly spoken language in the district is Setswana. In 2016, the JB Marks LM population was at 243 527 individuals with an average of 38 people per km<sup>2</sup>, while the CMLM had a total population of 417 282 with a density of 123 persons per km<sup>2</sup> (92% of whom lived in urbanised areas, which included towns and mining villages). Population and household growth in the CMLM have slightly increased over time, with the average annual population growth between 2011 and 2016 being 1.04% and the average annual household growth between 1996 and 2016 being 3.46%.

As of 2011, Khuma's population totalled 45 895 individuals and 14 154 households, which totals approximately 10% of the total municipal population. Population figures indicate that on average, approximately one third of the population sector within all the wards is made up by youth. The gender profile is relatively balanced, with only a slightly higher percentage of women within most of the affected wards as well as the CMLM. In Ward 2 of the JB Marks LM there are significantly more males (58%) than females.

Education levels within the CMLM wards are concerning, as figures indicate levels lower than the average within the district and North West Province overall. In contrast, wards within the JB Marks LM are higher than those of the North West Province. There is a larger labour force (i.e. portion of the population aged 15-64 years that offer their services on the labour market) and higher unemployment rate in the CMLM in comparison to JB Marks LM. Ward 2 of JB Marks LM, within which the project is located, shows lower unemployment rates than those experienced in the greater JB Marks LM and much lower rates than in the City of Matlosana in general or in the wards of the municipality directly adjacent to the project.

Youth unemployment rate in the province is on average much higher than the general unemployment rate- in 2011, the national youth unemployment rate was approximately 49%, whereas the North West provincial rate was 41%. Youth unemployment is especially high in the CMLM (43%) while JB Marks LM is below the provincial rate at 32%.

## **4.13 Visual Assessment**

### ***4.13.1 Visual Topography***

The topography of the surrounding environment includes semi-mountainous terrain, while the proposed development itself lies in a greater valley of this terrain. The elevation ranges from 1 250 to 1600 mamsl within a 10 km region of the proposed TSF expansion. Figure 4-15 provides a graphical illustration of the regional topography from a West to East and North to South cross-sectional view of the project area.

### ***4.13.2 Vegetation affecting visual impact***

Vegetation of the surrounding development is predominately composed of Grasslands. The majority of the infrastructure falls on the Rand Highveld Grassland with the remainder of the infrastructure, to the east, falling on the Vaal Reefs Dolomite Sinkhole Woodland. Figure 4-16 shows the view and vegetation looking towards the south and south east from receptor sites along the R502.

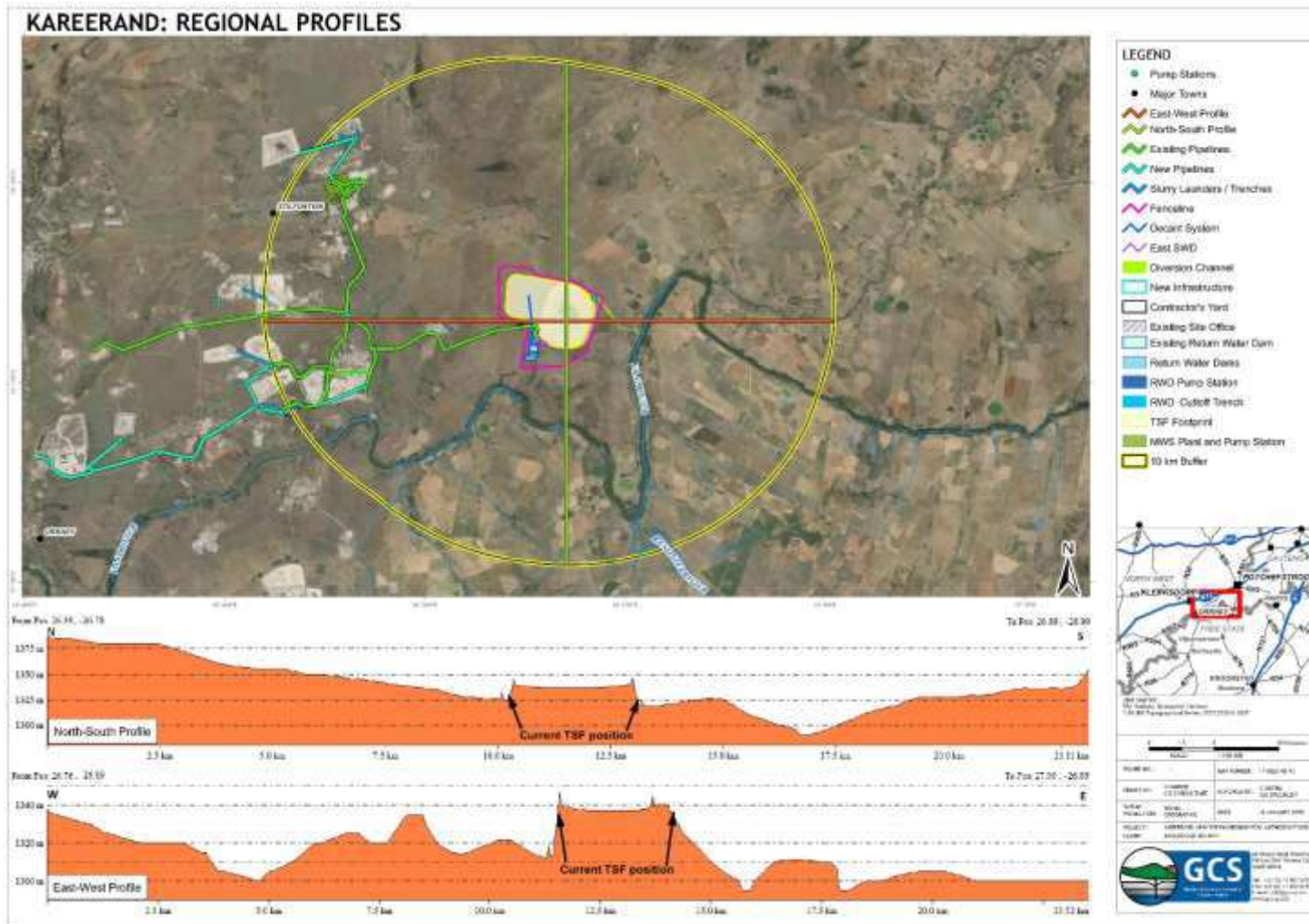


Figure 4-15:Regional cross section of the current Kareerand TSF



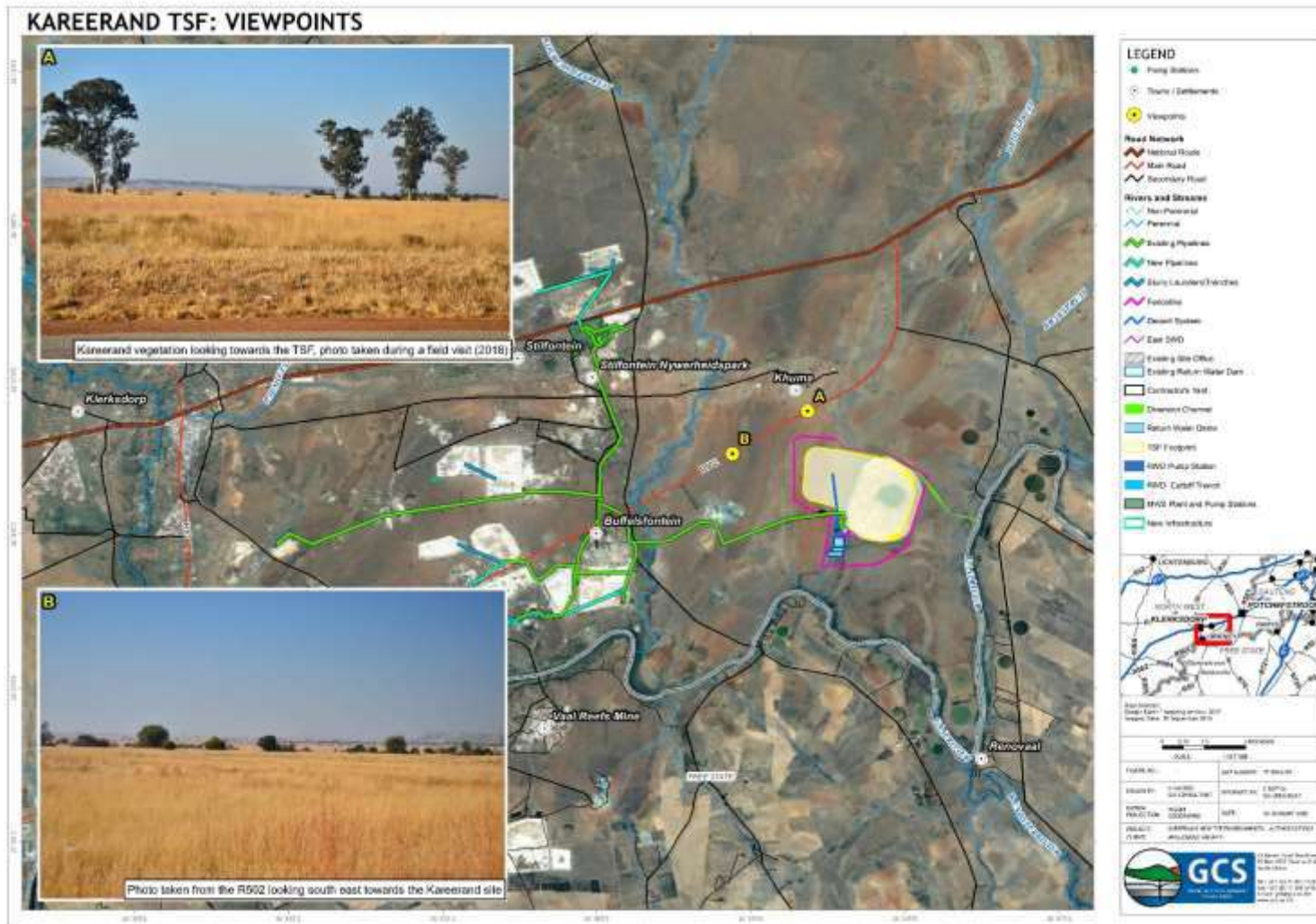


Figure 4-16: Photographs taken from the R502 to show viewpoints of the current Kareerand TSF.

#### 4.13.3 Tourism

While there are no significant tourist attractions in the immediate vicinity of the proposed TSF expansion, there are numerous nature reserves, national parks and potential tourism points of interest that can be accessed with routes in the vicinity of the proposed TSF expansion. In particular, the N12 main route is the closest main road to the site, which links road users to the multiple nature reserves in the region. Figure 4-17 shows the regional nature reserves and tourism spots as per the Department of Environmental Affairs.

#### 4.13.4 Sense of Place

As per the Dr. Kenneth Kaunda District Municipality IDP (2017/18-2021/22), the overarching principles that have been identified as important include:

- Improved service delivery;
- Financial stability / growth of GDP; and
- Enhanced revenue base.

One of the key development areas identified as part of the IDP includes the growth of its GDP. The reworking of the surrounding TSFs in the area is therefore in-line with the municipality's objectives. There are several nearby mining activities within the 10 km Potential Zone of Influence (PZI) of the proposed TSF expansion that contribute to its sense of place. The activities include: the Buffels Solar PV (2.75 km), Buffelsfontien waste rock dump (3.03 km), Tony Shaft (5.37 km), Nicolor Gold plant (6.46 km), Margaret Shaft (7.53 km), OMV Crushers (7.99 km), Scott Shaft (8.01 km), and Mine Waste Solutions processing plant (8.23 km). Given the current mining activities found in the landscape, the sense of place for the project area is defined as an area of medium to low scenic, cultural or historical significance.



## 5 PUBLIC PARTICIPATION PROCESS

This section of the report documents the process, which was and will be followed with respect to consultation of Interested and Affected Parties (I&APs)/stakeholders and the Government Authorities.

### 5.1 Purpose of Public Participation

The most important objective of public participation is to provide sufficient and accessible information to potential Interested and Affected Parties ("I&APs") in an objective manner and to provide a platform for constructive participation in the application process, thereby assisting I&APs to:

- Gain an understanding of the Project, the various components and the potential impacts (positive and negative);
- Raise issues of concern and suggestions for enhanced benefits;
- Comment on reasonable alternatives;
- Verify that their issues have been recorded in the Comments and Responses Report ("CRR") and considered in investigations; and
- Contribute relevant local information and traditional knowledge to the process.

### 5.2 Public Consultation Process

This section provides a short summary of the various activities of the public consultation process to be undertaken in support of the application process. Some of the activities associated with the Scoping Phase have already commenced.

#### 5.2.1 Stakeholder database

A stakeholder database or list of I&APs was compiled and will be updated as the process unfolds and as more I&APs register. The database was compiled: a) using lists of contact details of previous applications in the area; b) using information provided by the applicant's community liaison officers; and c) including responses from I&APs.

The current I&AP database is attached as Appendix C to this Report. The I&AP database is the means through which information will be conveyed to stakeholders as part of the announcement of the applications and the availability of the consultation and final reports as these become available for public review. For this Project, I&APs typically include the following:

- Owners or persons in control of the land where the proposed Project activities are to be undertaken ("Project Area");
- Occupiers of the property where the activities are to be undertaken;
- Owners and occupiers of land adjacent to the Project Area;

- Provincial (North-West) and local government (the City of Matlosana and JB Marks Local Municipalities which fall within the Dr Kenneth Kaunda District Municipality);
- Organs of state, other than the competent authorities, which are DMR and DWS, such as the North West Department of Agriculture and Rural Development, Department Public Works and Roads, SANRAL, etc. having jurisdiction in respect of any aspect of the proposed activities;
- Relevant residents' associations, agricultural unions, community based organisations, water user associations, and any catchment management authority and Non-Governmental Organisation ("NGOs");
- Media (local and regional - e.g. Klerksdorp Record);
- Environmental organisations, forums, groups and associations; and
- Private sector (businesses, industries) in the vicinity.

### ***5.2.2 Announcement of the integrated application process***

The integrated application process was announced to I&APs by means of the following:

- Advertisements (Appendix D to this Report) were published as follows:
  - Klerksdorp Record (1 November 2019);
  - City Press (3 November 2019); and
  - Potchefstroom Herald (31 October 2019).
- A Background Information Document ("BID") (Appendix E to this Report) was compiled and distributed as follows:
  - To all I&APs on the stakeholder database via email notifications on 1 November 2019 and as I&APs requested copies of the document in response to the advertisements published and the site notices placed; and
  - Per hand to those who were visited while the site notices were placed on 1 November 2019.
- Site notices were placed on 1 November 2019 all around the Project Area on main roads and at public places. Appendix F to this Report provides a description of the locations where the site notices were placed as well as a photo of each site notice placement.
- Telephonic notification to key I&APs and landowners.
- Placement of all notices and the BIDs on the GCS website (<http://www.gcs-sa.biz/documents/>). The GCS website is used to make documents electronically available to stakeholders. The website address was published in the advertisement, BIDs, site notices and all other communication.
- A Registration and Comment Sheet was distributed with every BID, inviting stakeholders to register as I&APs and to provide their comments on the proposed application (See Appendix E).



### 5.2.3 Comments and Responses Report

All comments which will be received during the integrated application process will be captured in a Comments and Responses Report (CRR). The CRR will be updated on a continuous basis and will be presented to the authorities and other I&APs together with the consultation and final reports as a full record of issues raised, including responses on how the issues were considered during the integrated application process. The following versions of the CRR will be available:

- CRR Version 1: Submitted with the Draft Scoping Report (Appendix G). This version of the report will capture comments and issues raised from the beginning of the announcement until 8 January 2020. Comments received after this date will be captured in version 2 of the CRR;
- CRR Version 2: Will be submitted with the Final Scoping Report. This version of the report will capture comments and issues raised from the beginning of the announcement until the end of the review period of the Draft Scoping Report. Comments received after this date will be captured in version 3 of the CRR;
- CRR Version 3: Will be submitted with the Consultation Environmental Impact Report/Environmental Management Programme ("EIR/EMPr"); and
- CRR Version 4: Will be submitted with the Final EIAR/EMPr.

### 5.2.4 Review of the Draft Scoping Report

The announcement of the integrated application process also introduced the availability of the Draft Scoping Report for public review and comments. Specific further activities proposed in terms of the public participation process during the review of the Draft Scoping Report are described in this section. The Draft Scoping Report will be available for public comment for a period of 30 days from 24 January to 24 February 2020. The Report will be available as follows:

<b>PRINTED COPIES</b>
Klerksdorp Public Library, Voortrekker Street, Klerksdorp Central (Tel: 018 487 8373)
Stilfontein Biblioteek- Library, Somerset Drive, Stilfontein (Tel: 018 487 8291)
Khuma Library, Ndlondlosi Street, Khuma, (Tel: 018 487 8652)
Potchefstroom Public Library, 25 Wolmarans Street, Potchefstroom (Tel: 018 299
Orkney Library, Patmore Street, Orkney (Tel: 018 473 0310)



ELECTRONIC COPIES	
Website download	<a href="http://www.gcs-sa.biz/documents/">http://www.gcs-sa.biz/documents/</a>
CD copy	On request to the public participation office
Hard copies and / or CDs	To all commenting authorities

The availability of the Report was announced via the publishing of advertisements (See Section 5.2.2 and Appendix D), in the BID (Appendix E) and on-site notices (Appendix F). E-mails with notification letters were sent to all I&APs registered on the stakeholder database, providing the direct link to an electronic version of the Draft Scoping Report and its appendices. At all stakeholder meetings to be held, the availability of the Report and how stakeholders may access copies of the Report will be communicated.

Advertisements to announce specifically the review period of the Draft Scoping Report, meetings to be held to review the report contents and to obtain stakeholder comments were published as follows:

- Klerksdorp Record (23 January 2020)
- City Press (26 January 2020)
- Potchefstroom Herald (23 January 2020)
- Volksblad (23 January 2020)
- Kroonnuus (23 January 2020)

Proof of placement of the advertisements will be submitted with the Final Scoping Report.

#### 5.2.5 Stakeholder meetings

Stakeholder meetings will be held during the review period of the Draft Scoping Report. A record of the deliberations at the meetings will be included as part of the CRR - Version 2 (Appendix G) which will be made available with the Final Scoping Report.

Meetings will be held as follows:

DATE AND TIME	VENUE	MEETING
Wednesday, 5 February 2020 at 10am	Lost Treasure, 1 Winnie Mandela Drive, Stilfontein	Discussion on Draft Scoping Report
Wednesday 5 February 2020 at 6pm	Lost Treasure, 1 Winnie Mandela Drive, Stilfontein	Discussion on Draft Scoping Report

The purpose of the meetings is to announce the integrated application process, to present to stakeholders a summary of the Draft Scoping Report, and to obtain their views and comments on the information available as was presented to them during the meetings. All attendees will be reminded of the process being followed and that there will be opportunity again for them to comment on the Final Scoping Report as well as on the reports to be compiled as part of

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the integrated regulatory process. The presentations delivered at the meetings as well as the attendance registers of each meeting will be included in the Final Scoping Report.

A comprehensive list of authorities was developed during the Scoping Phase of the project. This list has been used to establish communication with the relevant authorities who are required to contribute to the environmental authorization process. All the authorities on the developed list have been invited to become involved in the process.

### **5.3 Review of the Final Scoping Reports**

The Final Scoping Report will be submitted to the Competent Authorities in March / April 2020 and the Report will be made available to I&APs for their final comments from the day of submission to the authorities for a 30-day period. Stakeholders will be requested to provide their comments on the final reports directly to the DMR North-West Regional Office. Stakeholders will be requested to copy their comments to the public participation office.

The availability of the Final Scoping Report and where copies of the Final Report can be obtained will be announced to registered I&APs via email.

### **5.4 Public Participation During EIA Phase**

Once the Scoping phase has been finalised and the Scoping Report is approved by the North-West Regional Office of the DMR, the EIA phase of the S&EIR process will begin. The main objectives of public participation during this phase will be a) to verify that stakeholder issues have been considered by the EIA Specialist Studies and in the reports, which will be compiled and b) to provide stakeholders the opportunity to comment on the findings of the EIR/EMPr Report and other associated reports, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. The public participation activities during the EIA phase of the integrated regulatory process will include:

- Email notifications to stakeholders to inform them of the opportunity to review the Draft EIR/EMPr and Waste Management License (WML) Report;
- The draft EIR/EMPr and WML reports will be made available for review. The same public places will be used to make the reports available as per the Scoping Phase (see Section 5.2.4);
- Advertisements to notify stakeholders of the availability of the draft reports will be published in the same newspapers used during the scoping phase;
- Stakeholder meetings will be held with stakeholders during the review period of the draft reports to provide them with the contents of the report for their comments and views;
- The final versions of the EIR/EMPr, WML and IWUL reports will also be made available to stakeholders once submitted to the different competent authorities; and

- 
- The CRR will be kept updated with stakeholder comments and issues and responses will be included with the updated versions which will be made available as stated in Section 5.2.3.

## **5.5 Public Participation during Authorisation Phase**

Once the Competent Authorities have provided information with regards to their decisions in terms of the integrated application process, their decisions and the detail thereof will be communicated to I&APs according to the conditions stipulated. I&APs will be made aware of their rights to appeal the decisions and the proposed process to follow in such regard. The legislative and required public participation activities will end once the appeal periods have lapsed.

## **6 PLAN OF STUDY FOR EIA**

### **6.1 Aspects to be Assessed in Environmental Impact Assessment Process**

Based on the outcome of the Scoping Phase, an EIA and an EMPr must be submitted to the competent authority, in this case the North-West Department of Mineral Resources (DMR) for consideration and approval.

The following specialist assessments will be undertaken:

- Soils, land use and land capability assessment;
- Hydrology assessment;
- Geohydrology (groundwater) assessment;
- Wetland assessment;
- Biodiversity assessment;
- Air quality assessment;
- Noise impact assessment;
- Heritage assessment;
- Socio-economic assessment;
- Visual impact assessment; and
- Radiation safety assessment.

## 6.2 Proposed method of assessing the environmental aspects

### 6.2.1 Impact Assessment for proposed site

The assessment of potential impacts was addressed in a standard manner to ensure that a wide range of impacts were comparable. The ranking criteria and rating scales will be applied to all specialist studies for this project. The following methodology will be used to rank these impacts. Clearly defined rating and rankings scales (Table 6.1 - Table 6.7) will be used to assess the impacts associated with the proposed activities. The impacts identified by each specialist study and through public participation will be combined into a single impact rating table for ease of assessment.

**Table 6.1: Severity or magnitude of impact.**

Insignificant/non-harmful	1
Small/potentially harmful	2
Significant/slightly harmful	3
Great/harmful	4
Disastrous/extremely harmful/within a regulated sensitive area	5

**Table 6.2: Spatial Scale - extent of area being impacting upon.**

Area specific (at impact site)	1
Whole site (entire surface right)	2
Local (within 5km)	3
Regional/neighbouring areas (5km to 50km)	4
National	5

**Table 6.3: Duration of activity.**

One day to one month (immediate)	1
One month to one year (Short term)	2
One year to 10 years (medium term)	3
Life of the activity (long term)	4
Beyond life of the activity (permanent)	5

**Table 6.4: Frequency of activity - how often activity is undertaken.**

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

**Table 6.5: Frequency of incident/impact - how often activity impacts environment.**

Almost never/almost impossible/>20%	1
Very seldom/highly unlikely/>40%	2
Infrequent/unlikely/seldom/>60%	3
Often/regularly/likely/possible/>80%	4
Daily/highly likely/definitely/>100%	5

**Table 6.6: Legal Issues - governance of activity by legislation.**

No legislation	1
Fully covered by legislation	5

**Table 6.7: Detection - how quickly/easily impacts/risks of activity on environment, people and property are detected.**

Immediately	1
Without much effort	2

Need some effort	3
Remote and difficult to observe	4
Covered	5

Each identified impact will be assessed in terms of severity, spatial scale and duration (temporal scale). Consequence is then determined as follows:

$$\text{Consequence} = \text{Severity} + \text{Spatial Scale} + \text{Duration}$$

The risk of the activity is then calculated based on frequencies of the activity and impact, whether the activity is governed by legislation and how easily it can be detected:

$$\text{Likelihood} = \text{Frequency of Activity} + \text{Frequency of Impact} + \text{Legal issues} + \text{Detection}$$

The risk of each identified impact is then based on the product of consequence and likelihood.

$$\text{Risk} = \text{Consequence} \times \text{likelihood}$$

Impacts will be rated as either of high, moderate or low significance on the basis provided in Table 6.8.

**Table 6.8: Impact significance ratings**

SIGNIFICANCE RATING	CLASS (NEGATIVE IMPACT)	CLASS (POSITIVE IMPACT)
1 - 55	(L) Low Significance	(L) Low Significance
56 - 169	(M) Moderate Significance	(M) Moderate Significance
170 - 600	(H) High Significance	(H) High Significance

**6.2.2 Risk Reporting Matrix**

The Risk Reporting Matrix (Figure 6-1) is typically used to determine the level of risks identified and associated with a project or within a program. The level of risk for each root cause is reported as low (green), low moderate (yellow), high moderate (purple) or high (red). The purpose of a risk assessment process is to move risks from the top right (high risk) to the bottom left (low risk) as reflected in the risk map.

Risk Map Before Treatment			Consequence				
			Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	A	Almost Certain			17 32		
	B	Likely			11 14 27 29 34 35 36 37	9 13 19 28 30	
	C	Moderate		33	1 2 7 20 23 24 38	6 21	3
	D	Unlikely			5 16 18 22 26	4 25 31	8
	E	Rare				39	
			Low 0	Moderate 6	High 19	Extreme 11	

Figure 6-1: Illustrative risk map.

The level of likelihood of each root cause is established utilising specified criteria (Table 6.9). For example, if the root cause has an estimated five per cent probability of occurring, the corresponding likelihood is Rare (Level E).

Table 6.9: Likelihood categories of root causes.

LIKELIHOOD CATEGORY				
E	D	C	B	A
Rare	Unlikely	Moderate	Likely	Almost Certain
Highly unlikely to occur on this project	Given current practices and procedures, this incident is unlikely to occur on this project	Incident has occurred on a similar project	Incident is likely to occur on this project	Incident is very likely to occur on this project, possibly several times

The level and types of consequences of each risk are established utilising criteria such as those described in Table 6.10. For each type of consequence there is a description that relates to a specific consequence value. The results for each risk are then plotted in the corresponding single square on the Risk Reporting Matrix.



Table 6.10: Levels and types of consequences.

	CONSEQUENCES				
	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Catastrophic
<b>Safety and Health</b>	First Aid Case	Minor Injury, Medical Treatment Case with/or Restricted Work Case.	Serious Injury or Lost Work Case	Major or Multiple Injuries - permanent injury or disability	Single or Multiple Fatalities
<b>Environment</b>	No impact on baseline environment. Localized to point source. No recovery required	Localized within site boundaries. Recovery measurable within 1 month of impact	Moderate harm with possible wider effect. Recovery in 1 year	Significant harm with local effect. Recovery longer than 1 year.	Significant harm with widespread effect. Recovery longer than 1 year. Limited prospect of full recovery
<b>Reputation</b>	Localised temporary impact	Localised, short term impact	Localised, long term impact but manageable	Localised, long term impact with unmanageable outcomes	Long term regional impact
<b>Business Impact</b>	Impact can be absorbed through normal activity	An adverse event which can be absorbed with some management effort	A serious event which requires additional management effort	A critical event which requires extraordinary management effort	Disaster with potential to lead to collapse of the project

### 6.3 Terms of reference for the specialist studies

The following terms of reference will be utilized in appointing the specialist consultants to undertake detailed investigations to assess the significance of potential impacts to the receiving environment.

#### 6.3.1 Ecology and Wetlands

##### 6.3.1.1 Literature Review

Desktop information on the expected biodiversity of the project area, including expected vegetation communities must be obtained from relevant sources. In addition to information on expected species assemblages, the project area will be assessed in terms of the following:

- North West Biodiversity Sector Plan (NW BSP, 2015);
- Relevant SANBI GIS data regarding ecologically important and sensitive areas in terms of fauna will be incorporated where relevant.
- Whether the study area is situated within a Listed Ecosystem in terms of Section 52 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) or in a vegetation that is classified as Vulnerable or Endangered;
- Whether any portion of the vegetation community in the project area is protected by legislation;

- 
- The presence of suitable habitats for faunal or floral species of conservation concern;
  - Whether any portion of the project area contributes to important ecological processes such as ecological corridors, hydrological processes and whether important topographical features such as ridges are present in the project area; and
  - Whether rivers and wetlands in the project area are listed as Freshwater Ecosystem Priority Areas (FEPAs) (SANBI, 2011).

#### 6.3.1.2 *Baseline Surveys*

- Vegetation communities must be sampled using random stratified sampling. This method entails the mapping of vegetation units prior to the site visit and placing at random 5 - 10 sampling plots per vegetation unit to obtain a species list. Size of sample plots will fit the type of vegetation as per methods used in the compilation of VEGMAP. Each sample plot will be sampled using the Braun-Blanquet methodology (Westhoff and Van der Maarel, 1978).
- Terrestrial faunal surveys will include field assessments, direct sightings and indirect evidence (calls, scat, tracks, etc.) of fauna species must be recorded. Surrounding areas, up- and down-slope must be scanned as needed. Since fauna may not always be directly observed, the field survey must focus on identifying habitat and micro-habitats to determine the likelihood of habitat specialists occurring on site with focus on ecologically significant species. An assessment of likelihood of occurrence of ecologically significant species must be provided, based on site survey findings.
- An assessment and mapping of any sensitive areas in terms of fauna must be provided. Identification of areas of current and future potential threat to fauna species, with focus on ecologically significant species. The development of a fauna management and monitoring plan is required.
- The wetland areas must be delineated in accordance with the DWAF (2005) guidelines.

#### 6.3.1.3 *Impact Assessment*

Once the baseline assessment has been completed the specialists will commence with the impact assessment. The significance of potential impacts on the above-mentioned attributes will be assessed using the GCS impact assessment matrix. Suitable and practically implementable mitigation measures will be identified, and the significance of potential impacts will be reassessed post mitigation.

### 6.3.2 *Soils and Hydrogeology*

#### 6.3.2.1 *Literature Review and Desktop Assessment*

- Review all existing and relevant previous soil reports compiled for the study area;
- From this assessment, gaps in the baseline information available will be identified and these will guide the site survey to ensure that these gaps are addressed with the new information; and

- In addition to this, aerial photography as well as broad soil and land capability classes as obtained from the Environmental Potential Atlas of South Africa (ENPAT) and the Agricultural Research Council (ARC) will be studied.

#### 6.3.2.2 *Field Survey*

- A detailed soil survey based on a 1 hectare (ha) grid must be undertaken where the proposed footprint area, and a 100 metre (m) buffer zone around the proposed footprint, will be assessed.
- In areas of great soil form variety, more sample points should be evaluated in order to establish soil form boundaries.
- Observations must be made regarding soil form, texture, soil profile depth, presence of soil structure and slope of the area.

#### 6.3.2.3 *Reporting*

- A Soil, Land Use and Land Capability Scoping Report must be compiled that describes the desktop study as well as the site survey, and adheres to the NEMA requirements.
- Once soil form groups have been outlined, the land capability classification of the area will be determined and mapped using the 2006 Guidelines of the ARC. Similarly, the agricultural potential of the study area must be assessed based on these guidelines, taking other agricultural potential calculation factors into consideration. The assessment of the potential impacts of the proposed project on the soil, land use and land capability properties of the project site must then be determined using the standard GCS risk rating methodology.

### 6.3.3 *Air Quality*

#### 6.3.3.1 *Baseline Assessment*

A study of the receiving environment by referring to:

- Available ambient air quality data for NO<sub>2</sub>, CO and PM (PM<sub>10</sub>, PM<sub>2.5</sub> and TSP). The available dust fallout and PM data from the monitoring network will be used;
- Identify air quality sensitive receptors; and
- Details on the physical environment i.e. meteorology (atmospheric dispersion potential), land use and topography.

#### 6.3.3.2 *Impact Assessment*

- The compilation of an emissions inventory incl. the identification and quantification of all emissions associated with current and proposed operations.
  - The baseline will be based on the most recent air quality impact assessment data available (likely the 2014 Air Quality Baseline Assessment conducted by Airshed).

- The future operations will include the expansion of the TSF and associated activities.
- Atmospheric dispersion simulations of gaseous pollutants, PM10, PM2.5 and dust fallout for the operations reflecting highest daily and annual average concentrations and total daily dust deposition due to routine and upset emissions from the TSF expansion operations. Relevant metals will also be assessed. The US EPA approved AERMOD model will be used.
- Compliance and impact assessment by comparing ambient pollutant concentration levels to the relevant air quality requirements.
- The identification of air quality management and mitigation measures based on the findings of the compliance and impact assessment.

#### 6.3.3.3 Reporting

- A specialist air quality impact assessment report.
- Assess and update if needed the ambient air quality monitoring programme.

#### 6.3.4 Noise

The terms of reference, designed to best meet the project requirements are summarised below:

- Screening-level input into phase 1 of the assessment which will include identification of potential noise sources, sensitive receptors and relevant legislation applicable to the assessment;
- A baseline assessment of the current noise climate in the vicinity of the proposed development which includes baseline sound level monitoring within the receiving environment (receptors);
- Compilation of a comprehensive acoustic inventory to account for sources of noise associated with the proposed development;
- An acoustic modelling investigation to determine the impact of the noise associated with the proposed development;
- Submission of an Environmental Acoustic Impact Assessment Report, detailing all findings from the baseline assessment, acoustic inventory and acoustic modelling simulations; and
- Provision of recommendations on the scope of any mitigation measures that may be applied to reduce noise associated with the proposed development, if necessary.

#### 6.3.5 Heritage

The scope of work comprises a background study and a Heritage Impact Assessment of the proposed impact area. The objectives for the cultural and archaeological study must be:

- To obtain a good understanding of the overall archaeological and cultural heritage conditions of the area through a brief desktop study;

- 
- To locate, identify, record, photograph and describe sites of archaeological and cultural importance;
  - Should any sensitive cultural heritage sites be identified, the specialist will be required to propose a way forward to avoid and mitigate impact to these sites;
  - Ensure that all requirements of the local South African Heritage Resources Agency (SAHRA) are met; and
  - Report on the results of the archaeological and cultural heritage survey adhering to minimum standards as prescribed by the SAHRA and approved by the Association for Southern African Professional Archaeologist (ASAPA).

#### **6.3.6 Surface water**

The hydrological study must include the following:

- Description of the hydrological setting of the proposed TSF expansion;
- Water management and freeboard requirements;
- Water balance assessment;
- Return Water Dam sizing; and
- Stormwater and stream diversions.

#### **6.3.7 Groundwater**

The main objectives of the hydrogeological assessment are:

- To collate all the available and historical hydrogeological information;
- To supply a detailed situation analysis of the current Kareerand TSF in terms of the hydrogeological environment;
- To incorporate the proposed expansion footprint;
- To assess the risk on the groundwater resources and the Vaal River; and
- To make recommendations on the management of groundwater resources and design parameters of the proposed TSF expansion.

The scope of work can be listed as follows:

- Obtain and assess all available information and identify the critical parameters that will require specific management;
- Undertake a field program to assess the foundation geology and hydrogeology;
- To understand the water quality criteria as obtained from the existing and newly drilled boreholes and surface water sites;
- Incorporation of recent field work and recommendations to fill any identified gaps;
- Application of numerical groundwater modelling;
- Final report with recommendations.

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### 6.3.8 *Socio-economic*

#### 6.3.8.1 *Social Impact Assessment*

The SIA report for the Project must include the following:

- Literature review, data collection and high level stakeholder consultation;
- Scoping Report input and the determination of anticipated impacts (construction, operation, and closure phases);
- Environmental Impact Report input including a detailed impact assessment and rating of anticipated impacts (construction, operation, and closure phases); and
- A management plan applicable to anticipated social impacts.

#### 6.3.8.2 *Economic Impact Assessment*

- Identify, predict and evaluate economic aspects of the environment that may be affected by the project activities and associated infrastructure; and
- Advise on the alternatives that best avoid negative impacts or allow to manage and minimise them to acceptable levels, while optimising positive effects.

#### 6.3.8.3 *Site Visit*

GCS/MWS will contact the concerned surface owners and provide them with a description of the proposed project team, the dates of the proposed site assessments as well as the equipment to be used. Any special requests for access will be communicated, and the contact details of the surface owners will be provided to the specialist team. In the event that the proposed site visit dates change from what was presented originally, the deviations must be discussed and confirmed between the surface owner and specialist prior to the site visit.

Site visits/consultations can only be initiated once the final project schedule has been agreed to with MWS. This will be discussed directly with both the social and economic specialists directly once the schedule has been finalised.

### 6.3.9 *Visual*

#### 6.3.9.1 : *GAP Analysis of Spatial Data Available*

Consolidating existing information and GIS data from existing information the applicant may have from previous environmental and engineering studies.

#### 6.3.9.2 *Scoping Assessment*

- Identification of preliminary receptors from a desktop assessment;
- Identifying major risks during the desktop study by identifying sensitive visual receptors within the surrounding areas;
- Consolidation of existing information detailing the proposed operations; and

- 
- Preliminary viewshed analysis to determine possible visual extent of the proposed TSF expansion and associated infrastructure.

#### 6.3.9.3 *Comprehensive Visual Impact Assessment*

Extensive spatial analysis using a series of GIS techniques must be used for the visual impact assessment. Additionally, data obtained from the applicant as well as documentation captured in-house must be incorporated into the assessment and which will assist in an initial desktop study.

A series of independent spatial analysis operations must be conducted and integrated to arrive at a visual impact index. Each of these spatial analysis operations must be briefly described in the following sections.

- Regional Overview and Visual Character;
- Description of the Landscape Quality;
- Description of the Sense of Place;
- Description of the Visual Resource;
- Determine Visual Absorption Capability;
- Determine Visibility and Visual Exposure; and
- Recommendation of practical Mitigation Measures.



## 7 POTENTIAL IMPACTS

Based on the investigation of the receiving environment, as well as the understanding of activities to be carried out for the construction and operation phases of the project, the potential impacts during the various phases of the operation will be identified and addressed in detail during the EIA phase. Potential impacts that have been identified at this stage are presented in Table 7.1.

**Table 7.1: Preliminary impacts identified.**

POTENTIAL ENVIRONMENTAL IMPACT	SPECIALIST STUDY TO INVESTIGATE POTENTIAL IMPACT
Loss of floral species and habitat	Ecology and Wetlands Assessment
Impact to local wetlands and water bodies	Wetland Assessment
	Surface Water Assessment
Disturbance of soil profiles	Soil and Land Capability Assessment
Soil Pollution and Compaction	Soil and Land Capability Assessment
Loss of Agricultural Potential and Land Capability	Soil and Land Capability Assessment
Dust generation	Air Quality Assessment
	Social Impact Assessment
Pollution to Groundwater quality	Hydrogeological Assessment and Modelling
Erosion of soils and drainage lines	Air Quality Assessment and Modelling
	Hydrology Assessment
Effect on local communities	Socio-economic Assessment
	Noise Assessment
	Visual Assessment
	Air Quality Assessment
Erosion	Soil and Land Capability Assessment
	Surface Water Assessment
Change of Land Use and sense of place	Noise Assessment
	Visual Assessment
	Socio-Economic Assessment
	Rezoning Application
	Soils, Land Capability and Agricultural Potential Assessment
Effect on Cultural Heritage and Graves	Cultural Heritage and Archaeological Assessment
	Socio-Economic Assessment

## 8 CONCLUSION

This Draft Scoping Report outlines tasks undertaken in order to describe in detail the proposed development activities. In addition, this phase of the process facilitates the assessment of the baseline biophysical and socio-economic environment. In so doing, the Environmental Assessment Practitioner and the environmental team have been able to indicate what potential impacts may be of significance, warranting more detailed investigation within the EIA phase.

## 9 UNDERTAKING BY EAP

### 9.1 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Sharon Meyer, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties received since project announcement, have been correctly recorded in the report.



Signature of the EAP

Date: 17 January 2020

### 9.2 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, Sharon Meyer, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders since announcement of the project, has been correctly recorded and reported herein.



Signature of the EAP

Date: 17 January 2020

**APPENDIX A**  
**EAP Declaration**



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF EAP AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

### PROJECT TITLE

Kareerand Tailings Storage Facility Expansion Project Scoping Report

Environmental Assessment Practitioner (EAP): <sup>1</sup>	Sharon Meyer		
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Project Consultant:	As above		
Contact person:			
Postal address:			
Postal code:		Cell:	
Telephone:		Fax:	
E-mail:			

#### 4.2 The Environmental Assessment Practitioner

I, Sharon Meyer, declare that –

General declaration:

I act as the independent environmental practitioner in this application;  
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;  
I declare that there are no circumstances that may compromise my objectivity in performing such work;  
I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;  
I will comply with the Act, regulations and all other applicable legislation;  
I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;  
I have no, and will not engage in, conflicting interests in the undertaking of the activity;  
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;  
I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;  
I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;  
I will keep a register of all interested and affected parties that participated in a public participation process; and  
I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not  
all the particulars furnished by me in this form are true and correct;  
will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and  
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

**Disclosure of Vested Interest (delete whichever is not applicable)**

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;

A handwritten signature in black ink, appearing to be 'J. Meyer', written in a cursive style.

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Signature of the environmental assessment practitioner:

GCS Water and Environment (Pty) Ltd

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Name of company:

20 January 2020

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Date:

**APPENDIX B**  
**EAP CV**





## International Environmental Group Manager

### PROFILE

Sharon joined GCS has over 18 years' experience as a Principal Environmental Assessment Practitioner within the consulting field. The work experience that she has ranges from small urban development projects to large projects with multi-national team input. She has worked on various projects and her focus has been on coal and diamond mining, industrial waste management and power generation projects. Sharon has focused on innovation in industrial waste management in the mining and electricity generation sectors. She has worked in power generation on coal fired power stations, combined cycle gas plants, wind and hydroelectric scheme projects. Sharon has worked on site and linear projects, managing biophysical and socio-economic impact assessments.

Sharon has skills and experience in the following areas:

- Project management
- Strategic environmental assessment
- Resource management and allocation
- Technical review
- Business development
- Impact assessment
- Conservation planning
- Sustainability reporting and auditing
- Environmental management and mitigation

Sharon has managed multi-disciplinary teams on projects of national and strategic importance, to comply with international funding requirements. She works closely with the client and authorities to identify practical and sustainable solutions to address business challenges.

Recent key project experience as Project Manager and Principal Environmental Assessment Practitioner includes the following projects:

- Medupi Power Station Flue Gas Desulphurisation Retrofit ESIA, Waste Management License and WULA, South Africa.
- Chitima Integrated Coal Power Project ESIA and RAP in Tete Province, Mozambique.
- Okatji Marble Mine Monitoring, Water Use Licensing and Authorisation, Namibia.
- Kendal Power Station Continuous Ash Disposal Facility ESIA, Waste Management License and WULA, South Africa.
- Richards Bay Combined Cycle Power Project EIA, South Africa.
- Koffiefontein Diamond Mine New Tailings Facility EIA, South Africa.
- Kangra Water Liability Assessment and Reporting for Closure, South Africa.

### CORE SKILLS

- Project Management.
- Technical Report Writing.
- Technical Supervision and Review.
- Environmental and Social Impact Assessment.
- Client engagement.
- Stakeholder Engagement.
- Resource management and integration.
- Resettlement Action Plans and Livelihood Restoration Planning.

### DETAILS

#### Qualifications

- BSc Zoology and Geography (University of Witwatersrand) 1999
- BSc Honours Environmental Management (University of Witwatersrand) 2000
- MSc Zoology and Environmental Education (University of Witwatersrand) 2007

#### Memberships

SACNASP - *Pr. Sci. Nat.*

International Association for Impact Assessment - Gauteng Branch Committee

#### Languages:

English (Excellent)

Afrikaans (Good)

#### Countries worked in:

South Africa  
Mozambique  
Namibia

## Previous Experience

Year	Employer	Project description	Roles and responsibilities
November 2017- June 2018	Savannah Environmental (Pty) Ltd	Principal Environmental Consultant	Technical Report Writing Impact Assessment Project Management Technical Review Auditing and Monitoring Client Liaison Stakeholder Engagement Management and Coordination of Multi-Disciplinary Teams
September 2013 - October 2017	Zitholele Consulting (Pty) Ltd	Divisional Lead and Senior Environmental Scientist	Resource Allocation and Management Project Management Marketing Technical Review Technical Report Writing Impact Assessment Client Liaison Stakeholder Engagement Management and Co-ordination of Multi-Disciplinary Teams

## Previous Experience

<p><b>September 2009 - August 2013</b></p>	<p>Envirokey Management Services CC</p>	<p>Director and Senior Scientist</p>	<p>Resource Allocation and Management            Project Management            Client Liaison            Marketing            Technical Review            Impact Assessment            Project Management            Technical Report Writing            Stakeholder Engagement</p>
<p><b>July 2007 - August 2009</b></p>	<p>Holgate, Meyer and Associates CC</p>	<p>Partner and Senior Environmental Scientist</p>	<p>Resource Allocation and Management            Project Management            Impact Assessment            Marketing            Technical Review            Client Liaison            Technical Report Writing            Stakeholder Engagement</p>

## Previous Experience

<b>May 2005 - June 2007</b>	Cymbian Environmental Services (Pty) Ltd	Environmental Consultant	Technical Report Writing Impact Assessment Project Management Stakeholder Engagement Client Liaison
<b>May 2003 - April 2005</b>	Oryx Environmental Consulting CC	Junior Environmental Consultant	Technical Report Writing Impact Assessment Environmental Management Planning Biodiversity Action Plans Strategic Environmental Management Plans
<b>January 2001 - April 2003</b>	Eskom Enterprises - TSI	Environmental Officer	Environmental Management Plans Animal Interaction Investigations Waste Management Committee Impact Assessment Technical Writing

**APPENDIX C**  
**Current I&AP database**

**Kareerand: I&AP Database**

Title	Last name	First name	Organisation	Position	Postal / Physical Address
<b>Landowners and lawful occupiers (Directly Affected)</b>					
	de Wit	Jan	Two Palms Trust		UMFULA 567 IP Ptns 8 - 19
	Janse Van Renst	Sarel Johannes	Chemwes (Pty) Ltd		STILFONTEIN 408 IP Re/10, Re/15, Re/21, Re/30, Re/31, Re/33, Re/66 and Ptn 140, BUFFELSFONTEIN 443 IP Re/2, Re/6, Ptn 7, 9 and 15, MEGADAM 574 IP Ptn 0, UMFULA 575 IP Ptn 0
			Temotuo Rehabilitation Co		ZANDPAN 423 IP Ptn 3
			NATIONAL GOVERNMENT OF THE RSA		ZANDPAN 423 IP Ptn 4
			AngloGold Ashanti Ltd		NOOITGEDACHT 434 IP Ptn 200, WITKOP 438 IP Re/1, Re/2 and Re/4, VAALKOP 439 IP Re and Re/3, MODDERFONTEIN 440 IP Re/4, MAPAISKRAAL 441 IP Re
			African Rainbow Minerals Ltd		MAPAISKRAAL 441 IP Re/1
			Da Rocha Maria Ines		MAPAISKRAAL 441 IP Re/2
			M Q M Prop (Pty) Ltd		
	Matsose	Fannie	WILDEBEESTPAN (PORTION 9 & 10) COMMUNAL PROPERTY ASSOCIATION		WILDEBEESTPAN 442 IP Re
<b>Landowners and lawful occupiers of adjacent properties</b>					
Mr	Johan	Fourie	ChubbyChick		
Mr	Hennie	Kruger	ChubbyChick		
Mr	Geoff	Allem			
Mr	Ben	Delpont			
Dr	Pieter	Groenewald			
Mr	Jaco	Steyn	SENWES / Hartbeesfontein Agric		
Ms	Sally				
Mr	Peter	Hill			
Mr	N	Marais			
Mr	Piet	Theron			
Mr	Johan	Kondos			
Mr	Carl	Crous			
Mr	Johann	Tempelhoff	NWU		
<b>Government Authorities</b>					
<b>Local Government</b>					
<b>Dr Kenneth Kaunda DM</b>					
	Barei	Segotso-Mosiane	Dr Kenneth Kaunda District Municipality	Executive Mayor	
		Cllr F I Tagaree	Member of the Mayoral Committee	Finance & Debt	
		PA: Yousuf Minty 8030/8031			
		Cllr M L Mojaki	Member of the Mayoral Committee	Corporate Services	
		PA: Khotso Richard Moabi			
		Cllr N I Matetoane	Member of the Mayoral Committee	Transversal Issues	
		PA: Bonolo Tedla			
		Cllr M F Nthaba	Member of the Mayoral Committee	Infrastructure	
		PA: Thapelo Majelenane			
		Cllr T O Vilakazi	Member of the Mayoral Committee	Housing, Land & Rural	
		PA: Babalwa Saxhanti			
		Cllr S D Montoedi	Member of the Mayoral Committee	Electrical Engineering	
		PA: N Mondli 8735			
		Cllr S J Daemane	Member of the Mayoral Committee	Public Safety	
		PA: Mojalefa Hani			
		Cllr P E Mabeli	Member of the Mayoral Committee	Sports, Arts & Culture	
		PA: Puleng Chelane			
		Cllr N S Mendela	Member of the Mayoral Committee	Community & Health	
		PA: Orapeleng 8763			
		Cllr T G Khoza	Member of the Mayoral Committee	Economic Growth & Market	
		PA: Rondy Kiti			
<b>City of Matlosana</b>					
	TSR	Nkhumise	City of Matlosana (Klerksdorp)	Municipal Manager	41 Bram Fischer Street
	E	Marumo	City of Matlosana (Klerksdorp)	Deputy Director in o	41 Bram Fischer Street
	B	Masibi	City of Matlosana (Klerksdorp)	Office of the Speake	41 Bram Fischer Street
	J	Masilo	City of Matlosana (Klerksdorp)	Directorate: Municip	41 Bram Fischer Street
	T	Tsime	City of Matlosana (Klerksdorp)	Directorate: Macro C	41 Bram Fischer Street
	T	Pelesane	City of Matlosana (Klerksdorp)	Directorate: Civil Se	41 Bram Fischer Street
	J	Davis	City of Matlosana (Klerksdorp)	Town Planning	
	MJ	Masilo	City of Matlosana (Klerksdorp)	Community Services	
	B	Sikhampula	City of Matlosana (Klerksdorp)	Parks and Development	
	M	Mithi	City of Matlosana (Klerksdorp)	Chief Cleansing	
	CK	Monatisa	City of Matlosana (Klerksdorp)	Administration	
	TW	du Plessis	City of Matlosana (Klerksdorp)	Cleansing	
	LD	Rambuani	City of Matlosana (Klerksdorp)	Parksand Cemeteries	
Mr		Mabeli	Ward Councillor Ward 31(Khuma)		
Mr	Fanie	Kloppers	Ward Councillor Ward 30 (Stilfontein)		

<b>JB Marks</b>					
Mr	Lebo	Ralekgetho	JB Marks Local Municipality (Ventersdorp / Potch)	Municipal Manager	35 Wolmarans Street
Mr	Jack	Monnagkothu	JB Marks Local Municipality (Ventersdorp / Potch)	Head: Technical Ser	35 Wolmarans Street
Mr	William	Maphosa	JB Marks Local Municipality (Ventersdorp / Potch)	Head: Communicati	35 Wolmarans Street
<b>Competent Authorities and Commenting Authorities</b>					
<b>Office of the Premier</b>					
	Vuyisile	Ngesi	Office of the Premier: Spokesperson		
<b>Land Claims Commissioner</b>					
	Keabetswe	Mothupi	Office of the Regional Land Clams Commissioner: North West		Cnr James Moroka and Sekame Drive, West Gallery, Mega City
<b>North West Department of Public Works and Roads</b>					
Mr	Pakiso	Mothupi	HOD: Department Public Works and Roads		Ngaka Modiri Molema Road, Old Parliament Complex, Provincial Head Office
	Dolly	Mogonediswa	Department Public Works and Roads (PA to Chief Director)		Ngaka Modiri Molema Road, Old Parliament Complex, Provincial Head Office
	Katlego	Mogale	Department Public Works and Roads		Ngaka Modiri Molema Road, Old Parliament Complex, Provincial Head Office
	Johan	van Wyk	Department Public Works and Roads		Ngaka Modiri Molema Road, Old Parliament Complex, Provincial Head Office
<b>North West Parks and Tourism Board</b>					
	Phuti	Mahloko	North West Parks and Tourism Board		3031 Heritage House, Cookeslake, Nelson Mandela Drive
<b>North West Department of Agriculture and Rural Development</b>					
Dr	Poncho	Mokaila	HOD: North West Department of Agriculture and Rural Development		
	Mohlalisi	Motshabi	North West Department of Agriculture and Rural Development		Agricentre Building, Cnr Dr. James Moroka Drive & Stadium Road
	Portia	Krisjan	North West Department of Agriculture and Rural Development		Agricentre Building, Cnr Dr. James Moroka Drive & Stadium Road
<b>Department of Water and Sanitation</b>					
Ms	Mogale	Matseba	DWS Forums		
Ms	Philimon	Khwinana	DWS Forums		
Mr	Bashan	Govender	DWS:Head Office	CD: Mine Water Management	
Mr	Jurgo	van Wyk	DWS	Integrated Water Quality Management	
Mr	Marius	Keet	DWS	CMA: Vaal Proto	
Mr	Tseliso	Ntili	Department of Water and Sanitation	Free State Province	Regional Head of Department
Mr	Vernon	Blair	Department of Water and Sanitation	Free State Province	WUL
Mr	George	Nel	Department of Water and Sanitation	Free State Province	WUL
<b>South African Heritage Resources Agency (SAHRA)</b>					
Ms	Khumalo	Nokukhanya	South African Heritage Resources Agency (SAHRA)		
Ms	Natasha	Higgitt	South African Heritage Resources Agency (SAHRA)		
<b>Department of Environmental Affairs (DEA)</b>					
Mr	Mahlangu	Lucas	Department of Environmental Affairs (DEA)		Environment House, 473 Steve Biko Road, Arcadia
<b>Department of Mineral Resources (DMR)</b>					
Ms	Lorraine	Nobela	Department of Mineral Resources (DMR) - NW		Vaal University of Technology, Cnr Magarete Prinsloo and Voortrekker Street
	Neo	Kgokong	Department of Mineral Resources (DMR) - NW		Vaal University of Technology, Cnr Magarete Prinsloo and Voortrekker Street
	Phumudzo	Nethwadzi	Department of Mineral Resources (DMR) - NW		Vaal University of Technology, Cnr Magarete Prinsloo and Voortrekker Street
	Chris	Tshisevhe	Department of Mineral Resources (DMR) - NW		Vaal University of Technology, Cnr Magarete Prinsloo and Voortrekker Street
<b>SANRAL</b>					
Mr	Jan	Oliver	SANRAL		
<b>Department of Economic Development, Environment, Conservation and Toursim (Detect)</b>					
Mr	L	Tshikovhi	HOD: DETECT		NWDC Building, Cnr Provident and University Drive, Mmbatho, 2735
Ms	Lebo	Diale	Chief Director: Environmental Services		Agricentrebuilding
<b>North West Department of Social Development</b>					
Ms	Dikeledi	Mothobi	HOD		
<b>NGOs/ CBOs/ Parastatals</b>					
Ms	Shalene	Janse van Resnburg	Midvaal Water Company		
Ms	Mariette	Liefferink	Federation of Sustainable Environment (FSE)		
Mr	Boeta	du Toit	Agri North West		
			SenWes	Tel: 0184647357	
Ms	Thea	Liebenberg	Agri SA		
	John	Capel	Bench Marks Foundation	Executive Director	
	Moses	Cloete	Bench Marks Foundation	Deputy Director	
	Eric		Bench Marks Foundation		
	Bishop	Seoka	Bench Marks Foundation		
	Simo	Gumede	Bench Marks Foundation		

	Motlatsi	Makhetha	Dr KKDM Development Agency		
	Makoma	Lekalakala	Earthlife Africa	Branch coordinator	
	Thabo		Earthlife Africa	Sustainable Energy & Livelihoods Project	
	Louis	Stydom	Lawyers for Human Rights		
	Lindiwe	Khumalo	South African Human Rights Commission	CEO	
	Isaac	Mangena	South African Human Rights Commission	Spokesperson	
	Robert	Krause	Centre for applied legal studies		
	Louis	Snyman	Centre for applied legal studies		
	Stuart		Socio-economic Rights Institute		
	Edward		Socio-economic Rights Institute		
	Thomas	du Toit	Save the Vaal		
	Stephina	Modau	Minerals Council SA		
<b>Pressure Groups</b>					
	Khuma Bantu Forum		Concerned Group		
	Jabulani	Latha	Khuma Concerned Community Movement (KCCM)		
	Mr Phatsoane		Black Business in Mining		
<b>General Interested and Affected Parties</b>					
Mr	Nkosinathi Leorn	Qotwane	Nathis Works and Consultancy Services Pty Ltd		
Mr	K	Monnahela	Fresheners Multipurpose Co-Operative Pty Ltd		
Mr	M	Motloung	Fresheners Multipurpose Co-Operative Pty Ltd		
	Koketso	Moagi			
Mr	Phoka	Phatsoane			
Mr	Tlisane	Lesedi	General public		
Mr	Thato	Porogo	Khuma BusinessForum (KBF)		
Mr	Thabo	Tshabalala	Khuma BusinessForum (KBF)		
	Motau	Lekitlane	Khuma Community		
	Mabote	Ntaopane	Khuma Community		
Ms	Mercia	Whitehorn	Kromdraai		
	Burns	Kobue	Khuma Business		
	Toko	Mathabela	Khuma Business		
			Paradyskop		
<b>Libraries (Public Places for review of documents)</b>					
			Klerksdorp Public Library	Voortrekker Street, Klerksdorp Central,	
			Khuma Library	Ndlondlosi Street, Khuma, (Tel: 018	
			Potchefstroom Public Library	25 Wolmarans Street,	
			Stilfontein Library	Somerset Drive, Stilfontein (Tel:	
			Orkney Library	Patmore Street, Orkney (Tel:	
<b>Media</b>					
			Klerksdorp Rekord	Advert ran on 01/11/2019	
			Klerksdorp Midweek		
			Overvaal		
			Potch Herald	Advert ran on 31/10/2019	
			City Press	Advert ran on 03/11/2019	
<b>Client</b>					
	David Setshedi	Rasepae	Anglo Ashanti	Enterprise Development Manager	
	Kgomotso	Tshaka	Anglo Ashanti	VP Sustainability Sustainability	
	John	Van Wyk	Anglo Ashanti		
	Charl	Human	Anglo Ashanti	Environmental Manager	
	Sipho	Fipaza	Anglo Ashanti	Project Coordinator Sustainable Development	
	Vernon	Storbeck	Anglo Ashanti		
	Conrad	Freese	Anglo Ashanti		
	Brenda	Diseko	AGA:MWS		
	Rendani	Masevhe	AGA:MWS		



**APPENDIX D**  
**Advertisements**





Hoërskool Klerksdorp het onlangs hul sportsterre vir die jaar vereer. Jaco Anderson en Zane van Staden is as sportseuns van die jaar aangewys en Kayla van der Bergh is die sportvrou van die jaar.



Ané Venter en Reghard Jooste is as Hoërskool Klerksdorp se kultuurmeisie en -seun vir die jaar aangewys.



Laerskool Goudkop se Duxleerders vir die derde kwartaal is aangewys. Hulle is Juan-Carlo Passano (graad 4 - 96,17%); Ruzanne Oosthuizen (graad 5 - 96,17%); Anchen Hodgson (graad 6 - 94,83%) en Ruven Jansen van Vuuren (graad 7 - 96%).



Laerskool Meiringspark se o/13 krieketspan het die Noordwesliga gewen. Hulle speel 20 wedstryde waarvan hulle net twee verloor. Die voorste lopiemarkers in die span is Eduard Dreyer (952 lopies en vat 39 paaltjies), Marneau Dreyer (841 lopies en vat 30 paaltjies) en Shawn Beukes (615 lopies en vat 26 paaltjies). Die span bestaan uit Manie Rousseau en Kenny Swart (afriegers), Marneau Dreyer, Eduan Jerling, Diwan Labuschagne, Tristan Maraba, Thlogi Mokatsane, Ronaldo Joubert, Bevan Morkel, Jonathan Botha, Eduard Dreyer, CJ Evert, Shawn Beukes, Ané Saunderson en Shaun du Plessis.



Laerskool Goudkop wen al hulle ligawedstryde en tree as Kosh-wenners uit die stryd. Hulle wen die Noordwes finale teen Laerskool Noordvaal met 8 paaltjies, om as Noordweswenners die jaar af te sluit. Die span is (agter) Lukas Davidtz (afrieger), Zaid Bekker, Nathan Hing, Divan Botha, Logan Botha, Dian Mostert (kaptein), Jhanco Janse van Rensburg, Piet White (afrieger), (voor) Ruben van der Merwe, Kyle Speelman, Ethan Botes, Zachary Smith, Dean Sammons en Dean van der Merwe.

## VEILING - WOONHUIS & ONVERBETERDE ERF te WILKOPPIES, KLERKSDORP

In opdrag van die likwidadeurs van Autumn Star Trading 251 (Edms) Beperk (M150/19) sal ons die ondervermelde eiendomme verkoop

**WOENSDAG, 13 NOVEMBER 2019**  
**10:00 te LEWISSTR 16C**

**Eiendomme:** 1) Gedeelte 3 van Erf 632 Wilkoppies Uitbr 11 (578<sup>2</sup>); 2) Gedeelte 8 van Erf 632 Wilkoppies Uitbr 11 (516m<sup>2</sup>) en 3) Gedeelte 11 van Erf 632 Wilkoppies Uitbr 11 (2073m<sup>2</sup>).

**Gedeelte 3:** (toegangspad); **Gedeelte 8:** onverbeterde eiendom. **Gedeelte 11:** woonhuis wat omgeskakel is in 6 x eenpersoon eenhede; 2 gemeenskaplike badkamers; onthaalvertrek, buitekamer / werkwinkel; 3 x motorhuise en 4 x motorafdakke.

**VOORWAARDES:** 10% van die koopprys en 5% kommissie plus BTW daarop is betaalbaar deur die KOPER by toeslaan van die bod. Balans teen registrasie, waarborg gelewer te word 30 dae na aanvaarding. Kopers moet 'n bewys van woonadres en identiteit beskikbaar hê.

**Vir nadere besonderhede skakel:**  
Afslaer/ RUDI MÜLLER 082 490 7686  
ANTON ENGELBRECHT 082 789 2772  
Kantoor: 018 294 7391

Besoek ons webtuiste vir meer inligting asook die reëls van die veiling en die regulasies in terme van die Verbruikerswet: [www.ubique.co.za](http://www.ubique.co.za)



**Afslaers**  
**UBIQUE Auctioneers**  
[www.ubique.co.za](http://www.ubique.co.za)



**NOTIFICATION OF AN APPLICATION FOR AN ENVIRONMENTAL AUTHORISATION AMENDMENT AND WASTE MANAGEMENT LICENSE FOR THE EXPANSION OF THE KAREERAND TAILINGS STORAGE FACILITY FOR MINE WASTE SOLUTIONS, NORTH-WEST PROVINCE**

GCS Ref. No: 17-0026

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), collects and reprocesses mine tailings that were previously deposited on tailings storage facilities (TSFs) in order to extract gold and uranium. One such a facility is the Kareerand TSF which is situated to the east of Klerksdorp (19 km from facility), within the jurisdiction of the City of Matlosana and JB Marks Local Municipalities in the Dr Kenneth Kaunda District Municipality in the North-West Province.

Kareerand TSF was designed with an operating life of 14 years, taking the facility to 2025 with a total design capacity of 352 million tonnes. Subsequent to commissioning of the TSF, MWS was acquired by AngloGold Ashanti in 2012 and tailings production target has increased by an additional 485 million tonnes, which will require operations to continue until 2042. The additional tailings therefore require extension of the design life of the TSF.

The integrated application is for the expansion of the current Kareerand TSF to accommodate the increased tailings, six additional pump stations (three main and three satellite) and approximately 30 km of pipelines. The TSF expansion is proposed on the western edge of the current facility, and the final height of the combined facility (both expansion and current) will be 122m. The expansion will add approximately 380 hectares to the TSF footprint, including support infrastructure. Infrastructure that will be constructed as part of the TSF expansion includes fences, access roads, a topsoil bund wall, stormwater diversion channels, delivery pipelines, solution trenches, collector sump, catchment paddocks, starter wall, drainage system, decant system, catwalk, energy dissipater, silt trap, stormwater dam, return water dams (RWDs), contractors yard, RWD emergency spillway, pump stations, process water/slurry pipelines and slurry launders.

### INTEGRATED ENVIRONMENTAL AUTHORISATION PROCESS

GCS (Pty) Ltd, as the independent environmental practitioner (EAP), has been appointed by MWS to conduct the integrated process of a Scoping and Environmental Impact Assessment (S&EIA) and Waste Management Licence (WML) Application. The following activities are applied for:

National Environmental Management Act (NEMA) (Act 107 of 1998): • Listing Notice 1 of 2014 (GN R983 as amended)- Activity 12, 16, 19, 24, 28, 31, 46, 48; • Listing Notice 2 of 2014 (GN R984 as amended)- Activity 15 and 16; and National Environmental Management: Waste Act (NEM: WA) (Act 59 of 2008): • List of waste management activities that have, or are likely to have, a detrimental effect on the environment (GN 921, as amended)- Category B, Activity 3 and 7.

### YOUR PARTICIPATION IS IMPORTANT

Interested and Affected Parties (I&APs) are invited to participate by providing comments and raising issues of concern regarding the proposed project. The Scoping Report will be available in January 2020 for review and comment. To register as an I&AP and to receive copies of documents please contact: GCS (Pty) Ltd: Anelle Lötter / Georgina Wilson, Tel: 011 803 5726, Fax: 011 803 5745, E-mail: [anellel@gcs-sa.biz](mailto:anellel@gcs-sa.biz) / [georgina@gcs-sa.biz](mailto:georgina@gcs-sa.biz) or Mail: P O Box 2597, Rivonia, 2128, <http://www.gcssa.biz/documents/>



**Waterberg District Municipality**  
 VISION: "We are the best energy hub and ecotourism destination in Southern Africa"  
 MISSION: "To invest in a constituency of talented human capital who are motivated and innovative to build a sustainable economy in the field of energy, minerals and eco-tourism for the benefit of all our communities"

**CALL FOR TENDERS**  
 Waterberg District Municipality (WDM) invites service providers to submit tenders for the following projects:

Bid Number	Project Name/Description	Compulsory Briefing Session	Local Content Threshold	Closing Date	Technical Contact Person
WDM/2018/19-09	Re-Advert: Occupational Medical Examination and Diseases	08 November 2019 at 10h00 at the Waterberg District Municipality Council Foyer	N/A	06 December 2019 at 11h00	Mr Kenneth Mothata, tel. 014 718 3338 or email: kmothata@waterberg.gov.za
WDM/2019/20-09	Provision of Banking Services	08 November 2019 at 10h30 at the Waterberg District Municipality Council Foyer	N/A	17 January 2020 at 11h00	Mr Aubrey Nkhata, tel. 014 718 3344 or email: ankhata@waterberg.gov.za
WDM/2019/20-10	Instant Sampling Kits for Food and Water	08 November 2019 at 11h00 at the Waterberg District Municipality Council Foyer	N/A		Ms Tebogo Tshabalala, tel. 014 718 3325 or email: tshabalala@waterberg.gov.za
WDM/2019/20-11	Stack Monitoring Equipment	08 November 2019 at 11h30 at the Waterberg District Municipality Council Foyer	N/A	22 November 2019 at 11h00	Mr Vincent Raphunga, tel. 014 718 3362 or email: vraphunga@waterberg.gov.za
WDM/2019/20-12	Review of the Waterberg Spatial Development Framework	08 November 2019 at 12h00 at the Waterberg District Municipality Council Foyer	N/A		Mr Phattu Siebe, tel. 014 718 3362 or email: psiebe@waterberg.gov.za
WDM/2019/20-13	Supply and Delivery of Uniform and PPE	08 November 2019 at 12h30 at the Waterberg District Municipality Council Foyer	100%	06 December 2019 at 11h00	Mr Kenneth Mothata, tel. 014 718 3338 or email: kmothata@waterberg.gov.za

**CANCELLATION OF TENDER**  
 WDM/2018/19-05: Review of WDM Air Quality Management Plan  
 • THE PROJECT WAS CANCELLED  
 • ADVERT DATE: 24 AND 26 FEBRUARY 2019  
 • CLOSING DATE: 15 MARCH 2019  
 Mr Stanley Koenale, tel. 014 718 3331 or email: skoenale@waterberg.gov.za

Tender documents are available and can be downloaded free of charge from the e-Tender portal (www.etenders.gov.za) or can be obtained at a non-refundable amount of R250.00 from the Municipality's offices from 07h45 to 15h30 (Monday to Friday) as from 04 November 2019. All proposals must be in a sealed envelope and marked with the Project Name, Project Number and the Closing Date and be deposited in the tender box of the WDM Council Building, Harry Gwala Street, Modimolle. The Tender Box is accessible 24 hours/7 days per week at the WDM Building. The compulsory briefing session will be held on the date, time and venue as indicated above.

Proposals will be evaluated on the basis of the PPPFA 80/20 point system and WDM Supply Chain Management Policy. No faxed or emailed proposals will be accepted. Interested Service Providers should submit proposals to the following address: The Municipal Manager, Waterberg District Municipality, Harry Gwala Street, Modimolle, 0510. Administrative queries relating to the tender may be addressed to the Divisional Manager: SCM on tel. 014 718 3350 / 014 718 3300 or email: kmakgobela@waterberg.gov.za and technical queries as per the contact person above.

**M MALULEKA - MUNICIPAL MANAGER**

**GCS**  
 Water & Environmental Consultants

**NOTIFICATION OF AN APPLICATION FOR AN ENVIRONMENTAL AUTHORISATION AMENDMENT AND WASTE MANAGEMENT LICENSE FOR THE EXPANSION OF THE KAREERAND TAILINGS STORAGE FACILITY FOR MINE WASTE SOLUTIONS, NORTH-WEST PROVINCE**

GCS Ref. No: 17-0026

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), collects and reprocesses mine tailings that were previously deposited on tailings storage facilities (TSFs) in order to extract gold and uranium. The residue is then deposited on a single facility known as Kareerand TSF which is situated to the east of Klerksdorp (19 km from facility), within the jurisdiction of the City of Matlosana and JB Marks Local Municipalities in the Dr Kenneth Kaunda District Municipality in the North West Province.

Kareerand TSF was designed with an operating life of 14 years, taking the facility to 2025 with a total design capacity of 352 million tonnes. Subsequent to commissioning of the TSF, MWS was acquired by AngloGold Ashanti in 2012 and tailings production target has increased by an additional 485 million tonnes, which will require operations to continue until 2042. The additional tailings therefore require extension of the design life of the TSF.

The integrated application is for the expansion of the current Kareerand TSF to accommodate the increased tailings, six additional pump stations (three main and three satellite) and approximately 30 km of pipelines. The TSF expansion is proposed on the western edge of the current facility, and the final height of the combined facility (both expansion and current) will be 122m. The expansion will add approximately 380 hectares to the TSF footprint, including support infrastructure. Infrastructure that will be constructed as part of the TSF expansion includes fences, access roads, a topsoil bund wall, stormwater diversion channels, delivery pipelines, solution trenches, collector sump, catchment paddocks, starter wall, drainage system, decant system, catwalk, energy dissipater, silt trap, stormwater dam, return water dams (RWDs), contractors yard, RWD emergency spillway, pump stations, process water/slurry pipelines and slurry launders.

**INTEGRATED ENVIRONMENTAL AUTHORISATION PROCESS**  
 GCS (Pty) Ltd, as the independent environmental practitioner (EAP), has been appointed by MWS to conduct the integrated process of a Scoping and Environmental Impact Assessment (S&EIA) and Waste Management Licence (WML) Application. The following activities are applied for:

- National Environmental Management Act (NEMA) (Act 107 of 1998):
  - Listing Notice 1 of 2014 (GN R983 as amended)-Activity 12, 16, 19, 24, 28, 31, 46, 48;
  - Listing Notice 2 of 2014 (GN R984 as amended)-Activity 15 and 16; and
  - National Environmental Management: Waste Act (NEM: WA) (Act 59 of 2008):
    - List of waste management activities that have, or are likely to have, a detrimental effect on the environment (GN 921, as amended)- Category B, Activity 3 and 7.

**YOUR PARTICIPATION IS IMPORTANT**  
 Interested and Affected Parties (I&APs) are invited to participate by providing comments and raising issues of concern regarding the proposed project. The Scoping Report will be available in January 2020 for review and comment. To register as an I&AP and to receive copies of documents please contact:

GCS (Pty) Ltd: Anelle Lotter / Georgina Wilson, Tel: 011 803 5726, Fax: 011 803 5745, E-mail: anelle@gcs-sa.biz / georgina@gcs-sa.biz or Mail: P O Box 2597, Rivonia, 2128, http://www.gcs-sa.biz/documents/

**TSHWANE ECONOMIC DEVELOPMENT AGENCY**

**TEDA: BID PPM 06/10/19: APPOINTMENT OF A TRANSACTIONAL ADVISOR ON DEVELOPMENT OF A BUSINESS PLAN FOR TSHWANE VERTICAL FARMING FACILITY PROJECT**

The 80/20 preference point system will be applied to this tender. Bidders who are in the employ of the state will be disqualified automatically.

**CLOSING DATE: 19 NOVEMBER 2019 AT 11:00 AM**

Tender documents and Terms of Reference are obtainable on the e-tender and the TEDA website. Only bidders that submitted proof of a non-refundable deposit of R250, 00 will be accepted. Cash and Bank-guaranteed cheques will not be accepted. Proof of payment must be submitted together with bid documents. Name of bidder must reflect as reference.

Bidders who have disputed municipal accounts for rates and taxes and/or accounts for municipal or other services that are more than 30 days overdue will be disqualified. Municipal accounts for the last three months must be submitted together with the bid documents.

Should the bidder be renting in a leased property, both lessor and the lessee's agreement must be furnished together with the landlord's municipal account or statement Municipal account must be submitted together with the bid documents.

Submission of municipal accounts is applicable to sub-contracting service providers as well. Failure to comply with the above conditions will lead to disqualification.

Enquiries regarding technical terms of reference or bid documents must be referred to Mr Richard Ramolemi at 012 358 6539 or Richard.R@TSHWANE.GOV.ZA

Tender documents must be enclosed in a sealed envelope bearing the applicable tender number, tender description and reference number, as well as the closing time and due date, and must be addressed to TEDA, Supply Chain Management, PO Box 11751, Zwartkop, Pretoria 0051. It must be placed in the tender box situated at the reception area on the 5<sup>th</sup> Floor, Anker Building, 1279 Mike Crawford Road, Centurion

The bid are accessed on the Website at www.etenders.gov.za

No briefing session will be held.

www.tshwane.gov.za Municipal Entity of the City of Tshwane

**LHDA**

**Lesotho Highlands Development Authority**  
 Lesotho Highlands Water Project PHASE II

**Procurement of Construction Contract**

The Lesotho Highlands Water Project (LHWP) is a multi-billion Maloti/Rand and bi-national project which was established by the treaty of 1986 signed between the governments of the Kingdom of Lesotho and the Republic of South Africa. The LHWP includes large scale civil engineering, socio-economic, public health and environmental disciplines. The Lesotho Highlands Development Authority (the implementing Authority of the LHWP) intends to procure the following Construction Contract:

Contract Number and Name	Availability of Documents	Date of COMPULSORY Briefing and Site Visit	Deadline for Submission
Contract LHDA No. 4005D: Installation of Telecommunication Infrastructure for Phase II	04 November 2019 to 02 March 2020	Briefing and Site Visit 28 November 2019 at 08:00	02 March 2020 at 14:00

**COLLECTION OF DOCUMENTS**  
 All Documents may be obtained during the periods indicated above at NO COST, from the Phase II project website <http://www.lhda.org.ls/tenderbulletin/>.

Alternatively, for a non-refundable fee of M1 000.00, the documents may be collected from Lesotho Highlands Development Authority, LHWP2 Project Management Unit, 9th Floor Lesotho Bank Tower, Kingsway Street, Maseru, Lesotho between the hours of 9:00 and 15:00 during the dates indicated above. Proof of payment to the LHDA account must be provided at the time of collection of document.

Banking details and specific information regarding this procurement can be obtained from LHDA's website: <http://www.lhda.org.ls/tenderbulletin/>.

**MPUMALANGA PROVINCIAL LEGISLATURE**

**RE-INVITATION TO BID**

The Mpumalanga Provincial Legislature is looking to appoint service providers to bid for the goods/services below:

BID NO.	DESCRIPTION	NON-REFUNDABLE COST	COMPULSORY BRIEFING SESSION	CLOSING DATE FOR SUBMISSION OF BIDS	CONTACT PERSONS
REF: MPL 5/1/3/1/1	Cleaning Services for the Legislature Building 1 for the period of 36 months				Mr A J Arendse at 013 766 1062 for technical issues OR Mr. D. Madonsela-Khanyani at 013 766 1111 for Supply chain Management
REF: MPL 5/1/3/1/2	Provision of Outsourced internal Audit services for the period of 36 months	R300.00	14 November 2019 At 09:00	3 December 2019 At 14:00	Ms Nomcebo Qwabe at 013 766 1415 for technical issues OR Mr. D. Madonsela-Khanyani at 013 766 1111 for Supply chain Management

The 80/20 Preferential Point System will be used as Evaluation Criteria:

- 80 points for price.
- 20 points for B-BBEE Status Level of Contributor

Bid documents will be available during working hours from 14 November 2019 at Legislature, address stated below

**COMPULSORY BRIEFING SESSION WILL BE HELD AT LOWER GROUND FLOOR AT THE ADDRESS BELOW:**

Bids are to be deposited in a tender box at the Mpumalanga Provincial Legislature, Building Number 1, Lower Ground Floor, Mpumalanga Government Complex, Building 1, Riverside Park, Government Boulevard, Mbombela/Nelspruit.

**Human Settlements**

**Invitation to Bid**  
 Developers/Contractors and Professionals are hereby invited for:

Bid No.	Description	Bid Price	Evaluation Criteria	Briefing Session	Contact Details
DH01/18A	Supplementary of Pre-Qualified List of Turnkey - Design and Building Construction.	Bid documents can be downloaded for free on www.etenders.gov.za or be purchased from our offices at a cost of R50.00 each (non-refundable)	Functionality as per the bid document	N/A	Bid Documents Mr CT Mbombi/Mr DL Smith/ Ms Elna Kepadisa tel:(018) 388 2947/6/4435 email: ctmbombi@nwpg.gov.za email: dlsmith@nwpg.gov.za email: ekepadisa@nwpg.gov.za
DH 45/19	Establishment of Pre-Qualified List of Sites - Design and Install Internal Services of Low Cost Houses for a period of three years.	Bid documents can be downloaded for free on www.etenders.gov.za or be purchased from our offices at a cost of R50.00 each (non-refundable)	Functionality as per the bid document	N/A	Bid Documents Mr CT Mbombi/Mr DL Smith/ Ms Elna Kepadisa tel:(018) 388 2947/6/4435 email: ctmbombi@nwpg.gov.za email: dlsmith@nwpg.gov.za email: ekepadisa@nwpg.gov.za
DH 46/19	Establishment of Pre-Qualified List of Professional Services Providers in the Building Industry for a period of three years.	Bid documents can be downloaded for free on www.etenders.gov.za or be purchased from our offices at a cost of R50.00 each (non-refundable)	Functionality as per the bid document	N/A	Bid Documents Mr CT Mbombi/Mr DL Smith/ Ms Elna Kepadisa tel:(018) 388 2947/6/4435 email: ctmbombi@nwpg.gov.za email: dlsmith@nwpg.gov.za email: ekepadisa@nwpg.gov.za

The pre-qualification of this application will include functionality as per the bid document.

The minimum threshold for functionality for DH 01/18A AND DH 45/19 - EME will be 40 points; QSE and GENERIC will be 50 points AND for DH 46/19 will be 60 points and application that fail to achieve the minimum qualifying score will be disqualified. Only applicants that achieved the minimum qualifying score/percentage for functionality will be included in the pre-qualified list.

NB: Contractors who are already included in the existing departmental pre-qualified lists MUST NOT re-apply, but to submit renewable documentations, such as NHBRC, CIDB, B-BBEE, etc.

Note: Military Veterans and People Living with Disability are encouraged to apply

Documents will be available at the Department of Human Settlements, Craft Press Building, 27 James Watt Crescent, Industrial Site, Mafikeng.

**Closing date: 22 November 2019**

Department: Human Settlements North West Provincial Government REPUBLIC OF SOUTH AFRICA

Kone Solutions K31298

**City Press**

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**Chapi Crapp**

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**OPEN MARKET LOG SALES**  
 1 APRIL 2020 to 31 MARCH 2021

All parties interested in Pine and Eucalyptus Logs are required to register for the above-mentioned process. Timber will be on offer from the KZN, Mpumalanga and Limpopo plantations.

A special invitation is directed to SMME's to participate. All interested parties must register before 29 November 2019.

Registration forms and more details can be obtained from: Noko Rammutla: Tel: 013 754 2849 Email: noko.rammutla@safcol.co.za

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**TENDERS & AUCTIONS**



# L.E.G.A.L NOTICES



**NOTIFICATION OF AN APPLICATION FOR AN ENVIRONMENTAL AUTHORISATION AMENDMENT AND WASTE MANAGEMENT LICENCE FOR THE EXPANSION OF THE KAREERAND TAILINGS STORAGE FACILITY FOR MINE WASTE SOLUTIONS, NORTH-WEST PROVINCE**

GCS Ref. No: 17-0026

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), collects and re-processes mine tailings that were previously deposited on tailings storage facilities (TSFs) in order to extract gold and uranium. One such a facility is the Kareerand TSF which is situated to the east of Klerksdorp (19 km from facility), within the jurisdiction of the City of Matlosana and JB Marks Local Municipalities in the Dr Kenneth Kaunda District Municipality in the North-West Province.

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- Listing Notice 2 of 2014 (GN R984 as amended)- Activity 15 and 16; and

National Environmental Management: Waste Act (NEM: WA) (Act 59 of 2008):

- List of waste management activities that have, or are likely to have, a detrimental effect on the environment (GN 921, as amended)- Category B, Activity 3 and 7.

### YOUR PARTICIPATION IS IMPORTANT

Interested and Affected Parties (I&APs) are invited to participate by providing comments and raising issues of concern regarding the proposed project. The Scoping Report will be available in January 2020 for review and comment. To register as an I&AP and to receive copies of documents please contact:

GCS (Pty) Ltd: Anelle Lötter / Georgina Wilson, Tel: 011 803 5726, Fax: 011 803 5745, E-mail: anelle@gcs-sa.biz / georgina@gcs-sa.biz or Mail: P O Box 2597, Rivonia, 2128, <http://www.gcs-sa.biz/documents/>

P533

## VEILING !!!

### VEILING – POTCHEFSTROOM

#### STUDENTE WOONSTELLE & WOONHUISE

**DONDERDAG, 21 NOVEMBER 2019, soos aangedui**  
10:00 te WALTHOFF NR 12, HOFFMANSTR 84, DIE BULT (WOONSTEL)

Deeltitel eenheid 12, WALTHOFF SS168/2011, Potchefstroom Registrasie Afdeling IP, Noordwes: **Groot: 69m<sup>2</sup>** (Die kompleks is geleë naby aan die NWU)

**Verbeterings:** Woonstel met 2 balkonne, oopplan sitkamer/kombuis, 2 slaapkamers elk met en-suite badkamer. Onderdakparkering.

**11:00 te CLASSIC OAKS NR 1, MEYERSTR 10, DIE BULT**

Deeltitel eenheid 1, CLASSIC OAKS SS 3/2009, Potchefstroom, Registrasie Afdeling IP, Noordwes:

**Groot: 77m<sup>2</sup>** en parkering 22m<sup>2</sup> (Ideaal geleë, 500m vanaf NWU hoofhek).

**Verbeterings:** Pragtige tuinwoonstel met 2 slaapkamers, 1 badkamer, oopplan leefarea, kombuis, gasstoof, houtvloere, lugreëling en pragtige tuintjie asook onderdakparkering van 22m<sup>2</sup>. Die maandelikse huurinkomste is tans R10,000.00.

**12:00 te JASMYNSTRAAT 11, GRIMBEEKPARK (WOONHUIS)**

Erf 276, Grimbeekpark uitbr 6, Registrasie Afdeling IQ, Noordwes: Groot: 460 m<sup>2</sup>

**Verbeterings:** Woonhuis met 4 slaapkamers, 2 badkamers, sitkamer/onthaalarea, eetkamer, kombuis en afdak vir 2 voertuie (fondasie vir dubbelmotorhuis reeds voltooi). Die woonhuis is toegerus met 'n sonkrag geysers en lugreëlings asook 'n besproeiingstelsel.

**13:00 te FREDERIKSTRAAT 27, BAILLIEPARK (WOONHUIS)**

Erf 720 Bailliepark Uitbr 5, Registrasie Afdeling IQ, Noordwes: Groot: 1361 m<sup>2</sup>

**Verbeterings:** Goed versorgde woonhuis met 4 slaapkamers, 2 badkamers (een en-suite met hoofslaapkamer), sitkamer, eetkamer, gesinskamer, studeerkamer, groot kombuis, buitekamer met toilet en dubbel motorhuis. Die eiendom is toegerus met 'n koopkrugmeter en 'n alarmstelsel.

**VOORWAARDES:** 10% van die koopprys en 7,5% kommissie plus BTW daarop is betaalbaar deur die KOPER by toeslaan van die bod. Balans teen registrasie, waarborge gelewer te word 30 dae na aanvaarding. Kopers moet 'n bewys van woonadres en identiteit beskikbaar hê.

Vir nadere besonderhede skakel:

Afslaer/ RUDI MÜLLER 082 490 7686

ANTON ENGELBRECHT 082 789 2772

Kantoor: 018 294 7391

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### VEILING - 2 X LANDBOUHOEWES HARPINGTON & TURFVLEI POTCHEFSTROOM op DONDERDAG, 7 NOVEMBER, soos aangedui

**10:00 by Plot 81 Harpington**

**Ged 81 plaas Harpington 461, IQ – Groot: 8.5ha**

Ligging: Ry vanaf Kruisstraat na Berts Bricks Skool, draai regs en volg pad tot waar teer ophou. Ry vir 800m en draai regs by 3de Laan en ry vir 400m, draai links by Bergstraat en ry vir 1.2km, ingang na eiendom aan regterkant

**Verbeterings:** Hoofwoning met 3 slaapkamers, badkamer, kombuis sitkamer, eetkamer, waskamer. Eskomkrag asook Solar eenheid; 2 x boorgate (1 toegerus). Verdere verbeterings: 2 slaapkamer woonstel; 4 x motorafdak / stoor.

**12:00 by Turfvlei Hoewe nr 28 (1.7ha)**

Ligging: Ry vir ± 1km verby Kleinplaas Pype op die Parys-pad, draai links op die eerste grondpad en volg ons rigting aanwysers (GPS: -26.7290538, 27.1354523).

**Verbeterings:** Stoor (± 90m<sup>2</sup>); toegeruste boorgat. Munisipale krag.

**VOORWAARDES:** 10% van die koopprys en 7,5% kommissie plus BTW daarop is betaalbaar deur die KOPER by toeslaan van die bod. Balans teen registrasie, waarborge gelewer te word 30 dae na aanvaarding. Kopers moet 'n bewys van woonadres en identiteit beskikbaar hê.

Vir nadere besonderhede skakel:

Afslaer/ RUDI MÜLLER 082 490 7686

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## Tenders



### ERRATUM

#### Tender 59/2019: ELECTRICAL ENGINEERING DIVISION

which was advertised on 17 October 2019 on Herald has been amended as follows:

1. The revised CIBB GRADING is 6EP
2. Compulsory Briefing Session will be held on 04 November 2019, 10:00 am at the Department Technical Services, Electricity, Luitingh Street, and Potchindustria. (Companies that have already attended the briefing on 21/10/2019 DO NOT NEED TO ATTEND AGAIN changes will be emailed to them)
3. CLOSING TIME AND DATE: 12:00pm on 29/11/2019

MR. L. RALEKGETHO  
MUNICIPAL MANAGER

Notice No. 109/2019

## Tenders

MooiVaal Media and Media24 have not verified whether any of the services or products advertised are safe to use or will have the desired effect or outcome. Readers are warned that they should carefully consider and verify the advertiser's credentials.

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**APPENDIX E**  
**Background Information Document (BID)**



63 Wessel Road, Rivonia, 2128 PO Box 2597, Rivonia, 2128  
South Africa

## Background Information Document

Notification of an application for an Environmental Authorisation Amendment and Waste Management License for the expansion of the Kareerand Tailings Storage Facility (TSF) for Mine Waste Solutions, North-West Province.

October 2019

GCS Project Number: 17-0026

### ENVIRONMENTAL ASSESSMENT PRACTITIONER: GCS (PTY) LTD

GCS Water and Environment (Pty) Ltd (GCS) is a fully integrated water, environmental, and earth science consulting services company based in the Republic of South Africa. GCS provides a professional consulting service in the fields of environmental, water and earth sciences. GCS has a team of highly trained staff with considerable experience in the fields of environmental and water science.

### YOUR COMMENTS ARE IMPORTANT - CONTACT THE GCS PUBLIC PARTICIPATION OFFICE TO REGISTER AS AN INTERESTED AND AFFECTED PARTY

**Contact Person(s):** Anelle Lotter / Georgina Wilson  
T: 011 803 5726  
F: 011 803 5745  
Email: [anelle@gcs-sa.biz](mailto:anelle@gcs-sa.biz) /  
[georgina@gcs-sa.biz](mailto:georgina@gcs-sa.biz)

**Postal Address:** PO Box 2597  
Rivonia  
Johannesburg, 2128

Documents for review and comment will be made available at public places and electronically at <http://www.gcs-sa.biz/documents/>



## INTRODUCTION

The purpose of this Background Information Document (BID) is to provide all Interested and Affected Parties (I&APs) with information in respect of the applications for an Amendment of Environmental Authorisation and Waste Management License for Mine Waste Solutions, also known as Chemwes.

In addition, the BID aims to:

- Introduce and explain the Scoping and Environmental Impact Assessment (S&EIA) Process, as well as other related parallel environmental processes;
- Introduce and explain how I&APs can participate in the process as prescribed by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- Invite all I&APs to comment on:
  - The potential for negative and positive biophysical and socio-economic impacts of the project, as well as any other issues of concern;
  - The proposed public participation and environmental assessment process, and
  - Any other comments or suggestions which might be of relevance.

ABBREVIATIONS	
<b>BID</b>	Background Information Document
<b>CRR</b>	Comments and Responses Report
<b>DEIR</b>	Draft Environmental Impact Report
<b>DMR</b>	Department of Mineral Resources
<b>DSR</b>	Draft Scoping Report
<b>EAP</b>	Environmental Assessment Practitioner
<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Report
<b>EMP</b>	Environmental Management Programme
<b>FEIR</b>	Final Environmental Impact Report
<b>FSR</b>	Final Scoping Report
<b>I&amp;AP</b>	Interested and Affected Party
<b>MWS</b>	Mine Waste Solutions
<b>NEMA</b>	National Environmental Management Act, 1998 (Act 107 of 1998)
<b>NEM:WA</b>	National Waste Management: Waste Act (Act 59 of 2008)
<b>PPP</b>	Public Participation Process
<b>S&amp;EIA</b>	Scoping and Environmental Impact Assessment
<b>TSF</b>	Tailings Storage Facility

### WHAT IS A S&EIA AND AN ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)?

The National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) prescribes the processes to be followed when compiling the Scoping and Environmental Impact Assessment (S&EIA) and the Environmental Management Programme (EMP), in respect of the NEMA listed activities, which forms the legal basis of this authorisation.

The process evaluates the potential environmental impacts of a project, as well as developing appropriate environmental management measures to mitigate these impacts. The purpose of the S&EIA is to assess the current environment in which a proposed activity will take place and assess all potential impacts in terms of its extent, duration, intensity and significance relating to the specific activity. The Environmental Management Programme (EMP) describes the goals and objectives for environmental management:

- to avoid, minimise and manage potential environmental impacts;
- to recommend practical actions or implementation by the mine; and
- to raise awareness of employees and the surrounding community with regards to environmental management.

Specialist assessments are conducted as part of the S&EIA process and the following will be undertaken as part of this application:

- Hydrology
- Hydrogeology
- Air quality
- Noise
- Socio-economic
- Biodiversity
- Soils, land use, land capability
- Wetland and aquatics
- Heritage and palaeontology
- Visual
- Radioactivity

**PROJECT BACKGROUND**

Mine Waste Solutions (MWS), also known as Chemwes (Pty) Ltd (Chemwes), has been in business since 1964 and conducts its operations over a large area of land to the east of Klerksdorp, within the area of jurisdiction of the City of Matlosana and JB Marks Local Municipalities (LM), which fall within the Dr Kenneth Kaunda District Municipality (DM) in the North-West Province. The MWS Operations are located primarily to the south of the N12, east of the town of Stilfontein. The closest town is Khuma, located about 3km northwest of the Kareerand TSF, and other nearby towns include Stilfontein (10 km from the Kareerand TSF) and Klerksdorp (19 km from Kareerand TSF). The operations at MWS entail the collection and reprocessing of mine tailings that were previously deposited on TSFs in order to extract gold and uranium. High pressure water cannons are used to slurry the tailings on the source TSFs, then the slurry is pumped by a number of pump stations and pipelines to the MWS Processing Plant, and the residues from the Processing Plant are pumped to the Kareerand TSF. Once an old source TSF has been completely reclaimed, its footprint is remediated and rehabilitated. The Kareerand TSF was designed with an operating life of 14 years, for use until 2025 with a total design capacity of 352 million tonnes. Subsequent to the commissioning of the Kareerand TSF, MWS was acquired by AngloGold Ashanti in 2012 and the tailings production target has increased by an additional 485 million tonnes, which will require operation of the TSF to continue until 2042. The additional tailings therefore require extension of the design life of the Kareerand TSF.

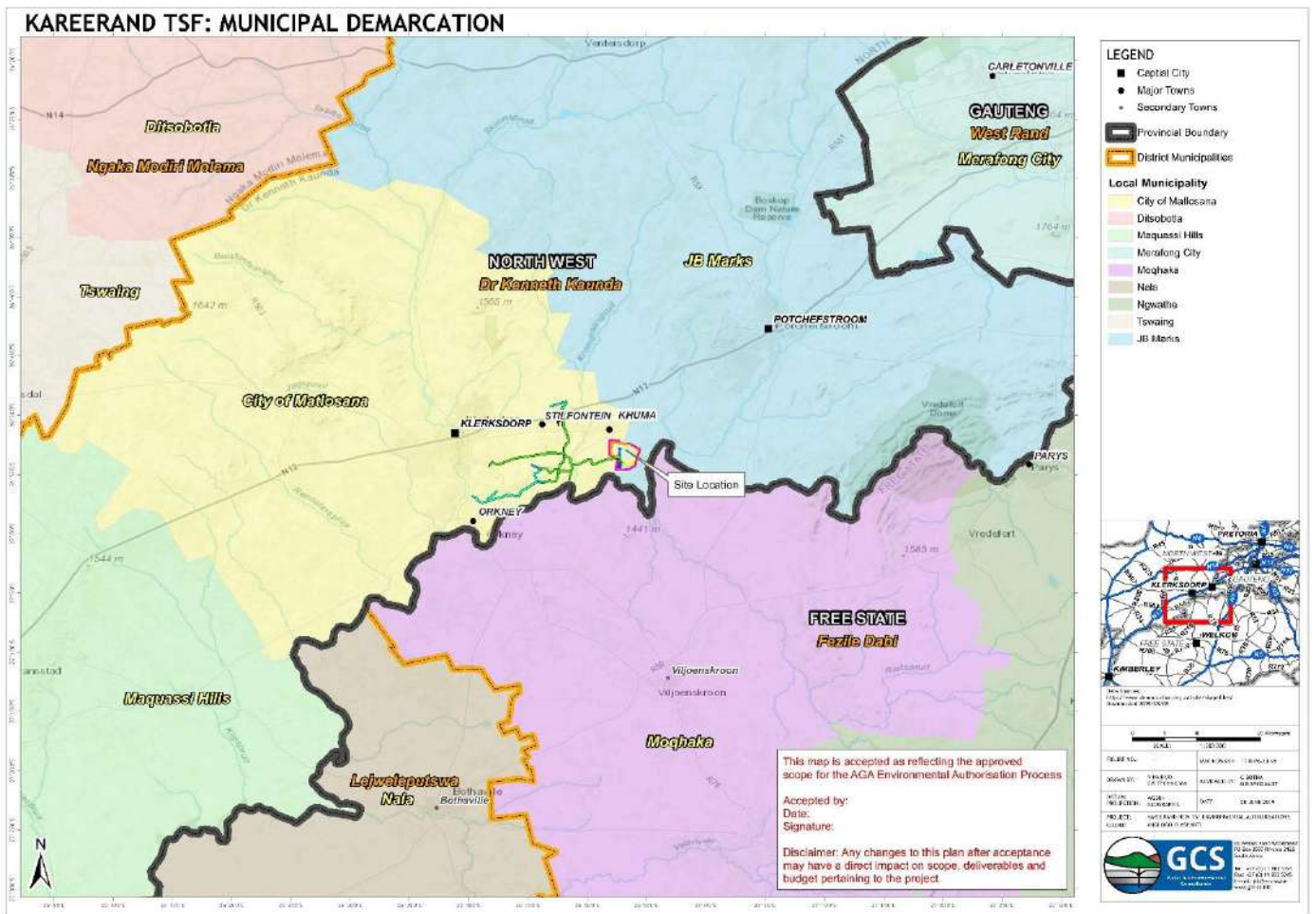


Figure 1: Site Locality Map and Municipal Boundaries.



**PROJECT DESCRIPTION**

This project entails the expansion of the current Kareerand TSF to accommodate the increased tailings and final design capacity, along with six additional pump stations (three main, three satellite) and approximately 30 km of pipelines. The TSF expansion is proposed on the western edge of the current facility, and the final height of the combined facility (both expansion and current) will be 122m. The expansion footprint will add approximately 380 hectares to the TSF, including support infrastructure. Infrastructure that will be constructed as part of the TSF expansion includes fences, access roads, a topsoil bund wall, stormwater diversion channels, delivery pipelines, solution trenches, collector sump, catchment paddocks, starter wall, drainage system, decant system, catwalk, energy dissipator, silt trap, stormwater dam, return water dams (RWDs), contractor's yard, RWD emergency spillway, pump stations, process water/slurry pipelines and slurry launders.

**LOCATION OF THE KAREERAND TSF**

<b>Province:</b>	North West
<b>District:</b>	Dr Kenneth Kuanda District Municipality
<b>Local municipality:</b>	City of Matlosana and JB Marks Local Municipalities
<b>Nearest town:</b>	Khuma
<b>Farm, number &amp; portions affected:</b>	Stilfontein 408 IP RE/10, RE/15, RE/21, RE/30, RE/31, RE/33, RE/66 & 140; Zandpan 423 IP 3 & 4; Nooitgedacht 434 IP 22; Witkop 438 IP RE/1, RE/2 & RE/4; Vaalkop 439 IP RE & E/3; Modderfontein 440 IP RE/4; Mapaiskraal 441 IP RE, RE/1, RE/2; Wildebeestpan 442 IP RE, Buffelsfontein 443 IP RE/2, RE/6, 7, 9, 15; Megadam 574 IP, Umfula 567 IP 8 - 19; Umfula 575 IP The surface rights of the study area are largely owned by Chemwes, AngloGold Ashanti and Two Palms Trust.

**REGULATORY CONTEXT**

For MWS to continue with their proposal to expand the Kareerand TSF and its associated infrastructure, there is a requirement to submit the following applications to obtain authorisations and licences as part of the integrated regulatory process:

- Application for Environmental Authorisation through a Scoping and Environmental Impact Assessment Report (S&EIA) process and the compilation of an Environmental Management Programme (EMP) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998; NEMA) and its Regulations; and
- Waste Management Licence Application (WMLA) in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008; NEM:WA).

A Heritage Impact Assessment in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999; NHRA) will also be undertaken.

**Environmental Authorisation (EA) application:** The proposed Kareerand TSF and associated infrastructure will likely trigger the activities below which are listed under the NEMA 2014 Environmental Impact Assessment (EIA) Regulations (GNR 983 and 984 of 2014, as amended). The activities will be confirmed prior to submission of the application, as the final specifications are currently being determined. The EA Application will be submitted in terms of NEMA, for the listed activities in **Table 1**. The list of waste management activities that have, or are likely to have, a detrimental effect on the environment (GN 921, as amended) which may be relevant to the project and will be applied for along with the EA application, are listed in **Table 2**.

**Table 1: Identified Listed Activities under NEMA**

No.	Activity
<b>Listing Notice 1 (GN R983)</b>	
12	The development of - (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such

No.	Activity
	development occurs - (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.
16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the highwater mark of the dam covers an area of 10 ha or more.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse
24	The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 metres, or where no reserve exists where the road is wider than 8 metres
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
31	The decommissioning of existing facilities, structures or infrastructure for - (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; (ii) any expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; (iii) any phased activity or activities for development and related operation activity or expansion or related operation activities listed in this Notice or Listing Notice 3 of 2014; or (iv) any activity regardless the time the activity was commenced with
46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes where the existing infrastructure - (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion - (aa) relates to the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes within a road reserve or railway line reserve; or (bb) will occur within an urban area.
48	The expansion of - (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding - (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 23 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.
<b>Listing Notice 2 (GN R984)</b>	
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.

Table 2: Identified Waste Activities under NEM:WA

Category	Activity no.	Activity description
B	(3)	The recovery of waste including refining, utilization, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
B	(7)	The disposal of any quantity of hazardous waste to land.

**PUBLIC PARTICIPATION PROCESS**

Public involvement is an essential part of any environmental assessment process. You have been identified as an I&AP who may want to receive information regarding the above-mentioned project. You will be given the opportunity to provide your input into the environmental assessment process and to receive information. All comments will be recorded and presented to the project team and regulatory authorities. You will receive feedback on how your comments have been considered and the outcome of the assessment.

I&APs include any person who will be directly or indirectly interested in and/or affected by the project. To be recognised as an I&AP one must register with GCS to be added to the stakeholder database for the project. You may communicate via fax, email or telephone to obtain further information or comment on the proposed project. All registered I&APs will be kept informed of the decision taken by the DMR. **Table 4** outlines the steps which will be followed in the S&EIA process.

**Table 4: S&EIA Process**

<p><b>Step 1:</b> Stakeholder identification and project announcement (October 2019 - January 2020)</p>	<ul style="list-style-type: none"> <li>• Notification of project and call for I&amp;AP registration and comments placed in local newspapers;</li> <li>• I&amp;APs are required to register their interest in the project to receive further project information;</li> <li>• Identify any issues/concerns of I&amp;APs;</li> <li>• Provide I&amp;APs with a Background Information Document (BID) (electronically or accessible at community centres) on the project, including a locality map and a Registration and Comment Sheet; and</li> <li>• Development of Comments and Responses Report (CRR) to capture comments and concerns of I&amp;APs.</li> </ul>
<p><b>Step 2:</b> I&amp;AP review of Draft Scoping Report (DSR) (January - March 2020)</p>	<ul style="list-style-type: none"> <li>• Issues and concerns raised by I&amp;APs contained in CRR to be included in the DSR;</li> <li>• DSR released for a <b>45-day</b> commenting period; and</li> <li>• All registered I&amp;APs on the project database are notified in writing of the opportunity to comment.</li> </ul>
<p><i>To assist I&amp;APs with their understanding of the project, stakeholder meetings or consultations in a similar manner, to which all I&amp;APs will be invited, will be held during the review period of the Draft Scoping Report and Draft EIR.</i></p> <p><i>Copies of the report will be made available for review.</i></p>	
<p><b>Step 3:</b> Final Scoping Report (FSR) (March - April 2020)</p>	<ul style="list-style-type: none"> <li>• Comments received from I&amp;APs during the review process are considered in the compilation of the FSR; and</li> <li>• The FSR is submitted to the Competent Authority (North-West DMR).</li> </ul>
<p><b>Step 4:</b> Draft EIR and EMP for I&amp;AP review (May - June 2020)</p>	<ul style="list-style-type: none"> <li>• Compilation and release of a Draft EIR (DEIR) for a <b>45-day</b> review period.</li> </ul>
<p><b>Step 5:</b> Final EIR and Draft EMP (June/July 2020)</p>	<ul style="list-style-type: none"> <li>• The Final EIR (FEIR), including the CRR and EMP will be compiled for submission to the Competent Authority (North-West DMR) for decision making.</li> </ul>
<p><b>Step 6:</b> Environmental Authorisation and Appeal Period (August 2020)</p>	<ul style="list-style-type: none"> <li>• All registered I&amp;APs will be notified in writing of the decision by the Competent Authority (North-West DMR) regarding the authorisation, being positive or negative for the project. All I&amp;APs will also be notified of the appeal period, as well as the manner of appeal.</li> </ul>

<b>Public Notification</b>	<p>A major part of the public participation component of the application process is to notify members of the public of the proposed activities and the application process, particularly those who may be directly or indirectly affected by the proposed project. This will be achieved via the following means:</p> <ul style="list-style-type: none"> <li>• The placement of an advertisement in a regional newspaper;</li> <li>• Notices in English will be placed at the proposed site for development;</li> <li>• Distribution of BIDs to landowners and occupiers of land adjacent to the proposed construction area and to I&amp;APs on request; and</li> <li>• Local authorities will be notified in writing and automatically registered as I&amp;APs.</li> </ul>
<b>How to comment</b>	<ul style="list-style-type: none"> <li>• Should you wish to register as an I&amp;AP in order to be kept informed, please complete the registration form on the overleaf and submit to GCS via fax, post or email.</li> <li>• Any further enquiries can be directed to GCS telephonically, or via fax or email.</li> <li>• It is important that you provide your contact details so that we can respond to your comments or questions.</li> </ul>
<p>Kindly note that should you require any other party to be contacted, please provide their contact details as well.</p>	

Approved 29 Oct 2019



**NOTIFICATION OF AN APPLICATION FOR AN ENVIRONMENTAL AUTHORIZATION AMENDMENT AND WASTE MANAGEMENT LICENSE FOR THE EXPANSION OF THE KAREERAND TAILINGS STORAGE FACILITY FOR MINE WASTE SOLUTIONS, NORTH-WEST PROVINCE**

I&AP Comment and Registration Form  
GCS Ref No: 17-0026

Name:		Surname:	
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Organisation / interest:

Postal / Residential address			
	Area:		Code:

Contact details	Tel:	(    )
	Fax:	(    )
	Mobile:	(    )
	Email:	

Please mark with an X to indicate whether you would like to participate in the process:

Yes, I would like to participate in this process and receive periodic updates	<input type="checkbox"/>
---	--------------------------

No, I am not interested in participating and do not wish to receive further information	<input type="checkbox"/>
---	--------------------------

Preferred method of communication	Email	<input type="checkbox"/>	Fax	<input type="checkbox"/>	Post	<input type="checkbox"/>
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Date commented	(DD / MM / YYYY )
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Please indicate any issues, comments and concerns with regards to the proposed project


Please indicate in which aspects you would require more information


Please indicate the contact details of any other I&APs whom you think should be contacted

Name:		Surname:	
Tel:	(    )	Fax:	(    )
Mobile:	(    )		
Email:			

In order to be registered as an I&AP for this project, fax, mail, or e-mail the completed registration form to  
GCS (Pty) Ltd  
Anelle Lötter / Georgina Wilson at:  
Tel: (011) 803 5726, Fax: (011) 803 5745  
Email: anelle@gcs-sa.biz / georgina@gcs-sa.biz  
Post: PO Box 2597, Rivonia, 2128



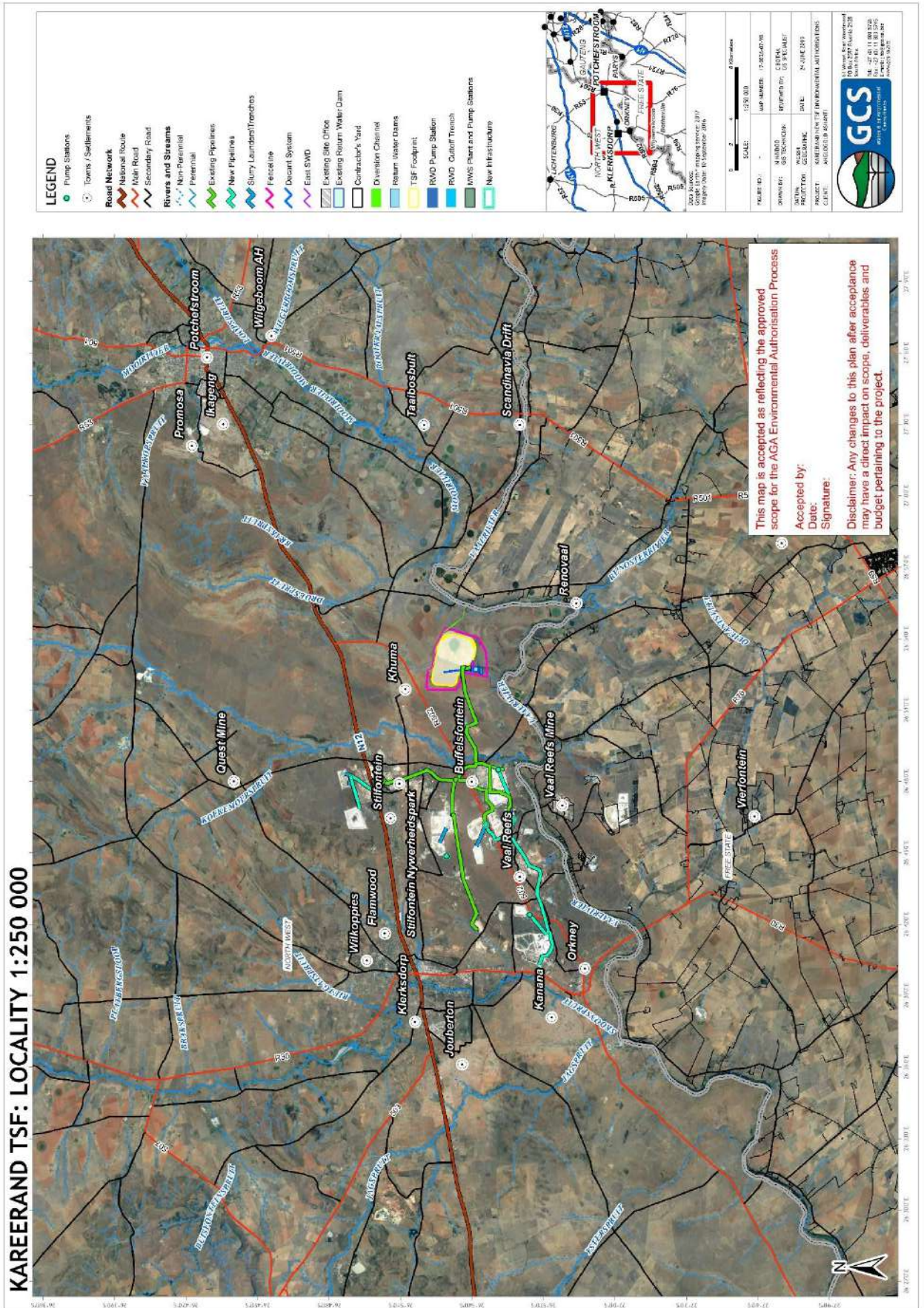


Figure 2: Kareerand Locality Map at 1:250 000.

**APPENDIX F**  
Site notices

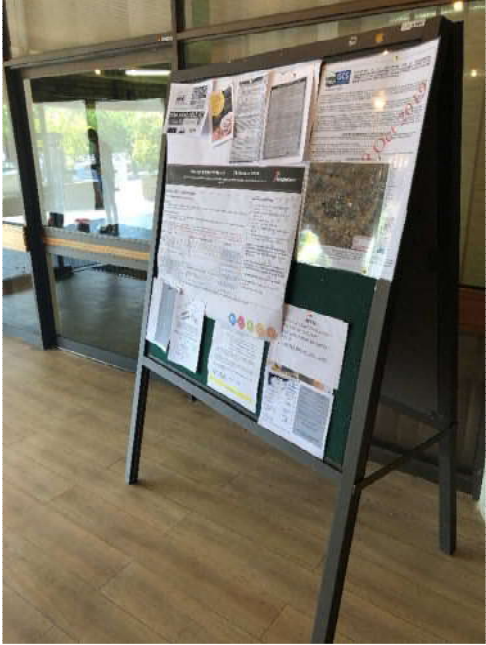



Environmental Authorisation Amendment and Waste Management License for the Expansion of the Kareerand Tailings Storage Facility for Mine Waste Solutions, North-West Province




# Placement of site notices

1 November 2019



LOCATION	GPS CO-ORDINATES	PROOF
Klerksdorp library	-26.867047; 26.662789	 A photograph showing a tall, black metal display board in a library. The board is covered with several large sheets of paper, including maps and text documents, which are the site notices. The board is positioned in a well-lit area with a wooden floor and large windows in the background.
Stilfontein library	-26.845220; 26.774258	 A photograph of a brick wall in a library. Two black rectangular boards are mounted on the wall, displaying site notices. The wall is made of reddish-brown bricks, and the floor is tiled with a pattern of light and dark squares. A doorway is visible to the left of the boards.



<p>Khuma clinic</p>	<p>-26.849952; 26.866678</p>	
<p>MWS entrance</p>	<p>-26.837142; 26.794394</p>	
<p>Kareerand TSF entrance</p>	<p>-26.924167; 26.828381</p>	

<p>North-West boundary corner of Kareerand TSF</p>	<p>-26.872820; 26.884862</p>	
<p>North-East boundary corner of Kareerand TSF</p>	<p>-26.881472; 26.907426</p>	
<p>South-East boundary corner of TSF</p>	<p>-26.902031; 26.901049</p>	

**APPENDIX G**  
**Comments and Responses Report (CRR)**

**Environmental Authorisation Amendment and Waste Management License for the Expansion of the Kareerand Tailings Storage Facility (TSF) for Mine Waste Solutions, North-West Province**

# **Comments and Response Report (CRR)**

**Version 1**

**January 2020**



This Comments and Response Report (CRR) **Version 1** provides a summary of the comments, questions and issues raised by stakeholders since the announcement of the application on 1 November 2019 for an Integrated Regulatory Process for an Environmental Authorisation Amendment and a Waste Management Licence for the proposed expansion of the Kareerand Tailings Storage Facility (TSF) for Mine Waste Solutions in the North-West Province.

- Version 1 of the CRR is appended to the Draft Scoping Report and records issues and concerns raised during the announcement period of the project from 1 November 2019 until 8 January 2020;
- Version 2 of the CRR will be appended to the Final Scoping Report and will include comments that were raised on the Draft Scoping Report;
- Version 3 of the CRR will be appended to the Draft Environmental Impact Report and will include comments that were raised on the Final Scoping Report;
- Version 4 of the CRR will be appended to the Final Environmental Impact Report and will include comments that were raised on the Consultation for the Integrated Environmental Impact Report.

## **Table of Contents**

Comments received during the announcement (1 November 2019 – 17 January 2020) ..... 1

ISSUE OR CONCERN	CONTRIBUTOR			DATE OF CONTRIBUTION	MEANS OF CONTRIBUTION	RESPONSE
<b>Comments received during the announcement (1 November 2019 – 17 January 2020)</b>						
Will stakeholders have the opportunity to contribute to specialist studies?	Ms	Marianne Liefferink	Federation for Sustainable Environment (FSE)	1 Nov 2019	Focus Meeting	The public participation process allows for public comment on the terms of reference of the specialist studies during the Scoping Phase. Comments will be considered for the update of the terms of reference to ensure that specialist studies are optimised.
Will a health impact study be conducted? It is recommended that a full health impact assessment be conducted for this application.	Ms	Marianne Liefferink	Federation for Sustainable Environment (FSE)	1 Nov 2019	Focus Meeting	A health impact assessment was not considered necessary for the proposed project, but the potential health implications of dust would be considered within the air quality impact study.
Will a climate change specialist assessment be conducted for this application? It is recommended that a climate change assessment be conducted for this application.	Ms	Marianne Liefferink	Federation for Sustainable Environment (FSE)	1 Nov 2019	Focus Meeting	The impact of climate change will be considered during the design of the TSF during the EIA phase.
Requested to be sent available information and to be registered as an Interested and Affected Party (I&AP)	Mr	Nkosinathi Leonard Qotwanw	Nathis Works and Consultancy Services PTY LTD	7 Nov 2019	Email correspondence	The Background Information Document (BID) was emailed to the stakeholder on 7 November 2019.
I am not party to the Kareerand TSF that does not benefit the community of Khuma. Keep on engaging those who are party to it including the farmer who benefited from millions of Rands your company have paid.	Mr	Phoka Phatsoane		5 Nov 2019	Email correspondence	GCS is independently conducting an environmental process for the proposed development and you are welcome to provide your concerns to us. Through the public participation process, we encourage stakeholders to register and to be involved.

As Fresheners Multipurpose Co-operative Pty Ltd, we form part of the affected & interested parties which would like to take part in the public participation process taking place in due course. Our main concern is the environmental impact & rehabilitation of land as per NEMA act 107 of 1998 and NEM:WA act 59 of 2008. Please provide us with more details and documents regarding your Background Information Document on DSR, EMP, DEIR, S&EIR and any other details deemed necessary for preparation of the participation process.	Mr	K Monnahela and M Motloung	Fresheners Multipurpose Co-operative Pty Ltd	4 Nov 2019	Email correspondence	The Background Information Document (BID) was emailed to the stakeholders on 4 November 2019.
We request: Full participation of interested and affected parties Involvement and capacitation of SSMs in terms of the environment We would like more information on: Details on the scope of work with regards to the expansion Details in terms of norms and standards in terms of waste disposal (landfill) Environmental Implementation Plan Details in terms of compliance with NEM:WA licencing	Mr	Archibald Monnahela	Fresheners Multipurpose Co-operative Pty Ltd	4 Nov 2019	Comment and registration form	Requests are noted and information will be made available during the scoping phase of the application.
Requested to receive relevant information.		Koketso Moagi		11 Nov 2019	Telephonic Conversation	The Background Information Document (BID) was emailed to the stakeholder on 11 November 2019.
GCS should engage with all commenting authorities simultaneously with the Department of Mineral Resources (DMR). GCS to include the Department of Economic Development, Environment, Conservation and Tourism (Detec), the Department of Water and Sanitation (DWS), the Department of Agriculture and Rural Development, the National Nuclear Regulator, etc in Authority Communication.		Lorraine Nobela, Thilivhali Mereg, Neo Nthoesane	DMR	14 Nov 2019	Pre-application meeting with the DMR and DWS	Noted.

<p>GCS to ensure that the Khuma Community is engaged during the Public Participation Process. Community members must be provided with the opportunity to participate and not only just community representatives.</p>		<p>Lorraine Nobela, Thilivhali Mereg, Neo Nthoesane</p>	<p>DMR</p>	<p>14 Nov 2019</p>	<p>Pre-application meeting with the DMR and DWS</p>	<p>Noted. Advertisements were published to announce the project as follows:</p> <ul style="list-style-type: none"> <li>o Potch Herald (31/10/2019)</li> <li>o Klerksdorp Record (1/11/2019)</li> <li>o City Press (3/11/2019)</li> </ul> <p>The availability of the Draft Scoping Report for review and the dates of public meetings were again advertised as follows:</p> <ul style="list-style-type: none"> <li>o Potch Herald (23/01/20)</li> <li>o Klerksdorp Rekord (23/01/20)</li> <li>o City Press (19/01/20)</li> <li>o Kroonnuus (23/01/20)</li> <li>o Volksblad (22/01/20)</li> </ul> <p>During the announcement of the project, site notices were placed as per requirements, including at the Khuma Clinic. Stakeholders were notified via SMS and email of the review of the Draft Scoping Report as well as the public meetings of 5 February 2020.</p>
<p>An authority site visit will be arranged, and all relevant authorities invited, once the Draft Scoping Report has been submitted for comment. This will be in late January or early February 2020.</p>		<p>Lorraine Nobela, Thilivhali Mereg, Neo Nthoesane</p>	<p>DMR</p>	<p>14 Nov 2019</p>	<p>Pre-application meeting with the DMR and DWS</p>	<p>Noted.</p>
<p>Application for a Section 21(b) water use is not required as there is no clean water storage, and the dirty water storage is licensed as 21(g).</p>		<p>George Nel, Terence Ngilande</p>	<p>DWS</p>	<p>14 Nov 2019</p>	<p>Pre-application meeting with the DMR and DWS</p>	<p>Noted.</p>
<p>Requested that a socio-economic impact assessment be conducted as part of the study and that the findings be made available.</p>		<p>NL Qotwane</p>	<p>Nathis works and Consulting Services</p>	<p>15 Nov 2019</p>	<p>Comment and registration form</p>	<p>Noted.</p>

**APPENDIX H**

**Site Selection Report for proposed Kareerand TSF expansion**





November 2016

## ANGLOGOLD ASHANTI LTD. - VAAL RIVER OPERATIONS

# Project Charter for the Expansion of the Kareerand Tailings Storage Facility

**Submitted to:**  
PO Box 8044  
Western Levels  
Gauteng  
2501



REPORT

**Report Number:** 1535687-308423-1

**Distribution:**

1 x copy to AngloGold Ashanti Ltd.

1 x electronic copy to [ProjectReports@golder.co.za](mailto:ProjectReports@golder.co.za)





## Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery
AngloGold Ashanti	Duncan McArthur Charl Human	Draft	16 November 2016	Electronic and hard copy
AngloGold Ashanti	John van Wyk	Final	18 February 2019	Electronic and hard copy



## Executive Summary

The sustainability of the Mine Waste Solutions (MWS) operations in the Klerksdorp area depend on having access a tailings storage facility (TSF) that can accommodate the tailings derived from re-mining of the full reserve of 566 Mt. The operations are currently served by the Kareerand TSF where the capacity is limited to 352 Mt. This capacity is expected to be depleted by 2025 at the current processing rate of 28,47 Mt per annum. A new TSF is therefore required for the balance of the reserve. The start date for deposition of one (10.7 m tons per year) of the three tailings streams onto the Kareerand TSF expansion is February 2021. The other two tailings streams would then continue to be deposited on the current Kareerand TSF until April 2025 at which time the full tonnage will be deposited onto Kareerand Expansion. This proposed approach will allow AGA to have a staged approach to expansion to spread out capital cash flow.

The most significant cost element for a new TSF is the lining that has been prescribed by the 2013 regulations published in terms of the National Environmental Management: Waste Act, notably GN R. 634 to GN R. 636 relevant to *Waste Classification and Management, National Norms and Standards for the Assessment of Waste for Landfill Disposal and National Norms and Standards for Disposal of Waste to Landfill*.

The cost of lining depends on the waste assessment and classification but is expected to be R1M/hectare for the assumed type of waste. The area required for a new facility could as large as 800 hectares. Golder has been advised that the additional cost of R800M required for lining will impact negatively on the feasibility of extending the life of the current re-mining operations and could lead to postponement or abandonment of the operations. AngloGold Ashanti have therefore requested Golder to assess whether a liner is technically justified and, if not, to propose a way forward to motivate an alternative to lining to the regulatory authority

This report examines alternative sites that might be viable and narrows the selection down to the two most favourable options. These two most viable options are as follows:

**Option 3:** North of the existing MWS tailings facilities and located on dolomites; and

**Option 4/7:** West of and adjacent to the current Kareerand TSF and located off the dolomites.

The above options were selected since they rated best and both have the potential to be technically feasible without liners. They are however quite different insofar as the seepage interception measures that would be required to mitigate groundwater impacts. Option 3 will rely on the assumption that all seepage will gravitate downward into the dolomites and will be intercepted by dewatering from Margaret Shaft. No known sources of current groundwater use will thus be affected and expressions of seepage on surface will be prevented. Option 4/7 will rely on the assumption that a seepage interception curtain down gradient from the facility will effectively intercept most of the seepage. No ground water users will be impacted and the seepage will be intercepted before reaching the Vaal River.

Under the current regulatory regime there are challenges associated with licensing and developing new tailings storage facilities without liners since the mine must demonstrate to the regulator that the proposed alternative is as effective if not more effective than a liner (Class C barrier). This can only be done if the justification is based on credible knowledge of the groundwater regime and must be supported by modelling to demonstrate that an adequate level of protection can be achieved with the proposed mitigation measures in place. It is also necessary to present DWS with a lined base case (Class C barrier) against which the alternatives can be compared.

This report maps out the following process in order to justify an alternative:

- Carry out baseline hydrogeological and geotechnical investigations on the two candidate sites;
- Prepare prefeasibility level designs for the base case on site 4/7 (with a liner), for site 3 without a liner and for site 4/7 without a liner;
- Model the groundwater impacts for all three cases;



## PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

- Confirm the preferred option;
- Present the options and justification to the regulators; and
- Proceed to feasibility with the alternative options.

The Department of Environmental Affairs has recently indicated to the Chamber of mines that mining waste is to be excluded from the definition of waste in terms of the National Environmental Management: Waste Act and its regulations. The legal prescription of liners for mine tailings facilities would therefore fall away. Although this may take place shortly it will not necessarily mean that the competent authority will approve of an unlined site without justification. The seepage that is currently arising from the existing Kareerand TSF will provide the basis for the argument that a liner is required and that without one, the ground and surface water will be further threatened by an extended footprint. An alternative will therefore still need to be strongly motivated. It is therefore prudent to proceed as proposed above irrespective of what the outcome of the change to the Act or applicable regulations may be.

Golder has developed a roadmap for the implementation of the Kareerand TSF Expansion. It is proposed that further technical investigations be conducted on the preferred alternative options and that regulatory consultation takes place to confirm that the alternatives are viable. Further engineering, specialist investigation and integrated regulatory processes can be initiated to develop the Kareerand TSF expansion.



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## APPENDICES

### APPENDIX A

Site selection process maps

### APPENDIX B

Conceptual layouts of optional schemes

### APPENDIX C

Schedules of quantities of optional schemes



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# PROJECT CHARTER FOR THE KAREER AND TSF EXPANSION PROJECT

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## APPENDIX D Document Limitations





### 1.0 INTRODUCTION AND BACKGROUND

Gold mining with associated uranium mining has been carried out in the Klerksdorp, Orkney, Stilfontein, Hartebeestfontein (KOSH) area for many decades. The original gold mining operations were mainly conducted as underground mining operations. This has resulted in the development of large surface tailings residue deposits.

AngloGold Ashanti (AGA), as part of the long term business plan has developed a strategy for the re-mining and reclamation of surface tailings resources and processing through the Mine Waste Solutions (MWS) gold plant. Tailings and residues would continue to be disposed to the Kareerand Tailings Storage Facility (TSF).

The combination of AGA, Buffelsfontein and MWS re-mining and reclamation surface tailings resources opened the opportunity to also develop integrated water supply, reclaimed tailings conveyance, processing plant and tailings dam infrastructure.

AngloGold Ashanti (AGA) will continue with the underground mining operations, especially to the south of the Vaal River. To the north of the Vaal River, Mine Waste Solutions (now owned by AGA) will continue to re-mine substantial dormant tailings deposits.

At present all reclamation operations delivers tailings to three separate gold plants located in the north at the site of the original Mine Waste Solutions plant. Water is distributed from Midway sump to three separate reclamation operations. Each delivering to a dedicated gold plant at Mine Waste Solutions. Mine Waste Solutions gold plant #1 (MWS 1) receives slurried tailings from the Hartebeesfontein Complex. Mine Waste Solutions gold plant # 2 (MWS 2) receives slurried tailings from Buffelsfontein Compartment #4. Slurried tailings from the reclamation operation at sulphur pay dam is currently pumped to the tailings sump at Buffelsfontein Compartment 2, from where it is pumped to Mine Waste Solutions gold plant # 3 (MWS 3).

Tailings from the Mine Waste Solutions gold plant are conveyed through a pumping scheme to the Kareerand TSF and the TSF return water system allows for collection, conveyance and storage to a central facility (Midway Dam) and distribution back to the re-mining sites.

The Kareerand TSF is currently authorised by Water Use Licence (number 27087241) dated 11 June 2010 (hereafter referred to as the WUL). The licence was issued by the Department of Water and Sanitation (DWS) to Chemwes (Pty) Ltd in terms of Chapter 4 of the National Water Act, 1998. AGA currently produces 28,47 Mt per annum and the expected life of mine for the remaining reclamation process is until 2045.

The existing Kareerand TSF has a remaining storage capacity to accommodate the full tonnage profile until February 2021 and thereafter tailings deposition will have to be decreased and ultimately ceased during 2025. AGA has to ensure that the operation of the Kareerand TSF does not to exceed the allowable rate-of-rise and further meet the closure design requirements.

The management of AGA and Mine Waste Solutions (MWS) decided during 2016 to initiate the planning for the expansion of the current Kareerand TSF and proactively launched the development of a Project Charter, which includes a pre-feasibility step, due to challenging timeline requirements to permit, design and implement the planned expansion project.

Golder Associates Africa (Pty.) Ltd. has been appointed by AGA to develop a Project Charter for the expansion of the current Kareerand TSF, which includes assistance with an Integrated Regulatory Process (IRP) and the Engineering Concept Development (ECD) for the planned new facility.



# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

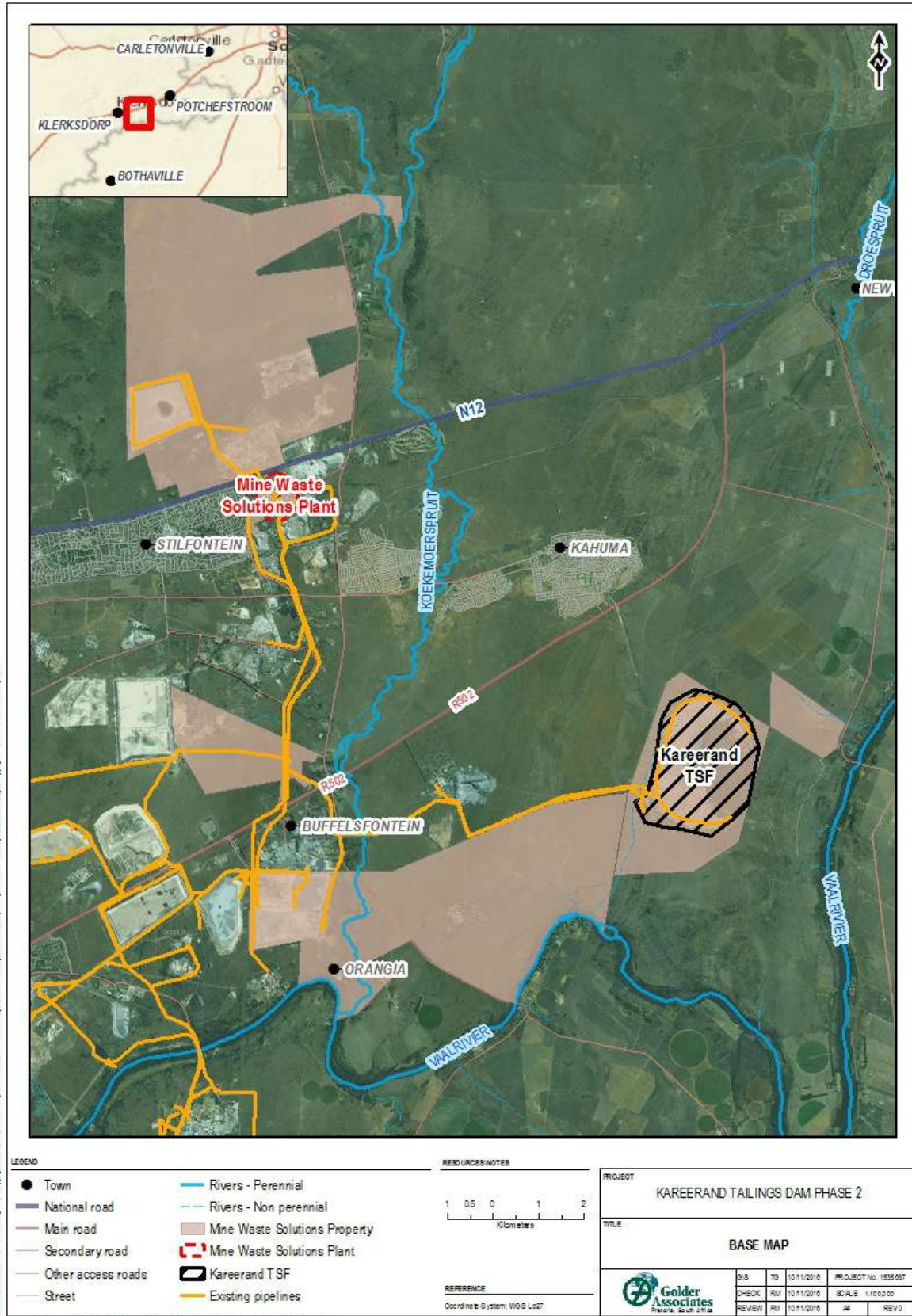


Figure 1: Location of MWS plant, re-mining operational infrastructure and current Kareerand TSF



## 2.0 PURPOSE OF THE PROJECT AND KEY STUDY OBJECTIVES

During June 2016 Golder submitted a proposal to position the AGA Vaal River Operations for the implementation of a large new TSF facility based on developing a second phase to the existing Kareerand TSF. This requires upfront consideration of technical, engineering, financial and regulatory approval aspects at a strategic level. The proposed development of a Project Charter included the following aspects related to the expansion of the Kareerand TSF:

- Develop an Integrated Regulatory Process (IRP) approach and road map for the new TSF outlining the regulatory process;
- Determine the scope of work for any technical and specialist investigations needed to inform the IRP, site selection, Engineering Concept Design and any follow-up/future feasibility process; and
- Develop a conceptual engineering approach for the TSF through a concept engineering design. A pre-feasibility step of preferred options and alternative implementation models for the TSF and a high level (order of magnitude) costing for the facility.

## 3.0 SCOPE OF WORK AND OVERALL PROJECT SCHEDULE REQUIREMENTS

The scope of work to develop a Project Charter for the Kareerand TSF Expansion project entailed the following:

### *Project initiation workshop and site visit*

This involved a project initiation meeting and workshop between environmental and engineering teams of AGA and the Golder. During this workshop the environmental and engineering requirements and project scope was defined in order to inform the engineering design, site selection and regulatory approval and technical assessment process. Aspects such as the planned life of the project, engineering concepts for alternative tailings dam construction, footprint area, waste characterisation of tailings and liner requirements were discussed. The workshop was concluded with a site reconnaissance to familiarise all team members with the project area. This workshop also facilitated information gathering of available information which informed the project.

### *Site selection*

The process to conduct a site selection for the Kareerand TSF Expansion was not included in the original scope of work, but it was necessary to conduct a high level site selection process prior to development of the conceptual engineering design for the TSF.

### *Document review and gap analysis of available information*

Golder reviewed existing technical and environmental baseline reports to determine the quality and extent of available information related to the project area. Technical and environmental baseline information relevant to the proposed project site was used for the development of the Integrated Regulatory Process and the identification of potential TSF sites. The outcome of the gap analysis on the technical and environmental baseline information defines the magnitude and extent of specialist work required during the IRP.

### *Develop project specific Integrated Regulatory Process*

It was proposed that a site-specific Integrated Regulatory Process (IRP) be developed taking into consideration various environmental Acts and Regulations applicable to the proposed TSF project and the authorisations required.

### *Engineering and technical approach*

It was proposed that the concept engineering designs would utilise the recently completed waste assessment and characterisation of the waste streams as a critical parameter impacting on engineering design and regulatory approval.





## PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

The concept engineering design would be informed by the outcomes of the project initiation workshop, on aspects such as the tailings processing capacity of MWS, engineering concepts for alternative tailings dam construction and operation; footprint area and liner requirements.

The following key items form the basis of a conceptual engineering/technical development scope of work;

- Pumps and pipelines (Tailings delivery system) from Midway Dam (Project battery limit);
- Geotechnical reconnaissance to confirm site for TSF;
- Tailings concept development taking key engineering and operational aspects into account i.e. Rate of rise, deposition rates, Outer side slopes, stability aspect, water management, leachate management and a stage capacity analysis to analyse the footprint size and storage capacity of the facility;
- Return water system and decant system on the new TSF, including the sizing of the return water pump pipelines;
- Dam safety requirements will include a professional opinion from a registered Dam Safety Engineer within Golder will be sourced to confirm the concept development and water management strategy, due to water needing to be stored on the Kareerand TSF Expansion project;
- Evaluate the existing TSF deposition / operations methodology and record lessons learnt and modification requirements which would be applicable for the new TSF;
- Liner requirements evaluated in terms of regulatory requirements, focusing on the findings of the waste assessment of the tailings, evaluation of the natural barrier system, ground water flow pathways, sensitivity of receptors, introduction of an engineered barrier system and a trade-off applying a risk based approach;
- Contractual / project models to implement the scheme will be proposed;
- Operating philosophy for Kareerand TSF Expansion project, which will include the roles and responsibilities of the operator, contractor and owner; and
- High level cost estimates.

It was proposed that the deliverable for this project would be a Project Charter which would include the IRP map, scope of work for environmental specialist studies to inform the authorisation process and concept engineering design process, conceptual engineering design and alternative implementation models for the TSF and a pre-feasibility level, to Order of Magnitude level of accuracy) costing for the facility.

No project schedule was included in the proposal. The schedule, as indicated in Figure 1, was drafted upon appointment and presented to AGA during the project initiation workshop on 26 July 2016. It was agreed during the workshop that the due date for submission could be adjusted to 30 October 2016.

This extension of time was required and approved due to the fact that Golder investigated more than one preferred option.



# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

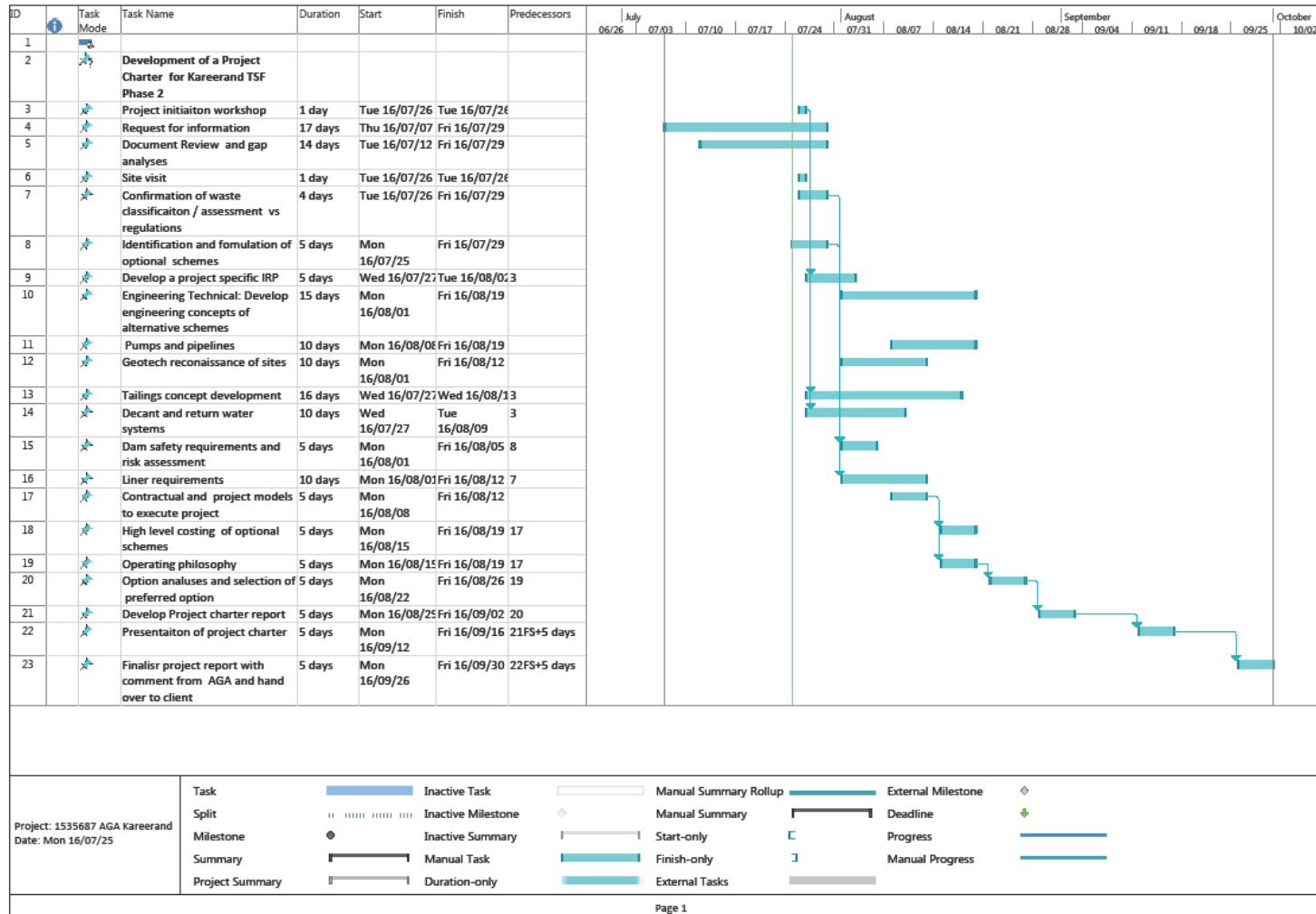


Figure 2: Kareerand TSF Expansion Project Schedule



### 4.0 PRE-AWARD MEETING WITH AGA TO AGREE TERMS OF REFERENCE

On 27 June 2016 a high level meeting was held between AGA and Golder, prior to the formal project initiation meeting, in order to ensure that the project deliverables meet client expectations.

The following key aspects were discussed during the meeting:

- AGA has not constructed a new TSF in recent years and the existing Kareerand TSF was an “inherited” facility, purchased as part of the MWS agreement;
- The current Kareerand TSF is under pressure due to increased deposition rates and the timing of the project for the TSF expansion is of the utmost importance;
- AGA was part of the discussions held between the Chamber of Mines (CoM) and the Director General of the Department of Water and Sanitation (DWS) during June 2016 during which an in principle agreement was reached for following a risk based approach for lining of mine residue disposal facilities;
- AGA has experience with a lined mega tailing facility where the reverse filter system blocked within 24 months of commissioning of the facility;
- AGA has reviewed their project standards and expects the project to align to AGA stage gates;
- AGA has a structured review process and a team of people will review the Project Charter. It was stated that AGA would make available their draft improved guideline;
- AGA tabled their request for Golder to not only develop an engineering concept but to take the process to a pre-feasibility level. AGA stated that they would like to have a fully implementable design at the end of the pre-feasibility stage. This requirement was re-visited again during follow up discussions and AGA agreed to a high level pre-feasibility study with order of magnitude costing;
- Associated with this request is the requirement to also prove site selection at the end of the pre-feasibility level. Golder was therefore tasked to also include the site selection process into the project charter development;
- The due date for commissioning of the new TSF was set as February 2021. At that stage one of the three waste streams deposited onto the current Kareerand TSF could be split off to the Kareerand TSF expansion;
- AGA committed to supply all the required background information to inform the project;
- AGA clearly articulated the requirement to design the TSF for closure;
- Borrowed material will be assessed for use either during operational and/or closure phase;
- The battery limit specified for the TSF return water system was set as the MWS plant;
- AGA stated that high level order of magnitude costing with an accuracy of  $\pm 25\%$  would be acceptable; and
- A trade-off between the existing pipeline and new pipeline should be included.

During the meeting the client's brief emphasized recent discussions with the Regulator related to the mine waste regulations; and the implication thereof for the lining of mine residue disposal facilities, the need to include a trade-off and pre-feasibility step within the project charter and the road map to implement the entire project.

Golder committed to identify, formulate and compare other engineering barrier systems versus the compliant design which could be used by AGA for motivation to the Minister for the Kareerand TSF expansion. After this meeting Golder re-submitted a final proposal and project budget, including a project timeline.





## 5.0 INFORMATION REQUIREMENTS AND REVIEW THEREOF WITHIN THE PROJECT STUDY AREA

In order to facilitate the effective execution of the project, an introductory meeting was held on 27 June 2016 at AGA West Wits Operations. During this meeting a decision was made that Golder would compile a request for information which will inform the scope of work and the effective execution of the project. The request was sent to AGA on 7 July 2016 and a memorandum is compiled to reflect the status of the information as received from AGA.

Based upon initial discussion and the scope of work outlined in the proposal the following information was requested and subsequently provided by AGA.

**Table 1: Information required and provided to inform the Project Charter development.**

Required information:	Status of information received
1) Survey data, 0.5 m to 1.0 m contours of the Kareerand TSF area and areas adjacent, where the new TSF is proposed;	Survey data was received.
2) Maps of the possible brown field areas where TSF developments could be pursued as alternatives to a green field site;	Map of Chemwes properties and GCS report on preliminary site selection provided.
3) AGA mine lease areas and legal boundaries within the: <ul style="list-style-type: none"> <li>• Kareerand TSF and adjacent areas; and</li> <li>• Mine lease areas within the available brown fields areas, where brown field TSF's could be considered;</li> </ul>	Map provided of Vaal River Operations and Mine Waste Solutions.
4) Underground mining layouts indicating historical mining area and depth of mining (< 500 m will be essential);	No information provided.
5) Dolomitic / no dolomite areas;	Files were provided.
6) Flood lines (1: 100 and 1: 50 year) of the rivers: Vaal River and Koekemoer Spruit;	There is a gap for Kareerand TSF.
7) Existing and future residential expansion areas, especially in the Karee Rand Phase 2 area;	No information provided, although reference was made to the fact that it may be obtained from local government.
8) The Local authority's Land Development Objectives (LDO's ) and spatial framework, indicting local authority expansions;	No information provided, although reference was made to the fact that it may be obtained from local government.
9) Areas within the study area, earmarked for future high intensity agricultural development;	No information was provided.
10) Tonnage profiles for re-mining and plant through-put;	Spreadsheet provided with deposition tons, the re-mining plan, and plant throughput.
11) Confirmation that February 2021 is the start date for the new TSF;	Start date for deposition of one (10.7 m tons per year) of the three tailings streams onto Phase 2 is February 2021. The other two tailings stream would then continue to be deposited on Phase 1 until April 2025 at which time the full tonnage will be deposited on Phase 2. Note that this will allow AGA to have a staged approach to Phase 2 which we would like to follow to spread out capital cash flow.



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12) Waste streams generated by the process plant: Confirmation of whether it is limited to ONE stream or are THREE streams generated and then mixed into ONE;	Three streams are pumped from the MWS plant in three separate pipelines plus a stream in a fourth line from a plant run by Village Mine. They are combined at the TSF pump station so that the tailings deposited on the dam is in the form of a combined stream.
13) Was a waste classification done for one or three streams (already in Golder possession);	Golder did waste assessment on final deposition site. Additional work on the three streams deposited on the TSF and the sources would be a recommendation.
14) Water balance of the current scheme;	Water balance provided.
15) Confirmation of any buffer storage for water at the process plant;	No information provided.
16) Decant and RWD facility requirements? Barge or Gravity penstock? AGA preferences?	<p>AGA has done studies for Kareerand Phase 1 to compare barge vs penstock for the ongoing operation. This has shown that there is no operational technical reason to select one over the other. AGA will be staying with the barge system as this is what AGA already has and the difficulty in constructing a penstock on the dam. However, AGA will be doing a study to look at installing a syphon system.</p> <p>Due to operational problems with the barge system on current TSF, AGA's preferred option for the expansion would be start off with a penstock and then change to a syphon system once there is sufficient height to drive it, AGA expect about 40 m.</p>
17) Tailings characteristics: Physical (PSD) and geochemistry for the existing and new TSF;	<p>PSDs for the typical material deposited on Kareerand Phase 1 was provided. AGA expects material deposited on Kareerand Expansion in future to be similar.</p> <p>Geochemical assessment was provided.</p>
18) % solids in tailings stream;	Spreadsheets provided gave the relative densities for the streams as received at the cyclones on the dam.
19) Is cyanide destruction done at the plant or is it a future consideration?	<p>There is a process circuit for destruction of cyanide in the MWS plant tailings. This circuit has not yet been commissioned. The current plan is to commission during 2017 as excess barren solution from the uranium plant becomes available.</p> <p>(Golder to assume for the project charter that cyanide will be removed. Impact on waste assessment to be confirmed.)</p>
20) Groundwater work: Baseline information / monitoring information in the area of Kareerand TSF and adjacent areas?	<p>GCS, Kareerand Hydrogeological Discussion Document Report, Version – 01 DRAFT for Discussion, 23 July 2015 provided.</p> <p>Groundwater data and monitoring locations provided.</p>
21) Tailings profile planned for the new TSF: 2021 and beyond on an annual basis (t / annum);	Spreadsheet provided the deposition tonnages, as well as the tons to be deposited on Phase 2 annually and for the life of TSF.



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22) % cyclone split for tailings: coarse to fines;	Spreadsheets provided gave the splits from the cyclones.
23) Could tonnage profile be split into two streams: X % to a new TSF and y to an existing upgraded / piggy back footprint? What is that split?	There is currently no facility for depositing the plant residue anywhere except Kareerand Phase 1. By 2021 there will be two current TSF footprints from which the tailings will have been reclaimed and one possibly redundant existing TSF which could be used for MWS tailings deposition. This is something AGA would only do if for some reason Phase 2 cannot be commissioned in time. AGA would have to do a trade-off of the costs of creating (and in future reclaiming) a temporary TSF against the costs of temporarily stopping one of the three plant streams. As above AGA needs to take one of the three tailings streams off of Phase 1 by early 2021 so the tonnage to be split to a temporary TSF would be 10.7 m tons per year.
24) Geotechnical report for Kareerand TSF 1, which could inform the study for Kareerand TSF 2;	Geotechnical report provided.
25) Environmental baseline reports for Kareerand TSF 1 area;	GCS, Mine Waste Solutions: Reworking of TSFs Environmental Impact Assessment Report Version – 1 dated November 2008. Project Number: SJM.B.06.272. DME Reference Number: NW 30/5/1/2/2/378 MR provided.
26) Pipeline requirements (minimum specifications for tailings delivery and return water pipelines; lining requirements, AGA paint specs, etc.);	No specific information provided.
27) Availability of power for the return water at Kareerand TSF 1 and would additional power be required for TSF 2;	There is spare capacity on the overhead line to Phase 1; assuming any additional return water pumping capacity has similar installed power as existing (1.5 M) AGA can accommodate. Would need transformers/switchgear. For Phase 2 there is power available at the ESKOM sub where AGA draws power for Phase 1, AGA could draw double the amount of power AGA is using for Phase1. Will need to look at loads for the staging of Phase 2 to determine whether AGA would need to pull in an additional overhead line from the ESKOM sub.
28) Will TSF 1 be kept dormant as redundancy when TSF 2 is commissioned?	The current plan is to use the full design capacity of Kareerand Phase 1 by early 2025 and then close the dam.
29) Critical crossings to be taken into account with new pipeline routing: national roads, provincial and local roads, streams, servitudes, etc.;	Only WUL for existing crossing provided.
30) Copies of previous permits for Kareerand TSF	NEMA authorisation, Dam safety permit, WUL, and Environmental Authorisation provided
31) Process flow diagrams for the plant (high level if available rather than detailed)	MDM Engineering, First Uranium, Phase 1B Chemwes Plant Process Design Criteria November 2008, and the MDM Engineering, First Uranium, Chemwes Uranium Plant Process Design Criteria supplied.



32) Closure philosophy for existing Karee Rand TSF 1	No information provided.
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### 6.0 AGA KEY REQUIREMENTS FOR PRE-FEASIBILITY STUDIES

According to the AGA Capital Investment standard the main objective of a Pre-feasibility Study is to make a decision on the most attractive technical option to follow to feasibility stage if viable.

This is achieved by means of the following:

- Evaluating all realistic options for developing the investment opportunity and establish a single base case and preferred option for moving forward. The preferred option is to be fully optimised as part of the subsequent Feasibility Study phase;
- Ensuring the commercial viability of the opportunity and demonstrating the justification for continued investigation and development of the opportunity;
- Ensuring that key stakeholder requirements have been adequately captured;
- Re-confirming that the investment opportunity remains aligned with the strategic and business objectives of the company;
- Ensuring that the project scope, cost estimate (+25% to –15%) and schedules are sufficiently developed in order to enable the selection of the preferred option thus providing the basis for conducting the Feasibility Study;
- Ensuring that major risks have been identified with mitigation and scenario plans in place;
- An appropriate plan has been completed with re-sourcing requirements, costs and forecast schedules for completing the subsequent Feasibility Study;
- Based on the level of assessment carried out to date, ensuring that no legal impediments exist with the potential to materially impact on the investment;
- Ensuring that sufficient technical work has been undertaken in order to demonstrate the technical viability of the opportunity, and to support the selection of the preferred option for moving forward; and
- Ensuring that technical issues requiring further investigation such as geological drilling, geo-technical assessments or pilot plant testing have been identified.

However, during subsequent discussions with AGA on 23 August 2016 regarding the fact that the TSF project will most likely end-up with more than two preferred options, and it was agreed to include a trade-off step to compare these options/ schemes first. The engineering related to the trade-off study's outcome will result into a lower level certainty than the pre-feasibility study requirements approximately conceptual level, Class 0 study outcome.

### 6.1 Other requirements related to the development of the Kareerand TSF Expansion

In a project meeting between AGA and Golder, held on 30 August 2016 the learnings from the current TSF facility were discussed. The Project Charter development must incorporate these fundamental requirements and document it as such.

#### Design Phase of TSF

- The gap between pre-feasibility, feasibility, conceptual design and final design in terms of specialist input was too big during the development of the current Kareerand TSF. The Hydrogeologist was not included from the feasibility onwards. Only baseline hydrogeology was done at an early stage and then



the area was changed and most of the geophysical survey was conducted at a different site location. Develop a very clear understanding of the geology underneath the site;

- Allowance must be made for a proper hydrogeological assessment and for close corporation between the design engineer and the geotechnical engineer;
- Allowance must be made for a proper vadose zone seepage analyses;
- Conduct detailed footprint geophysical survey at site selection phase;
- Determine the expected deposition rate and the MWS plant's maximum production rate and design the facility for the maximum tonnage profile plus and additional safety factor;
- Establish the physical properties of the material that will be reclaimed, re-processed and deposited, i.e. particular splits, chemistry etc. to select the correct deposition methodology;
- Compile a management plan for the storm water generated from the top and the side slopes of the TSF and design accordingly. The volume of storm water from the side slopes of the TSF must be incorporated in the water management system;
- Determine the volume of shallow seepage and develop a management plan for the seepage based upon the outcome of the geotechnical assessment;
- It is recommended that the seepage intervention mechanisms be installed prior to the development of the TSF;
- Align the environmental authorisations with the actual facilities which will be constructed on site;
- Ensure that the return water system and dams are adequately sized and designed correctly to allow for maximum deposition and an additional safety margin;
- Provide for a sufficient buffer zone around the TSF and ensure that access can be obtained to neighbouring properties for monitoring or other management measures;
- Make allowance for backup power supply system to continue deposition during unplanned power failures. This will prevent uncontrolled spillages of residue and water;
- Set out of the closure objectives for the dam to ensure the design of the final cover can support the final end land use;
- Make sufficient financial provision for closure based on a well-designed closure plan at the planning phase. Make a decision regarding closure construction and end rehabilitation of the TSF expansion at the planning phase;
- Use the rehabilitation requirements to inform the site selection process;
- Utilise the same cover design planning process that AGA conducted for the current TSF to ensure a sustainable closure cover;
- The planning and availability of water for irrigation should also be considered and quantified;
- Use the trails planned on current dam to set the rehabilitation specifications. It is important to ensure the rehabilitation specification and the outer slope design of the dams are aligned; and
- Develop a surface water, groundwater and dust management plan.

### Construction phase

- Collect sufficient and accurate baseline information before deposition commences. (i.e. surrounding groundwater levels and qualities);
- Ensure that the concept and final design are aligned and that it include the hydrogeology of the site;



- Implement a proper topsoil management and stockpiling plan to prevent problems with rehabilitation and to prevent sterilising good material. The stripping and stockpiling of topsoil should be in line with the planned closure cover and method;
- Install the seepage management measure before deposition commences;
- Install automatic level loggers in boreholes from the start to pick up sudden movement of water table at an early stage as not enough monitoring took place in first 6 months of the current facility; and
- Properly document the deep earth works for foundation construction to address uncertainty about the development of preferred pathways which may develop if excavations penetrate into the weathered diabase.

### Deposition phase

- Implement the design philosophy and deviate as little as possible;
- Develop a management plan to deal with water losses during the initial deposition because very little water will be recycled;
- Ensure that the concurrent rehabilitation is aligned with the TSF design and deposition schedule;
- Establish rehabilitation trial sites as soon as possible to monitor planned rehabilitation performance;
- Manage the storm water on the TSF side slopes. Don't allow water and tailings material to spill into the solution trench and surrounding environment;
- Develop a management plan for the shallow seepage;
- Implement a dust management plan (dust suppression system i.e. watering canons);
- Implement a ground and surface water monitoring plan to ensure early detection of water quality issues; and
- Provide for seepage losses which could result in as much as 10m groundwater level increase. The water balance only suggested about 4000 to 6000 m<sup>3</sup>/day loss to seepage.

## 7.0 TSF CANDIDATE SITE IDENTIFICATION PROCESS

The key objective of the site selection process was:

*To identify a suitable TSF site that will pose minimal risk to the environment, public health and safety and private properties. The preferred site would be associated with acceptable cost of development, operation and closure and would comply with legal and regulatory requirements.*

### 7.1 Methodology and Approach

The Kareerand TSF expansion to be designed will consist of a mega tailings storage facility with associated water management infrastructure. A suitable location for the TSF had to be found. The methodology that was followed to find the preferred TSF site is summarised in Figure 3.



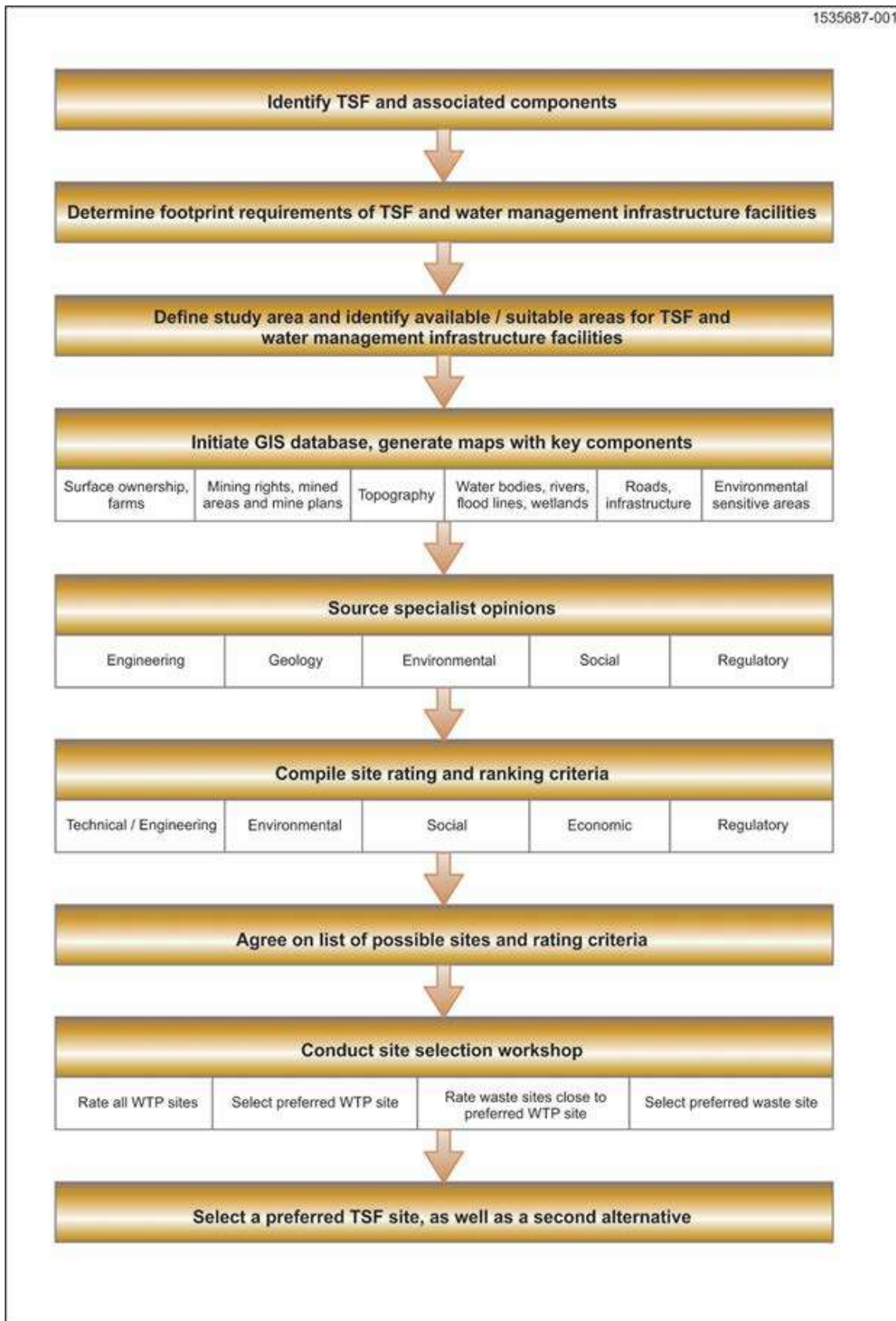


Figure 3: Kareerand Site selection process



## 7.2 Candidate sites

During the site identification process candidate sites for the Kareerand TSF expansion outlined in Table 2 and depicted in Figure 4 were identified.

In order to identify the candidate sites for the proposed Kareerand TSF expansion the following aspects were taken into consideration to identify potential sites:

- Location of sites both “of the dolomites” and “on dolomites”;
- Land available for further development for the TSF;
- Current and potential future land use;
- Greenfields and brown fields sites; and
- Airspace requirement for LOM tonnage (566 Mt) and associate footprint requirement of approximately 610 Ha.

**Table 2: Alternative sites for Kareerand Tailings Expansion Project**

Name	Site description
Option 1	Site located on Existing Buffelsfontein TSF footprint. Site area is 300 ha, can accommodate 230Mt, 70 m high at a deposition rate of 10Mt /a. Located on dolomite. Area required for expansion incorporate the current Buffelsfontein Gold Plant which does not belong to AGA.
Option 2	Site is located directly north of the existing MWS plant, on a TSF footprint area. Consist of 4 cells 2a, b, c, and d, of which 2b is a greenfields site, and 2c has an existing TSF, still to be reclaimed. The entire footprint area can accommodate 560Mt at 70m high at a deposition rate of 30 Mt/a. Located on dolomite. Land mostly owned by MWS.
Option 3	Site is located north of the existing MWS plant, on a greenfields area. The entire footprint area can accommodate 560 Mt at 70m high at a deposition rate of 30 Mt/a. Located on dolomite. Land mostly owned by MWS.
Option 4	Site is a greenfields site located directly to the west of the current Kareerand TSF. An area of 615 Ha is available, which caters for 456 – 584 Mt at a deposition rate of >30 Mt/a. The land is owned by and leased from the community. Site is not located on dolomite.
Option 5	Site is a greenfields site located directly to the north of the current Kareerand TSF. An area of 560 Ha is available. The land belongs to a private land owner. Site is not located on dolomite.
Option 6	Site is a greenfields site located directly to the south of the current Kareerand TSF. An area of 730 Ha is available. The land belongs to a private land owner. Site is not located on dolomite. The TSF footprint is located within the 500m buffer zone of the Vaal River.
Option 7	Site is a greenfields site located southwest of the current Kareerand TSF. An area of >510 Ha is available. The land belongs to MWS. Site is not located on dolomite. The TSF footprint is located within the 500m buffer zone of the Vaal River.





# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

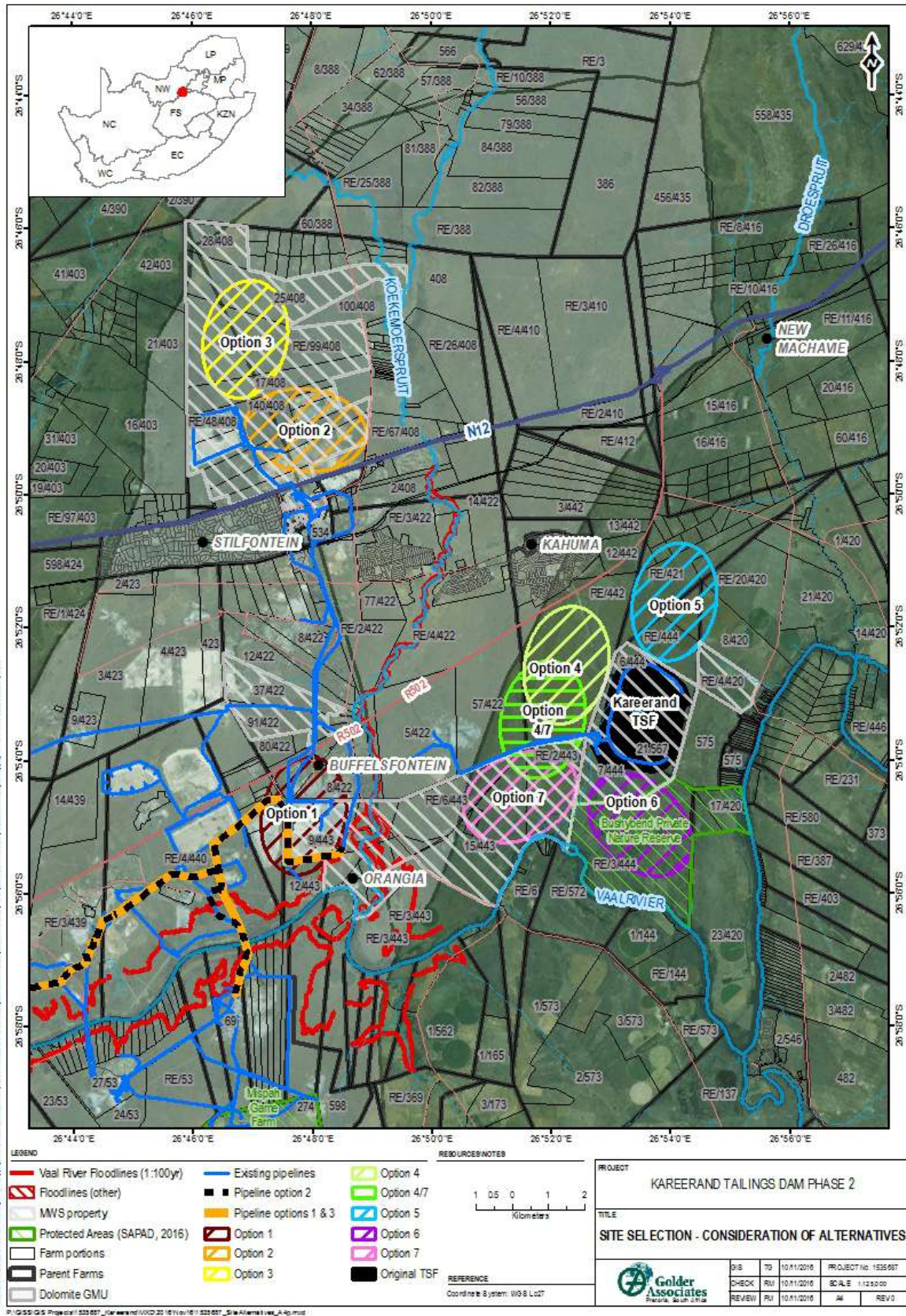





Figure 4: Alternative sites identified for the Kareerand TSF expansion







## PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

The candidate sites were visited after the project initiation workshop on 26 July 2016 and the following specific observations were made:

Name	Site observations
Kareerand Tailings Expansion Option 2	 <p>Stilfontein located directly adjacent to Option 2. Lack of topsoil due to rehabilitation and clean-up of a portion of the footprint of the former MWS TSF 2.</p> 
Kareerand Tailings Expansion Option 3	 <p>Greenfields site located to the north of the MWS TSF 4 and 5.</p>



Name	Site observations
Kareerand Tailings Expansion Option 4	 <p>Site located on Hartebeesfontein, adjacent to existing Kareerand and Buffelsfontein Gold Mine. No communities in the area.</p>
Kareerand Tailings Expansion Option 7	 <p>Site located on land owned by MWS, north of the Vaal River. Currently a game farm. No community or residential settlement in the area.</p>

## 7.3 Site selection process

### Site Selection Criteria

The main site selection criteria were identified according to which the identified candidate sites was evaluated. The criteria were grouped in the following categories:

- Technical/engineering
- Environmental and Social;
- Economical
- Constructability; and
- Operability.

The procedure that was followed for the rating and ranking of candidate sites in terms of the main criteria included the following:

- Assigning a relative weight to the main categories of criteria;
- Identification of various sub-criteria under the main categories of criteria;
- Defining the sub-criteria; and
- Rating and ranking based on the sub-criteria.



## Weighting of the Main Criteria

Based on professional collective views, opinions and consensus of the site selection specialist team present at the workshop, the following weights (refer to Table 3: Weighting allocated to main criteria for site selection below) were given to the main categories:

**Table 3: Weighting allocated to main criteria for site selection**

Criterion category	Weighting (%)
Economical	33
Technical/engineering	13
Constructability	10
Operability	10
Environmental and Social	34

## Identification of Sub-Criteria

### *Economical*

Economic criteria relate to the cost of purchasing, developing and operating the site and its associated infrastructure. Among others, they include the following considerations:

- Capital cost:
  - The distance of the site from the MWS plant, length of supply and return water pipelines;
  - Cost of ground preparation and infrastructure establishment; and
  - Purchase of private property.
- Operational cost:
  - Cost of operating and maintaining the TSF and water management infrastructure, including the tailings supply and return water system.
- Closure cost:
  - Cost of rehabilitation and capping of the TSF at closure and removal of infrastructure
- The possibility of motivating to the regulator for an alternative barrier design for the TSF was regarded as the most significant economic criteria as the cost of a lined facility will far outweighs the cost of conveyance infrastructure.

### *Technical/Engineering*

The following technical/engineering sub-criteria were used to identify suitable criteria to conduct the rating and ranking assessment:

- Ease of engineering
  - Proximity to bulk services access (road, electricity, telephone);
  - The need for relocating of bulk services;
  - How accessible the site is for vehicles during construction, operation, etc.;
  - Consider length of pipes to the site, whether existing pipes be used, etc.
  - Flexibility to expand or maximise tailings storage





- Geotechnical stability of underlying geological strata
  - The suitability of the geotechnical conditions for cut to fill operation;
  - Excavation difficulty; and
  - Suitability of the founding conditions.

### **Constructability**

The following constructability sub-criteria were used to identify suitable criteria to conduct the rating and ranking assessment:

- Availability of borrow material to construct starter walls and use as cover on closure;
- Availability of topsoil for cover during rehabilitation and closure; and
- Ease of stages construction of TSF.

### **Operability**

The following operability sub-criteria were used to identify suitable criteria to conduct the rating and ranking assessment:

- Deposition of tailings, formation and pool control;
- Adequacy of storage capacity; and
- Public safety as presented by Dam safety risks and the zone of influence of the facility.

### **Environmental Criteria**

Environmental criteria relate to the potential threat to the ecosystem and the geophysical environment. They include the following considerations:

- Geological regime;
  - The presence of local water bearing aquifers; and
  - Presence of dolomite in the underlying geology.
- Groundwater management / interception;
  - The incremental impact of the facility on the groundwater resource;
  - Short medium and long term liability for groundwater management; and
  - Interception and change in water quality (treatment).
- Proximity to the water resource;
  - Presence of fountains, wetlands and their buffer zones; and
  - Floodlines.
- Visual Exposure:
  - Sensitive viewers (proximity to communities / households/ buildings / roads).
- Heritage;
  - Presence of cultural heritage sites, graves, etc.
- Social Acceptance;



- Proximity of the TSF and associated infrastructure to residential development; and
- Potential impact on the value of neighbouring property.
- Land ownership:
  - The need for land acquisition.
- Air Quality:
  - Prevailing wind direction and dust impact of the facilities;
  - Potential dust generation from the project facilities that may impact the adjacent residents;
  - Prevalent wind direction; and
  - Proximity to communities / households/ buildings.

**Site Selection Matrix**

A project specific site selection matrix was developed to assist with qualitative rating and ranking of the identified candidate sites.

The rating of the candidate sites was based on the values given in Table 4.

**Table 4: Site selection rating value**

<b>Rating:</b>	
Excellent	5
Above average	4
Below average	2
Very poor	1
<b>Fatal Flaw</b>	<b>F</b>

Where different rating values were used, the values were scaled to a value between 1 and 5 before using them to calculate the total rating of each site. The site selection categories were weighted according to pre-determined weighting values as indicated in Table 4. The individual criteria within each category were not weighted, thus each criteria within a specific category carried the same weight. The score of the selection categories were normalized.

**Site Selection Workshop**

The rating and ranking of the candidate sites was carried out in a workshop held at the offices of Golder Associates in Midrand on 15 August 2016, with contributions from the people listed in Table 5.

**Table 5: Site selection workshop participants**

<b>Name</b>	<b>Role / discipline description</b>
Riana Munnik	Project Manager
Francois Marais	Civil Engineer
Graham Hubert	Geohydrologist
David Love	Geochemist
Brent Baxter	Environmental Specialist
Theunis Duminy	Process Engineer
John Wates	Civil Engineer



During the process of considering the alternative sites the details of the scheme and alternative technologies were not considered, but a focus was placed on the area and site specific aspects such as:

- The broader engineering / technical criteria (the flexibility to accommodate a possible relaxation of a prescriptive engineering barrier system were taken into account);
- Environmental and social criteria; and
- Constructability and operability criteria.

It was decided that the economic criteria would be applied once a preferred scheme / next best option have been selected. The maps which informed the site selection workshop are attached in APPENDIX A.

Golder then presented the outcomes of the site selection to AGA in a meeting held on 23 August 2016.

The rating and ranking of the sites are depicted in below in Figure 5.

It must be noted that the rating and ranking of the alternatives were based upon qualitative evaluation of available information, professional knowledge and judgement. No detailed site specific investigation were conducted on all of the candidate sites.





The outcome of the site selection process is summarised in Table 6.

**Table 6: Outcome of site selection process for Kareerand TSF Expansion**

Name	Ranking	Comments on site selection
Option 1	6	Site is only 300 ha and cannot accommodate the required tonnage profile. Fatally flawed.
Option 2	2	Option 2 is located in close proximity to the residential area of Stilfontein and the risk of exposure to Radon were deemed to be a fatal flaw. Site 2 also had limited topsoil for rehabilitation. The site directly adjacent to the residential area of Stilfontein. The site will not be feasible from a social acceptance point of view.
Option 3	1	Feasible site, but located on dolomite. Land mostly owned by MWS.
Option 4	4	The land is owned by and leased from the community. Site is not located on dolomite. Feasible for development
Option 5	5	Option 5 is located on privately- and government owned land and land acquisition was not regarded as feasible. Site development regarded as having a very low potential.
Option 6	5	Option 6 is located on privately owned land and a very low probability of obtaining landowner consent for the proposed scheme development and the option was not feasible.
Option 7	3	Feasible site. The land belongs to MWS. Site is not located on dolomite. The TSF footprint is located within the 500m buffer zone of the Vaal River.

The outcome of the TSF site selection showed that Option 3 and 7 was deemed the most feasible sites for the location of the Kareerand TSF expansion, as Option 2 was deemed fatally flawed.

However Option 7 is located closest to the Vaal River and upstream of the Midvaal abstraction point. Due to the potential risk it was proposed that Option 7 be moved further away from the Vaal River and combined with the next best alternative, namely Option 4. Thus an Option 4/7 was created as a result of the site selection process. The footprint of Option 4/7 is further away from the Vaal River and was subject to further investigation and scheme development.

The project charter was developed for Option 4/7 and Option 3.

For Option 4/7 consideration was given to both a lined facility, deemed a legally complaint design and an unlined facility.



Figure 6: Site 4/7 located south east of the current Kareerand regarded as a preferred site for the TSF Expansion

## 8.0 KEY REGULATORY CRITERIA AND REGULATIONS RELATED TO MINE WASTE

The regulatory regime governing the management of mine residue facilities such as the Kareerand TSF expansion, are guided by the classification and characterisation of mine waste streams, which needs to be conducted according to the appropriate regulations and Norms and Standards, including the following:

- Classification of waste according to SANS 10234 as per *Waste Classification and Management Regulations* (GN R.634 of 23 August 2013);
- Waste Assessment as per the *National Norms and Standards for the Assessment of Waste for Landfill Disposal* (GN R.635 of 23 August 2013);
- Identification of the barrier design as per the *National Norms and Standards for Disposal of Waste to Landfill* (GN R.636 of 23 August 2013); and
- Characterisation of residue stockpiles and deposits as per the *Regulations regarding the planning and management of Residue Stockpiles and Residue Deposits from prospecting, mining, exploration or production operation* (GN R.632 of 24 July 2015).

### Waste Classification

According to section 4(2) of GN R.634 of 2013, all waste generators must ensure that their waste is classified in accordance with SANS 10234 within 180 days of generation, except if it is listed in Annexure 1 of the GN R.634. Furthermore, waste must be re-classified every 5 years.

Waste classification according to SANS 10234 (based on the Global Harmonised System) indicates physical, health and environmental hazards. The SANS 10234 covers the harmonised criteria for classification of potentially hazardous substances and mixtures, including wastes, in terms of its intrinsic properties/hazards.

The chemical test results as well as intrinsic properties of the waste streams were used for the SANS 10234 classification. Constituents present in concentrations exceeding 1% are used for classification in terms of health hazards, except when the constituent is known to be toxic at lower concentrations (carcinogens etc.) (Table 7).

Environmental hazard is based on toxicity to the aquatic ecosystem and distinguish between acute and chronic toxicity, bioaccumulation and biodegradation.





**Table 7: Cut-off values/concentration limits for hazard classes**

Hazard class	Cut-off value (concentration limit) %
Acute toxicity	> 1.0
Skin corrosion	> 1.0
Skin irritation	> 1.0
Serious damage to eyes	> 1.0
Eye irritation	> 1.0
Respiratory sensitisation	> 1.0
Skin sensitisation	> 1.0
Mutagenicity: Category 1	> 0.1
Category 2	> 1.0
Carcinogenicity	> 0.1
Reproductive toxicity	> 0.1
Target organ systemic toxicity	> 1.0
Hazardous to the aquatic environment	> 1.0

### Waste Assessment

A GN R. 635 waste assessment is performed to determine the Type of waste and based here on the correct barrier design requirements for disposal. The assessment of waste must be done in terms of the procedures stipulated in GN R. 635 of 23 August 2013.

In terms of the *National Norms and Standards for the Assessment of Waste for Landfill Disposal* (GN R.635 of 23 August 2013), the potential level of risk associated with disposal of materials/wastes can be determined by following the prescribed and appropriate leach test protocols. The results must be assessed against the four levels of thresholds for leachable and total concentrations, which in combination, determines the waste type and associated barrier design / liner requirements. The relevant terminology is as follows:

- LC = means the leachable concentration of a particular contaminant in a waste, expressed as mg/l;
- TC = means the total concentration of a particular contaminant in a waste, expressed as mg/kg;
- LCT= means the leachable concentration thresholds for particular contaminants in a waste (LCT0, LCT1, LCT2, LCT3); and
- TCT= means the total concentration thresholds for particular contaminants in a waste (TCT0, TCT1, TCT2).

Figure 7 shows the flow diagram of the process to be followed to determine the waste type for correct disposal. According to this process, the waste needs to be analysed to determine total and leachable concentrations of potential Constituents of Concern (CoCs). The results are then compared to the threshold values to determine the waste type.

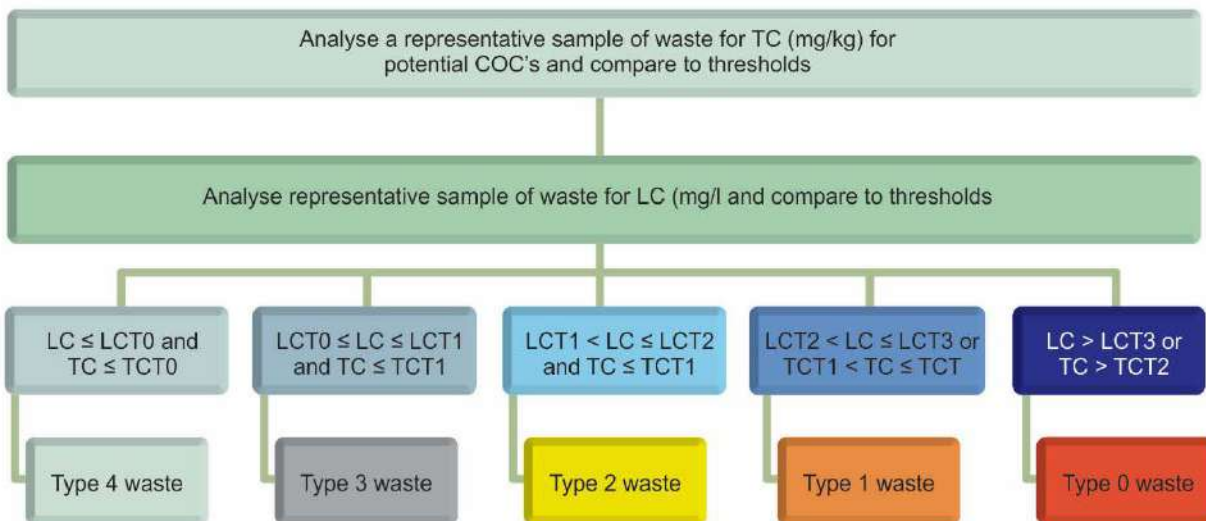


Figure 7: Flow diagram for waste assessment according to the GN R. 635

### Barrier design requirements

The liner requirements/barrier design requirements, based on the type of waste, as detailed in GN R.636 are presented in Table 8.

**Table 8: Landfill disposal requirements detailed in the GN R. 636 of 2013**

Waste Type	Landfill Disposal Requirements
<b>Type 0 Waste</b>	The disposal of Type 0 waste to landfill is <b>not allowed</b> . The waste must be treated and re-assessed in terms of the <i>Standard for Assessment of Waste for Landfill Disposal</i>
<b>Type 1 Waste</b>	Type 1 waste may only be disposed of at a <b>Class A</b> landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a <b>Hh / HH landfill</b> as specified in the Minimum Requirements for Waste Disposal by Landfill (2 <sup>nd</sup> Ed., DWAF, 1998).
<b>Type 2 Waste</b>	Type 2 waste may only be disposed of at a <b>Class B</b> landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a <b>GLB+ landfill</b> as specified in the Minimum Requirements for Waste Disposal by Landfill (2 <sup>nd</sup> Ed., DWAF, 1998).
<b>Type 3 Waste</b>	Type 3 waste may only be disposed of at a <b>Class C</b> landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a <b>GLB+ landfill</b> as specified in the Minimum Requirements for Waste Disposal by Landfill (2 <sup>nd</sup> Ed., DWAF, 1998).
<b>Type 4 Waste</b>	Disposal allowed at a landfill with a <b>Class D</b> landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a <b>GLB- landfill</b> as specified in the Minimum Requirements for Waste Disposal by Landfill (2 <sup>nd</sup> Ed., DWAF, 1998).

### Mining Residue Risk Assessment

#### GN R.632 of 2015 sets out the framework for assessing the risk posed by a mining residue deposit

- 1) Characterisation of the mining residues (understood to include stockpiles, waste rock dumps (WRDs), tailings storage facilities (TSFs) and similar mining residue facilities or MRFs) in terms of:
  - a) Geochemical characteristics,
  - b) Physical characteristics, and



- c) Toxicity;
- 2) Classification of the mining residues in terms of physical, health and environmental hazards (SANS10234);
- 3) Assessment of the mining residues in terms of total and leachable concentrations (National Norms and Standards for the Assessment of Waste for Landfill Disposal);
- 4) Aggregation and integration of the mining residue assessments into the profile of the completed MRFs;
- 5) Determination of the impact on the receiving groundwater and surface water environment, considering:
  - a) The characterisation, classification and assessment of the mining residues,
  - b) The vulnerability of the local aquifer(s), and
  - c) The predicted runoff and seepage chemistry, with classification of the predicted mine water in terms of baseline water quality, DWAF (1996) water use guidelines and applicable receiving water quality guideline;
- 6) Determination of the impact on biodiversity based upon the impact on groundwater and surface water; and
- 7) Prevention of pollution in order to satisfactorily mitigate the impact on groundwater and surface water and on biodiversity, such prevention measure to potentially include:
  - a) The minimisation of runoff and seepage,
  - b) The interception of runoff and seepage, and
  - c) The reuse or treatment and release of intercepted mine waters.

## 9.0 DEVELOPMENT OF THE SHORT LISTED OPTIONS

The initial site selection process eliminated a number of options as discussed earlier in this report. Option 3 and Option 4-7 were selected from the site selection process for further development. Option 4-7 is a hybrid option combining features of Option 4 and Option 7. Option 4-7 is further sub-divided into an “a” and a “b” option (refer section 9.1.1).

This report sets forward information on the three options for consideration. The aim is to present information on the possible development of the short-listed options which will facilitate a discussion based on high level **concept development** and indicative **capital** costs associated with the options. The outcome of the discussion would be to decide upon an agreed options for taking forward to pre-feasibility design stage.

This report is not aimed at presenting such a discussion, and it is proposed that a workgroup be convened to discuss the alternate options selected and to ensure that the proposed alternatives are viable. The workgroup could consist of a Client team (sponsor, engineers, specialists and operational team) and the consultant.

### 9.1 Engineering attributes

The layout drawings in APPENDIX B have reference to this section.

#### 9.1.1 TSF Expansion: - Option 4-7a and Option 4-7b

Option 4-7 is located approximately 440 m west of Kareerand TSF. The minimum distance to the Vaal River at the southern extremity of the proposed Phase 2 TSF is 640 m. The minimum ground elevation in the south is 1,293.40 m.a.m.s.l, and the maximum at its north-west corner is 1,337.20 m.a.m.s.l i.e. a fall of about 43.8 m across the TSF footprint over a distance of 3,980 m.

The sub-options are defined as follows:



- a) Option 4-7a - lined with a Class C liner in alignment with the National Environmental Management : Waste Act, 2008 (Act No. 59 of 2008) Regulation 636 National Norms and Standards for Disposal of Waste to Landfill, promulgated 23 August 2013, and
- b) Option 4-7b - unlined

Consideration was given to a location further north in order to avoid the existing pipeline corridor – however, the TSF air space requirement and the proximity to the nearby settlements necessitated the location currently shown in APPENDIX B.

Moreover, refinements to the currently proposed layout could see it constructed up against Kareerand Phase 1 in order to effect savings by sharing infrastructure such as the starter wall and seepage collection drains. These design optimisation steps could be pursued during the feasibility phase of the project.

The in-situ density of the re-claimed/retreated tailings is assumed to be 1.45 t.m<sup>3</sup>. The following geometric parameters apply to the design of the proposed Phase 2 Kareerand expansion Option 4-7:

**Table 9: Option 4-7 selected geometrical attributes**

PARAMETER	VALUE
Footprint area (m <sup>2</sup> )	8,896,806
Starter wall maximum height (m)	23
Kicker wall height (m)	6
Starter and kicker wall top width (m)	8
Starter and kicker wall side slopes (V:H)	1:2.5
Starter and kicker wall total volume (m <sup>3</sup> ) above existing ground	2,738,687
Tailings lift slope (V:H)	1:5
Tailings bench width (m)	7
Tailings average slope (V:H)	1:7.7
Tailings beach slope (V:H)	1:250
Tailings volume (Mm <sup>3</sup> )	388.2
Tailings tonnage @ 1.45 t.m <sup>3</sup> (Mt)	563.0
Tailings maximum height above minimum elevation (m)	85.5

### Pipelines

The proposed TSF footprint will engulf approximately 2,650 m of the existing pipeline route. Therefore the three 500 mm diameter mild steel tailings delivery pipelines and the 800 mm diameter mild steel return water pipelines will have to be re-routed. It is estimated that 50% of the existing tailings pipelines, and 80% of the existing return water pipeline, will be utilised in the re-routing of the pipelines. Quantities involved in the works are reflected in the schedule of quantities in APPENDIX C.

An improvement of the pipe crossing at Koekemoerspruit is allowed for. A provisional sum has been provided in the schedule of quantities for this work, which could involve:

- Creating an underground siphon in the stream which would extend from a predetermined distance upstream to a predetermined distance downstream. The pipes could then be wrapped in Denso-tape or similar and covered in a prism of dump rock for given distances on either side of the crossing, in order to discourage vandalism; and
- Creating a cradle and roof for the pipes with reinforced and precast concrete work.



In both the above (or other) schemes, reinstatement/improvement of the emergency berms must be considered.

### **Return Water Dams**

Provision is made for new lined return water dams (RWD), dual compartments. This includes silt traps. The facilities will be sized during subsequent studies to comply with GN 704 requirements.

### **Pump Stations**

Provision is made for a new return water pump station. It is proposed that the existing Kareerand pressure break station and tailings pump station be retained and used for tailings deposition to the TSF extension. A return water pump station mounted on a floating barge will discharge water from the pool to the solution trench which will in turn drain into the return water dam. A pool wall will be constructed by dry stacking and cyclone, followed by a length of floating walkway to the barge. Submersible pumps will be suspended from the barge into the pool.

### **Solution Trench**

The TSF extension will operate on the same basis as the current facility, with a ring trench along the starter wall toe to collect seepage and return water and convey these streams to the return water dam.

### **Drainage**

A clean water cut-off trench and berm (cut-to-fill) will be constructed to the north of Kareerand and the extension in order to intercept and discharge clean storm water runoff approaching the TSF's and discharge the water away from the affected footprints into the receiving environment. A non-perennial drainage line exists between Kareerand and the proposed extension in its current configuration. It is proposed that this drainage line be retained as-is if the TSF's are constructed as separate compartments.

### **TSF Underdrainage**

A toe-drain and a blanket-drain, hydraulically linked by link-drains, will be provided to draw down the phreatic surface which develops in the TSF and thereby increase stability. The tow drain will be provided with outlet pipes into the solution trench. The underdrains will consist of HDPE pipes with drilled round openings, encapsulated in washed stone and covered with sequential filter layers to prevent blockage by fines material.

## **9.1.2 TSF Expansion: - Option 3**

Option 3 is located approximately 3.5 km North-Northwest of the Mine Waste Services plant area. The minimum ground elevation in the southeast is 1,344.70 m.a.m.s.l, and the maximum at its Northwest corner is 1,387.60 m.a.m.s.l i.e. a fall of about 42.9 m across the TSF footprint over a distance of 4,095 m.

The in-situ density of the re-worked tailings is assumed to be 1.45 t.m<sup>3</sup>. The following geometric parameters apply to the design of the proposed Phase 2 Kareerand expansion Option 3:



**Table 10: Option 3 selected geometrical attributes**

PARAMETER	VALUE
Footprint area (m <sup>2</sup> )	9,881,305
Starter wall maximum height (m)	15.6
Kicker wall height (m)	6
Starter and kicker wall top width (m)	8
Starter and kicker wall side slopes (V:H)	1:2.5
Starter and kicker wall total volume (m <sup>3</sup> ) above existing ground	2,305,549
Tailings lift slope (V:H)	1:5
Tailings bench width (m)	7
Tailings average slope (V:H)	1:7.7
Tailings beach slope (V:H)	1:250
Tailings volume (Mm <sup>3</sup> )	387
Tailings tonnage @ 1.45 t.m <sup>3</sup> (Mt)	561
Tailings maximum height above minimum elevation (m)	72.2

## Pipelines

New pipelines will be required for this option, since the current lines will need to remain operational in the interim. The proposed pipe location of the MWS plant and the candidate site necessitates a crossing of the N12 national route. It is proposed that the pipes be stacked on supports in a square configuration for this section in order to minimise the size of precast conduit to be jacked across the highway. Quantities involved in the works are reflected in the schedule of quantities in APPENDIX C.

## Return Water Dams

Provision is made for new lined return water dams (RWD), dual compartments and silt traps. The facilities will be sized during subsequent studies to be compliant with GN 704.

## Pump Stations

Provision is made for a new return water pump station. The relatively short distance from the MWS plant to the proposed site negates the need for a pressure break station and tailings pump station for tailings deposition to the TSF extension. A return water pump station mounted on a floating barge will discharge water from the pool to the solution trench which will in turn drain into the return water dam. A pool wall will be constructed by dry stacking and cyclone, followed by a length of floating walkway to the barge. Submersible pumps will be suspended from the barge into the pool.

## Solution Trench

The TSF extension will operate on the same basis as the current facility, with a ring trench along the starter wall toe to collect seepage and return water and convey these streams to the return water dam.

## Drainage

A clean water cut-off trench and berm (cut-to-fill) will be constructed to the north of the extension in order to intercept and discharge clean storm water runoff approaching the TSF and discharge the water away from the affected footprint into the receiving environment.





## **TSF Underdrainage**

A toe-drain and a blanket-drain, hydraulically linked by link-drains, will be provided to draw down the phreatic surface which develops in the TSF and thereby increase stability. The toe drain will be provided with outlet pipes into the solution trench. The underdrains will consist of HDPE pipes with drilled round openings, encapsulated in washed stone and covered with sequential filter layers to prevent blockage by fines material.

## **9.2 Environmental attributes of preferred alternatives**

### **9.2.1 Option 3**

#### **Conceptual Site Model**

The conceptual hydrogeological model for the Tailings locality Option 3 is detailed in the section below. The conceptual hydrogeological model has been developed based on hydrogeological studies and environmental engineering project completed between 2008 -2016 (GCS, 2008, 2014, 2015 and 2016 and Golder 2014, 2015 and 2016).

#### **Location**

The Option 3 site is located 3.8 km north of Stilfontein.

#### **Topography and drainage**

The site is located in quaternary catchment C24A which forms part of the Vaal Water Management Area. The regionally topography slopes from the north toward the Vaal in south. The Koekemoer Spruit drains the quaternary catchment and as such surface water flows in an easterly direction relation to the Option 3 position. The southern portion of the quaternary catchment has been extensively mined.

#### **Rainfall**

The site is characterised by summer rainfall conditions. The mean annual precipitation (MAP) is in the order of 556 mm/a.

#### **Land use and dewatering history**

The Klerksdorp, Orkney, Stilfontein and Hartbeesfontein (KOSH) mining complex has been the site of deep underground mining and more recently surface re-mining operations for many decades. The KOSH area was mined as a number of distinct underground operations, with many connections between adjacent mine workings. Each active mining operation managed underground dewatering individually to provide safe access to the ore resources. However, as these mining operations are discontinued, active mine lease areas now receive water from the various up dip mine lease areas, where operations have ceased (Golder, 2016).

The gold ore body dips in a southerly direction with the deeper AGA operations south of the Vaal River dependant on up-dip mines to maintain dewatering operations. Thus even following cessation of mining at Stilfontein Mine in 2002, groundwater abstraction at Margret shaft continued.

Groundwater abstraction in the order of 25 000 m<sup>3</sup>/d is pumped from the Margret shaft and discharge to the nearby Koekemoer Spruit.

The area is characterised by numerous tailings storage facilities, many of which are being re-worked.

#### **Geology**

The Option 3 tailings site is underlain by Malmani dolomites which dip gently in a south easterly direction. The dolomites are in turn underlain by the Witwatersrand fractured quartzite, shales and Golder bearing conglomerates.

#### **Hydrogeology**

Hydrogeological zones

The most significant aquifers in the region comprise the Malmani dolomites. The primary permeability of the dolomites is low, however where the dolomites are chert rich and karst features have developed the



permeability significantly increases. The main hydrogeological zones identified in previous studies are summarised below;

- Eastern shallow dolomite aquifer zone;

The shallow dolomites were inferred to extend to a maximum thickness of 30 mbgl. The weathered dolomites are in turn underlain by solid and fractured dolomites which extend to a depth of 60 mbgl. Site investigations found an increase in chert rubble toward the southern area of the footprint indicating the contact of the Oaktree (chert poor dolomites) and the Monte Christo (chert rich dolomites). It is estimated that approximately 70% of the site is underlain by the chert poor dolomites.

- Fractured quartzite/conglomerate and shale aquifer;

The fractured rock aquifer underlies the dolomitic aquifer. The permeability of the aquifer is controlled by the dense network of fractures which characterise this aquifer zone.

- Dyke and fault zone;

A dyke/fault zone with a north-south strike traverses the footprint of the Option 3 site. The weathered and fractured margins of dolerite dykes emplaced in the Malmani dolomites are well known to act as preferential flow pathways for groundwater flow and contaminant migration.

### Aquifer parameters

The aquifer parameters interpreted by GCS (2008) found that;

- Solid dolomites have low conductivity values in the order of 0.0014 m/d;
- Weathered dolomites have a mean conductivity in the order of 0.25 m/d; and
- Karst and dyke structures are estimated to have conductivity values in the order of 6.6 m/d.

### Recharge

Recharge to the Malmani dolomites is estimated to be in the order of 6% - 12% of MAP which equates to 33 mm/a - 66 mm/a (GCS, 2008).

### Water levels and flow directions and groundwater velocity

As part of the study undertaken by GCS (2008), 16 shallow characterisation boreholes were drilled and tested. Water levels were all shallower than 11 mbgl.

A significant correlation was observed between hydraulic head and topography which indicates groundwater flow in the shallow aquifer zone is expected to mimic surface topography. In relation to the Option 3 tailings site, this indicates that groundwater will flow toward the Koekemoer Spruit, east of the site. Pretorius (2004) found that water levels in the shallow aquifer zone in this area do not reflect the extensive dewatering of the underground shafts and as such the deeper fractured aquifer zone is inferred to be confined to semi-confined. Deep and shallow borehole pairs are required in order to confirm this inference.

In conceptualisation of Option 3 as a potential site for the TSF, it was envisioned that dewatering of the Margret shaft is resulting in dewatering of the shallow aquifer beneath the tailings. However based on the water levels and hydraulic head contours, flow toward the Margaret Shaft is not supported. As such should an unlined facility be placed on the dolomites it is not expected for seepage to migrate to the Margret Shaft but rather it is expected that seepage will migrate toward the Koekemoer Spruit.

Based on the parameters indicated below the seepage velocity is in the order of 25 m per year. However, should the TSF be constructed without a liner it is probable that the resulting mounding could enhance the head gradient between the Koekemoer Spruit and the TSF resulting in an increased seepage velocity.



**Table 11: Seepage Velocity – Option 3 - based on field data collected by GCS (2008)**

Parameter	Value
Head at BH 4 (mamsl)	1369.98
Head at BH 2 (mamsl)	1336.57
Length (m)	4400
Porosity (n) (%)	3%
Hydraulic conductivity (m/d)	0.25
Vs (m/year)	25m per year

### Potential receptors

The primary receptor in the vicinity of the proposed tailings site is the Koekemoer Spruit which is located 2 km east of the proposed TSF. Based on the groundwater flow contours, contamination migration could be expected to impact on the river over time.

### Groundwater quality and expected seepage qualities

The water quality in proximity of the Option 3 site has been significantly impacted by the historical tailings storage facilities immediately south of Option 3. Updated sampling is required to confirm if the contamination generated from these facilities is migrating toward the Margret shaft or easterly toward the Koekemoer Spruit.

Based on the information obtained from the Kareerand tailings, seepage water quality from the existing tailings displays sulphate concentrations in the order of 1500 mg/l. As such seepage from the tailings will have an impact on background groundwater concentrations and may therefore potentially impact on the water quality of the Koekemoer Spruit.

Contamination migration from the TSF is expected to occur primarily in the upper weathered aquifer zone, i.e. shallower than 30 mbgl. In addition to contaminant flow in the shallow aquifer zone a component of contaminated seepage is expected to move vertical along the fracture zones associated with the fractured quartzite's and conglomerates.

### Schematic conceptual hydrogeological model

The conceptual hydrogeological model described above is presented schematically in Figure 9 and Figure 11. The schematic depicts the conditions likely to prevail where (i) no mitigation is considered, where (ii) a liner is installed and (iii) where other mitigation options are considered.



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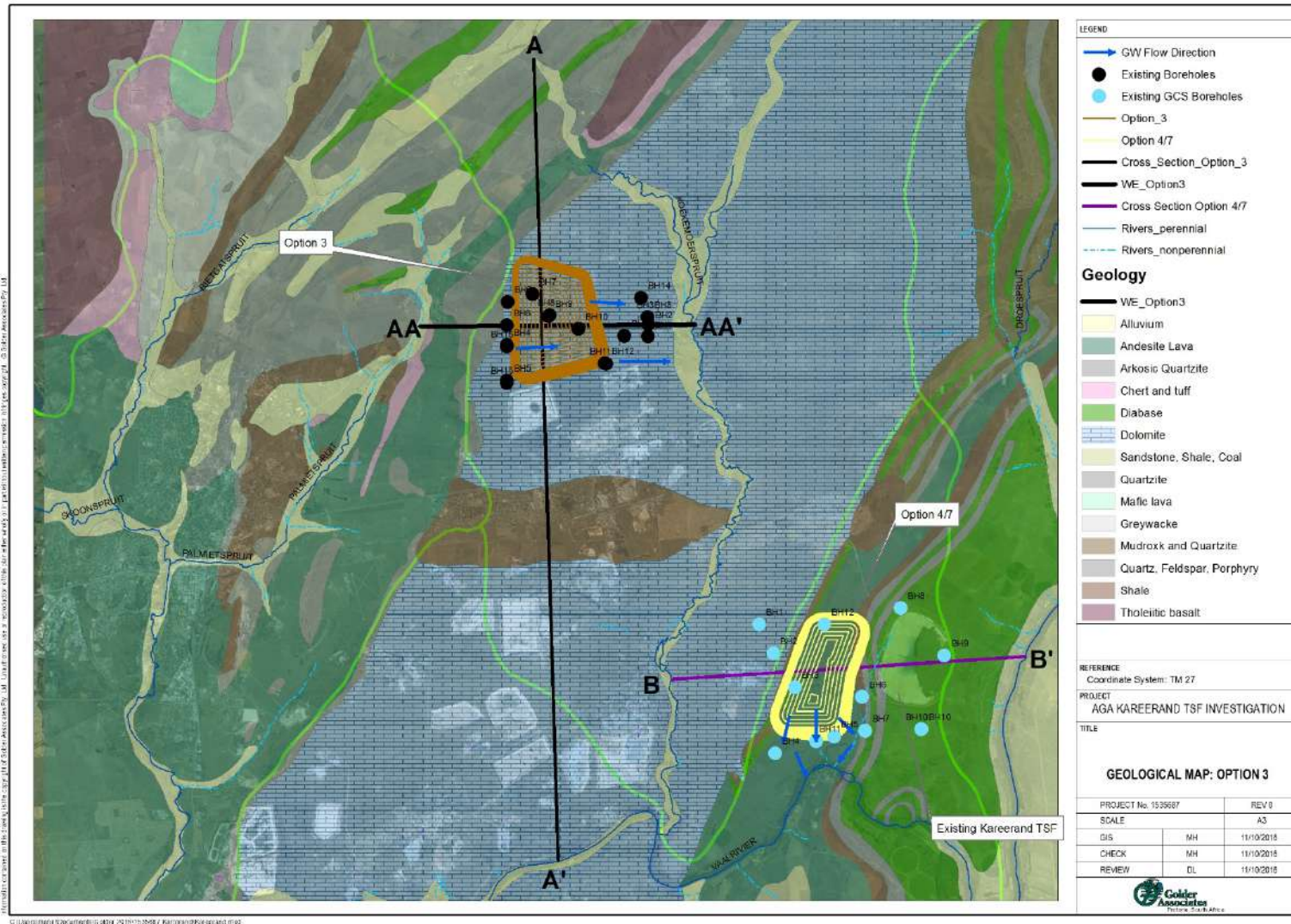
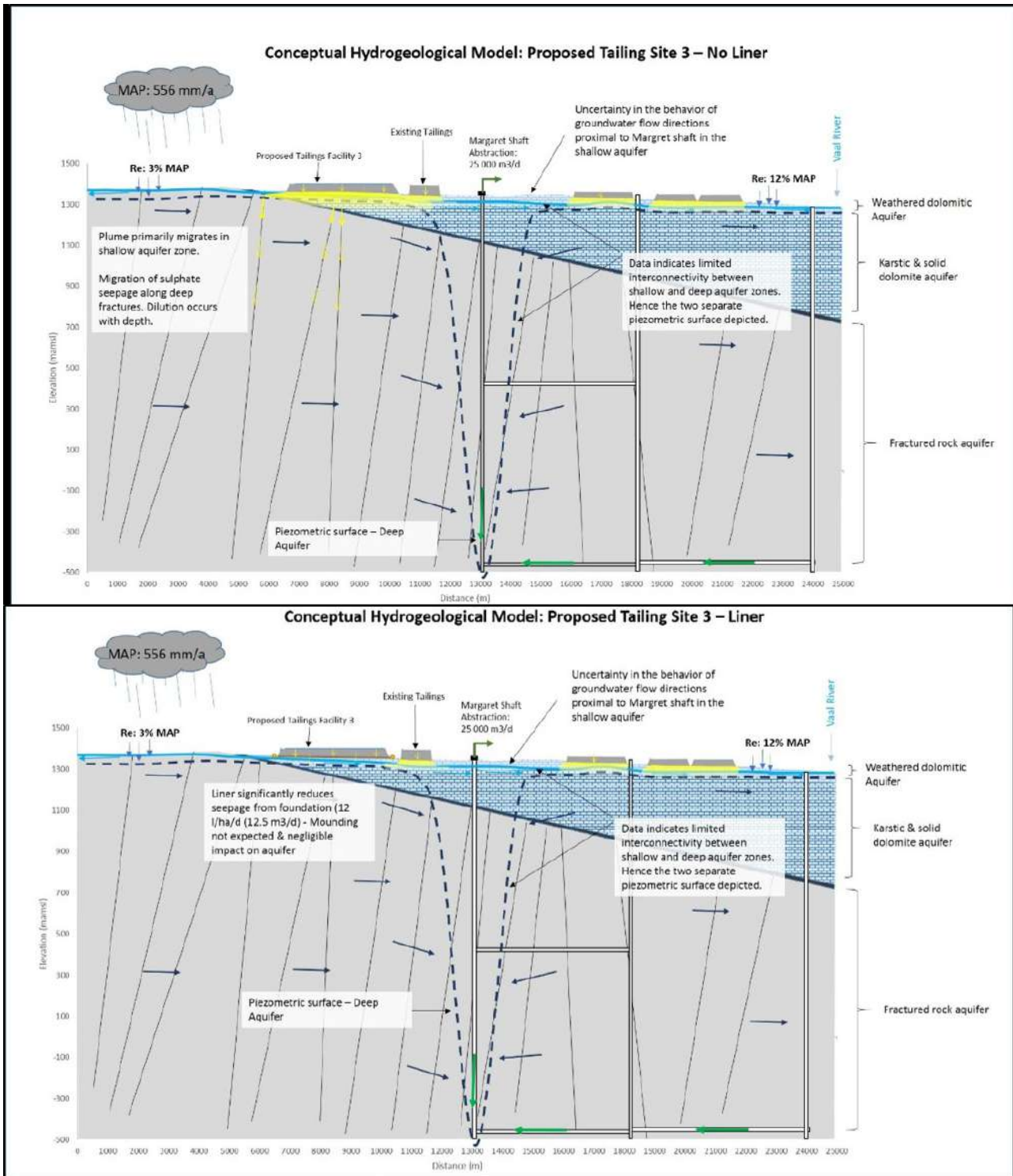


Figure 8: Geological Map of the study area - Option 3





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# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

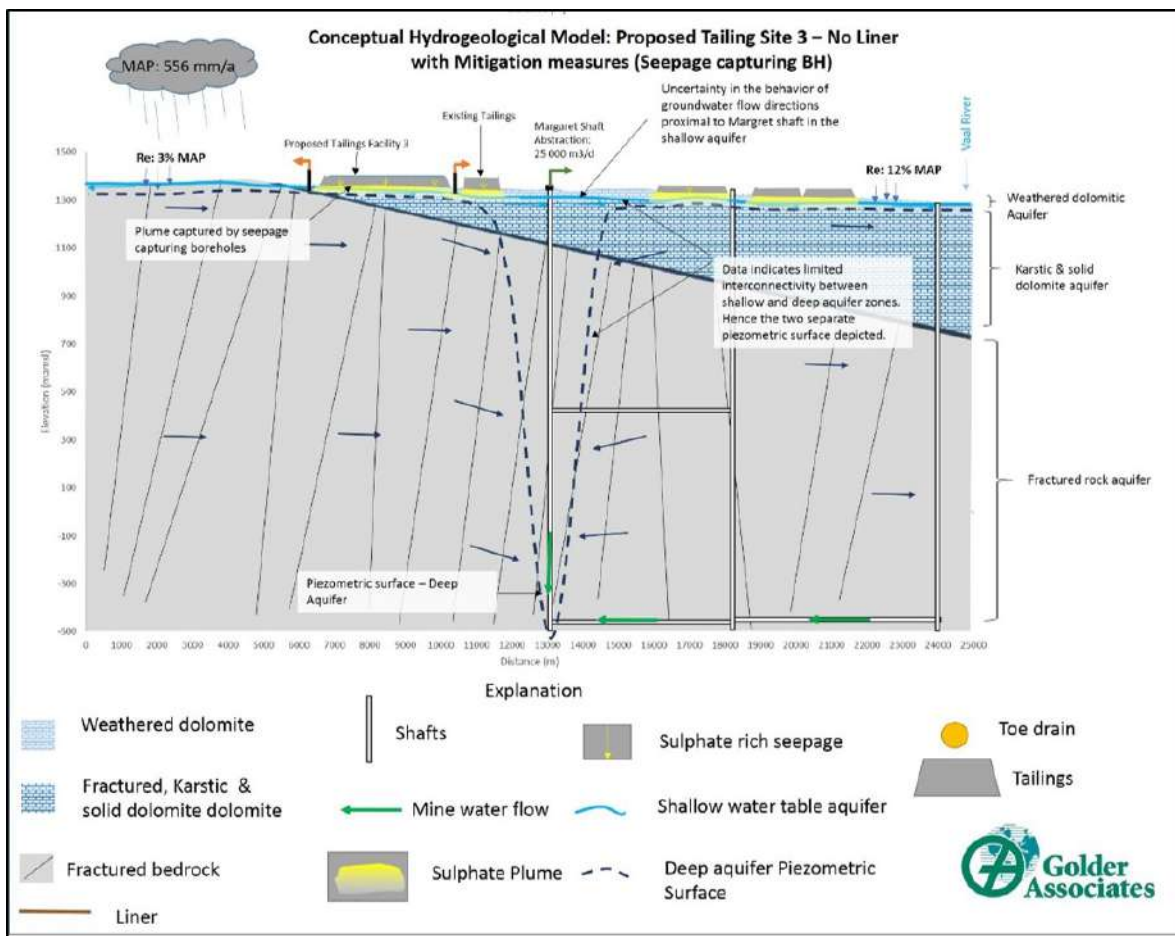
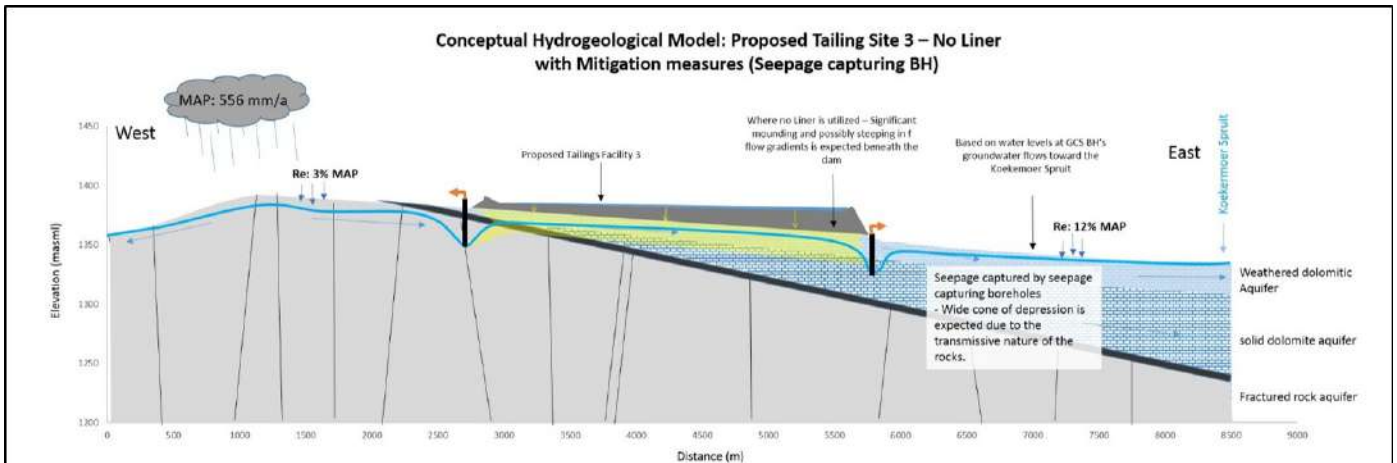
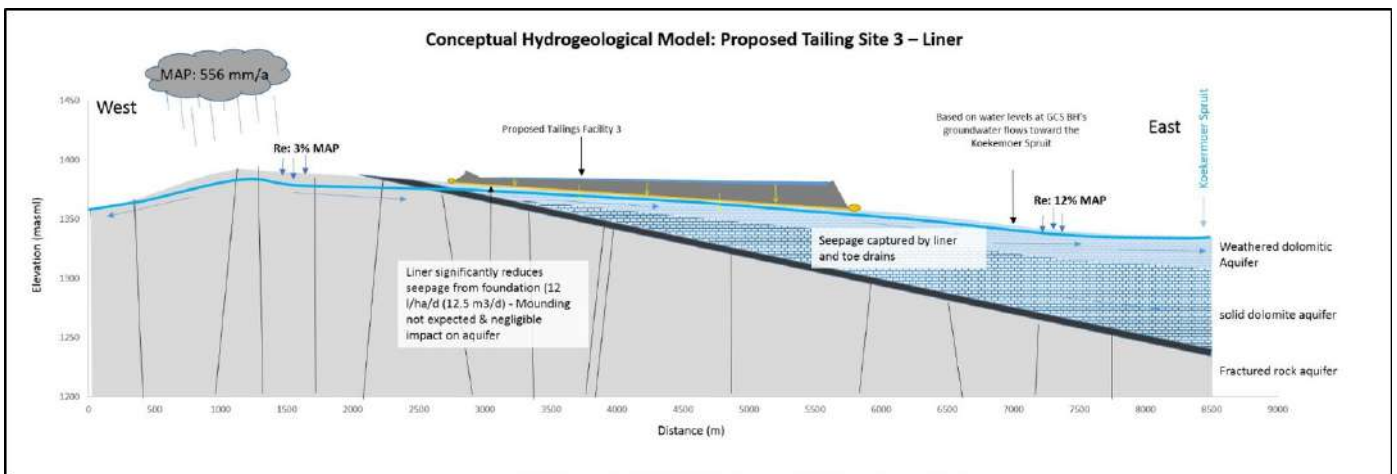
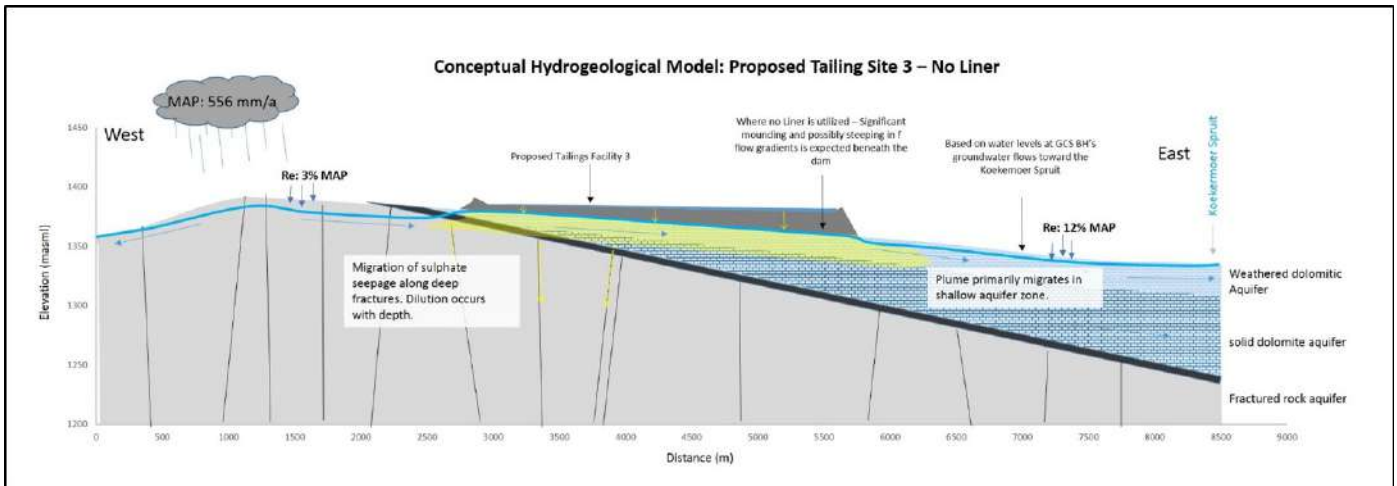


Figure 9: Conceptual Hydrogeological Model – Proposed Tailings: Option 3 (North – South (A-A'))





# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT



- | Explanation |  |  |                             |
|-------------|--|--|-----------------------------|
|             | Weathered dolomite                           |  | Toe drain                   |
|             | Fractured, Karstic & solid dolomite dolomite |  | Tailings                    |
|             | Fractured bedrock                            |  | Sulphate rich seepage       |
|             | Liner  |  | Shallow water table aquifer |
|             |  |  | Sulphate Plume              |



Figure 10: Conceptual Hydrogeological Model – Proposed Tailings: Option 3 (West -East (AA-AA'))





### *Interception of Contaminated Seepage*

Interception of contaminated seepage water options include the following;

- Compliant: Class C barrier system.

Alternative interception techniques may include:

- Interception by Margaret # pump and treat station;
- Based on review of the data, there is a risk that complete interception of contaminated seepage water by the Margret shaft pumping may not occur due to the current groundwater flow in the shallow weathered horizon towards the Koekemoer Spruit. However, an updated hydrocensus must be undertaken to confirm this finding;

- Seepage capture boreholes;

Aquifer testing of boreholes located on the proposed foot print of option 3 and representing the weathered dolomites (< 15 mbgl) indicates that the aquifer has a high permeability and as such seepage capturing via boreholes is deemed a plausible method for capturing a plume associated with the proposed tailings.

- Interception trench;

The drilled boreholes indicate a weathering depth of approximately 15 m, thus it is unlikely that a cut-off trench will prove to be effective in containing contamination associated with the tailings. In addition the deeper aquifer zone is envisioned to be highly fractured and thus deep vertical migration of contamination is expected thus rendering the cut-off trench ineffective.

### *Further Investigations Required*

Should this option be investigated further the recommended follow up confirmatory work is outlined below;

- Hydrocensus;

A detailed hydrocensus is required in order to confirm the flow directions of groundwater in the shallow aquifer zone.

- Geophysical survey;

It is necessary to undertake a high resolution gravity survey over the Footprint of Option 3 in order to confirm the sinkhole risk status.

- Drilling program and aquifer testing;

Extensive drilling was undertaken in the preceding study undertaken for the site. However, information on the water levels and groundwater flow direction behaviour for the deep fractured aquifer (underlying the dolomites) is required to be understood in order to definitively establish whether or not seepage from the tailings will flow toward the Margaret shaft or the Koekemoer Spruit.

- Source-Pathway-receptor modelling;
- Speciation modelling of seepage + deep groundwater;
- Seepage modelling;

Seepage modelling in order to estimate the flow through the tailings impoundment. This is necessary information to guide the numerical flow model which in turn will guide, for example, the number and position of boreholes required for seepage capture.

- Groundwater flow and contaminant transport model to demonstrate plume capture by alternative options;



As described above, a detailed groundwater flow model is required in order to determine the effectiveness of the possible mitigation strategies conceptualised.

- Design of monitoring system;

On completion of modelling a detailed water management plan is required to be developed for the operational phase of the TSF.

### 9.2.2 Option 4/7

#### Conceptual Site Model

The conceptual hydrogeological model for the tailings locality option 4/7 is detailed in the section below. The conceptual hydrogeological model has been developed based on hydrogeological studies and environmental engineering project completed between 2008 -2016 (GCS, 2008, 2014, 2015 and 2016 and Golder 2014, 2015 and 2016).

#### Location

Tailings option 4/7 is located 2.5 km south of the Khuma settlement and 9.5 km south east of Stilfontein. The tailings option is positioned ~700 m west of the existing Kareerand Tailings impoundment which was constructed in 2008.

#### Topography and drainage

The proposed tailings is located in quaternary catchment C24B which forms part of the Vaal Water Management Area. The Vaal River is located approximately 900 m south of the proposed TSF site and 4.6 km east of Option 4/7. The southerly flowing Koekemoer Spruit is located 3 km west of the proposed tailings position.

The local topography slopes in a southerly direction. A non-perennial drainage line runs between the existing tailings and the proposed TSF site.

#### Rainfall

The site is characterised by summer rainfall conditions. The Mean annual precipitation (MAP) is in the order of 556 mm/a.

#### Land use

The land use proximal to the proposed tailings option is dominated by gold mining activities. South of the Vaal River, the land is extensively utilised for agriculture. North of the proposed TSF the Khuma settlement has been developed.

#### Geology

Geological units significant to the investigation area include;

- Malmani dolomites which outcrop west of the proposed tailings and which are documented to dip at 50° toward the east;
- Andesite lava of the Hekpoort formation which underlies Option 4/7 TSF site;
- Shale and quartzite strata of the Strubenkop and Daspoort formations; and
- Diabase located east of the proposed tailings and which underlays the existing Kareerand TSF.

#### Hydrogeology

The GCS (2008) study documented the drilling and pumping tests results of boreholes located proximal to Option 4/7. The majority of boreholes were drilled to intersect the andesite underlying the proposed footprint and the diabase east of the proposed footprint. The andesite typically showed higher blow yields and higher estimated hydraulic conductivity relative to the adjacent diabase strata in which boreholes were typically dry. Weathering is present to depths of 20 - 30 m below surface level.



**Hydrogeological zones**

As such the geology was subdivided into three main hydrogeological zones (GCS, 2008);

- Dolomites (Upper weathered and deeper fractured and karstic) –(Major to moderate aquifer zone):

The estimated hydraulic conductivity values for the dolomites based on pumping tests conducted are 0.25 m/d for the shallow weathered zone and 0.001 m/d where the dolomites are solid. Where cavities occur the dolomites were estimated to have hydraulic conductivities of 6.6 m/d.

- Andesite lava – (Moderate to minor aquifer zone):

The estimated hydraulic conductivity for the Andesite lavas is in the order of 0.09 m/d. While not apparent from the hydraulic conductivity values relative to those presented for the diabase, the Andesite is viewed to be a more transmissive aquifer than the Diabase based on the number of boreholes with moderate blow yields during drilling compared with the number of dry boreholes drilled in the Diabase.

- Diabase, shale and Quartzite (Minor aquifer zone):

The geometric mean of the data reflecting the diabase strata was in the order of 0.09 m/d. This is likely over estimated due to the fact that only boreholes with sufficient water could be tested, many boreholes drilled in the Diabase were dry.

**Recharge**

The major source of recharge to the aquifers in the area is rainfall the estimates of recharge on the various hydrogeological units are provided below as a percentage of MAP (Golder, 2016).

- Dolomite: 12% of MAP;
- Andesite lava: 4.5% of MAP; and
- Diabase: 2% of MAP.

**Water levels and flow directions and groundwater velocity**

The GCS (2008) study found there to be suitable correlation between topography and the hydraulic head elevation of the shallow aquifer zone to infer that groundwater flow directions are expected to mimic surface topography and hence groundwater from the proposed tailings areas is expected to flow toward the Vaal River.

The average water levels in the andesitic lava is 15 mbgl, while the average water level depths for the diabase are 23.79 mbgl. The latter deeper water levels are inferred to be a consequence of reduced hydraulic characteristics of the diabase (GCS, 2008).

The groundwater flow velocity is estimated to be in the order of 2m per year based on the parameters outlined below.

**Table 12: Seepage velocity based on field data collected by GCS (2008)**

Parameter	Value
Head at BH 12 (mamsl)	1302.88
Head at BH 11 (mamsl)	1294.88
Length (m)	3700
Porosity (n) (%)	3%
Hydraulic conductivity (m/d)	0.09
Vs (m/year)	2.3 m per year



The flow velocity may increase substantially due to a steeper flow gradient imparted on the system by the head on the tailings once operational, i.e. if the head at the tailings increases by 15 m, the expected flow velocity could increase up to 75 m per year. With no liner this type of condition is realistic as it was seen at the Kareerand TSF that water levels increased from 10 mbgl to <1 mbgl since initiation of the operation.

In addition, preferential flow pathways may not have been determined and as such fluid flow may be faster than anticipated above. This data gap needs to be closed through detailed resistivity surveying of the footprint of the TSF site.

### Potential receptors

There are no current groundwater users between the proposed tailings and the Vaal River. The major receptors (hydrological and dependent biological receptors) are inferred to be the non-perennial drainage line that runs between the existing and proposed tailings and the Vaal River downgradient of the TSF site.

Salts associated with TSF seepage which may accumulate in the drainage line during low rainfall periods are expected to be mobilised during wet periods and flow into the Vaal system. In addition the shallow groundwater is inferred to leave the aquifer zone as base flow contribution to the Vaal approximately 900 m south of the tailings.

### Groundwater quality and expected seepage qualities

Water quality of boreholes proximal to the proposed tailings facility was found to be of pristine water quality relative to the recommended limits for stock watering and domestic supply. Sulphate is a key parameter in identifying seepage associated with oxidation of sulphide minerals in mine waste. The geometric mean of sulphate based on the available 2008 dataset is <7 mg/l.

Seepage water quality from the existing tailings displayed sulphate concentrations in the order of 1500 mg/l. As such seepage from the tailings will have an impact on background groundwater concentrations and may potentially impact on concentrations of the surface streams.

Contamination migration is expected to occur primarily in the upper weathered aquifer zone, i.e. shallower than 20 mbgl.

### Schematic conceptual hydrogeological model

The conceptual hydrogeological model described above is presented schematically in Figure 12. The schematic depicts the conditions likely to prevail where (i) no mitigation is considered, where (ii) a liner is installed and (iii) where other mitigation options are considered.





# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

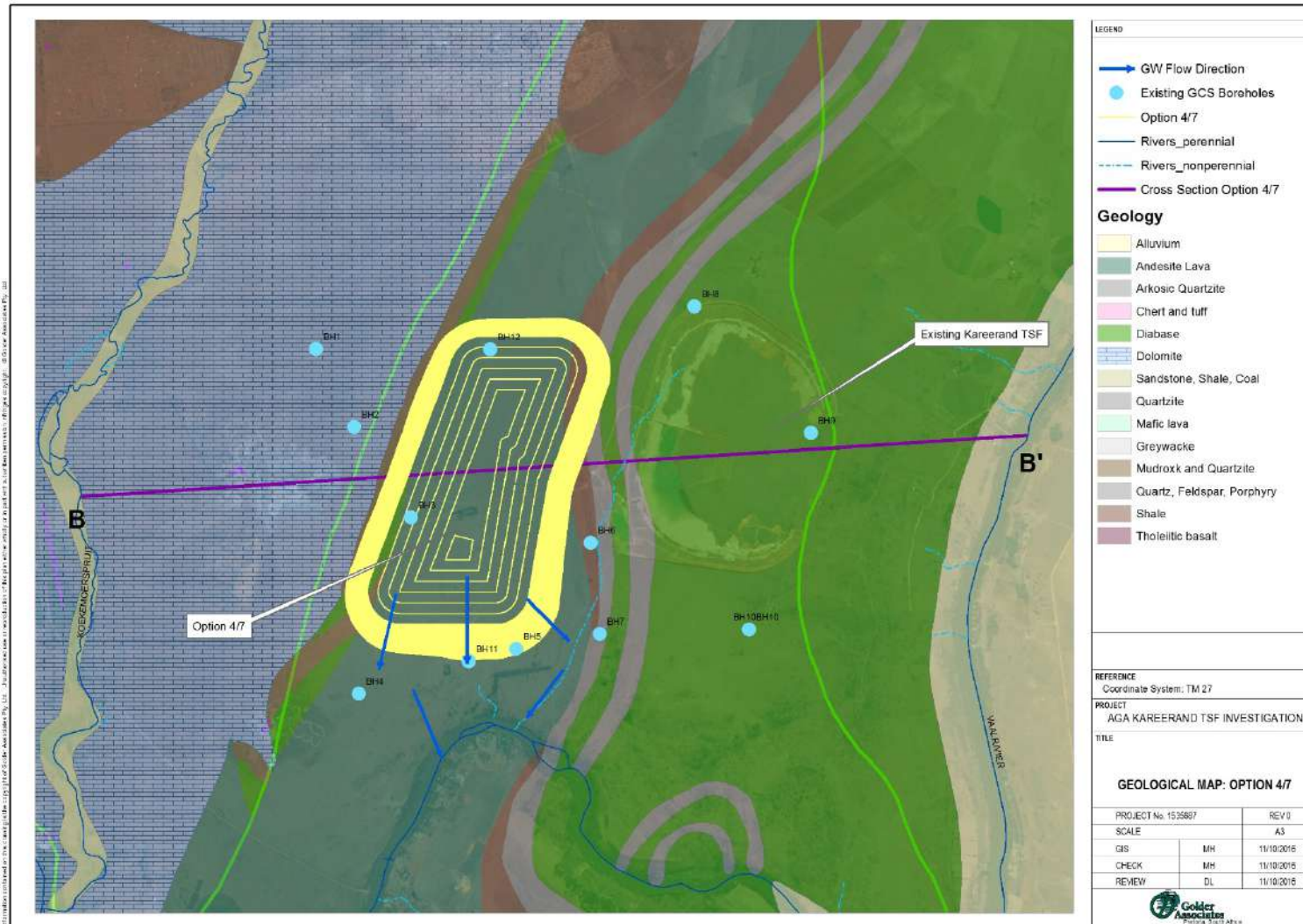
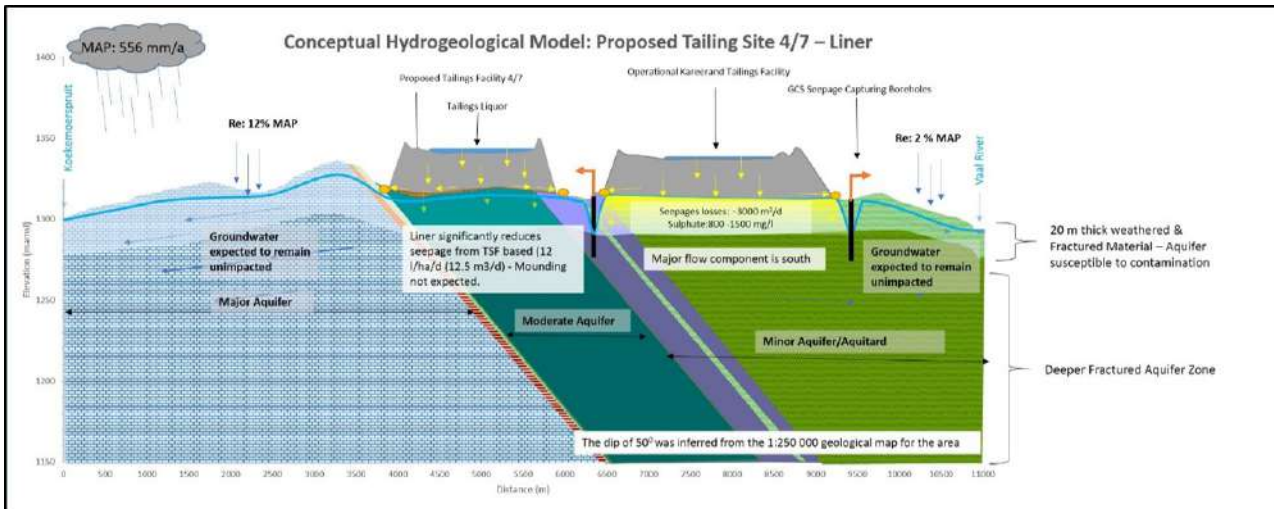
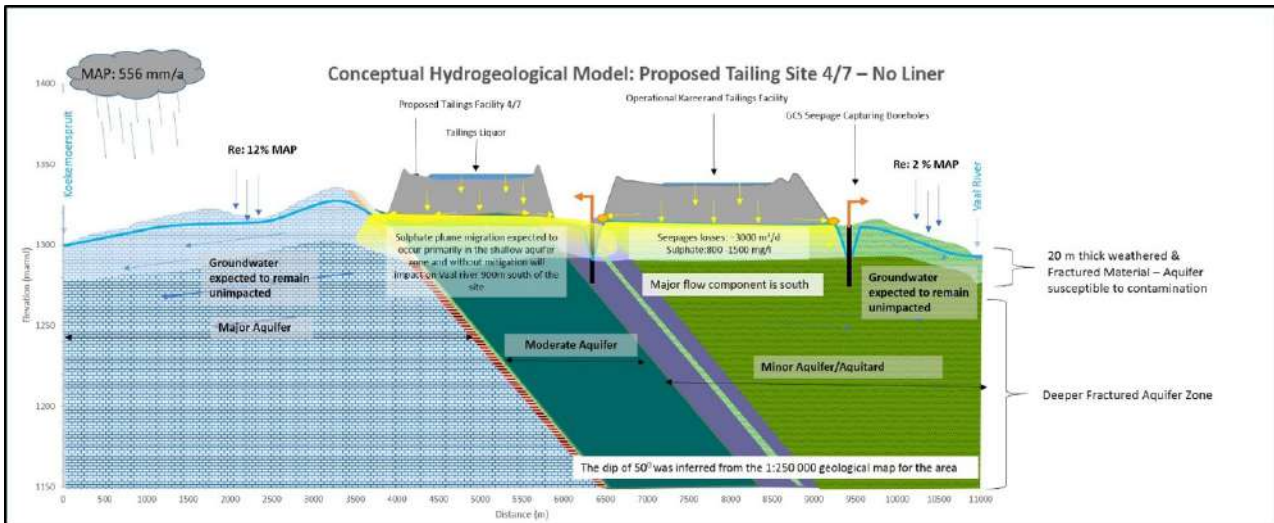


Figure 11: Geological Map: Option 4/7





# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT





# PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

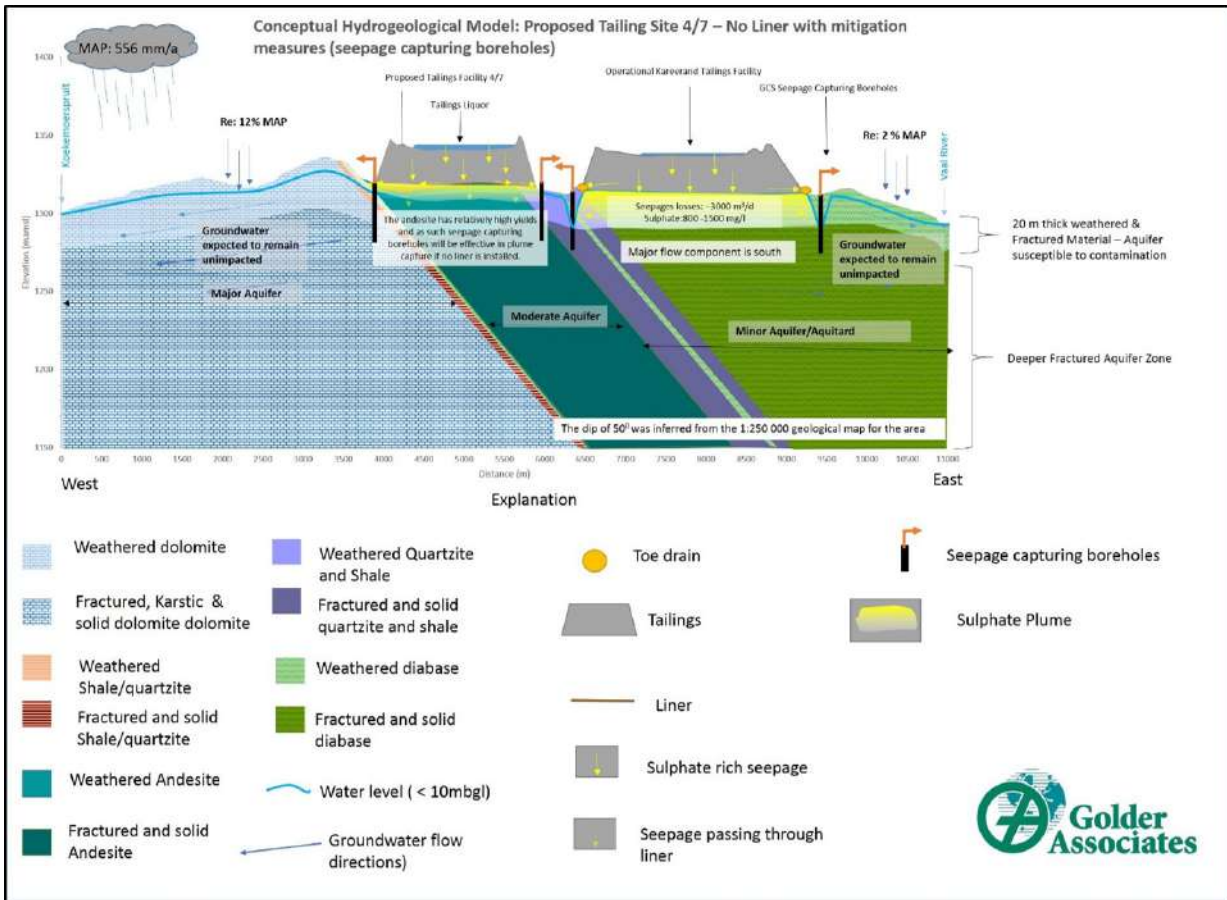


Figure 12: Conceptual Hydrogeological Model – Proposed Tailings: site 4/7 (West – East B-B')



### ***Interception of Contaminated Seepage***

Interception of contaminated seepage options include the following;

- Compliant: Class C barrier system

Alternative interception techniques may include;

- Seepage capture boreholes:

The data review indicated that the andesite which underlies the proposed facility had relatively high blow yields during drilling and moderate hydraulic conductivity values confirmed by pump testing. As a result it is concluded that seepage capturing boreholes will be effective in this strata as a significant radius of influence can be developed around abstraction boreholes.

Due to the proximity of the Vaal River, the seepage capturing boreholes and monitoring boreholes will be required to be located close to the footprint of the TSF to ensure early detection of seepage and prompt action to avoid impact on the receptor.

- Interception trench:

The drilled boreholes indicate a weathering depth of approximately 20 m. Due to the potential depth of contaminated seepage, the installation of a trench is not deemed a viable option.

- Pre-split (preferential pathway to interception point):

A pre-split with an interception point is viewed to be a potentially feasible strategy. The method relies upon developing a preferential flow zone along which the contaminated seepage associated with the tailings will be directed and abstracted via interception points (pump out boreholes drilled into the pre-split ground).

- Sub-surface funnel and gate system:

The method relies upon developing an impermeable trench (bentonite/cement) functioning as funnel along which contaminated seepage will be constrained to flow. Contaminated seepage can then be intersected at a gate in the funnel.

Similarly to the construction of a trench, the funnel and gate system is not viewed to be a viable option due to the potential depth of the seepage.

### ***Reuse of Captured Seepage***

Contaminated seepage collected via any of the above listed methods can likely be re-used as plant make-up water.

### ***Further Investigations Required***

Confirm sinkhole risk status, especially on western side of site where the dolomite sub-outcrop will be relatively shallow.

Source-Pathway-receptor modelling:

- Hydrogeological field study:

Geophysics

As outlined in the preceding sections, significant work has been undertaken on and proximal to the Option 4/7 footprint. However, the following gaps and associated field work requirements include;

A magnetic survey was previously conducted in vicinity of the Option 4/7 footprint in order to site characterisation boreholes.



It is recommended that a detailed resistivity survey be undertaken over the footprint to support the magnetic survey and confirm the absence (or presence) of any large fault structures beneath the footprint.

- This is necessary due to the potential risk associated with any as yet unknown potential preferential flow zone beneath the facility.

**Drilling and aquifer testing**

The existing drilling and aquifer testing is deemed suitable for characterisation of the aquifer. However, should the geophysical survey identify any preferential flow zones or possibly sinkholes (particularly on the western extent of the proposed TSF), additional drilling and testing will be required.

**Hydrocensus**

An update of groundwater water levels and water quality data is required in order to develop a model representative of present conditions.

- Seepage modelling:  
Seepage modelling in order to estimate the flow through the tailings impoundment. This is necessary information to guide the numerical flow model which in turn will guide, for example, the number and position of boreholes required for seepage capture.
- Groundwater flow and contaminant transport model to demonstrate plume capture by alternative options:  
As described above, a detailed groundwater flow model is required in order to determine the effectiveness of the possible mitigation strategies conceptualised.
- Development and implementation of a system-wide groundwater management plan in collaboration with GCS work on Kareerand;
- Design of monitoring system, including rapid early warning system:  
The monitoring system will be developed on completion of the recommended field work and modelling.

**10.0 TSF OPTION COMPARISON AND CAPITAL COSTS**

The Options Analysis Matrix, now updated to include Option 4-7, is attached in APPENDIX D. The options analysis process found Options 3 and 4-7 to be the most favourable candidates to take forward to feasibility evaluation.

Table 13 below provides capital costs (refer APPENDIX C for details) for the options, as well as various geometric features:

**Table 13: Comparison: - Option 3 and Option 4-7 a, b**

Parameter	Option 3 Unlined on Dolomite	Option 4-7a Lined	Option 4-7b Unlined
Capital Cost (ZAR) excl. fixed cost and time related P & G items, contingencies, VAT	537,404,758.00	1,348,646,579.00	535,865,546.00
Footprint Area Required (m <sup>2</sup> )	9,881,305.00	8,896,806.00	8,896,806.00
Tailings Tonnage Available (t)	561,000,000.00	563,000,000.00	563,000,000.00
Height Required (m)	72.2	85.5	85.5



## PROJECT CHARTER FOR THE KAREERAND TSF EXPANSION PROJECT

Parameter	Option 3 Unlined on Dolomite	Option 4-7a Lined	Option 4-7b Unlined
Pumping Distance (tailings) – 3 x 500 mm diameter steel pipes (m)	4,542.00	18,706.00	18,706.00
New steel pipe tailings pipe (m) – 500 mm diameter	13,626.00	6,759.00	6,759.00
Pumping Distance (water) – 800 mm diameter steel pipe (m)	5,576.00	16,036.00	16,036.00
New steel water pipe (m) – 800 mm diameter	5,576.00	302.00	302.00
Tonnage per m <sup>2</sup> (t/m <sup>2</sup> )	56.80	63.30	63.30
Capital per m <sup>2</sup> (ZAR excl. fixed cost and time related P & G items, contingencies, VAT)	54.40	151.60	60.20
Capital per t (ZAR excl. fixed cost and time related P & G items, contingencies, VAT) <b>(baselined to 560 Mt)</b>	0.96	2.41	0.96

Note: - cost ratios shown reflect total capital costs for all works per option as per Schedule of Quantities.

The following observations are pertinent:

- Option 4-7 provides more tonnage per m<sup>2</sup> of footprint. This is because the narrower shapes results in shorter beaches and hence a shallower depression. The larger and “squarer” option 3 footprint offers more scope for increasing height;
- Comparing the two unlined options i.e. Option 3 and Option 4-7b, capital outlay per tonnage are similar although Option 4-7b requires substantially less purchase of new pipe;
- A saving in operational costs can be achieved with Option 3 due to the shorter pumping distances and the omission of a tailings pump station at the TSF; and
- The capital costs per m<sup>2</sup> are more favourable in the case of Option 3 which reflects that its footprint size and location, as well as its geometry, offer a more favourable capital prospect, especially if raising is considered. Moreover operational costs in terms of power consumption and maintenance will be lower.

### 11.0 SUSTAINABLE DEVELOPMENT CONSIDERATIONS

Sustainability of tailings deposition can be seen in two contexts by MWS. The first of these is the sustainability of the MWS operations so as to facilitate optimum exploitation of the minerals resources available to the company. From this perspective an affordable disposal site needs to be found that can provide for the full mining reserve of 566 million tons of tailings. A site that will have excessive capital and operating costs will therefore render the operation unsustainable. Reserves that might otherwise be exploited will be left in place and will need to be rehabilitated in situ.

The second perspective is from the vantage point of the community. The local environment is already associated with mining and tailings in particular that will continue to impact on the environment for a long time to come. These impacts may never be mitigated given the practical limitations to what can be done. A new mega tailings facility therefore represents an opportunity for the region to bring about a significant





improvement by removing all the current diffuse sources of potential contamination and consolidating them into a single facility capable of storing the orphan tailings facilities dotted around the area.

The latter perspective is one that provides a context for this project. It is not so much about whether a new tailings dam can be established but whether the project will bring about a significant net positive impact on the social, economic and physical environment. This objective can be achieved simply by bringing economic and social benefit by continuing to provide employment in the region. Furthermore a net positive impact can be created by removing most of the tailings facilities in the close proximity of some communities and replacing them with one facility suitably located to minimise impact on community quality of life.

It is therefore important to approach the project with a positive net impact in mind as well as a commitment to engineer a new facility that will perform better than the past tailings facilities have done.

### **12.0 REGULATORY PROCESS**

A site-specific Integrated Regulatory Process (IRP) is proposed for the Kareerand TSF taking into consideration the below-listed key environmental legislation applicable to the proposed TSF.

#### **Triggered activities requiring authorisation(s) in terms of relevant environmental legislation**

##### ***National Environmental Management Act (NEMA)***

Should an activity listed in the EIA Regulations 983, 984 and/or 985 (of December 2014) be triggered, then an application for Environmental Authorisation is required, supported by either a Basic Assessment or Environmental Impact Assessment (EIA) process, outlined in the EIA Regulation 982 (of December 2014). A preliminary list of activities that could be triggered by the proposed TSF is provided in Table 14 below.





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**Table 14: Preliminary list of activities triggered in terms of the EIA Regulations**

Listed Activity	Relevance to proposed TSF
<p><u>GN R.983, Listed Activity 10 (alternatively, Listed Activity 46 for expansion<sup>1</sup> of existing pipe network)</u>: The development<sup>2</sup> and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.</p>	<p>Should new slurry/return water pipelines exceeding the trigger thresholds need to be installed beyond the existing pipeline servitude, outside a road reserve, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required for this Listed Activity.</p>
<p><u>GN R.983, Listed Activity 11 (alternatively, Listed Activity 47 for expansion/extension of existing electrical infrastructure)</u>: The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>Should electrical infrastructure exceeding the trigger thresholds need to be installed to provide power for, e.g. pump systems, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required for this Listed Activity.</p>
<p><u>GN R.983, Listed Activity 13</u>: The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.</p>	<p>Should the return water dam associated with the TSF exceed a capacity of 50000 cubic metres, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required.</p>
<p><u>GN R.983, Listed Activity 24 (alternatively Listed Activity 54 for lengthening of existing roads)</u>: The development of- (ii) a road with a reserve wider than 13, 5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>Should a road wider exceeding the listed trigger thresholds need to be constructed to access the proposed TSF, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required for this Listed Activity.</p>
<p><u>GN R.983, Listed Activity 46</u>: The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve.</p>	<p>In the event that existing slurry/return water pipelines are expanded outside a road reserve resulting in exceedances of the mentioned trigger thresholds, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required for this Listed Activity.</p>
<p><u>GN R.983, Listed Activity 47</u>: The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</p>	<p>Should existing electrical infrastructure be expanded beyond the trigger thresholds to supply power to the proposed TSF operation, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u>, will be required.</p>

<sup>1</sup> "expansion" means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased

<sup>2</sup> "development" means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, including any associated post development monitoring, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint



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Listed Activity	Relevance to proposed TSF
<u>GN R.983, Listed Activity 54</u> : The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres.	Where existing roads will be lengthened by more than 1 km to provide access to the proposed TSF, then an application for Environmental Authorisation, supported by a <u>Basic Assessment</u> , will be required for this Listed Activity.
<u>GN R.984, Listed Activity 15</u> : The clearance of an area of 20 hectares or more of indigenous vegetation <sup>3</sup> .	In all likelihood indigenous vegetation will be cleared over an area in excess of 20 ha, during preparation of the TSF footprint, and hence an application for Environmental Authorisation, supported by a <u>full EIA</u> , will be required.
<u>GN R.985, Listed Activity 12</u> : The clearance of an area of 300 square metres or more of indigenous vegetation except (a) In Eastern Cape, Free State, Gauteng, Limpopo, North West and Western Cape provinces...iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	The current zoning of the land associated with TSF Options 3 and 4/7 needs to be confirmed to determine whether this Listed Activity is triggered or not

Since an activity listed in GN R.984 is likely to be triggered, a full EIA process in terms of GN R.982 will need to be conducted, in support of an application for Environmental Authorisation in terms of the NEMA.

### **National Environmental Management Waste Act (NEMWA)**

The proposed TSF will trigger the following Waste Management Activity listed in GN R.921 of November 2013, as amended by GN R.633 of July 2015:

- GN R.921, Category B, Activity 4(11): The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

Since a Category B activity is triggered, a full EIA process in terms of GN R.982 will need to be conducted, in support of an application for a Waste Management Licence in terms of the NEMWA.

In support of the application for a Waste Management Licence, it will need to be ensured that the requirements of the Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation (GN R.632 of July 2015) are adhered to. These Regulations have detailed provisions on the management of residue stockpiles and deposits, including:

- Assessment of impacts;
- Analysis of the risks relating to the management thereof;
- Characterisation and classification of the waste material to identify any potential risks to health, safety and the environment;
- Site selection and designs; and
- Duties of Mining Rights holders regarding construction and operation; designs; water monitoring; preventative or remedial environmental measures; dust pollution and erosion; rehabilitation; maintenance and repair; monitoring and reporting; and decommissioning, closure and post closure management.

<sup>3</sup> "indigenous vegetation" refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years



### ***National Water Act (NWA), (Act 36 of 1998)***

The NWA lists the following eleven water uses in Section 21 of the Act:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a stream flow reduction activity contemplated in Section 36;
- e) Engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1);
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

The proposed TSF will trigger a number of water uses in terms of Section 21 of the NWA: The application for a Water Use Licence in terms of the NWA would need to include, along with the relevant application forms, a technical supporting document, containing the relevant information required by the Department of Water and Sanitation (DWS) to inform the decision-making process. Such information would be similar to that listed in GN R.632 of July 2015.

Furthermore, the technical supporting document and especially the design of the facility would need to address the requirements of the Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R.704 of June 1999), published under the NWA.

The TSF will in all likelihood need to be licensed as a dam with a safety risk in terms of Section 117 of the NWA, i.e. a dam which can contain, store or dam more than 50 000 cubic metres of water, whether that water contains any substance or not, and which has a wall of a vertical height of more than five metres, measured as the vertical difference between the lowest downstream ground elevation on the outside of the dam wall and the non-overspill crest level or the general top level of the dam wall.

### ***National Nuclear Regulatory Act (NNRA)***

Since the tailings contain radioactive elements, it is likely that the facility will be deemed to be a controlled area in terms of the NNRA; a Certificate of Registration (CoR) for the proposed TSF will therefore need to be obtained from the National Nuclear Regulator (NNR). As part of this process, a risk assessment will need to be conducted by a suitably qualified person.

### ***National Heritage Resources Act (NHRA)***

A Phase 1 heritage impact assessment (HIA) will need to be conducted on the footprint of the proposed TSF and related infrastructure (e.g. pipeline / road servitudes), to confirm if any heritage resources stand to be affected.

#### **12.1.1 Recommended process to be followed**

It is recommended that an integrated application for Environmental Authorisation and Waste Management Licence be applied for; one and the same EIA process could be used to support the integrated application. Furthermore, it is recommended that one public consultation process be followed for both the integrated



application for Environmental Authorisation and Waste Management Licence, and the application for a Water Use Licence. The radiation risk assessment and Phase 1 HIA can be conducted as part of the specialist studies during the EIA process.

The EIA and public consultation process will therefore be the key regulatory vehicle that will be used to meet the various legislative requirements.

The EIA process must comply with the requirements of Appendix 3 of GN R.982; the independent Environmental Assessment Practitioner (EAP) should pay particular attention to:

- Consideration of alternatives; which is a detailed assessment that requires application of full EIA assessment methodology;
- Rigour of scientific information required to inform planning and understanding of whether proposed mitigation measures are sustainable;
- Requirement for cumulative assessment of impact; and
- Obligation to provide a reasoned opinion on authorisation and conditions which should be attached to the authorisation.

All specialist reports need to comply with Appendix 6 of GN R.982. In the event that specialists belong to the same company as the EAP, it could be a requirement of the competent authority for the applicant to make provision for external review of such specialist reports.

The public consultation process should be aligned with the requirements of Chapter 6 of GN R.982, and as a minimum should consist of the following tasks:

- Consultation with:
  - Competent Authorities;
  - State departments that administer a law relating to a matter affecting the environment relevant to the application;
  - Organs of state which have jurisdiction in respect of the activity to which the application relates; and
  - Interested and Affected Parties (I&APs).
- Opening and maintaining a register of I&APs;
- Placing site notices at the preferred and alternative sites;
- Giving written notice to:
  - The occupiers of the site and, where AGA is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is to be undertaken or alternative sites;
  - Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - The municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - The municipality which has jurisdiction in the area; and
  - Any organ of state having jurisdiction in respect of any aspect of the activity.
- Placing an advertisement in one local newspaper;
- Placing draft reports in the public domain for 30 day comment periods;



- Conducting at least one public meeting; and
- Compiling a comment and response report, which records all comments made by I&APs during the process, including responses to such comments and records of meetings.

In accordance with the aims of the recent legislative changes, implementation of the “one environmental system”, should enable all authorisations to be granted within a period of 300 days.

### 12.1.2 Competent Authorities

It is Golder’s understanding that MWS has acquired Mining Rights to undertake tailings reclamation. Therefore, it is argued that the proposed TSF is directly related to the extraction and processing of a mineral resource. Based hereon and the provisions of Section 24C<sup>4</sup> of NEMA, as amended, we believe that the relevant Competent Authority for the Environmental Authorisation and the Waste Management Licence will be the Department of Mineral Resources (DMR). However, based on Golder’s recent experience, the DMR may not agree with this interpretation, especially if the land on which the proposed TSF will be developed is not covered by a Mining Right. If this is the case, the DMR may insist that the relevant applications be submitted to the Department of Environmental Affairs (DEA). This aspect will need to be confirmed with the authorities, prior to submission of the relevant application forms.

The Competent Authority for the Water Use Licence Application (WULA) is the Department of Water and Sanitation (DWS). As part of both the WULA and Waste Management Licence Application (WMLA), the design of the proposed TSF will need to be reviewed by the DWS. It is therefore recommended that one and the same design review meeting be requested for both applications. Furthermore, in the event that AGA proposes to construct a barrier design alternative to the requirements of the waste regulations, it is recommended that an upfront meeting be held with the DWS engineering department.

With regard to the applications for the NNRA CoR, the relevant Competent Authority will be the National Nuclear Regulator (NNR).

The Phase 1 HIA (heritage impact assessment) will be submitted to the North West Provincial Heritage Resources Authority.

### 12.1.3 Other

#### **Major hazard installation**

It will need to be determined if the proposed TSF is deemed as a major hazard installation in terms of the Major Hazard Installation Regulations (MHI Regulations) published in terms of the Occupational Health and Safety Act.

According to the document titled “*Explanatory Notes on the Major Hazard Installation Regulations*”, dated April 2005, issued by the Department of Labour, there are two reasons that can determine when an installation is a major hazard installation (MHI). The first reason is when there is more than the prescribed quantity of a substance. The quantities and type of substances are prescribed in the General Machinery Regulation 8 and its Schedule A, on notifiable substances. The second reason is where substances are produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident. The important issue is the potential of an incident and not whether the incident is a major incident or not. The potential will be determined by the risk assessment.

Furthermore, in terms of the Regulations, a “major incident” means an occurrence of catastrophic proportions, resulting from the use of plant or machinery, or from activities at a workplace. The Department’s explanatory document indicates that it is impossible to put a specific value to “catastrophic” because it will

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<sup>4</sup> “...the Minister responsible for mineral resources must be identified as the competent authority in terms of subsection (1) where the listed or specified activity is directly related to— (a) prospecting or exploration of a mineral or petroleum resource; or (b) extraction and primary processing of a mineral or petroleum resource.”





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always differ from person to person and from place to place; however, when the outcome of a risk assessment indicates that there is a possibility that the public will be involved in an incident, then the incident can be seen as catastrophic.

Based on the above, it is recommended that a risk assessment be conducted by a suitably qualified person to determine whether the proposed TSF (at the selected site – option 3 or 4/7) qualifies as a MHI or not.

## Servitude rights registration

Should additional pipeline or access road servitudes be required, over and above those associated with the existing pipe and road network, servitude rights will need to be registered at the Deeds Office.

## Land rezoning

The current land zoning of the site options 3 and 4/7 will need to be confirmed through consultation with the Municipality. It is only at this stage that the need for rezoning for the TSF footprint can be confirmed.

The proposed IRP process for Kareerand TSF Expansion is outlined in Figure 13.

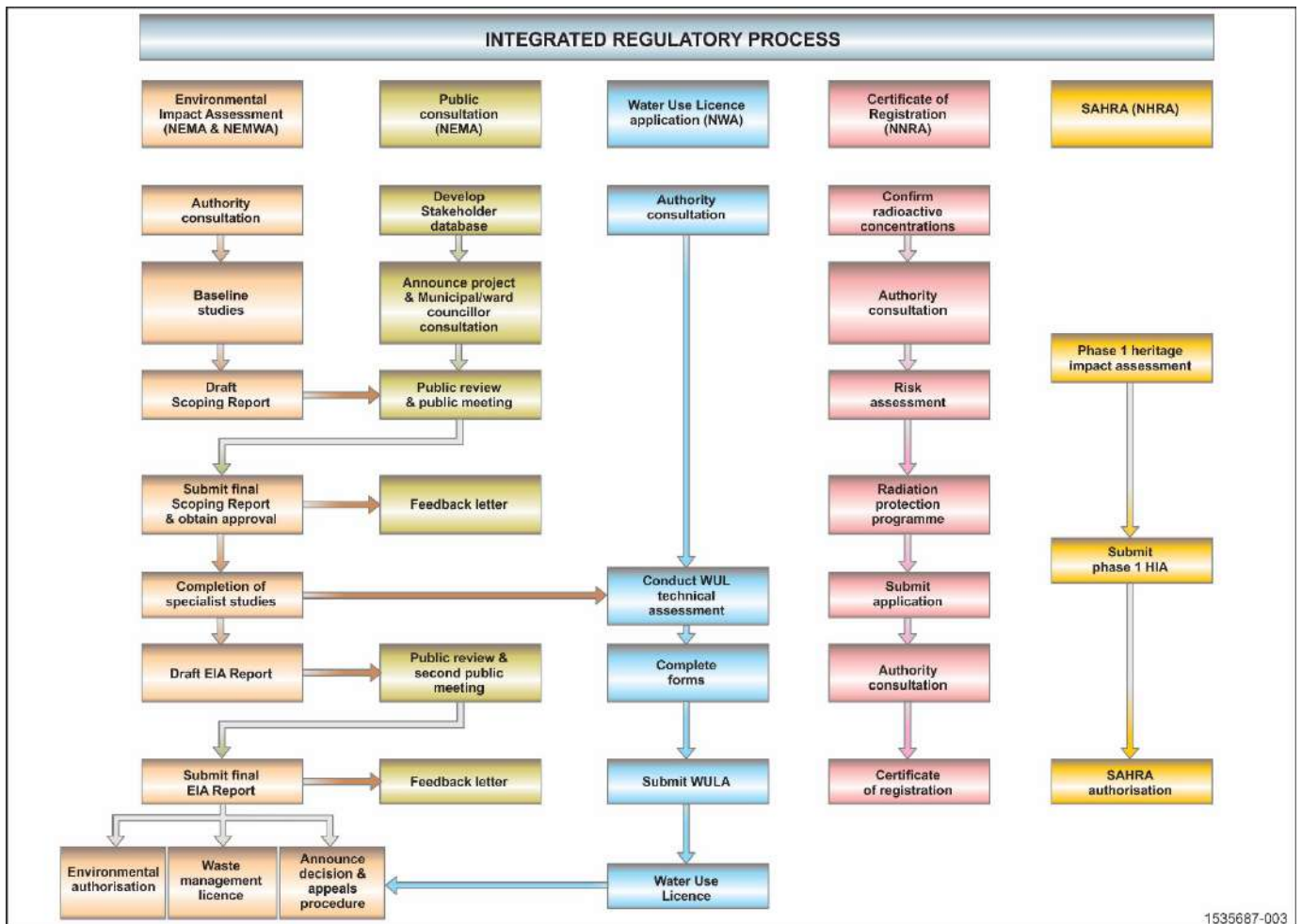


Figure 13: Proposed integrated regulatory Process for Kareerand TSF expansion project

## 12.1.4 Gap analysis of existing environmental baseline information

Based on a review of the existing baseline information generated for the MWS TSF reworking project and contained within the final EIA report, dated November 2008, and supporting specialist studies, the following data gaps exists.





It is important to note that site option 1 assessed in the 2008 studies is the same as site option 3 for the new TSF, and that site option 2 (i.e. the current Kareerand TSF locality) in the 2008 study is adjacent to the current site option 4/7 (see Figure 4).

### **Surface water**

A hydrological assessment was done in 2008 for the MWS TSF reworking project. The purpose of the assessment was to indicate the catchments characteristics as well as to recommend the preferred site for the location of the Kareerand TSF. A risk assessment of the water resources that may be impacted by the proposed activities was also conducted.

In going forward, the catchment characteristics associated with site options 3 and 4/7 will need to be updated with the latest available information, and an impact assessment conducted and mitigation measures proposed, based on the proposed locality and design of the TSF, for the different site options. Statements will also need to be made on the ability of the TSF to comply with the requirements of Regulations GN R.704, especially with regard to design capacity. Furthermore, the assessment needs to make provision for recommended storm water management measures to be implemented at the proposed TSF as well as any recommendations on updates to the current monitoring programme, so as to ensure that performance of the implementation of the relevant mitigation measures can be measured. It is not foreseen that a floodline determination will be needed for either of the sites.

### **Groundwater**

Already discussed in section 9.2 Environmental attributes of preferred alternatives.

### **Soils, land capability and land use**

A soils, land capability and land use investigation was conducted in 2008, covering the area associated with site option 3. As minimum, it is suggested that a suitably qualified specialist reviews the previous study report, conducts a site visit, and based thereon, compile a professional opinion on the adequacy of the baseline information already collated for this site, for the purposes of the permitting of the new TSF.

A new soils, land capability and land use investigation for site option 4/7 will however need to be conducted by a suitably qualified specialist, as this area was not covered in the previous investigation. The study will need to cover any other Greenfield footprints associated with the proposed development, such as new pipeline routes (and servitudes), powerlines, access roads, etc.

### **Terrestrial ecology**

A flora sensitivity analysis and faunal assessment were conducted in 2008, covering the area associated with site option 3. A site investigation was conducted for the flora sensitivity assessment; however, the season in which the study was undertaken is not stipulated in the report. The faunal assessment focussed on the availability of potential habitat for the red data species likely to occur in the study area. As a result of the timing of the site visit (29-30 September 2008), no trapping or active collecting of any animal group was done during this survey. Animals observed were noted, and investigations focused on habitat assessment.

As with the soils, land capability and land use investigation, it is recommended that a suitably qualified specialist reviews the previous study reports, conducts a site visit, and based thereon, compile a professional opinion on the adequacy of the baseline information already collated for this site, for the purposes of the permitting of the new TSF. Furthermore, any updates to existing literature relevant to the study area must be taken into account.

A new flora and fauna survey for site option 4/7 must be conducted by a suitably qualified specialist, as this area was not covered in the previous investigation. The study will need to cover any other Greenfield footprints associated with the proposed development, such as new pipeline routes (and servitudes), powerlines, access roads, etc. It is recommended that both a dry season and wet season survey be carried, if possible.



### **Wetlands**

A wetland investigation was undertaken for the 2008 EIA for the initial Kareerand TSF. Detailed field investigations were undertaken on the wetlands associated with site option 1 and site option 2, as well as along the proposed pipeline routes. Since the study area for this investigation includes both site options under consideration for the new TSF (i.e. site options 3 and 4/7), it is recommended that only a specialist opinion on the adequacy of the existing information is required for the permitting of the new facility.

### **Air quality**

An air quality study was conducted in 2008 for the TSF reworking project. The study focussed on the impacts associated with the sulphination plant and Kareerand TSF. As part of this study, air dispersion modelling was done for site option 1 (i.e. current site option 3); however, the model will need to be updated to take into consideration current baseline concentrations as well as the design of the new TSF. Furthermore, air dispersion modelling will need to be undertaken for site option 4/7. Based on the results of the modelling, mitigation measures will need to be made and the existing air quality management plan (AQMP) for the MWS reworking project updated.

### **Cultural and heritage resources**

A phase 1 heritage impact assessment was conducted for site option 3. The existing information generated in this study can be used for the purposes of the proposed TSF permitting process. However, a phase 1 HIA will need to be conducted for site option 4/7, as the previous study did not cover this area.

### **Socio-economic**

A social impact assessment (SIA) was not conducted for the initial Kareerand TSF. Since a portion of site option 4/7 for the new TSF is located on community-owned land and the establishment of a new TSF in the Stilfontein area has the potential to impact on the local community, specifically with regard to dust, and the establishment of the facility will lead to permanent sterilisation of land, it is recommended that a project-specific SIA be conducted.

### **Noise and vibration**

A noise survey was carried out at site option 1 and site option 2 in 2008. The existing information generated in this study can be used for the purposes of the proposed TSF permitting process.

### **Visual**

A visual assessment was conducted for both site options 1 and 2 in 2008. The existing information generated in this study can be used for the purposes of the proposed TSF permitting process.

### **Closure and rehabilitation**

Closure objectives and measures will need to be compiled for inclusion into the EMP for the new TSF. Furthermore, the existing closure plan and costing for the MWS tailings reworking project will need to be updated to include the new TSF.

### **Other**

A project-specific integrated regulatory process was compiled for the project. Based on the IRP, the following additional specialist studies will be required for the project:

- A risk assessment in terms of the National Nuclear Regulator Act; and
- A risk assessment in terms of the Major Hazard Installation Regulations published in terms of the Occupational Health and Safety Act.

It is suggested that the risk assessments be conducted on the preferred site only, unless such information is considered as critical inputs into the site selection process.



### **13.0 PROJECT IMPLEMENTATION ROAD MAP, CONCLUSIONS AND RECOMMENDATIONS**

Golder has developed a roadmap for the implementation of the Kareerand TSF Expansion. It is proposed that further technical investigations be conducted on the preferred alternative options and that regulatory consultation takes place to confirm that the alternatives are viable. Further engineering, specialist investigation and integrated regulatory processes can be initiated to develop the Kareerand TSF expansion. The process is highlighted in Figure 14.



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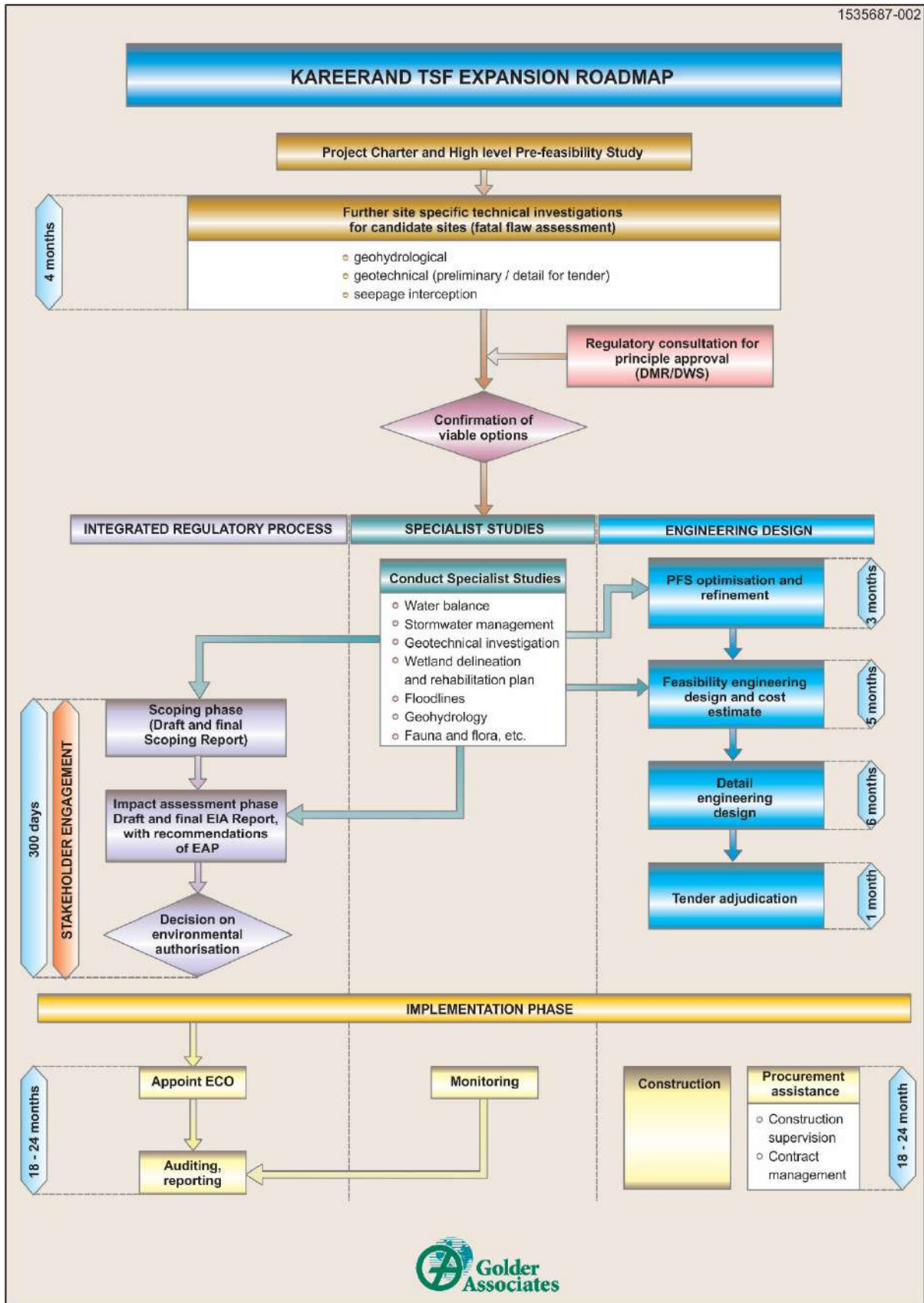


Figure 14: Kareerand TSF expansion roadmap



The following specialist studies will be required for the permitting process of the proposed TSF:

- Surface water assessment, which addresses:
  - Catchment characteristics;
  - Compliance with the requirements of Regulations GN R.704;
  - Storm water management; and
  - Recommendations on updates to the current monitoring programme.
- Groundwater assessment:
- Specialist opinions on the adequacy of existing baseline information for the purposes of permitting the new TSF, for:
  - Soils, land capability and land use for site option 3;
  - Flora and fauna for site option 3; and
  - Wetlands for site option 3 and site option 4/7.
- Soils, land capability and land use investigation for site option 4/7, including any other greenfield footprints associated with the proposed development, such as new pipeline routes (and servitudes), powerlines, access roads, etc.;
- Flora and fauna assessment for site option 4/7, including any other greenfield footprints associated with the proposed development, such as new pipeline routes (and servitudes), powerlines, access roads, etc.;
- Air quality impact assessment, which includes:
  - Updating the air dispersion model for site option 3, to take into consideration current baseline concentrations as well as the design of the new TSF;
  - Conduct air dispersion modelling for site option 4/7; and
  - Recommended mitigation measures, based on the results of the modelling.
- Phase 1 heritage impact assessment for site option 4/7;
- Social impact assessment;
- Updates to the MWS closure plan and costing;
- A risk assessment in terms of the National Nuclear Regulator Act; and
- A risk assessment in terms of the Major Hazard Installation Regulations published in terms of the Occupational Health and Safety Act (for site options 3 and 4/7).

It is important to note that all specialist reports need to comply with Appendix 6 of GN R.982, and must contain:

- Details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;
- A declaration that the specialist is independent in a form as may be specified by the competent authority;
- An indication of the scope of, and the purpose for which, the report was prepared;





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- The date and season of the site investigation and the relevance of the season to the outcome of the assessment;
- A description of the methodology adopted in preparing the report or carrying out the specialised process;
- The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;
- An identification of any areas to be avoided, including buffers;
- A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;
- Any mitigation measures for inclusion in the EMPr;
- Any conditions for inclusion in the environmental authorisation;
- Any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- A reasoned opinion as to whether the proposed activity or portions thereof should be authorised; and if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
- A description of any consultation process that was undertaken during the course of preparing the specialist report;
- A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- Any other information requested by the competent authority.

In the event that specialists belong to the same company as the EAP conducting the EIA, it could be a requirement of the competent authority for AGA to make provision for external review of specialist reports.

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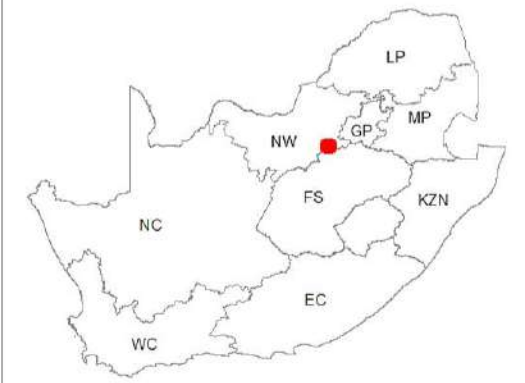
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# **APPENDIX A**

## **Site selection process maps**





**LEGEND**

- Pipeline option 2
- Pipeline options 1 & 3
- Existing pipelines
- Vaal River Floodlines (1:100yr)
- ▨ MWS property
- ▨ Protected Areas (SAPAD, 2016)
- ▨ Floodlines (other)
- Farm portions
- Parent Farms
- Dolomite Groundwater Management Unit (GMU)

**Site Alternatives (600 ha each)**

- ▨ Option 1
- ▨ Option 2
- ▨ Option 3
- ▨ Option 4
- ▨ Option 4/7
- ▨ Option 5
- ▨ Option 6
- ▨ Option 7
- ▨ Original TSF

1 0.5 0 1 2 3  
Kilometers

**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

**TITLE**  
**SITE SELECTION  
CONSIDERATION OF ALTERNATIVES**

PROJECT No. 1535687	REV 0
SCALE 1:75,000	A3
GIS	TG 19/08/2016
CHECK	RM 19/08/2016
REVIEW	FM 19/08/2016

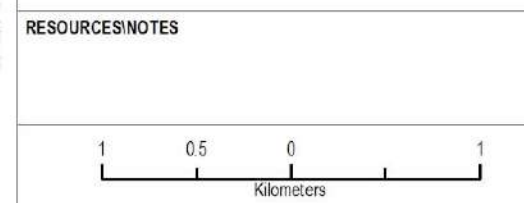
Golder Associates  
Pretoria, South Africa

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- LEGEND**
- Site
  - Original TSF
  - Farm portions
  - Parent Farms
  - Contours (From Survey)
  - Rivers - Perennial
  - Rivers - Non perennial



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

**TITLE**  
**SITE SELECTION  
CONSIDERATION OF ALTERNATIVES  
(SURVEY CONTOURS)**

PROJECT No. 1535687	REV 0
SCALE 1:40,000	A3
GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016

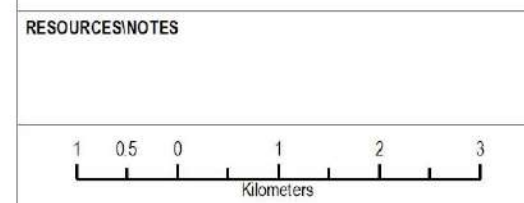


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- LEGEND**
- Vaal River Floodlines (1:100yr)
  - Site Alternatives
  - Original TSF
  - Protected Areas (SAPAD, 2016)
  - Floodlines (other)
  - SDI Development Corridor (10 km around N12)



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

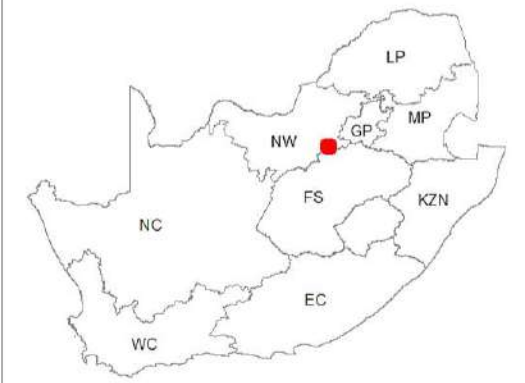
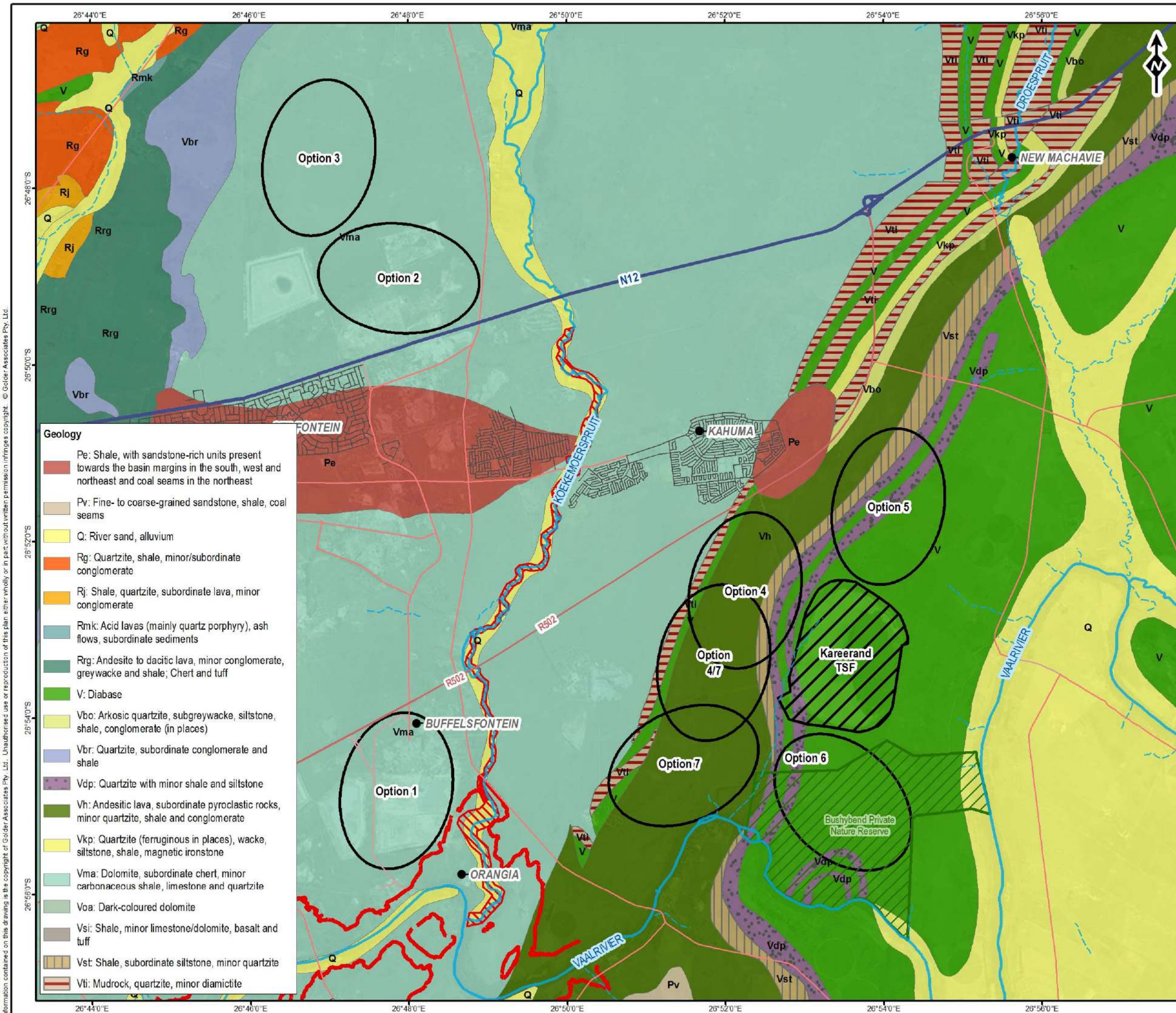
**TITLE**  
**SITE SELECTION  
CONSIDERATION OF ALTERNATIVES  
(SDI DEVELOPMENT CORRIDOR)**

PROJECT No. 1535687	REV 0
SCALE 1:75,000	A3
GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016



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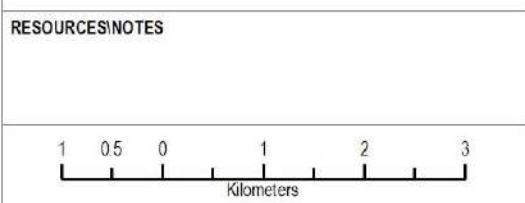


**LEGEND**

- Vaal River Floodlines (1:100yr)
- Protected Areas (SAPAD)
- Floodlines (other)
- Site
- Original

**Geology**

- Pe: Shale, with sandstone-rich units present towards the basin margins in the south, west and northeast and coal seams in the northeast
- Pv: Fine- to coarse-grained sandstone, shale, coal seams
- Q: River sand, alluvium
- Rg: Quartzite, shale, minor/subordinate conglomerate
- Rj: Shale, quartzite, subordinate lava, minor conglomerate
- Rmk: Acid lavas (mainly quartz porphyry), ash flows, subordinate sediments
- Rrg: Andesite to dacitic lava, minor conglomerate, greywacke and shale; Chert and tuff
- V: Diabase
- Vbo: Arkosic quartzite, subgreywacke, siltstone, shale, conglomerate (in places)
- Vbr: Quartzite, subordinate conglomerate and shale
- Vdp: Quartzite with minor shale and siltstone
- Vh: Andesitic lava, subordinate pyroclastic rocks, minor quartzite, shale and conglomerate
- Vkp: Quartzite (ferruginous in places), wacke, siltstone, shale, magnetic ironstone
- Vma: Dolomite, subordinate chert, minor carbonaceous shale, limestone and quartzite
- Voa: Dark-coloured dolomite
- Vsi: Shale, minor limestone/dolomite, basalt and tuff
- Vst: Shale, subordinate siltstone, minor quartzite
- Vti: Mudrock, quartzite, minor diamictite



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

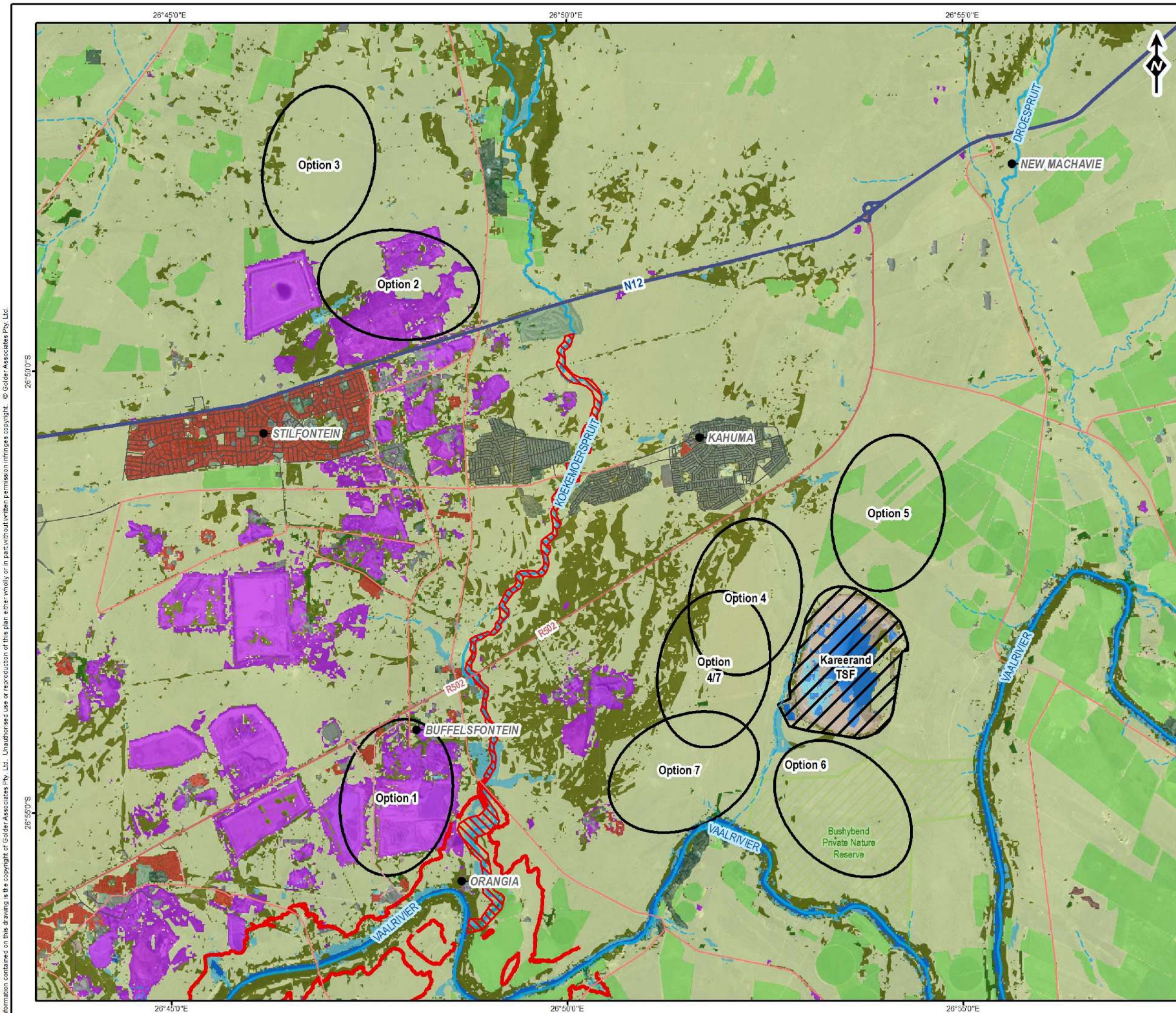
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**SITE SELECTION**  
**CONSIDERATION OF ALTERNATIVES**  
**(GEOLOGY)**

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GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016

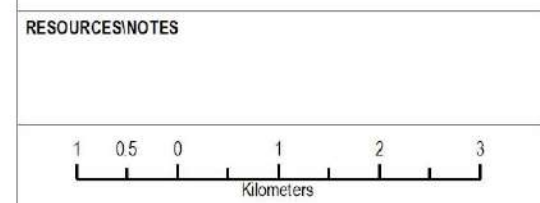


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- LEGEND**
- Vaal River Floodlines (1:100yr)
  - Floodlines (other)
  - Site alternatives
  - Original TSF
- Land**
- Cultivated
  - Grassland
  - Bush & shrubs
  - Plantation
  - Bare none vegetated
  - Erosion (donga)
  - Mining
  - Urban commercial / industrial
  - Urban residential
  - Urban sports and golf
  - Water
  - Wetlands
  - Protected Areas (SAPAD,



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

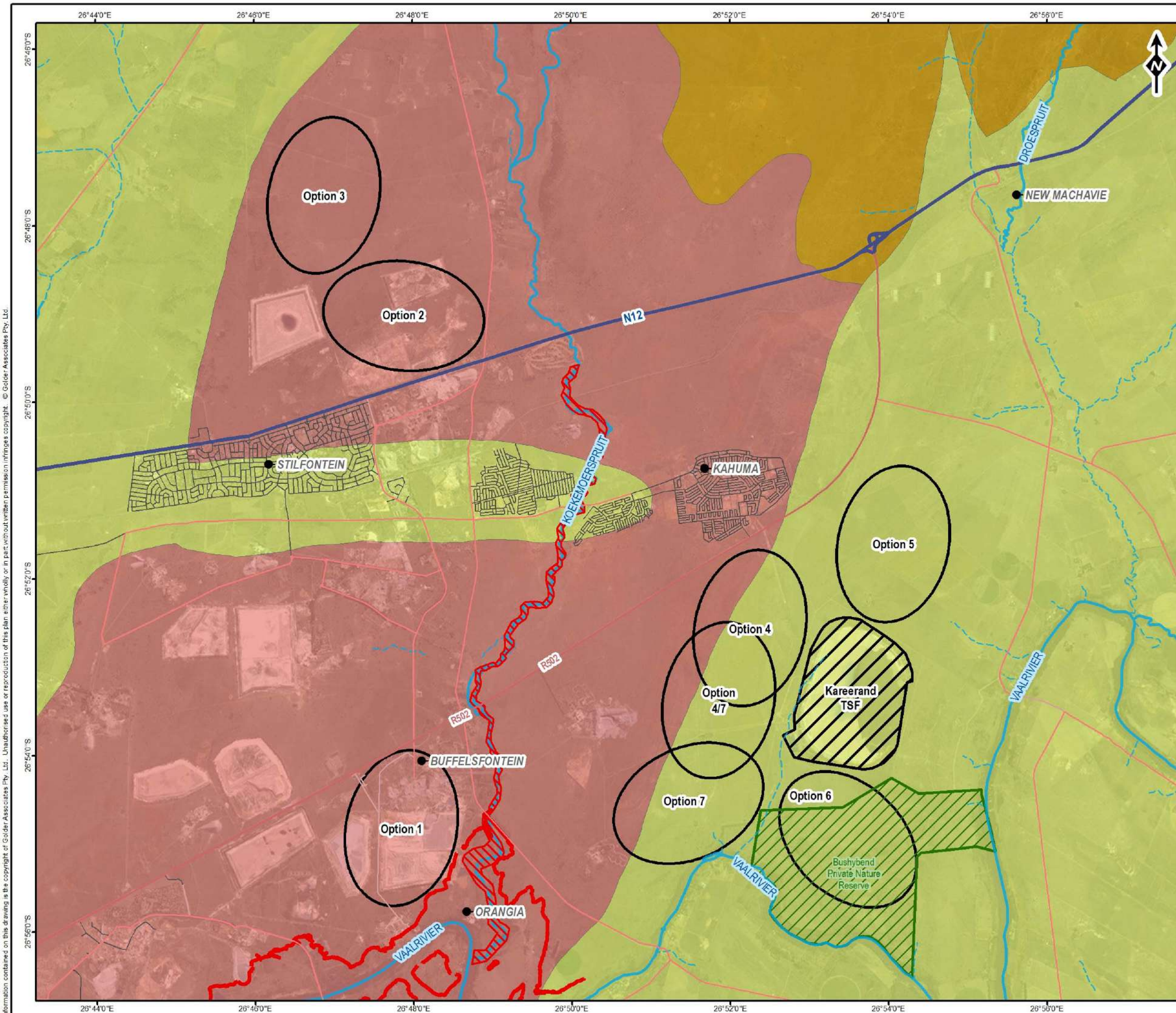
**TITLE**  
**SITE SELECTION  
CONSIDERATION OF ALTERNATIVES  
(LAND COVER)**

PROJECT No. 1535687	REV 0
SCALE 1:75,000	A3
GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016

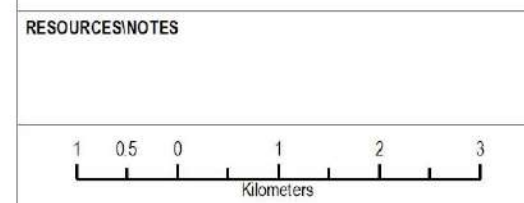


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- LEGEND**
- Vaal River Floodlines (1:100yr)
  - Floodlines (other)
  - Protected Areas (SAPAD, ...)
  - Site alternatives
  - Original TSF
- Vegetation protection level (SANBI)**
- Well protected (not on map)
  - Moderately protected (not on map)
  - Hardly protected
  - Poorly protected
  - Not protected



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

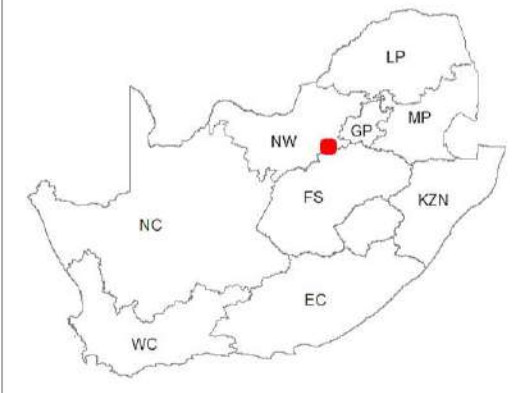
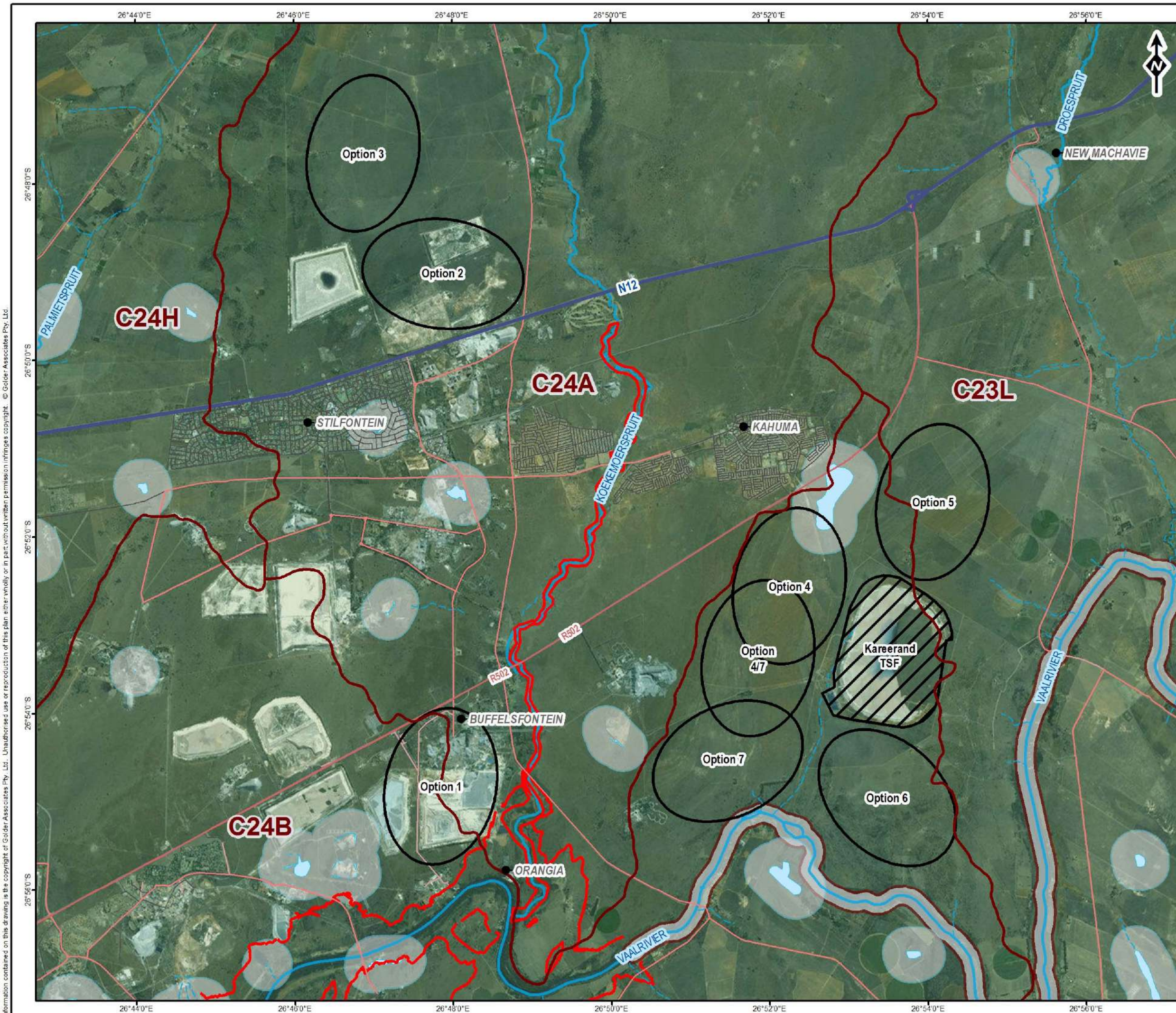
**TITLE**  
**SITE SELECTION**  
**CONSIDERATION OF ALTERNATIVES**  
**(VEGETATION PROTECTION LEVEL)**

PROJECT No. 1535687	REV 0
SCALE 1:75,000	A3
GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016



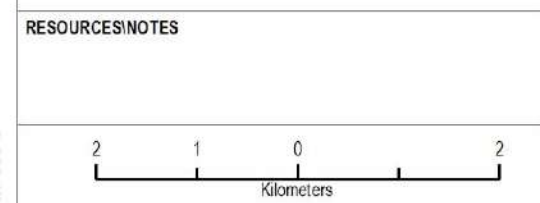
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**LEGEND**

- Quaternary catchment
- Site alternatives
- Original TSF
- Floodlines (other)
- Rivers - Perennial
- Rivers - Non perennial
- 1:100 year Floodlines
- Natural Wetlands (NFEPA)
- 500 m Buffer around Wetlands
- 100 m River Buffer (where floodlines are not available)



**REFERENCE**  
Coordinate System: WGS Lo27

**PROJECT**  
MINE WASTE SOLUTIONS EXPANSION PROJECT

**TITLE**  
**SITE SELECTION  
CONSIDERATION OF ALTERNATIVES  
(WATER RESOURCES)**

PROJECT No. 1535687	REV 0
SCALE 1:75,000	A3
GIS	TG 25/08/2016
CHECK	RM 25/08/2016
REVIEW	FM 25/08/2016



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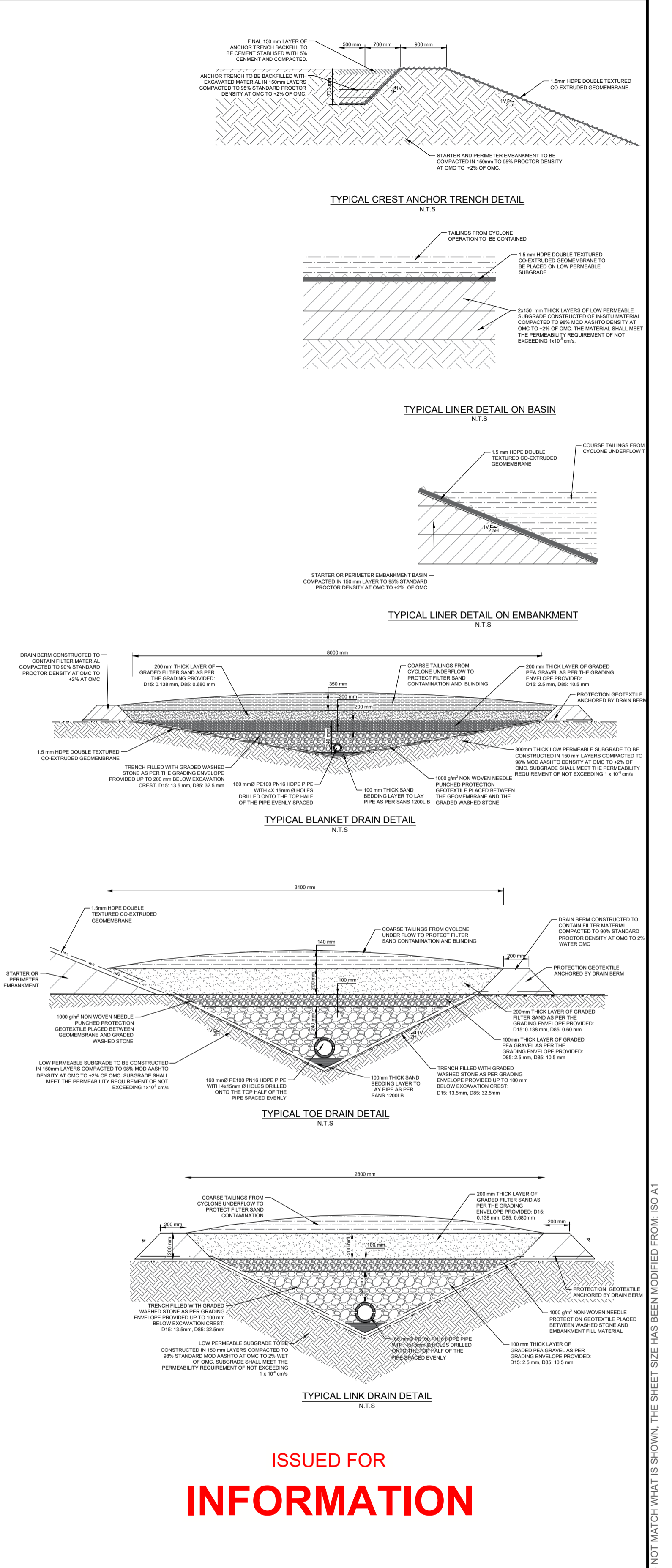
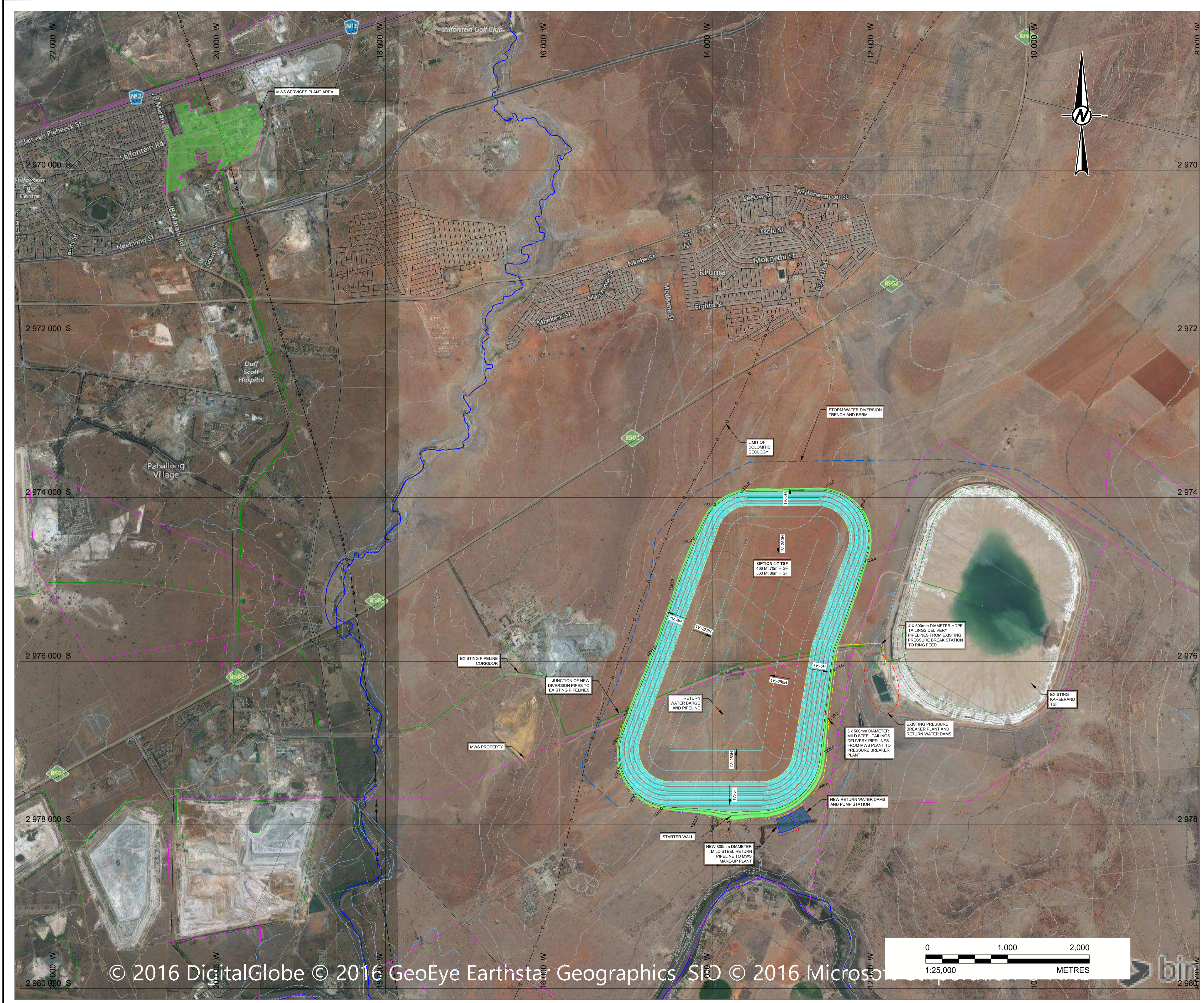


# **APPENDIX B**

## **Conceptual layouts of optional schemes**



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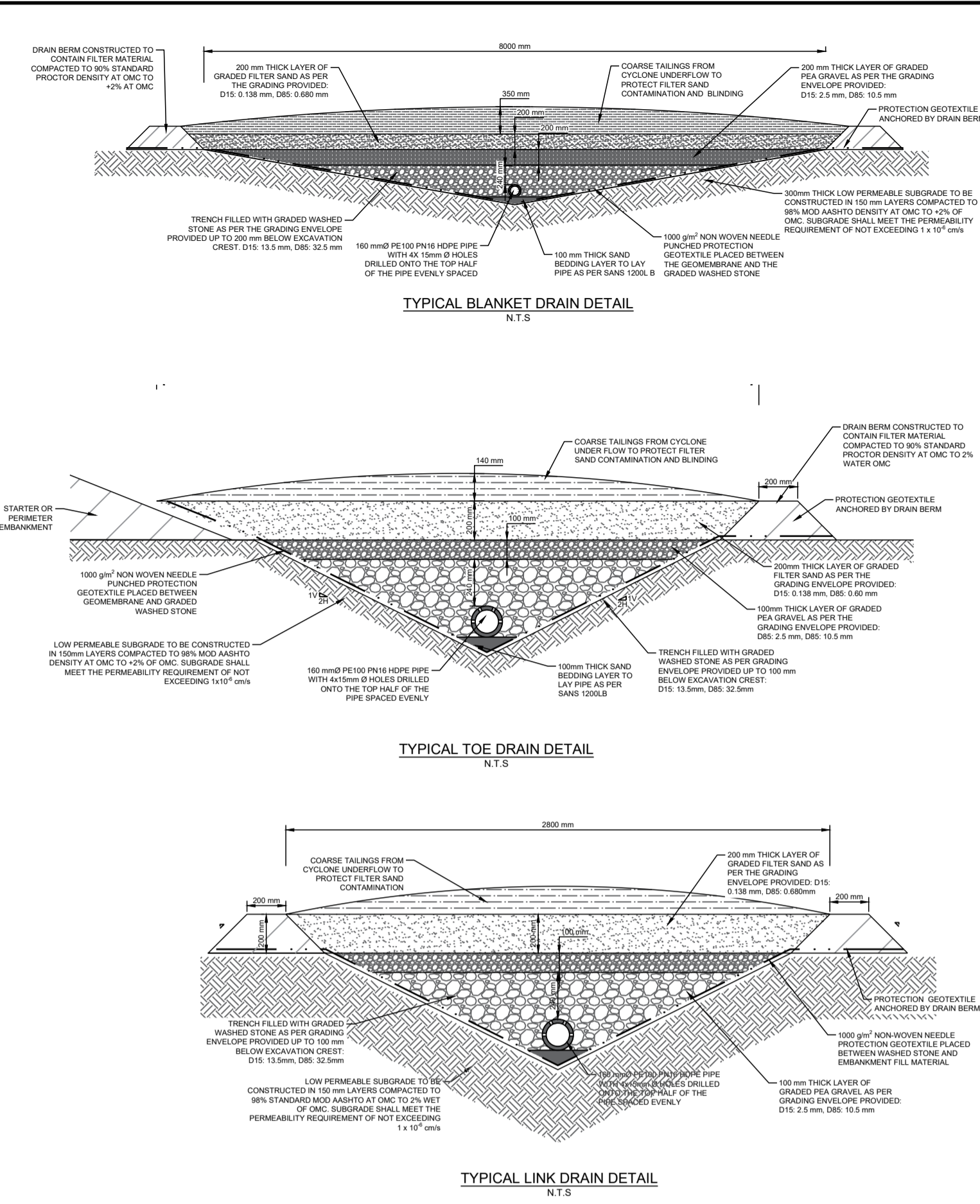
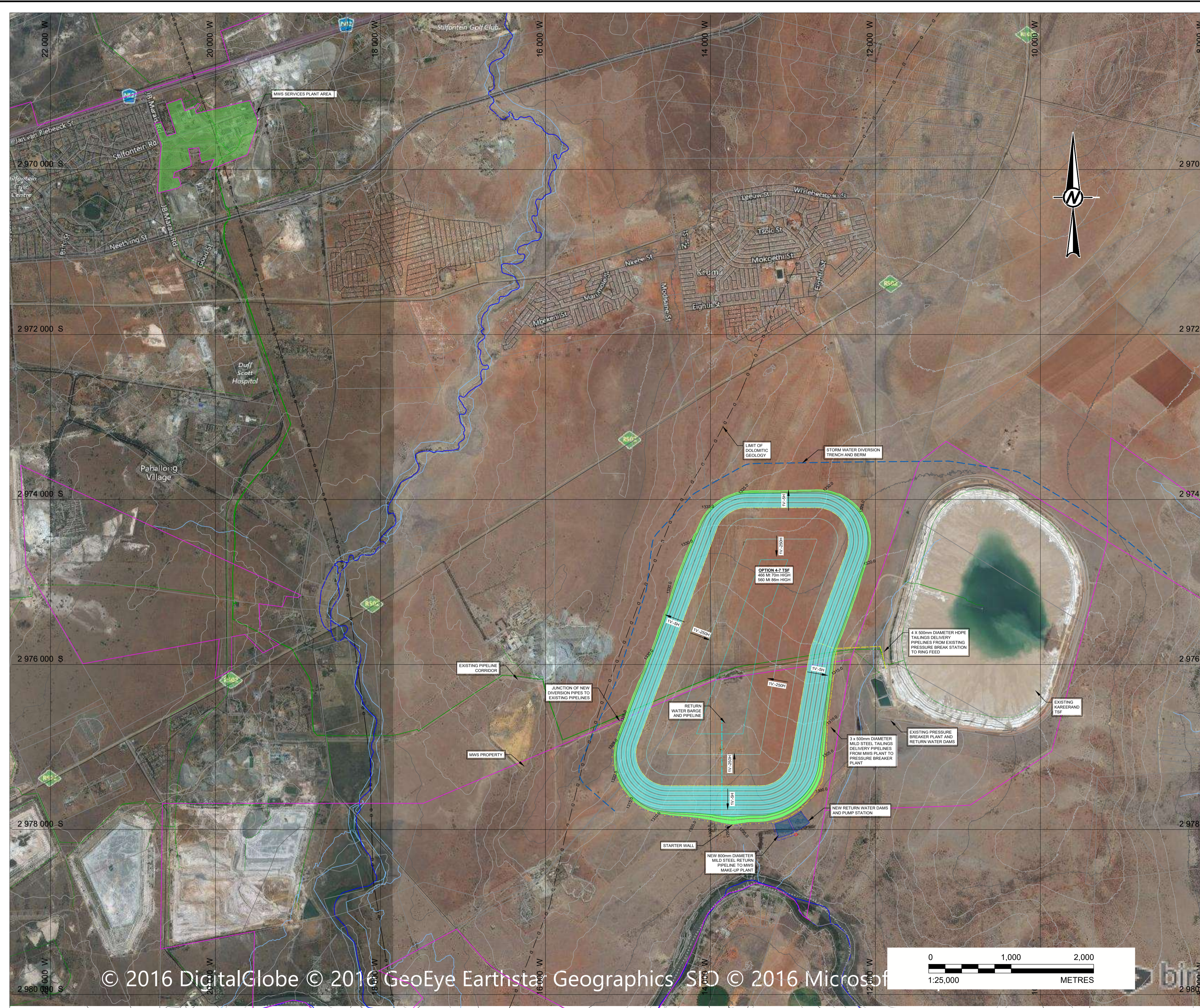
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CONSULTANT		GOLDER ASSOCIATES AFRICA (PTY) LTD MAXWELL OFFICE PARK, MIDRAND GAUTENG SOUTH AFRICA [+27] (12) 254 4000 www.golder.com					
A	2016-10-17	ISSUED FOR INFORMATION	JJJ PrEng	JJJ PrEng	FJM PrEng	FJM PrEng	830215
REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED	

PROJECT		KAREERAND TSF EXPANSION			
TITLE		GENERAL ARRANGMENT OPTION 4-7a LINED			
PROJECT NO.	SUBSET	REV.	100 of 1	DRAWING	
1535687	1000	A		100	

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1



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ISSUED FOR  
**INFORMATION**

CLIENT ANGLOGOLD ASHANTI (PTY) LTD		PROJECT KAREERAND TSF EXPANSION	
CONSULTANT Golder Associates		TITLE GENERAL ARRANGMENT OPTION 4-7b UNLINED	
GOLDER ASSOCIATES AFRICA (PTY) LTD MAXWELL OFFICE PARK, MIDRAND GAUTENG SOUTH AFRICA [+27] (12) 254 4000 www.golder.com		PROJECT NO. 1535687	SUBSET 2000
A 2016-10-17 ISSUED FOR INFORMATION		REV. A	1 of 1
REV. YYYY-MM-DD DESCRIPTION		DRAWING 110	
JJJ PrEng	JJJ PrEng	FJM PrEng	FJM PrEng
DESIGNED	PREPARED	REVIEWED	APPROVED
830215			

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A1









# **APPENDIX C**

## **Schedules of quantities of optional schemes**





ANGLO GOLD ASHANTI LIMITED							1535687
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY		OPTION 4_7a					12 October 2016
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
		<u>EARTHWORKS</u>					
		Clearing and grubbing of site TSF Footprint (5% of footprint)	ha	44	9 800.00	435 943.49	
		Strip 250mm topsoil and stockpile	m <sup>3</sup>	2 224 202	28.00	62 277 642.00	
		Excavate footprint 200mm deep in all materials and use for starter wall or stockpile/ dispose as directed by the Engineer	m <sup>3</sup>	2 737 810	16.75	45 858 324.20	
		Extra over items for: Hard rock excavation and stock pile (Provisional - 5%)	m <sup>3</sup>	136 891	262.00	35 865 316.24	
		Starter wall embankments	m <sup>3</sup>	2 738 687	21.39	58 580 514.93	
		Compacted Clay Liner (CCL): - Rip and Re-compact basin to 95% MOD PROCTOR density in 2 x 150mm layers as directed by the Engineer. Both layers to be bentonite enriched.	m <sup>3</sup>	2 598 747	95.00	246 880 965.00	
		Preparation of surfaces to receive lining: - Recompect upper 150mm to 95% Mod AASHTO. Surface preparation and removal of sharp objects for geosynthetic installation including hand picking of stones greater than 5mm in diameter	m <sup>3</sup>	1 299 374	10.00	12 993 735.00	
		Place 150mm layer of topsoil on outer side slopes.	m <sup>2</sup>	211 415	10.00	2 114 150.00	
		Vegetate side slopes by means of hydroseeding with seed mix compatible with local conditions including soil preparation as required to receive seeding.	m <sup>2</sup>	211 415	6.00	1 268 490.00	
		<u>TOE DRAIN AS DETAILED</u>	m	11 488	1 242.13	14 269 589.44	
		<u>BLANKET DRAIN AS DETAILED</u>	m	9 290	4 187.20	38 899 088.00	
		<u>LINK DRAIN AS DETAILED</u>	m	13 935	1 147.68	15 992 920.80	
		<u>EXCAVATION FOR ANCHOR TRENCH</u>					
		Excavation in all materials not exceeding 1m deep and backfill in 150mm layers, compacted to 95% Standard Proctor density at OMC to % of OMC	m <sup>3</sup>	11 592	141.00	1 634 472.00	
		<u>GEOMEMBRANE LININGS</u>					
		<u>Supply and install the following liner by approved supplier and in accordance with the project specifications all inclusive of welding, penetrations, testing, etc as required in layer sequence</u>					
		Supply and install 1.5mm HDPE double textured co-extruded geomembrane lining to TSF	m <sup>2</sup>	8 715 019	63.00	549 046 197.00	
		<u>ANCHORAGE OF LINER SYSTEM AND BACKFILL</u>					
		Installation of liner system into anchor trench according to detail	m	34 776	64.00	2 225 664.00	
		<u>SOLUTION TRENCH (mesh reinforced concrete)</u>	m	11715	4 040.50	47 334 457.50	
		<u>CLEAN STORM WATER DIVERSION TRENCH (mesh reinforced concrete)</u>	m	10606	5 810.00	61 620 860.00	

ANGLO GOLD ASHANTI LIMITED							1535687
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY							OPTION 4_7a
							12 October 2016
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
		<u>LEACHATE COLLECTION POND, SEDIMENT TRAPS AND ANCILLARY WORKS</u>	m <sup>2</sup>	1	60 000 000.00	60 000 000.00	
		<u>PUMPS AND PIPELINES:</u>					
		<u>1. TAILINGS DELIVERY</u>					
		<u>1.1 Tailings delivery lines (3 x 500mm diameter lines) - new lines relocated sections</u>					
		Supply and install 3 x 500mm nominal diameter MS pipe in 9m lengths, double flanged, including bolt sets and full face neoprene rubber gaskets and corrosion protection (quantity is total length)	m	6759	1 762.33	11 911 611.00	
		<u>Extra over MS pipe for specials</u>					
		500mm diameter long radius bend 22.5° double flanged	No.	51	4 218.75	215 156.25	
		500mm diameter long radius bend 45° double flanged	No.	3	4 218.75	12 656.25	
		500mm diameter long radius bend 90° double flanged	No.	3	16 875.00	50 625.00	
		<u>1.2 Cyclone Ring Feed</u>					
		HDPE Piping, Class PE100 PN16, plain end, surface laid in long lengths					
		315mm Diameter HDPE pipe, welded	m	24138	992.30	23 952 137.40	
		160mm Diameter HDPE pipe, welded	m	14760	283.10	4 178 556.00	
		Extra over HDPE pipe for specials					
		Bends, tees and reducers					
		315mm Diameter 90° bend, including stub ends and mild steel backing ring to suit connection	No	8	8 698.99	69 591.92	
		315 x 150mm Diameter reducing tee, including stub ends and mild steel backing ring to suit connection	No	205	10 264.07	2 104 134.35	
		Flanges and bolt sets					
		Stub end to 315mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	410	2 345.70	961 737.00	
		300mm Diameter blank flange	No	2	1 191.28	2 382.56	
		Stub end to 150mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	615	1 217.69	748 879.35	
		Bolt set to suit 300mm flanged connection, including 3mm gasket, natural rubber	No	410	794.12	325 589.20	
		Bolt set to suit 150mm flanged connection, including 3mm gasket, natural rubber	No	615	279.09	171 640.35	
		Valves					
		300mm Diameter Pinch valves	No	12	17 925.67	215 108.04	
		150mm Diameter Pinch valves	No	205	2 655.67	544 412.35	

ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Cyclones				
		Metquip 250mm Hydor Cyclone complete with stand, Vortex Finder and Spigot. Vortex Finder sizing: 50mm, 60mm and increase in 5mm intervals up to 100mm. Spigot sizing: 10mm - 55mm with increase in 5mm intervals.	No	205	23 490.06	4 815 462.30
		<u>2. RETURN WATER</u>				
		<u>2.1 Barge and pump</u>				
		1.5m Wide floating catwalk, consisting of 3 interconnected units (6 elements/m), including stainless steel railing system complete	m	25	28 000.00	700 000.00
		10m x 8m Floating barge, consisting of 32 interconnected units, including stainless steel railing system, pump support steel frame, deck steel and connecting bars between barge and catwalk, all as per detail	No.	4	80 000.00	320 000.00
		Supply and install 400mm Diameter HDPE pipe, 6m length, including stub ends and mild steel backing ring to suit connection	m	5054	1 150.00	5 812 100.00
		<u>Extra over HDPE pipe for specials</u>				
		<u>Supply and install bends, tees and reducers</u>				
		400mm Diameter long radius bend, over 45° up to and including 90°, including stub ends and mild steel backing ring to suit connection	No.	2	6 650.00	13 300.00
		400mm Diameter unequal tee, including stub ends and mild steel backing ring to suit connection	No.	2	10 500.00	21 000.00
		400mm Diameter to 250mm diameter reducer, 300mm length, including stub ends and mild steel backing ring to suit connection	No.	4	10 300.00	41 200.00
		<u>Supply and install flanges and bolt sets</u>				
		Bolt set to suit 400mm flanged connection, including 3mm gasket, neoprene rubber	No.	842	1 100.00	926 566.67
		Bolt set to suit 250mm flanged connection, including 3mm gasket, neoprene rubber	No.	4	355.00	1 420.00
		<u>Supply and install pipe specials</u>				
		DN50 PN16 pipe, 617mm length, flanged both ends, fitted with 25NB special tee, two 25NB SS 316 ball valves and 25NB pressure gauge	No.	4	36 800.00	147 200.00
		100NB Pipe 50mm length, both ends, including gusset plates	No.	4	3 750.00	15 000.00
		DN250 Flexi hose 2582mm length	No.	4	1 260.00	5 040.00
		<u>Supply and install valves</u>				
		DN50 PN16 AVK resilient seal gate valve	No.	4	1 420.00	5 680.00
		DN400 PN16 AVK resilient seal gate valve	No.	8	23 900.00	191 200.00
		DN400 PN16 OZ-KAN silent check valve	No.	4	20 690.00	82 760.00
		<u>Mechanicals</u>				

ANGLO GOLD ASHANTI LIMITED							1535687
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY		OPTION 4_7a					12 October 2016
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
		Supply and install submersible pump with as specified complete with VVSD, safety cable and power cable	No.	4	650 000.00	2 600 000.00	
		<u>2.2 Return pipe</u>					
		Supply and install 800mm nominal diameter MS pipe in 9m lengths, double flanged, including corrosion protection	m	302	3 210.00	969 420.00	
		Joint sets	No.	34	825.00	27 683.33	
		<u>Extra over MS pipe for specials</u>					
		800mm diameter long radius bend 22.5° double flanged	No.	10	6 750.00	67 500.00	
		800mm diameter long radius bend 45° double flanged	No.	1	13 500.00	13 500.00	
		800mm diameter long radius bend 90° double flanged	No.	4	27 000.00	108 000.00	
		<u>3. PROVISIONAL SUMS FOR COMMON PIPE CORRIDOR CROSSINGS</u>					
		Crossing 1 - precast concrete culvert approx. 20m	m	20	25 000.00	500 000.00	
		Crossing 2 - Koekemoerspruit IMPROVEMENTS - allow a provisional sum	No.	1	2 500 000.00	2 500 000.00	
		<u>4. PROVISIONAL SUM FOR RETURN WATER PUMP STATION</u>					
		Return water pump station: - civil, mechanical and electrical	No.	1	26 000 000.00	26 000 000.00	
SUB-TOTAL						R 1 348 646 578.92	



ANGLO GOLD ASHANTI LIMITED					1535687	
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY			OPTION 4_7b		12 October 2016	
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		<u>EARTHWORKS</u>				
		Clearing and grubbing of site TSF Footprint (5% of footprint)	ha	44	9 800.00	435 943.49
		Strip 250mm topsoil and stockpile	m <sup>3</sup>	2 224 202	28.00	62 277 642.00
		Excavate footprint 325mm deep in all materials and use for starter wall or stockpile/ dispose as directed by the Engineer	m <sup>3</sup>	2 737 810	16.75	45 858 324.20
		Extra over items for: Hard rock excavation and stock pile (Provisional - 5%)	m <sup>3</sup>	136 891	262.00	35 865 316.24
		Starter wall embankments	m <sup>3</sup>	2 738 687	21.39	58 580 514.93
		Compacted Clay Liner (CCL): - Rip and Re-compact basin to 95% MOD PROCTOR density in 2 x 150mm layers as directed by the Engineer. Both layers to be bentonite enriched.	m <sup>3</sup>	-	95.00	0.00
		Preparation of surfaces to receive lining: - Recompect upper 150mm to 95% Mod AASHTO. Surface preparation and removal of sharp objects for geosynthetic installation including hand picking of stones greater than 5mm in diameter	m <sup>3</sup>	-	10.00	0.00
		Place 150mm layer of topsoil on outer side slopes.	m <sup>2</sup>	211 415	10.00	2 114 150.00
		Vegetate side slopes by means of hydroseeding with seed mix compatible with local conditions including soil preparation as required to receive seeding.	m <sup>2</sup>	211 415	6.00	1 268 490.00
		<u>TOE DRAIN AS DETAILED</u>	m	11 488	1 242.13	14 269 589.44
		<u>BLANKET DRAIN AS DETAILED</u>	m	9 290	4 187.20	38 899 088.00
		<u>LINK DRAIN AS DETAILED</u>	m	13 935	1 147.68	15 992 920.80
		<u>EXCAVATION FOR ANCHOR TRENCH</u>				
		Excavation in all materials not exceeding 1m deep and backfill in 150mm layers, compacted to 95% Standard Proctor density at OMC to % of OMC	m <sup>3</sup>	0	141.00	0.00
		<u>GEOMEMBRANE LININGS</u>				
		<u>Supply and install the following liner by approved supplier and in accordance with the project specifications all inclusive of welding, penetrations, testing, etc as required in layer sequence</u>				
		Supply and install 1.5mm HDPE double textured co-extruded geomembrane lining to TSF	m <sup>2</sup>	0	63.00	0.00
		<u>ANCHORAGE OF LINER SYSTEM AND BACKFILL</u>				
		Installation of liner system into anchor trench according to detail	m	0	64.00	0.00
		<u>SOLUTION TRENCH</u>	m	11715	4 040.50	47 334 457.50
		<u>CLEAN STORM WATER DIVERSION TRENCH (mesh reinforced concrete)</u>	m	10606	5 810.00	61 620 860.00

ANGLO GOLD ASHANTI LIMITED				1535687		
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY				OPTION 4_7b		
				12 October 2016		
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		<u>LEACHATE COLLECTION POND, SEDIMENT TRAPS AND ANCILLARY WORKS</u>	m <sup>2</sup>	1	60 000 000.00	60 000 000.00
		<u>PUMPS AND PIPELINES:</u>				
		<u>1. TAILINGS DELIVERY</u>				
		<u>1.1 Tailings delivery lines (3 x 500mm diameter lines) - new lines relocated sections</u>				
		Supply and install 3 x 500mm nominal diameter MS pipe in 9m lengths, double flanged, including bolt sets and full face neoprene rubber gaskets and corrosion protection (quantity is total length)	m	6759	1 762.33	11 911 611.00
		<u>Extra over MS pipe for specials</u>				
		500mm diameter long radius bend 22.5° double flanged	No.	51	4 218.75	215 156.25
		500mm diameter long radius bend 45° double flanged	No.	3	4 218.75	12 656.25
		500mm diameter long radius bend 90° double flanged	No.	3	16 875.00	50 625.00
		<u>1.2 Cyclone Ring Feed</u>				
		HDPE Piping, Class PE100 PN16, plain end, surface laid in long lengths				
		315mm Diameter HDPE pipe, welded	m	24138	992.30	23 952 137.40
		160mm Diameter HDPE pipe, welded	m	14760	283.10	4 178 556.00
		Extra over HDPE pipe for specials				
		Bends, tees and reducers				
		315mm Diameter 90° bend, including stub ends and mild steel backing ring to suit connection	No	8	8 698.99	69 591.92
		315 x 150mm Diameter reducing tee, including stub ends and mild steel backing ring to suit connection	No	205	10 264.07	2 104 134.35
		Flanges and bolt sets				
		Stub end to 315mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	410	2 345.70	961 737.00
		300mm Diameter blank flange	No	2	1 191.28	2 382.56
		Stub end to 150mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	615	1 217.69	748 879.35
		Bolt set to suit 300mm flanged connection, including 3mm gasket, natural rubber	No	410	794.12	325 589.20
		Bolt set to suit 150mm flanged connection, including 3mm gasket, natural rubber	No	615	279.09	171 640.35
		Valves				
		300mm Diameter Pinch valves	No	12	17 925.67	215 108.04
		150mm Diameter Pinch valves	No	205	2 655.67	544 412.35

ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Cyclones				
		Metquip 250mm Hydor Cyclone complete with stand, Vortex Finder and Spigot. Vortex Finder sizing: 50mm, 60mm and increase in 5mm intervals up to 100mm. Spigot sizing: 10mm - 55mm with increase in 5mm intervals.	No	205	23 490.06	4 815 462.30
		<u>2. RETURN WATER</u>				
		<u>2.1 Barge and pump</u>				
		1.5m Wide floating catwalk, consisting of 3 interconnected units (6 elements/m), including stainless steel railing system complete	m	25	28 000.00	700 000.00
		10m x 8m Floating barge, consisting of 32 interconnected units, including stainless steel railing system, pump support steel frame, deck steel and connecting bars between barge and catwalk, all as per detail	No.	4	80 000.00	320 000.00
		Supply and install 400mm Diameter HDPE pipe, 6m length, including stub ends and mild steel backing ring to suit connection	m	5054	1 150.00	5 812 100.00
		<u>Extra over HDPE pipe for specials</u>				
		<u>Supply and install bends, tees and reducers</u>				
		400mm Diameter long radius bend, over 45° up to and including 90°, including stub ends and mild steel backing ring to suit connection	No.	2	6 650.00	13 300.00
		400mm Diameter unequal tee, including stub ends and mild steel backing ring to suit connection	No.	2	10 500.00	21 000.00
		400mm Diameter to 250mm diameter reducer, 300mm length, including stub ends and mild steel backing ring to suit connection	No.	4	10 300.00	41 200.00
		<u>Supply and install flanges and bolt sets</u>				
		Bolt set to suit 400mm flanged connection, including 3mm gasket, neoprene rubber	No.	842	1 100.00	926 566.67
		Bolt set to suit 250mm flanged connection, including 3mm gasket, neoprene rubber	No.	4	355.00	1 420.00
		<u>Supply and install pipe specials</u>				
		DN50 PN16 pipe, 617mm length, flanged both ends, fitted with 25NB special tee, two 25NB SS 316 ball valves and 25NB pressure gauge	No.	4	36 800.00	147 200.00
		100NB Pipe 50mm length, both ends, including gusset plates	No.	4	3 750.00	15 000.00
		DN250 Flexi hose 2582mm length	No.	4	1 260.00	5 040.00
		<u>Supply and install valves</u>				
		DN50 PN16 AVK resilient seal gate valve	No.	4	1 420.00	5 680.00
		DN400 PN16 AVK resilient seal gate valve	No.	8	23 900.00	191 200.00
		DN400 PN16 OZ-KAN silent check valve	No.	4	20 690.00	82 760.00
		<u>Mechanicals</u>				



ANGLO GOLD ASHANTI LIMITED							1535687
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY							OPTION 4_7b
							12 October 2016
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
		Supply and install submersible pump with as specified complete with VVSD, safety cable and power cable	No.	4	650 000.00	2 600 000.00	
		<u>2.2 Return pipe</u>					
		Supply and install 800mm nominal diameter MS pipe in 9m lengths, double flanged, including corrosion protection	m	302	3 210.00	969 420.00	
		Joint sets	No.	34	825.00	27 683.33	
		<u>Extra over MS pipe for specials</u>					
		800mm diameter long radius bend 22.5° double flanged	No.	10	6 750.00	67 500.00	
		800mm diameter long radius bend 45° double flanged	No.	1	13 500.00	13 500.00	
		800mm diameter long radius bend 90° double flanged	No.	4	27 000.00	108 000.00	
		<u>3. PROVISIONAL SUMS FOR COMMON PIPE CORRIDOR CROSSINGS</u>					
		Crossing 1 - precast concrete culvert approx. 20m	m	20	25 000.00	500 000.00	
		Crossing 2 - Koekemoerspruit IMPROVEMENTS - allow a provisional sum	No.	1	2 500 000.00	2 500 000.00	
		<u>4. PROVISIONAL SUM FOR RETURN WATER PUMP STATION</u>					
		Return water pump station: - civil, mechanical and electrical	No.	1	26 000 000.00	26 000 000.00	
SUB-TOTAL						R 535 865 545.92	

ANGLO GOLD ASHANTI LIMITED				1535687		
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY				OPTION 3		
				12 October 2016		
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		<u>EARTHWORKS</u>				
		Clearing and grubbing of site TSF Footprint (5% of footprint)	ha	49	9 800.00	482 975.26
		Strip 250mm topsoil and stockpile	m <sup>3</sup>	2 464 160	28.00	68 996 466.00
		Excavate footprint 240mm deep in all materials and use for starter wall or stockpile/ dispose as directed by the Engineer	m <sup>3</sup>	2 365 593	16.75	39 623 684.76
		Extra over items for: Hard rock excavation and stock pile (Provisional - 5%)	m <sup>3</sup>	118 280	262.00	30 989 269.87
		Starter wall embankments	m <sup>3</sup>	2 305 549	21.39	49 315 693.11
		Compacted Clay Liner (CCL): - Rip and Re-compact basin to 95% MOD PROCTOR density in 2 x 150mm layers as directed by the Engineer. Both layers to be bentonite enriched.	m <sup>3</sup>	-	95.00	0.00
		Preparation of surfaces to receive lining: - Recompact upper 150mm to 95% Mod AASHTO. Surface preparation and removal of sharp objects for geosynthetic installation including hand picking of stones greater than 5mm in diameter	m <sup>3</sup>	-	10.00	0.00
		Place 150mm layer of topsoil on outer side slopes.	m <sup>2</sup>	205 350	10.00	2 053 500.00
		Vegetate side slopes by means of hydroseeding with seed mix compatible with local conditions including soil preparation as required to receive seeding.	m <sup>2</sup>	205 350	6.00	1 232 100.00
		<u>TOE DRAIN AS DETAILED</u>	m	11 792	1 242.13	14 647 196.96
		<u>BLANKET DRAIN AS DETAILED</u>	m	9 592	4 187.20	40 163 622.40
		<u>LINK DRAIN AS DETAILED</u>	m	14 388	1 147.68	16 512 819.84
		<u>EXCAVATION FOR ANCHOR TRENCH</u>				
		Excavation in all materials not exceeding 1m deep and backfill in 150mm layers, compacted to 95% Standard Proctor density at OMC to % of OMC	m <sup>3</sup>	0	141.00	0.00
		<u>GEOMEMBRANE LININGS</u>				
		<u>Supply and install the following liner by approved supplier and in accordance with the project specifications all inclusive of welding, penetrations, testing, etc as required in layer sequence</u>				
		Supply and install 1.5mm HDPE double textured co-extruded geomembrane lining to TSF	m <sup>2</sup>	0	63.00	0.00
		<u>ANCHORAGE OF LINER SYSTEM AND BACKFILL</u>				
		Installation of liner system into anchor trench according to detail	m	0	64.00	0.00
		<u>SOLUTION TRENCH</u>	m	11996	4 040.50	48 469 838.00
		<u>CLEAN STORM WATER DIVERSION TRENCH (mesh reinforced concrete)</u>	m	9288	5 810.00	53 963 280.00

ANGLO GOLD ASHANTI LIMITED				1535687		
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY				OPTION 3		
				12 October 2016		
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		LEACHATE COLLECTION POND, SEDIMENT TRAPS AND ANCILLARY WORKS	m <sup>2</sup>	1	60 000 000.00	60 000 000.00
		<u>PUMPS AND PIPELINES:</u>				
		<u>1. TAILINGS DELIVERY</u>				
		<u>1.1 Tailings delivery lines (3 x 500mm diameter lines) - new lines full route</u>				
		Supply and install 3 x 500mm nominal diameter MS pipe in 9m lengths, double flanged, including bolt sets and full face neoprene rubber gaskets and corrosion protection (quantity is total length)	m	12495	1 762.33	22 020 355.00
		<u>Extra over MS pipe for specials</u>				
		500mm diameter long radius bend 22.5° double flanged	No.	24	4 218.75	101 250.00
		500mm diameter long radius bend 45° double flanged	No.	9	4 218.75	37 968.75
		500mm diameter long radius bend 90° double flanged	No.	6	16 875.00	101 250.00
		<u>1.2 Cyclone Ring Feed</u>				
		HDPE Piping, Class PE100 PN16, plain end, surface laid in long lengths				
		315mm Diameter HDPE pipe, welded	m	21270	992.30	21 106 221.00
		160mm Diameter HDPE pipe, welded	m	12919	283.10	3 657 328.46
		Extra over HDPE pipe for specials				
		Bends, tees and reducers				
		315mm Diameter 90° bend, including stub ends and mild steel backing ring to suit connection	No	3	8 698.99	26 096.97
		315 x 150mm Diameter reducing tee, including stub ends and mild steel backing ring to suit connection	No	210	10 264.07	2 155 454.70
		Flanges and bolt sets				
		Stub end to 315mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	420	2 345.70	985 194.00
		300mm Diameter blank flange	No	2	1 191.28	2 382.56
		Stub end to 150mm diameter HDPE pipe including mild steel backing ring to suit flanged connection	No	630	1 217.69	767 144.70
		Bolt set to suit 300mm flanged connection, including 3mm gasket, natural rubber	No	420	794.12	333 530.40
		Bolt set to suit 150mm flanged connection, including 3mm gasket, natural rubber	No	630	279.09	175 826.70
		Valves				
		300mm Diameter Pinch valves	No	12	17 925.67	215 108.04
		150mm Diameter Pinch valves	No	210	2 655.67	557 690.70



ANGLO GOLD ASHANTI LIMITED				1535687		
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY				OPTION 3		
				12 October 2016		
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Cyclones				
		Metquip 250mm Hydor Cyclone complete with stand, Vortex Finder and Spigot. Vortex Finder sizing: 50mm, 60mm and increase in 5mm intervals up to 100mm. Spigot sizing: 10mm - 55mm with increase in 5mm intervals.	No	210	23 490.06	4 932 912.60
		<u>2. RETURN WATER</u>				
		<u>2.1 Barge and pump</u>				
		1.5m Wide floating catwalk, consisting of 3 interconnected units (6 elements/m), including stainless steel railing system complete	m	25	28 000.00	700 000.00
		10m x 8m Floating barge, consisting of 32 interconnected units, including stainless steel railing system, pump support steel frame, deck steel and connecting bars between barge and catwalk, all as per detail	No.	4	65 000.00	260 000.00
		Supply and install 400mm Diameter HDPE pipe, 6m length, including stub ends and mild steel backing ring to suit connection	m	5784	1 150.00	6 651 600.00
		<u>Extra over HDPE pipe for specials</u>				
		<u>Supply and install bends, tees and reducers</u>				
		400mm Diameter long radius bend, over 45° up to and including 90°, including stub ends and mild steel backing ring to suit connection	No.	2	6 650.00	13 300.00
		400mm Diameter unequal tee, including stub ends and mild steel backing ring to suit connection	No.	2	10 500.00	21 000.00
		400mm Diameter to 250mm diameter reducer, 300mm length, including stub ends and mild steel backing ring to suit connection	No.	4	10 300.00	41 200.00
		<u>Supply and install flanges and bolt sets</u>				
		Bolt set to suit 400mm flanged connection, including 3mm gasket, neoprene rubber	No.	964	1 100.00	1 060 400.00
		Bolt set to suit 250mm flanged connection, including 3mm gasket, neoprene rubber	No.	4	355.00	1 420.00
		<u>Supply and install pipe specials</u>				
		DN50 PN16 pipe, 617mm length, flanged both ends, fitted with 25NB special tee, two 25NB SS 316 ball valves and 25NB pressure gauge	No.	4	36 800.00	147 200.00
		100NB Pipe 50mm length, both ends, including gusset plates	No.	4	3 750.00	15 000.00
		DN250 Flexi hose 2582mm length	No.	4	1 260.00	5 040.00
		<u>Supply and install valves</u>				
		DN50 PN16 AVK resilient seal gate valve	No.	4	1 420.00	5 680.00
		DN400 PN16 AVK resilient seal gate valve	No.	8	23 900.00	191 200.00
		DN400 PN16 OZ-KAN silent check valve	No.	4	20 690.00	82 760.00
		<u>Mechanicals</u>				

ANGLO GOLD ASHANTI LIMITED			1535687			
KAREERAND PHASE 2 - PRINCIPLE COST ITEMS - ESTIMATE ONLY			OPTION 3		12 October 2016	
ITEM NO	PAYMENT CLAUSE	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		Supply and install submersible pump with as specified complete with VVSD, safety cable and power cable	No.	4	650 000.00	2 600 000.00
		<u>2.2 Return pipe</u>				
		Supply and install 800mm nominal diameter MS pipe in 9m lengths, double flanged, including corrosion protection	m	5575	3 210.00	17 895 750.00
		Joint sets	No.	619	825.00	511 041.67
		<u>Extra over MS pipe for specials</u>				
		800mm diameter long radius bend 22.5° double flanged	No.	7	6 750.00	47 250.00
		800mm diameter long radius bend 45° double flanged	No.	3	13 500.00	40 500.00
		800mm diameter long radius bend 90° double flanged	No.	6	27 000.00	162 000.00
		<u>3. PROVISIONAL SUMS FOR COMMON PIPE CORRIDOR CROSSINGS</u>				
		Crossing 1 - pipe jacking - N12 crossing 70m	m	70	33 232.22	2 326 255.12
		<u>4. PROVISIONAL SUM FOR RETURN WATER PUMP STATION</u>				
		Return water pump station: - civil, mechanical and electrical	No.	1	21 000 000.00	21 000 000.00
SUB-TOTAL						R 537 404 757.56



# **APPENDIX D**

## **Document Limitations**





## DOCUMENT LIMITATIONS

### DOCUMENT LIMITATIONS

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